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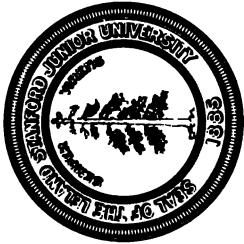
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CLINICAL MANUALS
FOR
PRACTITIONERS AND STUDENTS
OF MEDICINE.

DISEASES OF THE TONGUE.

BY

HENRY T. BUTLIN, F.R.C.S.,

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ILLUSTRATED WITH CHROMO-LITHOGRAPHS AND
ENGRAVINGS.



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1885.

S

YOUNG MAN

P R E F A C E.

EVER since I have been a member of the staff of St. Bartholomew's Hospital, I have used the opportunities which the large out-patient practice of the Hospital has given me of collecting notes and drawings of diseases of the tongue. I did not do so at first with any definite intention of publishing them, and certainly not with any intention of writing a work on Diseases of the Tongue. When, however, I was asked by Messrs. Cassell and Company to undertake this task, I accepted, on account of the opportunity it afforded me of bringing my material before the profession much more thoroughly than would probably have been the case had I published the book independently.

In addition to my own cases, I have had the advantage of observing many cases under the care of my colleagues in the Hospital, and have even been permitted to have drawings made of those which I desired. Some of these drawings have been lithographed; but the very large majority of the illustrations have been taken from cases which have been under my own care.

When Sir James Paget learned what work I was engaged in, he was good enough to interest himself in it so far as to look out for me his manuscript notes of several cases, among them one of tuberculous ulcer of the tongue taken about thirty years ago.

I have to thank Mr. Godart for the care which he has taken in rendering so truthfully the various diseased conditions, sometimes, indeed, in circumstances but little favourable to artistic skill.

Now that the book is passing out of my hands, I am oppressed by the feeling that, in spite of the labour which has been bestowed on it and of the exceptional advantages I have in many ways enjoyed, it does not nearly reach the ideal I had formed for it.

HENRY T. BUTLIN.

Queen Anne Street, W.,

April, 1885.

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DISEASES OF THE TONGUE.

CHAPTER I.

INTRODUCTORY.

It has, I am sure, occurred to most of us to meet with a rare or unfamiliar disease, and, after puzzling for a while as to its cause and nature, to refer to books in order to solve the doubt. But the search is not always easy, and may be wholly futile, owing to the manner in which works on medicine and surgery are, for the most part, unavoidably written. For example, the affected part is the lip or tonsil, and the actual lesion which is observed is, in the one case, a sore ; in the other case, a patch. A good work on surgery is referred to, and the chapters are opened which treat of diseases of the lips and of diseases of the tonsils. But there is no separate heading and description of sores in the first chapter, or of patches in the second. Sores on the lip may be due to several different diseases, and so may patches on the tonsils ; and, in order to discover the nature of the particular sore or patch, the account of each one of those diseases of the lip and tonsil must be carefully perused. Even then the search may be unsuccessful, for the actual lesion which has been observed may be the result of some general constitutional affection, and may be described there and nowhere else. Then does the reader wish that books on surgery and medicine were written in an entirely different manner, and that the various subjects were arranged as they are in a

dictionary or encyclopædia. In such a work he would find the chapter on diseases of the lips and a heading devoted to sores or ulcers. In the chapter on diseases of the tonsils the particular patch he sought would be described in a section devoted to patches. Sometimes he even conceives the idea of writing a book on this plan, and only reluctantly relinquishes the project when the full difficulties have dawned upon him. For general works on medicine and surgery, it is impossible; and even for the diseases of special organs and tissues, it is in most instances impracticable.

But when I was thinking over the scheme of this book, it occurred to me that the tongue is one of the few parts of the body in which it might be practicable to follow, in a large measure, the encyclopædic method; so many of the affections of the tongue are on the surface, and appear there as patches and plaques, as ulcers, as warts, as excoriations and indentations. I determined, therefore, to make the attempt; with what success the following pages will shew.

There are certain difficulties in carrying out the plan even for the diseases of the tongue. Some of the diseases are of such a kind that each one of them comprises in itself several or many different physical conditions of the surface of the organ; such a disease is chronic superficial glossitis, with its smooth plaques and white patches, its ulcers and its excoriations. Each of these conditions must be mentioned under a separate head, and yet it would not be right to ignore the disease as a whole. Again, some of the affections of the tongue present different physical conditions according as they occur in the deeper or the more superficial structures, and the nature of other affections is in most instances so patent to every one who looks at them that it would be almost absurd to class them under the head to which their outward form might naturally refer them. Thus, a cyst may present very

different characters according as it is situated near the surface or deep down in the muscular tissues ; yet in so far as most cysts present such clearly defined characters that no question can arise of their true nature, it is better to place them all under the single head of cysts, without doing more than pointing out that when they are more deeply seated they may assume the physical qualities of a lump or node in the substance of the tongue. The innocent tumours ought properly to be classed under such heads as warts, lumps, polypi, and the like ; but it is more convenient to collect them in one chapter and classify them as they are arranged in other works on surgery ; for, although occasionally it is not easy to be sure of the nature of such tumours, the chief difficulty lies in distinguishing between two or three varieties of innocent tumour, not between an innocent tumour and an affection of an entirely different nature.

Further, there are some imperfections in the encyclopædic method. It is an imperfection that the account of the various diseases is not always continuous : it may even be broken up into several different sections. As an example, take the account of syphilitic gumma. A gumma, before it breaks, is a lump or node in the tongue, and, after it has broken, leaves an ulcer. The description is therefore found under the separate heads, nodes and ulcers. Another imperfection is the repetition and overlapping which are, to a certain extent, necessary. A disease which presents in its course several widely different physical conditions, and is therefore described partly under one head, partly under another, requires a fuller description under each separate head than would be needful if the description were continuous ; the description cannot, with propriety, be taken up at the very word or point where it ceased in the last section. Repetition is, perhaps, more noticeable in the paragraphs relating

to treatment than elsewhere ; but I have thought it better to repeat simple directions than again and again to refer the reader to a particular chapter or page.

At the end of this volume is furnished a list of monographs and papers referring to diseases of the tongue. I need scarcely say that I have availed myself freely of many of these works in the following pages, although I have not been always able at the time to acknowledge what I have gained from them.

The order in which the chapters are arranged through the book is rather such an order as is dictated by convenience than encyclopædic. To have preserved the rigid encyclopædic method would have necessitated a much larger number of small chapters and the massing together of several of the larger chapters into one of very great length. The index and the synopsis of the contents will, I trust, supply any defect in this respect.

With the object of rendering reference to each subject and to each part of every subject more easy, the different subjects treated of in each chapter are printed in thick black type as they occur ; and the commencement of a fresh part of the subject, such as the diagnosis or the treatment, is, in many cases, indicated by printing a prominent word in italics.

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CHAPTER II.

ACCIDENTS TO THE TONGUE.

Burns and Scalds—Stings and Bites—Wounds—Foreign Bodies in the Tongue.

Burns and scalds.— Trivial *burns* of the tongue are of very frequent occurrence both in children and in adults, from taking food which is too hot into the mouth. The burnt spot is painful and very tender for a while, and is redder and smoother than the rest of the surface of the tongue, or, perhaps, it is actually excoriated. The material is seldom so hot or retained so long within the mouth as to produce sloughing of the cutis vera of the mucous membrane or even to raise up the cuticle, but the superficial portions of the papillæ are destroyed, and falling leave a smooth area. In the course of a few hours, and almost always by the following day, the tenderness has disappeared, the burnt spot has lost its extra red colour, and the appendages of the papillæ begin to form again. Such burns as these seldom call for treatment; but if the soreness of the tongue continues longer than usual, borax and honey may be painted over the burnt area, or an astringent lotion may be used, or a gargle of chlorate of potash at frequent intervals until the annoyance ceases to be felt.

The severest burns are those which are produced by chemical agents, by the mineral acids, the caustic alkalies, and corrosive sublimate. In these burns the tongue rarely suffers so much as the back part of the mouth and fauces. Indeed, in many cases, the fluid is thrown so far back in the mouth that the tongue escapes almost untouched. When the tongue has

been touched by the material, the effect is not usually that which would be produced by simple extreme heat, but varies according to the material which has been used, and partly with the length of time during which the tongue has been in contact with it. Thus :

Corrosive sublimate produces in most instances a very characteristic condition of the tongue, which is white and shrivelled, with great enlargement of the papillæ at the base.

In sulphuric acid poisoning the tongue is usually white and glazed, and the surface looks sometimes like soaked parchment, sometimes like white paint. In a short time it becomes grey or brownish-grey, is much swollen and often excoriated.

In nitric acid poisoning the tongue is generally swollen and of a citron colour ; the mucous membrane is soft and easily peels off.

In hydrochloric acid poisoning it is also swollen and often dry.

After oxalic acid has been taken it is generally swollen and covered with a thick white coat, as if it had been scalded.

Carbolic acid renders the mucous membrane white and hard.

Potash and soda soften the mucous membrane, which is easily detached. The tongue, in poisoning by these caustics, is often bluish-red or may be yellowish-brown. Ammonia colours it white, and excoriation is common when either of the three has been taken.

The vegetable poisons, as a rule, produce no alteration in the appearance of the tongue in cases of acute poisoning. Almost the only exception is the tincture of cantharides, which causes the tongue to swell and produces excoriation.

It need scarcely be remarked that the action of most of these powerful irritants and caustics is not

limited to the tongue, but is apparent on all parts of the interior of the mouth. The appearance of the tongue is thoroughly characteristic only in poisoning by corrosive sublimate. In such a case the white and shrivelled aspect of the tongue may be of great value in attempting to discover the poison which has been taken.

Scalds of the tongue and of the whole of the interior of the mouth are not very uncommon, especially in children; and in children of the lower orders they are frequently produced by an attempt on the part of the child to drink out of the spout of the kettle. Usually only a very small quantity of the fluid enters the mouth, but the tiny drop of water and, much more, the steam, are sufficient to produce disastrous consequences. The effect on the tongue, however, is one of the least of these. The real danger to life lies almost always in the damage to the air passages. The tongue swells and becomes for a while exceedingly painful and tender, so that the taking of food in any form is difficult. The surface of the tongue is very red, and sometimes blebs are formed. I have seen many cases of scalds of the mouth of such a kind, but I have never seen a very severe glossitis as a result. The swelling and distress, so far as the tongue is concerned, rapidly pass off, and the patient is often able to swallow without obvious discomfort in the course of a few hours. Yet no direct treatment is adopted for the relief of the buccal scald, partly on account of the difficulty of carrying it out in the cases of young children, partly, and probably chiefly, because it is notorious that the buccal trouble rapidly subsides without direct local treatment. The warm and moist atmosphere which is usually maintained in the immediate neighbourhood of these little patients may have something to do with the rapid recovery of the mouth; but I suspect the youth

of the patients and the excellence of the interior of the mouth as a sick chamber for the injured parts have more to do with it. It has been suggested that the blebs which sometimes form upon the tongue and over the interior of the mouth should be broken down with the finger; but I have never seen a case in which this appeared necessary or in any way likely to relieve the patient. Scalds of the mouth in older patients may be relieved by constantly sucking ice.

Stings and bites of insects and reptiles.

—The results of stings and of the bites of reptiles are referred to in the chapter on inflammation. The tongue is very rarely bitten by reptiles, but instances have been recorded in which snakes have been incautiously handled and a bite of the tongue has been the result. Stings of insects are much more common: the insects are taken into the mouth concealed in fruit, and serious injuries have in this manner been produced by wasps, bees, and other stinging insects. The bite of a very poisonous reptile will prove rapidly fatal if the tongue is the bitten part, on account of its vascularity and its large lymphatic supply. But, if the reptile be comparatively harmless, there will result from the bite, as from the sting of a wasp or bee, a smart attack of inflammation. The symptoms are similar to those produced by many other causes, and do not require a special description. The patient is, in almost every instance, exceedingly ill, and the swelling and pain threaten the most serious termination. But death is a very rare consequence even of the worst stings. The inflammation abates without actually producing the threatened suffocation, and the patient is speedily relieved. Gangrene and suppuration are equally unusual events in the course of these inflammations, however severe they are.

The treatment does not differ materially from that

which is proper in other cases of acute parenchymatous inflammation, but incisions are very seldom needful. F. Clarke recommends that the mouth should be very frequently washed out with an alkaline solution with the hope of neutralising the formic acid which is the active principle of the poison, and he gives the preference to a weak solution of ammonia. I have not had an opportunity of putting this suggestion into practice for the relief of stings of the tongue, but I should certainly do so if the opportunity offered on account of the rapidity with which I have seen relief follow the application of ammonia to stings of other parts of the body. But, I suspect the fluid should be applied very quickly after the sting has been inflicted if a decided effect is to be produced.

Wounds may be produced by various instruments, but by far the commonest wounds are those which are made by the teeth. As a rule, *bites* of the tongue are not serious accidents, but cases are on record in which they have been the cause of death. Dr. Wickham Legg has recorded cases of hæmophilia in which a bite of the tongue proved fatal, and at least one case has been published in which death has ensued from sloughing and septic poisoning resulting from the injury. But these are very great exceptions to the general rule that wounds of the tongue recover well and quickly. Indeed, wounds so severe as almost to cut off a segment of the tongue frequently heal so well that the integrity of the tongue is perfectly maintained, no part of the separated portion sloughing.

Bites of the tongue are usually the result of blows on the chin or falls when the tongue is protruded: some of the worst bites occur in the course of epileptic or apoplectic fits. The protruded portion of the organ may be completely bitten off, or it may be completely divided on the one side but remain attached on the other side. In many cases a transverse wound

is inflicted a short distance behind the tip: the wound cuts deeply into or through the central part of the front of the tongue, but spares the sides. The slighter bites require no treatment other than a wash of borax or a weak solution of alum or nitrate of silver. But the severe bites may need very careful management. They are seldom the source of serious hæmorrhage, but if there is much bleeding, the vessels should be sought for and secured with catgut ligatures, which will not interfere with the rapid and complete healing of the wound. If no vessel which can be ligatured is found and the bleeding is rather general oozing than a decided spurt, it may often be arrested by bringing together the surfaces of the wound and firmly uniting them. The actual cautery and the use of hæmostatics are scarcely ever necessary in the case of recent wounds in healthy persons; they would not be used after operations on the tongue involving deep incisions, even in persons not in the most perfect health, and they should therefore be avoided in all cases of simple wounds if it is possible to arrest the hæmorrhage by any other means, however troublesome to apply. The more complete the separation of the wounded part, the more should the cautery and hæmostatics be avoided; for the best chance of restoring the integrity of the organ is to obtain healing by the first intention, and such means as these are absolutely opposed to primary union. The only vessels in or near the tip of the tongue which can bleed severely in a healthy person are the ranine and sublingual arteries. If the wound lies across the front part of the tongue at no great distance from the tip, and the ranine arteries have been ligatured, there are no other vessels which can bleed severely or dangerously. In these cases the only hæmorrhage is such oozing as will soon cease spontaneously or can be easily arrested by slight pressure or the sucking of ice. Even the ranine

arteries so near the tip seldom require to be tied; the bleeding from them soon ceases spontaneously.

To speak once for all of the **hæmorrhage** from wounds of the tongue which is not due to the presence of foreign bodies, it should be a rule of practice to arrest the hæmorrhage *thoroughly* as soon after the accident as possible. If the wound is far forward, there is usually no difficulty in doing so; but if the wound is far back, a difficult and serious operation may be required. In such a case, let the bleeding be temporarily arrested by the pressure of the finger on the wound, or a pad of lint between the finger and the wound until the measures for the permanent arrest have been considered and arranged. Then place the patient in a good light, administer chloroform if possible, and open the mouth thoroughly with a strong gag, draw out the tongue by two stout threads passed through its tip, one on either side, and carefully examine the wound. The time lost in these manœuvres is in most cases time gained, for the loss of blood during them will be much less than if half measures are adopted, and the chances of permanently arresting the hæmorrhage are vastly increased. If, when the wound is thus exposed, a bleeding vessel can be seen, it will of course be ligatured; but if blood wells up from a deep and perhaps almost punctured wound, the wound should, without hesitation, be enlarged until the vessel is in view. If on examination it appears certain that the hæmorrhage is not arterial, but is the result of general oozing or of wounds of veins, the bringing together of the edges of the wound by deep sutures, after the clots and other matters have been removed, will suffice to arrest the bleeding. In all cases of hæmorrhage from the tongue, when the hæmorrhage is thought to be arterial, it must be borne in mind that the larger arteries are deeply placed. They cannot be wounded by a superficial

incision, and a punctured wound will have to be followed up to a considerable depth. Ligature of the lingual artery in the neck is probably never needful in cases of primary hæmorrhage from the tongue.

It may be objected to the practice which has just been recommended, that although it is not difficult to carry out in a large hospital or in a large city where the necessary instruments and the requisite assistance can be certainly and speedily procured, the case is far otherwise in a small town or a widely-extended country practice. I quite admit this, and, in the latter case, if the hæmorrhage is so severe as to threaten life, so much the worse for the patient. Yet, even in these conditions, much may be done to avert the catastrophe by timely and sensible measures. A surgeon, single-handed, or with lay assistance, may examine the wound, turning out the clot, and cleansing the surfaces, in a thoroughly good light, and he may succeed in finding and putting a ligature round the bleeding vessel, particularly if the patient has fortitude enough to remain quiet during the necessarily painful and tedious operation. But if this fails, and the bleeding still continues, I am sure the best hope is in pressure, kept up as long as may be necessary by the finger of the patient or some other person on a small piece of lint placed deep down in the interior of the wound. By this means the hæmorrhage may at least be arrested until further assistance can be procured.

Secondary hæmorrhage is very unusual from simple wounds of the tongue, unless they are complicated by the presence of foreign bodies. It is then fraught with the most serious danger to the patient, and may not improbably end fatally. In this case, as in the case of primary hæmorrhage, the only reasonable chance of success lies in the complete exposure of the wound and an examination under favourable conditions. If this is desirable in dealing with primary

hæmorrhage, it is doubly desirable in treating secondary hæmorrhage, for all the difficulties are increased. If the bleeding vessel cannot be discovered, or if it is in such a condition that a ligature cannot be applied, severe and repeated secondary hæmorrhage may necessitate ligature of the lingual artery. And, when the wound is far back in the tongue, and implicates the tonsil or other of the adjacent structures, the question may arise of ligaturing the external or even the common carotid artery.

The treatment of an incised wound of the tongue, when the hæmorrhage has been arrested, is very clear. If the wound is not extensive it is not necessary to use any special measures; the mouth must be kept cleansed by washing out with Condy's fluid or a weak solution of carbolic acid, and ice may be sucked if there is much swelling or inflammation. If the wound is long and the two portions of the tongue in front and behind it do not lie naturally in apposition, sutures should be employed. And if the wound is so severe or so directed as to cut off a segment of the tongue, the segment should be very carefully united to the body of the organ. Even if the segment be almost completely separated, so that it is attached by nothing more than a thread of muscular or mucous tissue, it should be fastened to the stump in the hope, which is not vain, of preserving it. There is no part of the body in which wounds heal better than in the tongue, although the injury is not unusually followed by considerable swelling and inflammation during the first few days. Of the many materials which may be employed for sutures, I believe that silk will be found as good as any; and it is more easily applied and more available than thick catgut or silver wire. The tongue must be drawn well out by grasping it through the medium of a piece of lint or cotton rag, a curved needle, or a needle on a handle should be used, and the

sutures must be passed deeply through the substance of the parts to be united. Great care must be taken to fit the parts accurately together. In an adult it is not difficult to carry out these measures, but in a child the case is different, and chloroform may be required. The oozing of blood which commonly occurs from the whole area of the cut surfaces ceases as soon as they are brought together. The after treatment consists merely in allaying inflammation, keeping the mouth clean, ordering very soft or liquid food, and removing the sutures in the course of a few days if they have not separated spontaneously. Powdered iodoform may, with advantage, be applied over the line of the wound, on account of its admirable antiseptic properties.

If the patient is not seen until several days after the injury, it will, of course, be impossible to obtain primary union. In the majority of cases no special treatment will be needed. If a portion of the tongue has been almost cut off, it will have sloughed, and the stump alone will require treatment; but if, as the result of a deep and long wound, the parts on either side are not in apposition or on the same level, and the wound has not healed, it will be necessary to pare or thoroughly clean the edges, and bring the parts together with sutures.

Gun-shot wounds are much more serious than simple wounds, even when they are not associated with grave injury of other parts, for they are attended by much greater inflammation and general disturbance. A mere perforation of the front part of the tongue, however, with a rifle or pistol-ball is not a serious accident unless the ball happens to pass through the main vessel. In this case the trouble and danger of a deep punctured wound complicated with severe hæmorrhage may have to be met. Gun-shot wounds are chiefly of importance on account of

the frequency with which foreign bodies are carried into the substance of the tongue. Portions of teeth and of the jaw are the bodies which are more frequently embedded than any others; and even the ball itself has remained for several years buried in the muscles. The general treatment of gun-shot wounds does not materially differ from that of simple wounds. The same means should be taken to arrest the hæmorrhage, and the same care should be taken in the after-treatment to subdue inflammation. But the greatest care should be taken to discover and remove a foreign body at the time of the accident; and it is usually quite hopeless to attempt to procure primary union, and therefore to unite the edges of the wounds with sutures.

Foreign bodies in the tongue.—In connection with the last section, it will not be amiss to draw attention to the symptoms produced by the presence of foreign bodies in the tongue.

When the nature of the accident has rendered it possible that a foreign body has been embedded in the substance of the tongue, it is scarcely necessary to say it should be very carefully sought for, and removed as speedily as possible. But it sometimes happens that a foreign body is not suspected, and, either on account of its small size or of the depth at which it lies, there is no hardness over it. It remains embedded, and for a long time unsuspected, but the wound does not heal. In the course of a few days the first serious symptom may be a slight attack of secondary hæmorrhage, and this alone ought to excite suspicion. If hæmorrhage occurs, it is generally repeated, and if the body is not soon extracted and the source of the hæmorrhage discovered and treated, a serious termination of the case may result. In the absence of hæmorrhage, inflammation may be excited by the presence of the body, and a hard, circumscribed, indolent tumour

is formed, through which a sinus sometimes leads down to the exciting cause. In some cases, much more severe inflammation is excited, suppuration occurs, openings are formed, and sinuses remain, through which fungous granulations protrude. Under these circumstances the foreign body may be spontaneously discharged, especially if it is small. But it rarely excites so much disturbance, and more commonly remains buried in the indolent inflammatory tumour which has been formed around it. Many cases are on record in which a foreign body has remained thus hidden for several years, and sometimes the symptoms have been very singular. Perhaps no case is more interesting in this respect than one which is quoted by Legouest from Manget of a person in whose tongue a ball had been embedded six years before it was removed. During the whole of the six years the patient stammered excessively, and the stammering ceased after the removal of the ball. Seiler relates a case which is worthy to be borne in mind. The patient was a man, twenty-eight years old, who had suffered from soreness of the throat, cough, slight hoarseness, difficult and painful deglutition, and white starch-like expectoration for several weeks, and who was growing worse. He was examined with the laryngoscope, and the usual appearances of chronic laryngitis were observed; but, in addition, a thin, glistening needle-like body, protruding about half an-inch from the surface of the tongue, near the glosso-epiglottic fold. The body was easily removed with a curved pair of forceps, and proved to be a bristle of a tooth-brush, somewhat swelled by long maceration. The symptoms of laryngitis quickly disappeared.

These are very unusual consequences of the presence of a foreign body in the tongue, and are only related to show what very peculiar and unexpected symptoms may occasionally be observed. In ordinary

cases the presence of a foreign body should always be suspected if a wound, especially a punctured wound, does not heal within a reasonable period, and thoroughly. An indolent tumour, and the presence of a sinus as the result of a wound of the tongue, are strong presumptive evidence of the presence of a foreign body. The sinus should be examined with a probe, when the presumption may often be exchanged for certainty.

The removal of the body is usually followed by speedy healing of the wound, and by a complete cessation of the symptoms. But cases are on record which prove that the result of the removal of such an object as a piece of the stem of a pipe, which has penetrated deeply, and been the cause of hæmorrhage, is not always so happy. The removal of the body has, in more than one case, been followed by an immediate flow of blood, which has only ceased with death. Such accidents are, however, much more common when the wounded structure has been the lower portion of the tonsil than when it has been the base of the tongue.

CHAPTER III.

CONGENITAL DEFECTS OF THE TONGUE.

Absence of the Tongue—Split or Bifid Tongue—Adherent Tongue—Tongue-tie—Tongue-swallowing—Extreme Length of Tongue—Congenital Hypertrophy of Papillæ.

Absence of the tongue.—This is a condition so rare that all works on diseases of the tongue quote the case related by Jussieu in 1718. This really appears to be the only case on record, for the best writers on congenital defects neither relate other cases nor give references to works in which they may be found. One

might almost imagine that Weber had seen a case, since he says that the place of the absent tongue is occupied by two movable nodules, whereas the patient described by Jussieu had only one nodule. However, I can scarcely imagine that Weber could have really seen so rare a condition and not have carefully recorded it.

At the age of fifteen years the girl described by Jussieu had, in place of tongue, a small elevation in the middle of the floor of the mouth, about three or four lines in height. It was to a certain extent movable, the muscles at the base of the tongue being fairly developed, and was evidently very useful in speaking and in swallowing. Speech was very little affected by the absence of the tongue; it was, indeed, so clear that no one would have suspected that so serious a defect existed. This circumstance, which excited great surprise and doubt in the beginning of the eighteenth century, would not be considered so remarkable now. That speech may be retained when the entire tongue has been removed has been proved so often of late years that the fact has ceased to appear wonderful. Mastication and the swallowing of solid food were the only acts which were really difficult to this patient: mastication because she was prevented by the absence of the tongue from collecting the food from about the teeth and between the teeth and cheeks; deglutition of solids because she could not carry the food back to the pharynx as usual with the tongue. She was therefore obliged occasionally to supply the defect by using her fingers to gather in the food and thrust it to the back of her mouth. The nerves which supply the tongue with taste and touch appear to have been perfect so far as the maintenance of these functions was concerned. It is probable that the lingual branch of the fifth and the anterior portion of the glosso-pharyngeal passed into the mucous membrane of the floor of the

mouth, and terminated there in normal filaments in or immediately beneath the epithelium, but it is scarcely probable that taste goblets were present.

I have sometimes been inclined to wonder whether this was a true case of congenital absence of the tongue, or whether it was not rather a case of the kind described by Aurrán and de Bélebat of loss of the tongue as the result of some destructive disease. Several cases are described in old medical literature of loss of the tongue from small-pox, an accident apparently much more frequent in past times, when small-pox was more destructive than it has been in the present century. The appearances recorded in some of these cases do not differ widely from those recorded by Jussieu. But Jussieu was not improbably acquainted with cases of this kind, and was not therefore likely to have been easily deceived. Moreover, the situation of the small elevation in the floor of the mouth of the girl is by no means inconsistent with the theory of arrest of development; for the first appearance of the tongue in the foetus is, according to Kölliker, a projection or swelling (*wulst*) on the middle of the inner aspect of the first arch (*Kiemenbogen*). This projection is said to unite at a later period of foetal life with a second projection proceeding from the second pharyngeal arch. It is possible, therefore, that the development of the tongue in the case related by Jussieu proceeded no farther than the formation of one or other of these projections. The situation of the elevation rather points to an absolute failure of the projection from the inferior maxillary arch, and to a partial development of that which proceeded from the second pharyngeal arch.

Split or bifid tongue.—Children are occasionally born with a longitudinal fissure, which divides the fore part of the tongue into two equal parts, and which extends, in some instances, a considerable distance

back towards the root. The condition is peculiar, but, as has frequently been pointed out, is analogous to the natural condition of the tongue in certain of the lower animals. The seal among mammals has a bifid tongue; the raven among birds; but the division of the fore part of the tongue into two reaches its height in reptiles, among which many of the snakes, with their extremely forked tongues, may be taken as examples. A bifid tongue does not appear to affect the functions of the organ in any serious degree: therefore no operation need be undertaken to unite the two halves. But an operation may be asked for in consequence of the ugliness of the deformity, and if it be desired, there is no reason why it should not be performed, provided the patient is strong and healthy. The opposed surfaces of the cleft must be pared and brought together with sutures. There is not any serious bleeding, and the wound will probably heal by first intention.

The manner in which the splitting of the tongue is to be accounted for by an arrest or defect of development is not at first sight apparent. If the tongue were developed in two equal halves, which, proceeding from two swellings or projections seated on either side of the middle of the inferior maxillary arch, grew upwards, and joined as they grew, it would not be difficult to perceive how a bifid tongue might be due to a failure of the junction of the two halves. But the history of the development of the tongue tells that it commences as a single elevation in the middle line, and some embryologists find that this elevation unites at a later period with a second elevation from the second pharyngeal arch, also in the middle line. The two halves of the tongue, therefore, appear to proceed from a common centre or centres, not from a centre derived from each side of the foetal body. Thus, there is nothing to suggest that the split is due to a failure of union. Ahlfeld says that the simpler or slighter

conditions of split tongue are generally due to dragging of too short a frænum, and this is probably the cause of most of the clefts which are observed in otherwise healthy children. When the cleft is very long, it is more often associated with the development of a tumour in the floor of the mouth, and the case is one of monstrosity. Ahlfeld has also observed cases of bifid tongue associated with deep clefts of the face.

Adherent tongue.—In some instances children are born with the tongue adherent to the floor of the mouth by bands or folds of mucous membrane. The adhesions are usually at the sides or immediately beneath the tongue. As a rule, there are only one or two of them, but they have been found passing from close to the tip far back around each side, so as to fasten the tongue completely down at every point. Instead of passing from the tongue to the floor of the mouth, they may be fixed to the lower jaw, and thus, as it were, widen out the surface of the tongue. The functions of the organ are, as may be imagined, seriously interfered with by the more extensive adhesions, and even an adhesion here and there is sufficient largely to impair its natural mobility.

The tongue is sometimes bound down to the floor of the mouth in adults as the result of ulceration and sloughing; and the question may be raised how far the congenital adhesions are the result of defective development, or whether they, too, are not due to intrauterine disease and subsequent repair.

To whatever cause they owe their origin, they may very easily be cured by simple division. If they are very thin, there is no danger from hæmorrhage; but if they are thick, and the child is very young and feeble, it will be safer to pass a thread around each band, tie it tightly, and allow it slowly to ulcerate through.

Tongue-tie is due to too great breadth of the frænum or to its attachment too far forward. The

tongue, when protruded, is incurved, and cannot be made to form a proper groove or furrow for the act of sucking. At a later age speech may be interfered with. But the frequency of this defect and the effect produced by it are very much exaggerated. The frænum is divided in the mouths of many children in whom an operation is not necessary. The doctor is pressed by the mother to operate, and as the operation is very trivial, and very easily performed, if there is the least doubt whether the frænum should be divided, he yields to the pressure which is put upon him. If the fingers can be placed beneath the tip of the tongue, and if the tongue can be protruded so that the tip appears beyond the teeth, it is not necessary to divide the frænum. If, under these circumstances, the child is not able to suck, the cause must be sought for in some other defect. On the other hand, if an infant cannot suck, it must not be forgotten that the reason may be that it is tongue-tied. I mention this because the complaint of tongue-tie comes so frequently from the mother or nurse, and the doctor is so seldom left to discover it himself, that it may possibly be overlooked if it is not complained of.

The cutting of the frænum is performed by placing the fore and second finger of the left hand beneath the front part of the tongue, one on each side of the frænum, so as to raise up the tip and tighten the band to be divided. Instead of the fingers, the split handle of a director (made for the purpose) may be used. The frænum is then divided by a single incision, about one-eighth of an inch deep, with a blunt-pointed pair of scissors. The bleeding which ensues is very trivial, and need not excite alarm or be treated. It is not necessary to cut the substance of the tongue or the floor of the mouth; indeed, care should be taken not to do so, for the only, or almost only, bad results of division of the frænum have been due or have been

attributed to these deep incisions. It is almost impossible to wound the ranine arteries unless the incision is outrageously deep and wrongly directed.

Tongue-swallowing.—As there are cases in which children are born with too short or too tight a frænum, so there appear to be cases in which children are born with too long a frænum. At first sight, it does not seem probable that such a condition as too long a frænum would attract the attention either of the doctor or of the relatives of the child; but the records of some of the cases show that this is a much more serious defect than the other. Too short a frænum has never, so far as I am aware, been the cause of the death of a child, but several children are reported to have died because the frænum was too long.

Attention was first drawn to the subject by Petit in 1742, in a memoir to the Académie Royale des Sciences, in which he related three cases of children in whom the frænum was so long that it failed to exercise its due influence in fixing the fore part of the tongue, so that two of them, drawing the tongue back into the pharynx in the act of swallowing, died suffocated. The third child was reared with difficulty, by keeping a continual watch over it. Since 1742 several papers have been published on the subject, some of them containing cases in point, but the defect or the danger of death from the defect does not appear to be at all common; or if it is common, it must be very generally overlooked, and the deaths must be attributed to some other cause. Even in several of the cases in which children have died from swallowing the tongue, the primary defect was not congenital: the frænum was probably natural at birth, but it was divided within a very short time after birth, and its natural bearing on the tongue was destroyed. Two of the three cases related by Petit were cases of this

kind, in which the operation was performed a few hours after the children were born. It is difficult to believe in the occurrence of such an accident; but the evidence is founded on post-mortem examination of several patients, and the description of the manner of death and of the appearances observed after death is very clear, and points decidedly to suffocation by the tongue.

Petit's two tiny patients died with all the symptoms of suffocation within a few hours after the frænum had been divided, and Petit made the examination by splitting open the cheek in such a manner as not to disturb the relation of the parts within the mouth. He found the throat completely filled by the tongue, the tip of which was turned back over the dorsum, and fixed, like a wedge, in the upper part of the gullet. The obstruction to the larynx was so complete that no air could possibly have passed into the lungs. A case recorded by Fairbairn differed in some respects from those by Petit. The child had a cleft palate, and whenever more than a very small quantity of liquid was dropped into its mouth, it was attacked by cough and threatened with suffocation. When it was two days old, it died, apparently from suffocation. At the autopsy the tongue was found to be short and thick, with a very defective frænum. The tip was not retroverted, but the whole tongue lay so far back that only the tip was visible at the back of the mouth. The dorsum was applied against the back wall of the pharynx, and the base pressed down on the epiglottis and arytenoid cartilages in such a manner that the entrance to the larynx was completely blocked. Fairbairn said that he had had another somewhat similar case, but the infant had been reared.

Hennig mentions two cases in which children between three and four months old died suffocated

during a paroxysm of hooping-cough, apparently from sucking the tongue into the pharynx in the long act of inspiration which occurs between the fits of coughing, but neither of these cases had been seen by himself. They occurred in the practice of a fellow-practitioner, by whom they were related to Hennig. Hennig refers to the drawing back of the tongue in sleep and in catarrh, and speaks of it as if it were not uncommon, and a source of danger to children fed for the first time with a spoon. His paper is worthy to be read, but he appears to attribute too great importance to the possibility of suffocation from drawing back or swallowing the tongue.

In considering the recorded cases of death from swallowing the tongue, the position of the organ described by Fairbairn appears much more likely to be assumed than that described by Petit. It is a mere sinking back of the entire tongue, and does not imply a complete alteration in the relation of its several parts. Sinking back of the tongue is known to occur after operations in which the attachment of the genio-hyo-glossi muscles has been separated from the lower jaw. The accident is now so far recognised that precautions are taken to prevent it in those cases in which the symphysis has been removed, or in which a large operation, implicating the anterior attachments of the tongue, has been practised. With these conditions in mind, it is not very difficult to imagine such an accident as that described by Fairbairn. But I confess it is much more difficult to follow the occurrences described by Petit. The tip of the tongue must not only have been very long and loosely attached, but it must have been manœuvred in a manner very different from that in which children at a slightly later period of life are accustomed to manœuvre it. Certainly, Ingals has related a case of a very dyspeptic and hysterical woman, twenty-eight

years old, who suffered on several occasions from attacks of suffocation, and who said that her tongue seemed much farther back in her mouth than she could voluntarily put it, and that the tip was pressed up against the palate, and seemed curled over on the dorsum. But the inverted position of the fore part of the tongue was not proved by the doctor, and was only a supposition on the part of the patient, whose evidence can hardly be regarded as very valuable.

In the presence of the evidence which has been adduced, it must, I think, be conceded that the tongue is sometimes drawn back so far into the throat that suffocation is produced, and that the accident usually happens to very young children. Further, the conditions which render this so-called "swallowing of the tongue" possible may be congenital, but may also be acquired. At the same time, it appears highly probable that the accident is extremely rare. Nevertheless, the occurrence of attacks of threatened suffocation in infants should always draw attention to the condition of the tongue, and particularly to the length of the frænum and to the mobility of the fore part of the tongue.

With regard to *treatment*, if a child is suddenly suffocated there is no time to procure medical assistance. But if a child is threatened with suffocation, and escapes on the first occasion, and the cause of the threatened death is discovered to lie in an ability to "swallow" the tongue, it is possible that careful management may succeed in averting the catastrophe. Both Petit and Fairbairn mention cases in which children were exposed to the chance of death from this accident, but the patients were successfully reared. The attendant in each case was very cautious, in feeding the child, not to give it too large a quantity at any one time; and when the access of suffocation was observed, it was arrested by putting the finger

into the child's mouth, and, presumably, correcting the position of the tongue. Whenever the child whose case is recorded by Petit was seemingly inclined to suck back its tongue, it was supplied with a substitute, in the form of the teat or the finger. I think it may be taken as a rule in the treatment of these rare cases that the children should be fed with the breast either of the mother or a wet-nurse, if it is possible; and, failing this, with an artificial teat in preference to a spoon. In such a case as that related by Fairbairn it would not be possible, in all probability, to carry out this recommendation, for the infant had a cleft of the palate. If the child is attacked by suffocation, either during or between the intervals of feeding, the attendant should at once pass a finger into the mouth, between the tongue and palate, and, passing it far back, draw the tongue forward. There is no difficulty in doing this if the finger is passed sufficiently far back. The woman whose case is described by Ingals cured herself in this manner; but too great weight must not be attached to this case, on account of the element of hysteria which prevailed so largely, and also of the great doubt which must be felt of the exact conditions which obtained.

Extreme length of the tongue must be regarded rather as a congenital peculiarity than as a defect. The only instances of this condition met with in medical literature are the two quoted by Clarke from Fournier. One of the persons was a lady whose tongue was so long that when it was protruded it hung over the teeth in folds; the other was a girl who could touch her chest with the tip of her protruded tongue. The extreme length of the tongue in these persons does not appear to have been attended with any great inconvenience, and they are only mentioned that nothing which is of interest in connection with this subject may be omitted.

In relation to this matter, it may be mentioned that, both in ancient and in modern times, defect of speech, particularly an imperfect and slovenly articulation, has been attributed to too great length and size of the tongue. This impression may be correct. But, on the other hand, it will be observed in the section on hypertrophy of the tongue that even a considerable enlargement, so great that the organ protrudes habitually from the mouth, does not very greatly impair the speech.

Congenital hypertrophy of papillæ.—Many of the warts and warty growths of the tongue undoubtedly owe their origin to hypertrophy of one or more of the natural papillæ of the tongue, but I have met with one instance in which there was hypertrophy of certain of the papillæ all over the papillary aspect of the dorsum, with the production of tuft-like growths which did not resemble the usual warty growths, and which could not well be classed among the true tumours of the tongue.

CHAPTER IV.

DISCOLORATIONS OF THE TONGUE.

Xanthelasma—Black Marks in Addison's Disease—Blood stains—Black Tongue (Nigrities)—Tinctorial Discolorations and Stains with Caustics.

UNDER this title will be considered discolorations of the fur and areas of discoloration situated in the mucous and submucous tissues of the tongue, but the consideration of the white and bluish-white patches and plaques (leucomata) which characterise psoriasis, etc., will be reserved for another chapter.

Xanthelasma of the tongue.—Patches of

xanthelasma have been only very rarely met with in the tongue. One of the best examples is that published in the St. Bartholomew's Hospital Reports by Dr. Wickham Legg. The patient was jaundiced, and, in addition to the jaundice, had xanthelasma of the eyelids and conjunctiva, of the palms of the hands, the left elbow, right ear, and left side of the nose. Along the sides of the tongue were yellowish-white oblong patches, quite soft, but slightly raised; there was also a yellow spot of the same kind on the middle line of the roof of the mouth, and another near the lingual vein. The patches on the tongue were sharply defined, and varied in size from a split-pea to that of a sixpence. Two of those near the tip showed a slight loss of substance, and were covered with a crust of blood. The microscopical examination discovered, with a low power, narrow long streaks of black immediately beneath the mucous membrane, and with a high power these black streaks resolved themselves into a great multiplication of the cells of the connective tissue, with fatty infiltration of most of them, appearances corresponding to those found in xanthelasma of the skin.

Black marks in Addison's disease.—

Persons suffering from Addison's disease not infrequently exhibit, in addition to the general discoloration of the skin, very dark or black marks on the mucous surface of the lips, the tongue, and other parts of the interior of the mouth. They look like mere stains of the mucous membrane, are sharply defined, neither raised nor depressed, and are usually situated on or near the tip and borders. They vary considerably in size.

The presence of these dark patches in the interior of the mouth is not of much importance, clinically. They are always, I believe, associated with discoloration of the skin, and are therefore not likely to be

very useful in the diagnosis of doubtful cases of Addison's disease. They produce no inconvenience, and in most instances the patient is not aware of their existence; they, therefore, require no treatment.

Dr. Greenhow has described a case in which there were patches of bluish-black discoloration at the tip and on each side of the tongue, with brown patches on the inside of the lips and cheeks. These patches were precisely similar in every respect to those which occur in Addison's disease. But there was no discoloration of any part of the surface of the body, and the marks had been noticed on the tongue three years at least. The man died of advanced pulmonary phthisis, and after death the supra-renal bodies were found to be quite healthy. Arnott made a microscopical examination of portions of the discoloured mucous membrane, and discovered that the pigment was present only in the corpuscles of the connective tissue of the papillæ and of the submucous layer; whereas in Addison's disease the pigment occurs in the deeper cells of the epidermis, and little or not at all in the connective tissue.

Blood stains are occasionally observed in purpura. Froriep has figured the tongue of a person suffering from purpura hæmorrhagica, and on the dorsum are two large blood patches, very black in colour. The illustration does not afford much idea of the actual condition of the tongue, for it was done many years ago, and is very deficient in artistic power and colouring.

Ecchymoses may occur in and beneath the mucous membrane from other causes than purpura. As they disappear, they may leave behind brown and yellow stains, which are very slow in passing away. It is not improbable that the dark marks in the case described by Greenhow owed their origin to this cause.

Blood stains are, of course, easily distinguished;

whether they are the only disease present, or whether they are only a symptom of a general disease, they require no special treatment.

The foregoing conditions are easily recognised, and can scarcely be assumed. The colour lies in the very structure of the tongue, and cannot be removed or greatly altered unless by destroying some of the superficial structures of the organ. Even the colours produced by caustics are much more superficial than these, and if they are deeper placed, can be so only by previous destruction of the superficial layers of the mucous membrane. The disease which is next to be described may be counterfeited, for many colouring solutions are capable of producing the exact tint which forms its characteristic feature.

Black tongue (nigrities; lichenoid).—Quite recently this affection has attracted considerable attention, owing chiefly to the publication of a case of "black tongue" in the medical journals. The publication of this case was followed by the publication of several others of the same kind, and most of these were recorded to prove that the affection is not so rare as has generally been imagined. In spite of this evidence, it must be admitted to be a very rare condition. The only case I have seen for a long time past was that which Mr. Stoker exhibited at a recent meeting of the Pathological Society. The patient was a man advanced in years, who was under the care of Mr. Stoker on account of some other disease with which the condition of his tongue appeared to have no connection. Indeed, the blackness of his tongue had been noticed by accident, for, as it gave him no discomfort, he made no complaint of it. The discoloration was known to have existed several months, and might have been present much longer for all that was clearly known to the contrary. It formed a brownish-black or quite black area, of the size of a

five-shilling piece, on the middle of the dorsum of the tongue, and was just such a discoloration as might have been produced by the taking of iron or by the application of ink. The affected portion of the tongue was not exceptionally rough, but the papillæ were, so to speak, thrown up by their black colour, so that they appeared more prominent than usual. The colour was limited to the papillæ and the free surface of the mucous membrane.

The discoloration is always noticed in the middle of the dorsum of the tongue, usually immediately in front of the V formed by the circumvallate papillæ. It is quite black at the centre, but less so towards the circumference, where it often assumes a light brown hue. The discoloured area is at first of small size, but extends, as a rule, very slowly, until, at the end of two, three, or four weeks, it covers a large portion of the dorsum. Then it disappears little by little, from the circumference towards the centre, presenting during its subsidence a brownish-yellow tint at the borders of the area. The disappearance of the area is followed generally by desquamation, which commences in the median furrow. The same series of phenomena is repeated as long as the affection lasts; extension, subsidence, desquamation, and the sequence lasts a variable period, from a few days to six weeks or two months.

The surface of the affected area is, in many instances, natural, except for the discoloration, but the papillæ are sometimes enlarged and elongated. Raynaud describes a case in which the surface of the area looked like a field of corn laid by the wind and rain. It must not, however, be forgotten that very large and long papillæ are as proper to the tongues of some persons as great smoothness is to the tongues of others.

The only symptom to which the discoloration

appears in any way to give rise is a feeling of extreme dryness when the area of blackness is largest and the colour is most intense. There is no alteration in the senses of touch and taste, nor is there any modification of the movements of the tongue. Were it not for the sensation of dryness and for the accidental discovery of the discoloration in the looking-glass or by a second person, the affection would probably be unknown to the patient.

The cause of black tongue has been during many years discussed, and no very satisfactory explanation has been yet afforded. Raynaud believed that it was a parasitic affection, and described fine sporules of round or oval shape adhering to the filiform papillæ. His observation has been confirmed by some, but has been denied by the majority of observers. He does not seem to have been aware that the spores of micrococcus are constantly present about the filiform papillæ, and form a very large constituent of the natural fur. It is probable that the masses of spores which he observed were merely the micrococcus masses of the fur. In addition to the spores, which he regarded as the essential element of the disease, Raynaud observed a blackish tint of the superficial epithelial cells. Armaingaud thinks the black tongue is associated with vaso-motor disturbance, and suggests that the condition is analogous to chromidrosis of the skin. Mr. Hutchinson, in his lectures at the College of Surgeons in 1884, seemed disposed to believe that most, if not all, cases of black tongue are cases of intentional deception; the minor cases may be referred to accidental causes.

I confess I am more inclined to believe that the affection is of parasitic origin than that it is the result of deception on the part of the patient. I do not, indeed, imagine that it is due to the presence of a special variety of parasite, but it is not unreasonable

to suppose that the colour is due to an altered condition, or power, or function of the parasites which habitually reside on the surface of the tongue, chiefly on and around the filiform papillæ. Whoever is familiar with the various colours (some of them extremely brilliant) which are produced by the agency of micro-organisms, cannot doubt the power of the organisms on the surface of the tongue to produce, under certain circumstances, a colour widely different from that of the natural fur or the fur of disease. What the condition is which causes them to produce the black tint of nigrities is at present unknown. I hope, when an opportunity offers, to try the effect of cultivation of the black parasite, and thus to discover whether the colour-producing fungus is capable of being propagated, still preserving its colour-producing properties.

The reasons which appear to me to be most strong against the theory of deception are the very different conditions in which the affection has been observed, the persistency of the blackness, and the close resemblance of the phenomena in cases which have been under the care of observers widely separated and unacquainted with the literature of the disease. The very large majority of the persons who have suffered from black tongue have been out of health at the time the discoloration was first noticed. Several of them have been persons advanced in years, and one patient was a woman eighty-three years old. In her case the patch of black was said to have slowly enlarged until it covered an area 4 cm. by 2 cm., to have remained almost unchanged for a year, when the threads (papillæ) became loose and separated. The situation of the discoloration has been the same in every recorded case, viz. the middle of the dorsum, in front of the circumvallate papillæ; and in every case the area has increased in size, until, from a small patch, it

covered a large portion of the surface of the dorsum. In many cases the phenomena of extension and subsidence were observed. I think, too, if the discoloration had in all, or almost all, cases been deliberately produced, it would have been accredited with some more troublesome symptoms than have ever been ascribed to it. Nor must it be forgotten that it has been accidentally discovered in a certain number of instances.

While, therefore, I am not disposed to believe that black tongues are usually the result of deliberate deception, I think, nevertheless, that each individual case should be regarded with a certain amount of suspicion until the weight of evidence appears strongly in favour of the discoloration being due to disease, and not to art. Especially should young and hysterical girls be watched. In such cases, an unexpected visit, as suggested by Mr. Hutchinson, may discover that the black colour has disappeared, and with the colour will disappear all doubt as to the nature of the affection in that particular instance.

Of treatment there is little to be said. Many different lotions and local applications have been employed, but none appeared to exercise any permanent influence on the affection. Nor has constitutional treatment been more successful. Inasmuch as nearly all the patients have been in feeble or not quite robust health at the time of the first appearance of the discoloration, it is well to order tonics. Fortunately, the question of treatment is comparatively unimportant, for the discoloration is almost unaccompanied by symptoms. In some instances the blackness disappears slowly and spontaneously at the end of a few weeks; in other cases it persists much longer, during many months or years; and in other cases, again, it has endured so long that its disappearance, if it did disappear, has not been recorded.

Tinctorial discolorations and stains with caustics.—It may be useful here to set down in a tabular form the discolorations and stains which can be produced by tinctures and the application of caustics. Most of the following table is copied from Rigal's table in the "Dictionnaire de Médecine et de Chirurgie Pratique":

Black.—Ink, red wine, mulberries, certain varieties of cherries, steel wine, and other preparations of iron.

Brown.—Tobacco, liquorice, fresh nuts, prunes.

Brown-red.—Chocolate.

Yellow.—Saffron, laudanum, rhubarb.

Red.—Red quinquina, rhatany, raspberries, cherries.

The effects of caustics are :

Grey-white.—Sulphuric acid, oxalic acid, carbolic acid.

Yellow.—Nitric acid if the effect is superficial, chromic acid.

Red.—Acid nitrate of mercury.

Grey and gelatiniform.—Caustic potash.

White or pearl-grey.—Nitrate of silver, corrosive sublimate (white and shrivelled).

The effect of some of these re-agents, of tobacco, steel, ink, liquorice, nitrate of silver, rhubarb, and fruit, is notorious. The effect of some of the others I have tested, and have generally found that Rigal's statements respecting them are correct. One or two of those relating to the caustics I have altered and amended.

CHAPTER V.

INFLAMMATION OF THE SUBSTANCE OF THE TONGUE.

Acute (Parenchymatous) Glossitis—Hemiglossitis—Inflammation at the Root of the Tongue—Mercurial Glossitis—Septic Glossitis, and Glossitis from the Bites of Reptiles, etc.—Gangrene.

Acute glossitis.—Acute inflammation of the tongue is admitted by all observers to be a rare disease. Even the largest hospitals in this country do not, in most years, record a single instance. Yet the history of the disease may be written with tolerable accuracy, for the very rarity of acute glossitis has led to the publication of a goodly number of cases in medical literature.

From a study of these cases, we learn that acute glossitis is much more common in adults than in children, and is more common in young adults than in old; also that it attacks men more frequently than women, and that it is more frequently observed in the winter than in the summer.

The onset of the inflammation is almost always very rapid. A little tenderness is experienced in masticating solid food, the movements of the tongue are attended with stiffness or with pain, or there are pains in the muscles of the neck and submaxillary region. Before these symptoms have existed many hours the tongue begins to swell; the swelling rapidly increases, until, in the course of twelve to twenty hours, the tongue is two or three times its natural size, protrudes from the mouth, is indented by the teeth, and is almost immovably fixed. It feels heavy, is usually very painful and tender, and every attempt

at movement is extremely painful. The dorsum of the organ is for the most part covered by a thick, opaque, white fur, and beneath the fur is livid, smooth, and glazed, or, if long protruded, is dry, and cracked, and brown. A profuse salivation accompanies these symptoms; speech is impossible; dysphagia is invariably present, and dyspnoea is not unusual. The submaxillary, salivary, and lymphatic glands are often greatly swollen. It must not be imagined that every case presents symptoms of the same severity; in some there is much more swelling of the tongue than in others; in some the swelling is greater towards the back of the mouth; in others, again, the inflammation is accompanied by very severe pain. In all cases there is fever, but the temperature seldom rises above 101° , however severe the case may be.

It will readily be understood, from the symptoms, that acute glossitis is not devoid of danger to life. In spite of all remedial measures, death may occur in the course of a few hours, either from diffuse suppuration in the substance of the organ, from exhaustion, or from septic fever and pneumonia. The tongue, too, may mortify, and, from the causes connected with this event, death may take place at a later period. Happily, these events are rare. Even suppuration is not common, and when it does occur, is in most instances limited in extent. The tendency of the inflammation is towards spontaneous resolution. The swelling begins to subside in the course of three, four, or five days; small superficial sloughs form upon the surface, and, separating, leave superficial ulcers; and at the end of a week the tongue has almost regained its natural aspect. With the subsidence of the inflammation disappear the fever and the symptoms which distressed the patient: the voice returns, first in a whisper, then louder; the dyspnoea is quickly lost; and the dysphagia, although it abides

longer than the other symptoms, finally gives way. According to the loss of substance from sloughing, so will be the permanent disfigurement, but this is seldom sufficiently grave to attract notice ; adhesions are very rarely formed, and the movements of the tongue are not impaired. In a few instances the swelling has partially subsided, the fever and most distressing symptoms have disappeared, but the tongue has remained thickened, either in whole or part, sometimes for many days or weeks, sometimes permanently. One such case is described in which the swelling and some troublesome symptoms were apparently kept up by the pressure and rubbing of the teeth against the tongue, for when means were taken to prevent this the disease speedily disappeared.

Acute glossitis has been ascribed to numerous *causes* : to cold, damp, injury, septic matters in the mouth, bites and stings of animals, mercury, corrosive and acrid substances, to the influence of certain fevers and eruptive diseases. Of the inflammations which are produced by mercury, by septic poisons, and by the bites and stings of animals, I shall speak presently. Of the other causes of glossitis, that is, of the glossitis which has been now described, I believe that none exercises so great an influence as cold : not simply cold weather, but the catching of cold, for I hold with De Mussy and Duckworth that acute glossitis is a catarrhal affection. The cause to which the patients themselves most frequently attribute the disease is the catching of a cold ; it occurs much more frequently in the winter months, when colds are most common and severe ; it commences in many cases with muscular pains and general symptoms of malaise ; it runs the rapid course of acute inflammatory attacks, and tends to terminate in resolution. Some authors (Weber, for example) speak of the occurrence of epidemic glossitis in the wet and cold seasons of the year. The

statement is rather deficient of support, but if it be true, such epidemics would lend additional colour to the theory of catarrhal inflammation; it is notorious that epidemics of catarrhal inflammation of parts which are in average years rarely attacked occasionally occur, and it is only reasonable to suppose that the tongue is liable to the same laws as those to which the neighbouring parts are subject in relation to catarrhal inflammations. It is quite in harmony with this theory that acute glossitis should occasionally attack persons who have been drinking beer and spirits heavily, and smoking immoderately at the same time. These are exciting causes which determine the inflammation to the tongue in preference to other, and perhaps neighbouring, parts. And it is not surprising that the disease attacks, by preference, persons who are not in good health at the time of its occurrence. The chief difficulty in connection with this, or, indeed, with any theory, is to explain why the tongue is so rarely the seat of acute inflammation of its substance. Its situation, so much more exposed than the tonsils, the frequency with which it is injured by the teeth and by the foods introduced into the mouth, would mark it as a part which might reasonably be expected to be frequently attacked by severe inflammations. In some instances the inflammation appears to be the result of direct exposure to cold air with the mouth widely opened, but in by far the larger number of instances the exposure has been indirect and general, and the inflammation must be regarded as reflex, perhaps due, as has been suggested, to reflex irritation of the lingual division of the fifth nerve.

The *diagnosis* of acute parenchymatous glossitis is generally so easy that it seems almost unnecessary to speak of it. The fever, the rapid and excessive swelling of the tongue, the salivation, and other symptoms,

are so peculiar to this disease, that it can scarcely be mistaken for any other. In a few instances, however, a difficulty has been experienced in deciding between glossitis and acute oedematous swellings due to salivary calculus and other affections of the floor of the mouth. S. Mackenzie has described a case of "acute ranula," which produced considerable swelling of the tongue, and led to the belief that the patient was suffering from acute glossitis. The case is very interesting, although the evidence that the affection was acute ranula is not very clear. The practical lesson to be learned from these and similar cases is that the floor of the mouth should be carefully examined in every case of supposed glossitis.

It is probable that the large majority of patients with acute glossitis would recover without more active *treatment* than a dose of purgative medicine and diet of slops. Not a few of the recorded cases have been treated thus, with the result of a speedy recovery, But the symptoms are so distressing, and sometimes apparently so urgent, that practitioners are not inclined to adopt the expectant course. The less serious cases are treated by leeching the submaxillary regions, and employing astringent lotions or iodine to the tongue. Other cases are treated by the application of blisters to the floor of the mouth, and of ice to the tongue. But the more serious cases, those which are aggravated by dyspnoea and extreme dysphagia, require more active measures. I remember, shortly after I entered at St. Bartholomew's Hospital, making the round of Mr. Wormald's wards, and seeing there a man suffering from acute glossitis. His tongue was greatly swollen and protruded from his mouth, and he was salivating profusely. Mr. Wormald accosted him in the following manner: "Well, you've been guzzling and swilling, and making a beast of yourself;" a statement which in this particular instance was strictly

true, but if it had not been, the man could not have defended himself, for he could not speak. Mr. Wormald then took a knife from his house surgeon, and, to my horror, cut deeply into the substance of the tongue on each side of the middle line for a length of at least two inches. The operation appeared to me at the time most brutal, but on the following day I found that the man's symptoms were marvellously relieved. He could retain his tongue within his mouth, could speak and swallow, and the salivation had completely ceased. Severe as this course may seem, it is, I believe, the best to pursue in most cases of acute glossitis. The symptoms are not always so rapidly relieved as in the case which has just been related, but relief is speedy, and almost invariably sure, and at the expense of a sharp momentary pain the patient is spared many hours or, it may be, days of torture. Deep suppuration, too, is much less likely to occur after incisions have been made. Two longitudinal incisions, one on either side of the middle line, and about two-thirds of an inch from the raphé, are to be preferred. They should penetrate to a depth of one-third of an inch, and may best be made with a very sharp curved bistoury. The hæmorrhage is never serious unless the incisions have been carried too deeply, and the moderate bleeding which occurs is decidedly beneficial. The chronic thickenings which remain behind after certain cases of acute glossitis are not very amenable to treatment. The condition of considerable thickening, associated with salivation and other distressing symptoms, which was alluded to on a previous page, was combated by means of a gutta-percha splint or mould applied over the lower teeth, which prevented the tongue from being rubbed and pressed; the result was rapid improvement.

Hemiglossitis (parenchymatous inflammation of one half of the tongue).—The exact relations between

this disease and acute glossitis have not yet been satisfactorily decided, and it may still be questioned whether the two diseases are not essentially the same, or whether true parenchymatous glossitis in its purest form is a simple inflammatory affection, due to the direct action of a mechanical or chemical irritant, while hemiglossitis is a catarrhal inflammation or neurosis. I believe them to be essentially the same disease, and, after hemiglossitis has been described, will state the grounds on which this belief is founded.

Hemiglossitis appears to be even rarer than the affection last described; for although several authors admit that acute glossitis may affect both sides of the tongue or one side only, the number of recorded cases in which the inflammation has been limited to one half of the tongue is exceedingly small. They bear, however, a striking resemblance to one another, so much so that the account of one of them would almost suffice for each of the others. In every case the left half of the tongue was affected, either solely or chiefly; for when, in some of them, the swelling extended to the right half, the left remained much more swollen than the right. In the left half there was, too, in almost every instance, a lump or nodule, either placed deeply in the substance of the organ, or a little raised upon the dorsum, thick, elastic, firm, and more tender than the surrounding parts. The onset of the inflammation was, in most of the patients, marked by general malaise or fever, by rigors, and by pains in the side of the head and face. Then the left half of the tongue began to swell, and the swelling quickly increased, extending in some cases to the right half, remaining in other cases strictly limited to the half in which it had commenced, but reaching quite up to the middle line. The swelling appeared to affect chiefly, if not entirely, the anterior two-thirds of the tongue, which led De Mussy more particularly to ascribe the disease

to an affection of the lingual branch of the fifth nerve. The dyspnœa noticed in some of the cases of acute glossitis does not appear to have been present in any of these ; indeed, none of them presented very alarming symptoms, and in no case were incisions necessary to procure resolution. The swelling subsided in from three to five or six days, although not always completely, for in Graves's patient the left half of the tongue was still enlarged at the end of two years. With the exception of slight erosions, the disease does not seem to have been complicated by sloughing, ulceration, or suppuration.

If we compare the account of this disease with that of acute glossitis, we shall find that hemiglossitis is, on the whole, a milder affection than general glossitis, but that otherwise it differs only from general glossitis in the occurrence of a definite nodule, or lump, in the substance of the inflamed part. Both affections are much more common in men than women ; both are usually ushered in by febrile symptoms ; both are often preceded by pains in the submaxillary region and muscles of the head and neck ; both run a rapid course, and tend to spontaneous resolution ; both diseases may leave behind an enlargement of the affected part, which may be permanent or very long-enduring. For the differences between them, they are not very difficult to explain. The less severity of hemiglossitis may be due to the fact that the right half of the tongue is either not at all or only slightly swollen, and that the swelling is chiefly of the fore part of the tongue ; deglutition is therefore not so difficult or so painful, and there is no cause for dyspnœa. For the same reason the incisions often practised in acute glossitis are not required in hemiglossitis. The lump, or nodule, felt in hemiglossitis may be present in many of the cases of acute glossitis, but the excessive swelling of the entire tongue prevents it being felt. It

is worthy of note that in one of the patients seen by Dr. Duckworth the inflammation followed a bout of drinking beer and spirits. I quite agree with Dr. Duckworth that many of the cases described as acute glossitis are really cases of hemiglossitis. A short time ago my colleague, Dr. Norman Moore, asked me to see with him a patient in Elizabeth ward. He had seen her a day or two previously in the surgery, and had observed a lump in the left half of the tongue, but he had not seen her since her admission to the hospital. We found her suffering from febrile symptoms, with swelling beneath the jaw on the left side, and with general swelling of the tongue, so that it could only with difficulty be retained within the mouth. But the swelling was chiefly of the left half, and the lump which Dr. Moore had observed when first he saw the patient was still plainly discernible as an oblong, firm, elastic swelling, slightly projecting on the dorsal aspect of the middle of the left anterior half of the tongue. The symptoms were not sufficiently urgent to call for surgical interference, and in a few days subsided, leaving a few excoriations or superficial ulcers where sloughing of the surface had taken place. Had we seen the patient for the first time on the day on which we saw her together, we should probably have regarded her as suffering from a mild attack of acute parenchymatous glossitis; but there can, I think, be no doubt that it was in strict truth a case of hemiglossitis, which had speedily become general.

The *treatment* of hemiglossitis is very simple: Leeching and scarification are scarcely ever necessary. A purge, followed by a drink of chlorate of potash, and a liberal diet of beef-tea, eggs, and milk, with the local application of ice, or, where warmth is more acceptable, of warm gargles, or bathings of the tongue with solutions of borax or chlorate of potash, are all that is required. As the inflammation subsides the

emollient lotions may advantageously be changed for astringents: alum or chloride of zinc, ten grains to the ounce of the former, two grains to the ounce of the latter.

Inflammation at the root of the tongue.—

Under the name of “lingual quinsy,” Dr. David Craigie described, fifty years ago, an acute inflammation of the tonsils and base of the tongue, apparently a very severe disease, for one of the patients whom he saw died of it, and three or four patients who recovered were exceedingly ill during the few days that the inflammation lasted. But this affection is, in truth, a severe modification of *cynanche tonsillaris*, in which the inflammatory swelling is not so strictly limited as usual to the tonsils, but extends to the base of the tongue and neighbouring parts, and produces considerable secondary swelling of the whole of the tongue.

There is, however, an acute inflammation of the base of the tongue, which is occasionally, though very rarely, met with. The tongue is protruded from the mouth, sometimes to the extent of two or even more inches; it is swollen also by the pressure of the inflamed structures at its base, and the case may be mistaken for one of acute general glossitis. But the less induration and tenderness of the anterior portion and the great tenderness of the hinder part of the organ, together with the symptoms of pressure at the base, will usually suffice to prevent an error in diagnosis. Suppuration is much more frequent as a result of this inflammation than of either of the preceding; abscess forms, and if not early opened, bursts spontaneously, usually within a week or ten days. In most cases relief quickly follows the escape of pus, but this is not invariably the case, for in more than one instance the tongue has remained swollen and protruded for many days afterwards and the swelling has finally been

removed by pressure. It is not easy, when the whole of the tongue is so swollen, to detect fluctuation at its base, but this should be sought for whenever the symptoms point to affection chiefly of the base. The pus may be safely let out by an incision with a long curved bistoury, guarded, except for the last inch, by strapping wound round the blade. The opening should be made in the middle line, in front of the epiglottis, where there is no danger of wounding the lingual arteries. Although pressure of the tongue upon the larynx produces in most instances more or less distress in breathing, tracheotomy has not, so far as I am aware, ever yet been necessary.

In a few rare cases, the inflammation, attacking the cellular tissue between the genio-glossi, produces swelling in the floor of the mouth, from the symphysis of the jaw to the hyoid bone. Fleming has described several instances of this disease. With the usual symptoms indicating affection of the base of the tongue, dyspnoea, dysphagia, salivation, etc., swelling of the floor of the mouth existed; the skin became slightly discoloured, was very tender, and perhaps œdematous. The pus which formed was let out by an incision in the middle line of the floor of the mouth.

Mercurial glossitis.—Formerly by no means an uncommon form of glossitis, but now very rare, owing to the care which is exercised in the administration of mercury, and to the greater caution than formerly of the various workers in mercury. In the worst forms of mercurial glossitis the tongue swells, sometimes considerably, but not to the same extent as in acute general glossitis; it is pressed against the teeth so as to be marked by them; its surface is thickly coated. It is exceedingly tender, prone to superficial sloughing, or, more frequently, to excoriation; it is not so firm as in the preceding forms of glossitis, the enlargement being rather œdematous. The breath is horribly

foetid. These signs would alone suffice to throw suspicion on the nature of the affection, but with them are associated other and such clear proofs of the mercurial origin of the disease that the diagnosis is singularly easy. The gums are swollen, tender, and spongy, and are apt to bleed; the teeth are loosened; the inside of the lips and cheeks is swollen; salivation is even more profuse than in the most aggravated forms of acute general glossitis. The febrile symptoms are not usually so pronounced as in the other varieties of glossitis, but fever is generally present.

The symptoms usually subside shortly after the mercurial course or employment has been discontinued; but the cure may be expedited by the use of chlorate of potash, ten or fifteen grains to the ounce of water, administered every four or five hours, by chlorate of potash gargles of the same strength, and a little later by astringent gargles of alum or perchloride of iron (ten minims of the tincture to the ounce of water). Tonics are of use in most cases of mercurial glossitis, for patients who are poisoned with mercury (as it is now employed) must be singularly susceptible to its effects or much out of health. A purge of two drachms of Glauber's salt or a seidlitz powder should be given, in order to get rid as speedily as possible of any mercury which may still remain in the intestinal canal. In very severe cases, where the tongue is excessively swollen and the patient is suffering greatly, leeches may be applied below the jaw, and ice should be constantly kept in the mouth. Such cases are now, however, rare, and death from mercurial glossitis, as Stromeier saw it occur, is, we may hope, a thing of the past.

Septic glossitis and glossitis from the bites of insects, reptiles, etc.—Unless every attack of acute parenchymatous glossitis has a septic origin, I do not know that there is any form of glossitis which deserves the name of "septic." Yet more than one author

PLATE I.

Fig. 1.—Vesicular eruption on the tip of the tongue of an intemperate man.

Fig. 2.—Indentations produced by the teeth in the tongue of a woman, 60 years of age.

Fig. 3.—Soreness and excoriation of the tongue in a youth, 17 years old. Cause uncertain.

Plate I



Fig. 1



Fig. 2



Fig. 3

speaks of an excessively acute glossitis which is due to the introduction of septic material into the mouth, and to the inoculation of the tongue. This form of glossitis is said to run a very rapid course, and to terminate, more often than any other, in gangrene of the whole or a part of the tongue. And in more than one place it is hinted, or even openly expressed, that this disease is a malignant pustule of the tongue. I believe that the general idea of this septic glossitis is derived from the account given by Heyfelder in 1834 of a Prussian butcher, who, while slaughtering a diseased sheep, put the knife between his teeth, and held it there for some time. In two or three days the margin of his tongue was covered with black pustules, while the entire tongue was hugely swollen, and in less than three days from that time he died. That this man died of very acute glossitis there can be no doubt, but, with the exception that the margin of the tongue was covered with pustules, I can see no reason for separating this case from those of the ordinary form of acute glossitis. The simple form of acute glossitis may be produced by the action of various irritating substances, and putrid or diseased meat should certainly be classed as an irritating substance, perhaps one of the most irritating. There is absolutely no evidence to show that this was a case of malignant pustule (charbon ; milzbrand). Nor can I discover, in a careful survey of the best papers and articles on malignant pustule, that that disease ever affects the tongue primarily, although it might be supposed that opportunities would occur, not infrequently, of direct inoculation of the tongue. Yet Demarquay has described charbon of the tongue as if it were a well-recognised disease, and states that it attacks most frequently butchers and horse-slayers, who are accustomed to place the knife they use between their teeth.

The sting of a wasp or some similar insect, and

the bites of small snakes, suffice to produce almost always a smart attack of inflammation of the tongue, and it may be right to class these separately from acute glossitis, which is attributed to catarrhal origin, for it can hardly be supposed that a predisposition is necessary, or that it was a mere matter of chance that the tongue should have been selected by the inflammation. The symptoms of glossitis due to these causes, however, differ only slightly from those observed in catarrhal acute glossitis. The swelling of the tongue is, of course, not preceded by febrile symptoms, for it generally follows directly on the injury; and the swelling, except in the immediate neighbourhood of the injured part, is softer and more cedematous than the swelling of catarrhal glossitis. The local distress is often very severe, but the disease runs almost always a benign course, and incisions are seldom necessary. The treatment is such as is required in the less severe cases of glossitis.

Gangrene occasionally occurs as the result of a very severe attack of glossitis, but does not more often result from those attacks of glossitis which are produced by the inoculation of poisonous substances (of whatever kind) than from those which are due to mechanical violence or to catarrhal causes. The form of gangrene is, as might be expected, moist. If the inflammation is so severe as to result in gangrene, the case is likely to prove fatal; but if the patient survives, the gangrenous portion will by-and-by slough off, and will leave a stump, which, even after the loss of a large fragment of the tongue, is serviceable for speech and swallowing. During the separation of the slough the mouth will need constant cleansing with lotions of chlorate of potash or chlorinated soda, or, better still, with powdered iodoform; and the patient's strength will need to be supported with wine, quinine, and mineral acids.

CHAPTER VI.

ERUPTIONS ON THE TONGUE.

Eruptions of Fevers and Pemphigus—Herpes—Vesicles preceding Aphthous Ulcers.

THE eruptions of exanthematous fevers, and certain of the acute and chronic eruptions which occur on the surface of the body, are met with also on the tongue. Thus, for example, the pustules of variola may occur on the tongue, but their occurrence is far from constant, and when they are observed, they are very scattered. The papules of rubeola are said to occur in a very modified form upon the tongue. Erysipelas affects the mucous membrane, but I know of no example of primary erysipelas of the tongue; the disease has always spread from the neighbouring parts. Pemphigus attacks the tongue, though rarely. Willan quotes a case reported by Dickson in 1787, in which a delicate woman, exhausted by nursing her husband through an attack of low fever, was herself affected with symptoms of fever and with a sore throat. On the fourth day of the fever there were large vesications on the tongue and insides of the cheeks, filled with yellowish serum. This was followed by a general outbreak of pemphigus over the surface of the body. The possibility of affection of the tongue in these various diseases should be borne in mind; but it is not necessary to do more than mention them here. The description of them belongs to the description of the general eruptive fevers and the exanthemata.

Herpes.—A vesicular eruption, which in most instances speedily becomes pustular, and occasionally attacks the tongue. Clarke objects to the name

"herpes," on the general ground that, as the mucous membranes differ notably in their structure from the skin, the intimate pathology of their diseases must differ also. He would not, therefore, transfer the names of skin diseases to the morbid affections of the mucous membranes. I confess I hold a different opinion, especially with regard to the disease in question. The analogy between the mucous membrane of the tongue and the skin is so great as to justify the use of similar terms to similar affections of both structures; the eruption of herpes of the tongue is decidedly vesicular, and herpes of the tongue has been observed in association with herpes of the face. It would be difficult to find a name more suitable to the disease than herpes; nor can I see any greater reason for inventing a new name for herpes of the tongue than for applying a new name to pemphigus or to variola when they affect the mucous membrane of the tongue.

Recently, a typical instance of herpes of the tongue has been under my care in the out-patient department of the hospital, and I cannot do better than describe it. The patient was a man of between forty and fifty years of age, hard-faced, bloated, and with all the appearance of habitual intemperance. His tongue was thickly coated, except towards the tip. There the mucous and submucous structures were a little swollen, a little indurated. The surface was redder than the rest of the mucous membrane, but mottled with bluish-white, slightly uneven, and here and there raised into a tiny vesicle or pustule. All the diseased region was sore and tender to the touch. The patient had suffered thus for several days, and in a few more days he was well (Plate I., Fig. 1).

It is usual for herpes to affect the tip or borders of the tongue, to attack persons whose stomachs are disordered either by drink or some other common cause, to run an acute course, and to disappear as soon

as the derangement of digestion has been corrected. There is not, usually, any serious constitutional disturbance other than that on which the outbreak of the eruption depends, but S. Mackenzie has reported a case in which the outbreak of an eruption of herpes on the tongue and other parts of the mucous membrane of the mouth was accompanied by severe general fever. In this case there was considerable swelling of all the affected parts; the eruption attacked the various parts in succession, and a similar eruption occurred towards the end of the attack on the right cheek and right ear.

The *treatment* of herpes of the tongue in the form I have described as typical is very simple and successful. The derangement of digestion must be corrected by saline aperients, by bismuth, and by forbidding the food or drink which appears particularly to have produced it. When the tongue is clean and the breath no longer foetid, tonics should be substituted for the saline draught. The local treatment consists in the application of mel boracis at frequent intervals with a soft brush, or of a solution of borax (not containing glycerine), and, after the soreness has passed off, of astringent lotions of alum or tannin.

Aphthous ulcers preceded by vesicles.—It must not be forgotten that although aphthous ulcers cannot be classed as a vesicular eruption, the ulcers are the result of the breaking down of vesicles. The appearance, therefore, of a crop of vesicles on the tongue of a child may usually be regarded as probably the commencement of an attack of aphthous ulceration. Herpes of the tongue is rare; aphthous ulceration is not unusual. The general account of aphthous ulceration is given in the chapter on ulcers.

CHAPTER VII.

INDENTATIONS—EXCORIATIONS—FURROWS—FISSURES.

Indentations — Excoriations — Natural Furrows — Grooves or Wrinkles — Inflammatory Furrows — Fissures from Jagged Teeth—Syphilitic Fissures—Tuberculous Fissures—Cancerous Fissures.

INDENTATIONS.

INDENTATIONS of the borders of the tongue are not unusual as the result of the pressure of the teeth upon the tongue. When the tongue is temporarily swollen the border is marked all round by the pressure of the teeth, so as to present a festooned outline, and this disappears as soon as the tongue regains its natural size. It is, therefore, a matter of no importance as far as the alteration of the tongue is concerned, but may be a matter of importance in so far as it denotes that the tongue is swollen.

In mercurial glossitis, when the tongue is much swollen and ulcerated, the borders are usually deeply indented, and each indentation may be the seat of a foul ulcer.

When the enlargement of the tongue is permanent the indentations also may be permanent. I have at this moment before me a drawing of the tongue of an old woman, which presents as singular an appearance as I have ever seen. The entire tongue is large, but not so much larger than natural that it would excite attention by its size. The borders are, nevertheless, indented to a marvellous degree; indeed, they are not so much indented as scalloped out at irregular intervals into deep cup-like depressions, corresponding to the few large ill-shaped teeth which still remained to her. And on the dorsum near the right border are three deep

pits in the dorsum itself, made by the resting on it of three of her upper teeth. It was not only that the enlarged tongue had been pressed against the teeth, but that the teeth had gradually, as it were, grown or turned inwards to meet the tongue, and had dug deep pits along its border. No doubt the depth and permanency of the depressions depended partly on many succeeding attacks of ulceration, for they were ulcerated at the time I saw her, and that was the reason which had brought her to the hospital (Plate I., Fig. 2).

These permanent indentations are, of course, not amenable to treatment, and the question of treatment only arises when they are ulcerated.

EXCORIATIONS.

A very short space will suffice for the description of the excoriations or raw places which are met with on the surface of the tongue: indeed, they are all alluded to in the chapter on ulcers, to some of which they are so closely related that the description of the various forms of simple ulcer would not be complete if they were omitted.

Without being actually ulcerated, the surface of the tongue may be excoriated or raw, and the rawness may be due to one of several causes. Dyspepsia and injury are among the most common causes, and excoriations are very frequently observed on tongues which are affected with chronic superficial inflammation. The excoriations themselves, whatever be their cause, bear much the same characters, and one general description will suffice for all of them. The surface of the tongue is smooth, quite deprived of papillæ over the affected area. It is redder than natural, and its rawness is quite apparent. The margin of the raw patch or area is sharply defined, but the area has no depth: it is merely a part of the surface of the tongue

from which the whole thickness, or part of the thickness, of the epidermis has been removed.

Although the appearance of the raw areas varies very little, the extent of surface which is cleared and the surroundings of the areas vary considerably. Raw places which are produced by the burning or scalding of the dorsum are usually very limited in extent, and quickly heal. For a day or two they are tender when touched, and when very hot or sharp or spiced food passes over them, but the tenderness speedily disappears, and the sore heals.

The raw places which are associated with dyspepsia often cover a considerable area of the surface of the tongue. The whole of the front part of the dorsum may be red and raw, deprived of its filiform papillæ, while the fungiform papillæ still remain, and look more numerous and striking, owing to the absence of the filiform papillæ, which naturally partially obscure them, unless they are much swollen and preternaturally red. The thick fur which invariably covers the back part of the dorsum makes the absence of fur on the front part, and its redness and rawness, more conspicuous (Plate I., Fig. 3). I have several times seen tongues of this kind in young persons in my out-patient room, and have suspected that they were not solely due to dyspepsia, but were produced by sucking the tongue or rubbing it against the teeth. But I have not found it easy to obtain a history of this. Hack has described superficial excoriations of the tongue occurring in certain families. In two families and in three generations he observed a row of long oval areas, separated sharply from the surrounding parts by a golden border. They were situated on the borders and at the tip. In most of the individuals they commenced in early childhood, and in some of them the tongue was strikingly smooth over large areas, with

red flat excoriations here and there. There was no history of syphilis in any case. In order to ascertain whether or not such raw places were of common occurrence, Hack examined the tongues of 600 soldiers, and found a similar condition in twelve of them. Hack's original paper is not within my reach, but the abstract of it in Schmidt's "*Jahrbücher*" (1883, 197, 128) does not offer any explanation of the cause of the raw places either in the two families or in the twelve soldiers. In the two families it is not improbable that the mucous membrane of the dorsum of the tongue was thinner and more easily destroyed than natural, as the skin in some persons is much more delicate and vulnerable than in others.

The excoriations which so frequently occur on the tongues of persons who are the subjects of chronic superficial glossitis are almost always due to slight traumatism or dyspepsia, and the frequency with which the surface of such tongues gives way is not surprising when the extreme thinness of the mucous membrane is considered. The natural thickness of the epidermis is diminished by more than one-half, in some places by as much as two-thirds, and although the superficial layers of epithelial cells are often harder, and more like the horny layer of the epidermis of the skin, the protection they afford is not so great as that afforded by the epithelium of the natural mucous membrane. In addition to the thinning of the epithelial covering, the subjacent tissues are always in an irritable condition, of which there is ample proof in the readiness with which the mucous membrane inflames, and in the large number of vessels and the many leucocytes, or cells like leucocytes, which are seen with the microscope in perpendicular sections of such tongues. The consequence is that an injury which would produce no appreciable effect on a healthy tongue (such an injury, for example,

as the passage over it of food a little too hot, or rather more rubbing than natural) suffices to produce an excoriation, and the excoriation is more troublesome and much more difficult to heal than if the tongue were healthy. On these inflamed tongues it is almost rare not to find a raw place here and there, and even when the stage of actual inflammation is passed, it is easily lighted up afresh, and fresh excoriations form.

The *treatment* of excoriations, when they are merely due to the usage of too hot food over the tongue, and are, in fact, slight burns or scalds, is to order a chlorate of potash wash or lozenge; the raw place rapidly skins over and the tenderness vanishes. When a large area of the tongue is the seat of such excoriations, and is, in consequence, very tender, it is necessary to use chlorate of potash wash more frequently, or to paint the raw places frequently with borax and honey; and when these do not relieve, to paint with a weak solution of chromic acid. By these and similar soothing applications the soreness is speedily relieved, and the patient may be cured by attention to diet, by refraining from strong drinks and tobacco, and by taking care not to eat or drink very hot and scalding foods.

The excoriations which occur on the chronically inflamed tongues are much more difficult to treat successfully. The same measures must be adopted, and, in addition, careful attention must be paid to rough and carious teeth, and ill-fitting plates of teeth must be improved. Even after every care has been bestowed, it is often extremely difficult to keep the surface of the tongue from constantly giving way. The excoriations may be cured as they appear, but a permanent cure can scarcely be hoped for. In such cases the best that can be done is effected by careful management of the health, by careful dieting, and by

the use of soothing remedies from time to time, as occasion arises, with sometimes the application of chromic acid or a weak astringent lotion.

FURROWS OR GROOVES, AND WRINKLES.

Furrows, fine linear depressions, or wrinkles, are met with on the dorsal aspect of the tongue in many persons, and are not necessarily tokens of disease, either past or present. In most persons there is such a furrow, which in some amounts almost to a fissure, in the middle line of the tongue. It varies in length from a few lines to an inch or more. Its edges can be separated easily by drawing them apart with the fingers, when it is seen to be quite smooth and without papillæ or fur, although the papillæ reach quite up to it on either side and the tongue is generally coated. This median furrow is not, in the natural state, ulcerated or excoriated, but is liable to become sore more early than the surrounding parts when the surface of the tongue is inflamed; and the excoriation, or ulceration, is then not easy to heal, on account of the constant contact of the sides of the furrow.

Natural furrows may be observed in other parts of the dorsum besides the middle line; they are usually directed longitudinally, and vary much in length and depth. They may, like the furrows on the forehead, be curved and forked; but they have not the same signification as the wrinkles on the forehead, for they are not signs of age, or, so far as I know, of care and anxiety. They may be observed on the tongues of quite young persons, but are not so frequent in them as in older persons: they are frequently due to the compression of a tongue a little too large to lie smoothly stretched out within the circle of the teeth. They are, therefore, in many instances, evidence of some past and, it may be, temporary inflammation, or hypertrophy, which has not completely subsided.

All these furrows bear the same general characters of smoothness of the interior of the depression, a complete absence of fur, a complete absence of induration about their borders, and the possibility of removing or smoothing them away momentarily by drawing apart their sides.

Their presence is not usually noticed by those whose tongues present them, and if it is noticed it is regarded as a curious phenomenon. Medical assistance is very rarely sought for their removal, and only by the highly nervous or eccentric. They are not amenable to treatment, nor is treatment needful.

Inflammatory furrows are not uncommon in tongues which are the seat of chronic superficial inflammation, and they are still more common in tongues which have been the seat of deeper limited chronic inflammations, which, after subsiding, have left the tongue enlarged. Of this latter class I have seen several excellent examples. One was in the person of a gas-fitter, who was one of my out-patients four years ago. He had been accustomed to drink a tolerably large quantity of rum each day, until his tongue became affected, and to smoke two or more ounces of tobacco every week. About two years before he applied for relief at the hospital the fore part of his tongue had been swollen, red, and sore, and although he had abandoned smoke and drink, the inflammation had endured a long time, and had left the tongue permanently larger than it was before. A large segment, chiefly of the front and right side of the dorsum, was swollen, and mapped out by numerous furrows, which, running over it in all directions, surrounded many small islands covered by perfectly smooth red mucous membrane. There was no ulceration of the bottom of the furrows, some of which were so deep and narrow that they might fairly have been termed fissures, and

they could all be smoothed out by the pressure of the fingers on each side of them. He came, not on account of the furrows, but because he was so frequently annoyed by the soreness of the islets which they surrounded. By reason of their prominence they were perpetually subject to friction from the teeth and from the food passing over them, and so became excoriated and inflamed. In this and similar cases the furrows and the raised areas between them bear no direct relation to each other, but are the results of a common cause, the compression of a portion of a tongue which is enlarged. The furrows can scarcely with precision be termed inflammatory, for they are only an indirect result of inflammation, and might be due to hypertrophy from any other cause.

True inflammatory furrows are such as have been described by Wunderlich in "Dissecting Glossitis." Demarquay speaks of the condition under the title of "chronic superficial glossitis," and says that this dissecting glossitis resembles the papillary form of acute superficial glossitis (whatever that disease may be), from which it only differs in the depth of the furrows with which the surface of the tongue is covered. Demarquay speaks of it as a very rebellious malady, of which the cure is often incomplete, the surface of the tongue retaining almost always afterwards a more or less mammilated aspect. The only example of this disease which I remember to have seen was in the tongue of a young man under the care of Mr. Savory, in Abernethy, during the past summer. He had been for some time a patient in the ward, and had not long before I saw him submitted to amputation of the thigh. The progress towards recovery was slow, and was interrupted by a rather acute attack of superficial inflammation of the tongue, which did not affect its entire surface equally or in the same manner, but produced with great rapidity a large number of

interlacing furrows, all of them very superficial, and many of them excoriated and very sore at the bottom. The surface of the tongue between them was smooth, redder than natural, and free from papillæ and fur. The appearance of the whole was not unlike that presented by an old painted door, which, through age and exposure to the sun, has cracked and dried, so that its former smooth surface is broken up and mapped out by vast numbers of intersecting lines and furrows. I, as well as others, thought at first that the disease was due to past syphilis, but there was no history of syphilis, and there was no other symptom to denote that the patient had ever suffered from syphilis. Further examination and consideration of the case led me to believe it to be an example of the more acute variety of superficial glossitis described by Demarquay and Wunderlich, but differing in one respect from what I may call "their" disease in the shallow depth of the furrows, which are, I imagine, generally deeper in the dissecting glossitis.

Both diffused and limited inflammations of the surface of the tongue may lead to scattered furrows, which are often permanent, especially when they have been preceded by actual ulceration (Plate II., Fig. 1).

Furrows which are due merely to compression of the tongue within too narrow limits can only be treated with success by such means as will reduce the enlargement, which is the prime cause of their existence. It is not usually the furrows, but the intervening areas, which we are called upon to treat, and the treatment fitted for them is such treatment as is needed in every similar condition of inflammation and excoriation of the surface of the tongue. It is described in the section on leucoma and chronic superficial glossitis, and need not be given here in detail. It consists in a careful attention to diet, with the avoidance of every article that can irritate the tongue, of

stimulants, and very hot or ice-cold foods, in abstinence from smoking and chewing tobacco, and in the administration of such local remedies as borax and weak solutions of chromic acid and chlorate of potash. The dissecting glossitis may be treated much in the same way, but the rapid formation of the furrows or fissures, and the frequency of ulceration of the bottom of the furrows generally call for more active treatment: stronger solutions of chromic acid (ten grains to the ounce), and the internal administration of chlorate of potash, and probably tonics, with cod-liver oil.

Furrows of the kind first described in the preceding section may be due to *syphilis*, and are, perhaps, more often due to syphilis than to any simple cause; but even when the same appearance of the surface of the affected part is produced, the furrows can rarely be so thoroughly smoothed out, for they have far more frequently been preceded by ulceration, or have been the seat of ulceration at some later period. It seems by no means unlikely that the disease which has been alluded to under the name "dissecting glossitis" may sometimes own a syphilitic origin; but I cannot remember to have seen a syphilitic case, and it is held to be quite unconnected with syphilis by Demarquay. The local treatment of the syphilitic furrowing is the same as that which is employed for the relief of the non-specific furrowing, and with it must be associated the internal administration of mercury or iodide of potassium, according as one or the other of them may seem better suited to the individual case of syphilis, and in such doses as are indicated by the general condition of the patient and the progress of the case. But if the furrows are deeply set, and have been the seat of ulceration, there is little hope of removing them by treatment.

FISSURES AND CLEFTS.

It has been mentioned in the last section that some of the natural and inflammatory furrows of the dorsum are so deep that they deserve the name of fissures, or clefts, rather than of furrows.

A fissure may be caused by the rubbing and deep indentation of a *rough and jagged tooth*. Then the fissure is situated at the border of the tongue, and is usually not very long, but may be both deep and starred, and may discharge foul matter. Usually there is inflammation around these dental fissures, and the base is often slightly raised and indurated, or may be swollen and sodden. The sides and bottom of the fissure are ulcerated; indeed, the condition may more correctly be described as a fissured ulcer than as an ulcerated fissure. The diagnosis of the character of the disease is usually easily made by noting the presence of the offending tooth, by the inflammation, the very slight induration, the sodden base, and the absence of other signs and history of syphilis. The treatment is to remove the jagged cause as speedily as possible, to use chlorate of potash gargles, borax and honey, and if stimulation is required, a solution of chromic acid, or of sulphate of copper, or chloride of zinc. Care should be taken not to irritate the sore place by caustics and other active treatment, for in persons who are over thirty years of age there is always the possibility that it may develop into carcinoma. The manner in which this change takes place, and the increasing intensity and depth of induration by which it is accompanied, are discussed at length in the chapter on ulcers, and in that on cancer. In most cases in which these foul fissures are produced by such a simple cause as a rough tooth, constitutional treatment will be necessary, for the depth of the fissure and the general characters of the sore indicate a lowered

PLATE II.

Fig. 1.—Fissured tongue from a man, 34 years old, the subject of tertiary syphilis.

Fig. 2.—Great disfigurement of the tongue, produced by tertiary syphilis, in a woman.

Fig. 3.—Chronic ulcer of the tongue in a man, surrounded by contracted tissues.

Plate II



Fig. 1



Fig. 2



Fig. 3

condition of the general health. Attention to the digestion and tonics are always useful, even if they are not absolutely necessary.

Syphilis is a much more common cause of fissures than any other, and the fissures occur for the most part in the tertiary period of the disease, although their occurrence is not limited to it. The fissures of *secondary syphilis* are formed almost always on the borders of the tongue, and are due almost as much to the rubbing of the teeth as to the syphilis. One of the conditions most frequently observed is that in which a mucous tubercle is developed on the border of the tongue, and being pressed on, or rather into, by the teeth against which it projects, ulcerates. The ulcer is linear or stellate, and gradually deepening, owing to the continuance of the pressure which first produced it, becomes by-and-by a deep and foul fissure. Any other swelling of the border of the tongue might lead to similar ulceration and fissuring; but it is more than probable that the syphilis acts as a powerful predisposing cause.

In secondary syphilis, too, it is not uncommon to meet with cases in which, without the development of mucous tubercles, the margins of the tongue are in many places ulcerated and sometimes deeply fissured, and this condition also is due in great part to the rubbing of the teeth against a tongue which is predisposed to inflame and ulcerate. These sores and fissures are scarcely at all inflamed, and are not angry, like the sores and fissures which are produced in persons out of health, but who are not syphilitic. In spite of the absence of a red areola, and the signs of inflammation, these cracks and fissures are usually very sensitive, and from the constant movement of the tongue, and the continual irritation to which they are subjected, are a source of great annoyance to the patient. The syphilitic fissures are generally easily recognised by the

gumma, or of a collection of gummata. He is put on iodide of potassium, and the sore is simply cleansed as often as he can manage it with Condy's lotion, and, when it flags in healing, with an astringent solution. The healing is steady, but is very slow, and it is long before the fissure is obliterated. A scar remains, not corresponding with the depth of the great cleft, for the two sides joined together over a part of their extent, but still quite deep enough to be easily seen when the tongue is protruded.

The second patient was a woman, who was for a while an inmate of Mr. Smith's wards. She was younger than the man, for she was not more than two-and-thirty. She was well-looking, and bore no marks of syphilis unless upon her tongue, but there was no attempt to conceal the fact that she had suffered some years earlier from the disease. Deeply grooving the dorsal aspect of her tongue were two long and sinuous fissures, each from an inch and a half to two inches in length, or even longer. Each fissure branched here and there, and thus bore the appearance of a river on a map, with its tributaries joining it at intervals. When she protruded the tongue it was not difficult to see into some parts of both the fissures, for their edges separated, and allowed the deeper parts to be discovered, and then it was seen that they were at least a third of an inch deep, and in some parts deeper, a great depth when the extremely short diameter of the cleft is taken into account. The sides of the clefts were either quite perpendicular or a little undermined, and were not ragged and sloughy, as in the last case, but smooth and glazed, here and there redder and more sensitive; and often at the bottom of the fissure could be seen coagulated discharge or decomposing food. The parts of the fissures which could not be perceived by the natural separation or falling apart of the sides could easily be brought into view by gently separating

them with the fingers. There was a little swelling and a very little induration of the borders of both fissures, and a narrow area immediately about them of smooth glazed dorsum, and beyond this the dorsum of the tongue was natural, and covered with papillæ and with fur. The patient suffered exceedingly, for although there was no inflammation of the tongue, it was extremely sensitive, and there was profuse salivation. During her stay in the hospital she made very little progress towards recovery, for she could not take iodide of potassium, on account of the iodism which it almost immediately produced, and none of the local applications which were ordered appeared to alleviate her suffering. Before she returned home she began to recover under small doses of the solution of bichloride of mercury and the local insufflation of a powder composed of morphia and oxide of zinc. After she left the hospital I lost sight of her, but I have little doubt that her fissured tongue healed, and that sinuous fissured scars, more or less deep, were left to mark the trouble she had passed through.

The third patient was also a woman about fifty years of age, who had had a very bad tongue for many years, and in whom the trouble recurred from time to time. Her whole tongue was strangely altered and disfigured; long furrows and deep fissures ran down the dorsum from far back almost to the tip, and more than half-way back were crossed by similar fissures, extending nearly quite across the tongue. In front of and behind these transverse lines there were other transverse fissures, less deep and long, merely producing a puckering of the tongue, instead of appearing almost to cut the tongue across. The sides of the fissures were quite smooth and covered with unbroken mucous membrane; nor was there any ulceration at the bottom of them. Between them the substance of the tongue bulged forth in smooth red masses, forming

longitudinal rolls, which were broken and puckered by the smaller transverse fissures. There were no papillæ or fur upon them, but the most central of them was roughened and warty. She was annoyed by frequent excoriation and ulceration of the prominent portions, which protruded between the fissures, but the fissures themselves seldom gave her any trouble. In her case treatment was directed solely to relieve the transient disturbance of the surface, for it was obviously impossible to remedy the general disfigurement (Plate II., Fig. 2).

The fissures in the first of these two women were probably due to the breaking down of long lines of small gummata situated in the mucous and submucous tissue; those in the older woman might have been due to the same cause, or might have had their origin in the contraction of long lines of organised inflammatory tissue. They were more probably due to the latter cause, for on this hypothesis it is much more easy to account for the bulging of the intervening parts. The contraction was sufficient to produce partial constriction of the vessels which return the blood from the superficial parts, without being sufficient to cut off the arterial supply, and thus these parts swelled and projected, and their papillæ were worn down, and finally disappeared.

I do not know that I can add much to the description of tertiary fissures contained in the foregoing cases. The first form, that in the tongue of the man, is perhaps the least common, for although large gummata and masses of gummata are frequent, they seldom, in their breaking, leave fissures, but usually large foul cavities. Both of the other varieties are much more frequently observed. They may occur at any period of tertiary syphilis, but belong to the later rather than the earlier periods. They affect, almost invariably, the dorsum of the tongue and the central

parts of the dorsum much oftener than the sides. The fissures of the first form, those which are actually the seat of ulceration when they are observed, and which are probably always due to the breaking-down of long lines of minute gummata, form generally long channels, with more or less smooth walls, according to the period at which they are seen. Immediately after the breaking of the gummata, the walls are still rough and ragged, but by-and-by they become smoother and indolent, and the bottom of the fissure would be in the same condition, were it not for the *débris* of food and the discharge which collect there. The borders are usually a very little raised, smooth, and a little more deeply coloured than the surrounding mucous membrane.

These fissures are not uncommonly long; I have seen them as long as two or three inches. They are generally sinuous, and often branched. There is no contraction of the tongue, for the period of contraction has not arrived, and does not arrive until the ulceration has healed. Healing may take place in two ways and with two very different results. The sides and bottom of the fissure may skin over, so that the fissure, when healed, still retains many of the characters it had when it was still an open sore. Its depth, the separation of its sides, its length, are all retained, but it is no longer sensitive, unless from accidental ulceration. With such healing there is very little contraction, but the tongue is exceedingly disfigured. The crevices are also prone to renewed ulceration on very little provocation, so that they are often sore, and require medical attention. The second manner of healing is that in which the two sides of the fissure grow together, so that it is in time obliterated; it is a healing by the second intention, the growing together of granulations. Although the deep cleft is closed, the condition of the tongue is often not much bettered on that account.

There has been so much loss of substance that a thick scar is formed, which, contracting, distorts the neighbouring structures, producing undue prominences, smooth bosses, which protrude on the dorsum, and, with the contraction, cause greater disfigurement than the presence of the fissures which are skinned over.

Such fissures as are described in the older woman may be the further stage of those which have been now discussed, and may owe their origin to the presence in the more superficial tissues of long lines of gummata. But they are probably quite as often due to the organisation and subsequent contraction of long lines of embryonic tissue which was formed in the mucous or submucous structures, a condition which has been described by Fournier as "sclerosis." In this process there is not necessarily ulceration, nor is there sloughing as in the destruction of a gumma. The entire process may take place, as it were, beneath the surface, and its occurrence may be only marked by the formation in the earlier stages of slightly raised smooth patches or lines of greater or less breadth, and in the later stages by the gradual sinking in of these diseased areas, which deepen and deepen until they produce the horrible furrows and fissures which disfigure some tongues which have been the seat of old tertiary syphilis. It is, however, rare for sclerosis to occur without the formation of gummata, either small or great, and it is not unusual to find the entire surface of the dorsum broken by gummata in various stages down to the last stage of destruction, and by such areas as are characteristic of the occurrence of sclerosis. The fissures alternating with raised smooth areas, and the breaking up of the whole surface of the tongue in this fashion, produce an effect not easily mistaken. Although some, at least, of these fissures were not ulcerated in the first instance, have never, indeed,

owed their origin to ulcers or been fissured ulcers, they are very subject to ulceration during and after the full period of contraction ; and as the intervening areas are even more liable to ulceration, these tongues are a source of more than distressing disfigurement to the patients. They are seldom free from sore places, therefore the owners of them are constantly compelled to seek relief.

It is important to bear in mind that the lymphatic glands are very seldom enlarged in association with syphilitic fissures, of whatever kind. Occasionally enlargement of one or more glands occurs, but the enlargement is almost invariably due to some accidental cause.

It is very unusual for a tertiary syphilitic fissure *to be mistaken for any other disease* than syphilis. It is so very rare to meet with deep and long fissures from other causes. Fissures, certainly, are formed in some cases of carcinoma, and sometimes in tuberculous disease of the tongue, but there is seldom any difficulty in distinguishing between these different fissures. Carcinoma does not appear in the first instance as a long sinuous fissure or a deep and ragged cleft of the tongue. There is, in almost every case in which clefts occur, a distinct tumour, and the fissures are clefts in the substance of the tumour, which is not uncommonly a large, more or less prominent, ulcerated mass. It is evident, at the first sight, that the disease is a malignant disease, and not a mere fissured condition of the surface of the tongue. Tuberculous disease might possibly be mistaken for syphilitic disease in a very few rare cases. Such a great ulcerated cleft as that described in the first case is occasionally formed in tuberculous disease, but it is not until the disease is very far advanced and the signs of tubercle of other organs are clearly apparent. The fissures which resemble those described in the second

case are occasionally formed in the earlier stages of tuberculous disease, but I know of no instance in which long sinuous fissures, such as were the notable feature of that woman's disease, have been formed in tubercle. The tuberculous fissure is generally small, not long or generally deep, at first single, and bearing such characters as are described in the section on tuberculous ulcers and in a farther page of this chapter. The associated signs, if there are any, are widely different in the two diseases, and the tongue is seldom without some other signs in the case of tertiary syphilitic fissures.

The *treatment* of tertiary fissures of the tongue is guided by the rules which prevail in the treatment of tertiary affections generally. Mercury is seldom administered, unless in the form of the solution of the bichloride or in very small doses of the powder of mercury and chalk. Iodide of potassium is in most instances so effectual, and so rapidly effectual, that it is almost invariably employed. The healing usually takes place more quickly with large than with small doses, therefore the dose may be increased at short intervals, from five or ten grains to twenty or five-and-twenty grains. There are, however, some cases in which even small doses of the iodide cannot be tolerated by the patient; I have mentioned one case of the kind in the record of the younger of the two women. Under such circumstances, resort must be had to mercury, and dram doses of the solution of the bichloride, or from one to two grains of the mercury and chalk powder, may be given. Intolerance of iodide of potassium does not necessarily imply constitutional weakness of the patient, and is therefore not a special contra-indication to mercury. Whether mercury or iodide of potassium is administered, the treatment will in most patients be greatly improved by the use of tonics and, perhaps, of cod-liver oil.

But, in addition to the general treatment of the case, the healing of the fissures may be often hastened by local measures, or if not materially hastened, may be rendered much more endurable by the patient. The use of chlorate of potash in the form of gargles of various strengths will probably suggest itself to most persons, and some patients are very much relieved by it. Borax and honey is also painted on the sore parts of the fissures with decided benefit. But there are other local remedies which are much more efficacious than these. In some persons glycerine of borax and glycerine of tannin, either of the Pharmacopœial strengths or diluted to a greater or less degree, produce a rapid improvement in the condition of the sores. Other persons are more certainly and speedily relieved, and their sores healed, by the use of gargles of black wash, either pure or diluted with liquor calcis. And in other cases, the application of weak solutions of the bicyanide of mercury with a soft brush at frequent intervals (three or four times a day), or in much stronger solutions once in two or three days, produces an excellent effect on the condition of the tongue. But the local applications from which I have seen the greatest benefit are powders blown on the tongue, just as they are blown into the pharynx or larynx through an insufflator. Pure iodoform, or iodoform and borax in various proportions, are excellent for the purpose; and if there is great sensibility of the affected part of the tongue, small quantities of morphia, from the twelfth to the sixth or more of a grain, may be added to each powder. The manner of employing these powders and other points connected with them are mentioned in the chapter on the palliative treatment of cancer and in the chapter on ulcers, but it will not be amiss to direct attention in this place to the necessity for cleansing, as far as is practicable, the surface of the fissure before the application of the

powder. This precaution ought, indeed, to be taken before any local application is made, otherwise the remedy does not reach the actual sore surface. Fissures especially require careful cleansing, on account of their depth and the tendency of food and other matters to collect in them. When the tongue is protruded and held gently out by means of a soft rag, the sides of the fissures often separate naturally, or if they do not, may be easily separated by pressing them gently asunder with the fingers. A stream of warm water, with a little Condyl's fluid in it, should be allowed to fall very gently into the fissure from a syringe, or through a syphon tube furnished with a nozzle. The stream clears out the material which has collected, and the surface of the fissure is clean, but it is still wet. It should be dried with a pellet of absorbent cotton-wool or with a tiny roll of blotting-paper, and then, while its sides are still separated and its deepest parts are exposed as thoroughly as possible, the powder should be dropped or blown into every part of it. The lack of these precautions is a great reason of the lack of success which attends the use of many local remedies which otherwise might be of the greatest service.

The same attention to diet which is paid in the case of other painful or sensitive conditions of the tongue should be paid here, and the possible advantage of feeding for a few days by the rectum must not be forgotten, although I have never yet seen a case so severe that this has had to be resorted to.

These remarks on treatment are intended to be applied to the first and second of the cases which were given as examples of tertiary fissures, and to all similar conditions, especially to those of the kind from which the woman suffered. Treatment by iodide of potassium and mercury is not likely to do much for cases of the third class, which, in truth, only

require or are benefited by treatment when they are accidentally inflamed or ulcerated. They are then much more often cured by attention to diet and by local remedies than by constitutional treatment.

Tubercle of the tongue rarely appears in the form of fissures, but as occasionally it does so, the possibility must not be ignored in this place. It is not, however, necessary to give a very full description of the disease. All the associations of the fissures are similar to those which surround tuberculous ulcers which do not assume the form of fissures, and it is only needful to describe the actual tuberculous fissures. They occur most frequently at the tip or borders, another point in which they differ from the tertiary syphilitic fissures, and they are much more often single than multiple. They are generally stellate or irregularly branched, and are very seldom long, like those of syphilis. The fissures are at first shallow, and are indeed merely a small kind of fissured ulcer, with indolent granulations or an absence of granulations, with a smooth border, pink or reddish-pink, and sometimes slightly raised. By the deepening of such an ulcer, without corresponding widening, a very deep fissure may be formed, which may extend down to and through the superficial layers of the muscle. As it rapidly deepens it may lose some of the characters of a tuberculous fissure, for the sides are prone to slough, and merely a foul and ragged cleft is sunk in the substance of the tongue. But the fissures which do not extend so quickly usually preserve their distinctive features longer, and can readily be distinguished for what they are.

For an account of the characters of the surrounding parts, of the general characters of the disease, and the question of the affection of the lymphatic glands, the reader may be referred to the chapter on ulcers and the section on tuberculous ulcers. Nor is there

anything to add to the treatment of the disease which will be found there, for a fissure of this kind requires no other treatment than that which is needed for a tuberculous ulcer.

Cancerous fissures scarcely need a separate description, but it is well to bear in mind that fissures may be connected with carcinoma in two different ways. A fissure which has formed as the result of some simple or specific cause may develop into a carcinoma, and a carcinoma may become the seat of fissures. The first metamorphosis of a simple fissure was alluded to in the beginning of this chapter, and it was there pointed out how the change is associated with increasing hardness of the base and borders of the cleft. The same thing may be said of the transformation of a syphilitic into a cancerous fissure. The change takes place almost always very slowly, and it is most difficult to be sure at a given moment whether a fissure is cancerous or not. This subject has been discussed at length in the chapters on ulcers and carcinoma, where the reader may be referred for further information, and where the measures to be taken for the diagnosis are considered.

The fissuring of a carcinoma is rather a matter of pathological than of clinical interest. It is not unusual for some of the larger and more exuberant carcinomas to split, as it were, and show deep clefts running far down into their substance. Large carcinomas are often broken up by several of these clefts, at the bottom of which discharge and decomposing food collect, and from which, in consequence, offensive odour emanates. They may, too, extend into vessels of larger size, and may thus be the source of hæmorrhage. There is no possible difficulty in the diagnosis, for the nature of the disease is written on the face of it: it is plainly a fissured carcinoma.

Fissured carcinomas require no special treatment.

CHAPTER VIII.

ULCERS OF THE TONGUE.

Simple Ulcers—Apthous Ulcers—Traumatic Ulcers—Ulcers in Hooping-cough—Mercurial Ulcers—Tuberculous Ulcers—Lupus Ulcers—Syphilitic Ulcers.

WEBER says quite truly, that, besides syphilitic, mercurial, and cancerous ulcers of the tongue, there is a great series of ulcers of other kinds. In truth, the tongue is very prone to ulceration; nor is this to be wondered at when the soft structure of the mucous membrane is considered, and the many sources of irritation and injury to which it is subjected. Even the teeth, which surround it on all sides on which it is exposed to injury from external enemies, and which look (when they are sound, and white, and clean) like a handsome range of bodyguards set there on purpose to protect it, sometimes fail to fulfil their natural duty, and even close upon it and wound it deeply, or falling to decay, slowly wear and irritate its borders. The food and drink, which, passing continually over it, serve generally to cleanse its coat, if taken too hot, or strong, or too abundantly, produce inflammation, and, as a frequent result of inflammation, ulceration; or, passing into the stomach, appear thence to re-act upon the tongue, and cause it to inflame and ulcerate. I spoke just now of the soft and delicate structure of the mucous membrane as a predisposing cause of ulceration; and it is well to note that, with the exception of syphilitic gummatous ulcers, and, perhaps, of some or all of those which are tuberculous, all the ulcers of the tongue are *primarily* diseases of

the mucous membrane. Even of cancerous ulcers this is true; for if they are not diseases of the superficial layers of the epithelium, the evidence which has been adduced is entirely in favour of their origin in the deeper layers. And for some kinds of ulcers, notably the cancerous, the very vascularity and activity of the membrane, which serves in health to preserve its integrity and to renew it speedily after slight injury, are among the chief causes of the rapid spread of the ulceration.

It is not easy to classify all the various ulcers of the tongue, but the best basis of classification is, I believe, that which rests on the causes of the ulcers. There is, then, no difficulty in placing the cancerous, tuberculous, syphilitic, and mercurial ulcers. The difficulty arises when the many ulcers which are not due to either of these causes are to be arranged; the aphthous, for example, and the ulcers which are described by some authors as inflammatory, by others as catarrhal, by others as dyspeptic. Perhaps the safest way of dealing with the various ulcers which cannot certainly be ascribed to a definite and clearly ascertainable cause will be to include them under the general name of "simple." Many of those which will be included under this head might, no doubt, fairly be classed as traumatic, inasmuch as they are due to slight injuries or irritation, but the injury or irritation cannot always be discovered or defined. The ulcers which are undoubtedly due to such injuries as the rubbing or bites of teeth will be considered under the term "traumatic." And although aphthous ulcers present many features which might justly lead one to include them among the simple ulcers, yet they present such special and distinctive features that it is better to class them separately as "aphthous" ulcers.

These remarks will suffice to introduce the study of the different varieties of ulcer.

Simple ulcers occur frequently upon the tongue. In some cases of *long-standing and inveterate chronic superficial glossitis*, where the surface of the tongue is almost everywhere void of papillæ, covered with a thin, bluish-white, pearly pellicle, which might form a continuous layer were it not broken up into numerous small areas by fine lines and fissures, simple ulcers not uncommonly occur. They tend to form in the centre of the tongue or of the diseased area, as if (what is not improbably the case) that part were more feeble, and less capable than other parts of resisting evil influences. They form sometimes by the actual sloughing of a fragment of the surface in the course of an acute attack of inflammation in the seat of the old chronic inflammation or scar tissue; but oftentimes they are formed by a kind of melting away of the epithelium. The sore which is in either case produced soon ceases to present an active appearance, and settles down into a chronic ulcer, with a smooth, red, glazed surface, inactive callous edges, not inflamed or indurated, unless from the dragging of the surrounding tissues towards it in a fruitless attempt to heal (Plate II., Fig. 3). Its shape is irregular, triangular, or starred, or fissured at the borders. Although it is so chronic, it is often sensitive, and even very painful, especially on the taking of hot and spiced and irritating food. It is therefore a source of much trouble to the patient, even the movements of the tongue producing distress in some instances. In the softer varieties of chronic superficial glossitis, in which the extreme smoothness and lissome character of the tongue is a more striking feature than the pearly or white pellicle, the ulcers which are very frequently observed are rather excoriations than true ulcers. The surface, especially at the tip and borders, looks red and raw, but the outlines of the raw patches are very difficult to define, and there is not any well-

marked depression, as in an ulcer. In truth, only the epithelium has been removed, leaving the corium of the mucous membrane uncovered and extremely sensitive. Few of those persons who suffer from chronic superficial glossitis in any of its varied forms escape ulceration of the tongue from time to time; nor is this to be wondered at, for the thick layer of epithelium which preserves the surface of the natural tongue is, in almost all conditions of superficial glossitis, exchanged for a much thinner and less efficient layer, and the thick plaques which form on some of these tongues at intervals, or which habitually cover the dorsum of some of them, peel off at intervals, and in their peeling off leave raw and unprotected areas. The diagnosis of these ulcers is easy on account of their association with chronic superficial glossitis; but the treatment is beset with difficulties. Not but that most of the ulcers and abrasions can be healed over, but they are scarcely healed when they break out again, or similar sores form in other portions of the tongue. It is on account of this tendency to ulceration and abrasion that persons with tongues affected with glossitis are obliged to live carefully and, for the most part, very plainly, avoiding hot, strong, sour, sharp, or even very sweet foods, preferring soft, unirritating substances and drinks. Those who are very subject to ulcers should, too, avoid smoking, and, above all things, the chewing of tobacco. Spirits are always bad for chronic glossitis: indeed, I am convinced that some cases of chronic superficial glossitis are to be attributed chiefly to the drinking of raw spirits, and the condition is aggravated by continuance of the habit.

For local remedies, it will be found that the same treatment is not suitable for every case. Thus, honey and borax painted frequently on the surface of the tongue affords speedy relief to some persons, solution of tannic acid and of alum to other persons,

chlorate of potash gargle to others, and a solution of chromic acid (five to ten grains to the ounce), again, to others. The chromic acid is recommended by Sir James Paget especially for those patients whose glossitis is of rheumatic or gouty origin; it should be painted on the surface of the ulcers and the surrounding tongue with a soft brush: it seems to deaden the sensibility if it does no more. Nitrate of silver, unless in very weak solutions, is seldom serviceable; in truth, the free use of nitrate of silver to all kinds of ulcers of the tongue, which was at one time the universal custom, and which is still largely practised, cannot be too strongly deprecated. So far from being beneficial, it is calculated to do infinite harm in many cases, and is a sure means of inducing cancer in those ulcers which may be said to be predisposed to cancer, but which a milder and more appropriate local treatment might have cured. It is not possible to lay down absolute directions as to which remedy should be used in each individual case; in practice I have sometimes found that the particular remedy which I thought applicable to a certain tongue suited it far less well than another remedy which *à priori* might have seemed unsuitable. I am therefore in the habit of employing first the remedy which seems most likely to be useful, the soothing remedies to the most irritable ulcers, the astringent to the chronic and less sensitive sores, and, if relief is not quickly afforded, of changing the local remedy until the desired effect is produced.

Occasionally a very chronic ulcer is met with in the centre of a large bluish-white or opaque-white plaque, which resists every treatment, whether local or general. It is absolutely callous; like an old ulcer of the leg seated upon the bone, its surface is smooth and dry, the surrounding tissues appearing to be drawn in towards it. Such an ulcer gives one the

impression that it might be cured if it were seated in some part of the body where it could be treated by first destroying its smooth surface and its callous edge, then planting it with grafts. But on the tongue it is, I believe, an incurable disease, and will remain incurable, unless some similar plan can be devised to those which are practised on the surface of the body. Even these ulcers may be rendered far less sensitive and more enduring by chromic acid or tannin or some other local remedy. It need scarcely be suggested that all obvious causes of irritation should be removed or lessened, that rough teeth should be taken out or smoothed down, that plates of artificial teeth should be as well-fitting and smooth as possible, and that the mouth and teeth should be kept carefully and thoroughly cleansed. The constitutional treatment is guided partly by a recognition of the causes which produced the chronic glossitis, and partly by the condition of the ulcer itself. It does not follow that ulceration of a tongue which is the seat of chronic glossitis of syphilitic origin will be improved by iodide of potassium or mercury; indeed, iodide of potassium is sometimes decidedly baneful to such tongues. The salivation which is always present when they are ulcerated is apt to be increased by the iodide. In more than one case in which the affection of the tongue was associated with eczema of the palms or of other parts of the body I have used liquor arsenicalis with advantage. But the chief reliance is, in almost every instance, to be placed on the local treatment, and the avoidance of all that can irritate or inflame the tongue.

The simple ulcers, which are described as *dyspeptic* or *catarrhal*, occur chiefly on the tip, or on the dorsum near the tip, but may extend some distance back towards the centre. One of the commonest conditions is that in which the dorsum of the tongue, from the tip for a greater or less distance back, is very red, and

almost raw. The filiform papillæ are absent, and, in consequence of this and of the general congestion of the superficial parts, the fungiform papillæ appear much larger and more prominent than natural. There are small superficial ulcers, without definite shape or characters, except that they are always red and irritable. Instead of ulcers, there may be only excoriations, and the whole of the diseased area may be quite raw, or the rawness may be limited to the central parts of the area (Plate I., Fig. 3). Behind the congested and ulcerated or excoriated area the surface of the tongue is furred, and the coating of fur is usually thick. There is not any general swelling of the organ, the disease being seemingly limited to the superficial parts. Although this condition is ascribed to dyspepsia, and is, in some instances, undoubtedly of dyspeptic origin, I have met with examples of it in persons in whom I could not discover any history or sign of dyspepsia. In some of these I have been inclined to attribute the condition to constant rubbing of the dorsum of the tongue against the roof of the mouth and teeth; in fact, to sucking of the tongue.

There is *another variety of dyspeptic ulcer*, with characters more decided than those of the ulcers just described. It usually results from the breaking down of vesicles or pustules, such as are described in the section on eruptions of the tongue. The vesicles or pustules, and, consequently, the ulcers which result from them, are almost invariably observed at or about the tip of the tongue. They break, and leave small, circular, well-defined ulcers, with sharp-cut edges, as if punched out. They vary in size from a pin's head to a split pea, but are sometimes larger, are very superficial, and are often covered with a thin layer of slough, but when no slough is present the surface is very red. These sores are much more tender and

irritable than those last described ; and as they frequently attack the very tip of the tongue, and are consequently in contact with the teeth, they are the source of great annoyance. Ulcers of this variety may, by the frequency with which they recur, and by the distress with which they are attended, prove quite a serious evil. I have lately seen a lady, verging on sixty years of age, whose life for more than two years has been made miserable by them. No sooner had she recovered from one outbreak of ulcers than she was attacked by another crop. At the time I saw her there were on the tip of the tongue, in two places on the left border, and in one place beneath the tip on the left side, small superficial ulcers, generally of rounded shape, covered by a thin slough, and surrounded by an angry red areola. They were so painful and tender that she could only take the softest food, and was almost obliged to restrict her diet to liquid food. There was salivation, and her speech was thick and indistinct. There were not any ulcers of the dorsum of the tongue, nor of the inside of the lips and cheeks, but she said they often occurred in these situations. Her gums, however, were shrunken, very red, spongy, and ulcerated where they were in contact with the teeth.

It was not easy to discover the exact cause on which these obstinate sores depended, but they appeared to be due to a general deficiency of strength, coupled with slight constipation ; and the treatment was aimed at correcting these defects, while a solution of chromic acid was ordered to be applied to the sore places. Sufficient time has not yet elapsed to enable me to decide whether she is likely to be permanently benefited.

Small circular ulcers, which may also be described as dyspeptic, occur occasionally on the under surface of the tongue, on either side of the frænum. They,

too, are superficial and punched out, with a golden or red surface. They are extremely sensitive, and occasion salivation. Weber thinks they are due to inflammation of the mucous follicles which are seated beneath the tongue, but I cannot find a sufficient reason for accepting his statement. These circular ulcers, whether of the dorsum or the under surface, are much more common in children than in adults; but they do occur in adults, especially in those who eat and drink heavily, and in invalids who are much enfeebled by disease. In children their dyspeptic origin is a matter of popular belief, and they are attributed by the nurses and those who have charge of the children to the eating of some food which has been forbidden or which is supposed to be unsuitable, unripe fruit, common sweet-meats, etc.

In the large majority of cases these dyspeptic ulcers and excoriations are not treated, and do not require treatment. A seidlitz powder or a dose of castor-oil, followed by care in diet, serves to allow them to recover in the course of a day or two, and, in worse cases, within a week. If they are more obstinate, or if they frequently recur, the patient must be regularly dieted: non-spiced and non-irritating food, not much meat, not much stimulant, but milk and other plain and simple food. The bowels should be kept open by the use of confection of senna or a dinner pill, or, for children, a little grey powder and rhubarb. The regular taking of medicine is rarely needful. But the distress arising from the presence of the most irritable sores may be greatly allayed by gargles of chlorate of potash or borax, in some cases by a weak solution of alum; and in children, by painting the sore places at intervals with a solution of chromic acid, or even by touching the most tender ulcers with nitrate of silver. The caustic is painful for the

moment, but the application is followed by very quick relief.

Apthous ulcers are met with both in children and in adults, but so much more frequently in children that the disease is described as a disease of infancy and childhood. They attack children between the ages of six months and three years, are less common after the end of the third year, and rare after the fifth year. Dr. West says they may be either concomitant with or a sequel of measles, or may be idiopathic. In the former case they depend on an extension to the mouth of a state of inflammation similar to that which gives rise to the eruption on the skin. Naturally, as a surgeon, I have seen the idiopathic affection much more frequently than that which is associated with measles. It is generally preceded or attended by slight fever, with loss of appetite, and general malaise, and the evacuations are unhealthy. The child's mouth is hot, and there may be some salivation, especially in older children. If the child is suckled, it sucks with evident discomfort. The breath is almost invariably fetid. If the mouth is examined, the mucous membrane is livid or deep red, and on the surface of the tongue, especially near the tip, a few small vesicles may be observed. But the disease is not limited to the tongue; the inside of the lips, the inside of the cheeks near the angles of the mouth, and sometimes other parts, are the seat of similar vesicles. The vesicles soon burst, and leave behind them ulcers, small, round, or oval, superficial, with sharp-cut edges, with a yellowish-white adherent slough upon them, and with a bright red areola surrounding them. The crop of vesicles varies in number, but there are rarely more than twenty. Usually the ulcers rapidly heal, the tongue regains its natural appearance, and the patient is soon quite well; but it not uncommonly happens that the first crop of vesicles is followed in a few days

by a second crop, and the second by a third crop, and in this manner the malady may be prolonged during many days or weeks. This is the reason why vesicles and ulcers are sometimes observed in the mouth of the same patient; the vesicles are those belonging to a fresh eruption; the ulcers are the result of a former crop of vesicles. If the course of the individual ulcers is observed, it will be noticed that the little curd-like slough on each remains for a long time adherent, and can only be detached with pain and slight bleeding, while the area around the ulcer remains very red. In the course of three or more days the slough separates, and a shallow ulcer or excoriation is left, which speedily heals, and leaves behind neither permanent stain nor scar.

I have said that there are reasons for including these aphthous ulcers among the simple ulcers, inasmuch as the individual ulcers resemble some of the simple ulcers, and both diseases appear to be largely due to dyspepsia. But the greater reasons for describing aphthous ulcers as a separate disease are apparent, I would venture to say, in the description. The general malaise, the fœtid breath, the successive crops of vesicles, and the number of the vesicles and ulcers, stamp this as a special variety, at least, of dyspeptic ulcer.

The very symptoms which have been mentioned, the malaise, the fœtor of the breath, and the successive crops of vesicles and ulcers, render the *diagnosis* of aphthous ulcers very easy. And the characters of the ulcers themselves are so striking that there is little fear that this disease will be mistaken for any other. The curd-like slough, the small circular sores, and the bright red areola surrounding them, are peculiar to aphthous ulceration. The fact, too, that the disease almost invariably attacks children will not be lost sight of.

In many cases of aphthous ulceration no medical *treatment* is called for. A dose of opening medicine is given by the mother or nurse, the mouth is washed with water, and the patient recovers in a few days. But in the majority of instances the patient is poorly and the tongue is very sore, therefore medical aid is sought. The bowels must be cleared by a dose of castor-oil or a small quantity of rhubarb powder mixed with carbonate of soda ; or, better still, sulphate of magnesia may be given in a mixture, thus : two drams of sulphate of magnesia, one dram of tincture of orange-peel, and six drams of water ; a fourth part to be taken every hour until a thorough action of the bowels is produced. The child must be put on very plain diet, without salt food or pastry of any kind, but consisting largely of milk, with one or two eggs. Chlorate of potash may be administered in doses of four or five grains every four hours, and the tongue may be wiped over, as Dr. West recommends, at frequent intervals with a soft piece of rag dipped in a lotion of borax. I prefer, however, the formula he has advised : one containing a smaller proportion of glycerine, and generally order half a dram of borax, with twenty minims of glycerine, in an ounce of water. The larger quantity of glycerine is apt to irritate, on account of the rapidity with which it combines with water. It is seldom necessary to use an astringent lotion unless the ulcers flag in healing ; but they may then be treated with a weak lotion of alum or nitrate of silver, and syrup of the iodide of iron or some other preparation of iron, with cod-liver oil, may be ordered.


I do not think it is advisable to administer mercury in any form to children suffering from aphthous ulceration, not even as a mercurial purge. The children are generally below par, the ulceration is foul and unhealthy ; and these are the very cases in which we may expect to meet with gangrenous stomatitis, the

occurrence of which has in some cases been attributed to the administration of mercury, although it has been given in very small doses.

This account of aphthous ulcers must not be closed without alluding to the possibility of contagion. I have, on more than one occasion, seen two or more children in a family attacked either simultaneously or after a short interval; and the question has naturally arisen whether the disease has in such cases been due to one common source, or whether one child has caught it of another. Aphthous ulceration of the mouth has, by some authors, been attributed to the presence of a special parasite, and more than one author (F. Clarke, for example) has confounded this disease with thrush, and has spoken of aphthous ulcers as due to the presence of *oidium albicans*. But there is no relation between the two diseases, and there is no evidence to prove that aphthous ulcers are due to the action of a parasite. In the slight outbreaks I have seen the disease has occurred so nearly at the same time in the patients who were attacked that I have been disposed to attribute the epidemic to a common cause rather than to contagion. In one family of children it followed close on a debauch on sweets, which seemed to have been as bad as they were plentiful.

Traumatic ulcers.—Ulceration may follow a wound, whether inflicted by a cutting instrument, a firearm, or by the teeth. No special description is needed of the sores which depend on wounds; their cause is evident, and their treatment will be guided by the general laws of the treatment of wounds, which are considered in the chapter on wounds of the tongue. But the ulcers which depend on the continued irritation or injury produced by *rough and carious teeth*, or by the chafing of a badly-fitting or rough plate of teeth, are so important on several accounts that they

must be separately dealt with. They form almost invariably on the tip or borders of the tongue, and vary much in character, according to their date and the kind of irritation to which they have been subjected. They may be mere cracks or excoriations, or may be ulcers of half-an-inch to an inch in length, but they are seldom very deep, unless a ragged tooth has pressed directly into the affected part of the tongue where it is swollen and œdematous. The surface of the sore (for there is usually only one) and the borders are covered with a shreddy slough; the edges are sharp-cut and irregular, eaten out; the surrounding area is angry; and all the tissues of the tongue for some distance around and beneath the sore are swollen, sodden, or even indurated (Plate III., Fig. 1). The swelling of the subjacent tissues may cause the ulcer to be upraised to a considerable extent. The dorsum of the tongue at a little distance from the ulcer, in fact beyond the swollen area, is thickly coated, and the breath and the ulcer, too, often smell badly. In more chronic cases the induration may be more marked, but the swelling around the sore is less, the edges are not so sharply cut, the surface is not sloughy, and the surrounding area is not so red and angry. The whole disease is more defined and much more difficult to diagnose. The thickening and induration is, in some instances, so marked a feature of the affection, and the ulceration is so inconsiderable, that Demarquay has described it under the name of deep chronic glossitis. Paget has pointed out that the formation of these ulcers depends largely on the condition of the general health, and says that, as long as the health is good the tongue may tolerate without damage the irritation of decayed and rough teeth; and this, no doubt, is largely true of the more active and ill-looking of the traumatic ulcers, but the more chronic and



indolent thickenings and ulcers do not depend so much on the condition of the patient's health.

The *diagnosis* of these traumatic ulcers is often a matter of extreme difficulty. The active ulcers are liable to be mistaken for syphilitic sores, the indolent forms for tuberculous, or syphilitic, or cancerous ulcers. The rapid formation of the ulcer, the sodden condition of the surrounding parts, and the very small amount of real induration, together with its seat opposite a rough or carious tooth, and the absence of the signs of secondary or tertiary syphilis, should serve to distinguish the traumatic ulcer from almost any variety of syphilitic sore. The condition of the teeth and the relation of bad teeth or plates to the position of the ulcer are points to be carefully looked to. The diagnosis of the chronic forms of traumatic ulcer is infinitely more difficult. They have to be distinguished from primary syphilitic sores, and this may be done by the much greater hardness and circumscription of the initial lesion of syphilis, the almost invariable seat on the border near the tip, and the enlargement of the lymphatic glands, which is rarely present in association with a traumatic ulcer, unless it is very acute and angry. While, too, traumatic ulcers are of frequent occurrence, initial sores of syphilis are extremely rare. In the course of many years of out-patient practice in one of the largest hospitals in this metropolis, I have seen primary sores on many parts of the face, and frequently on the lips, but I have never seen one on the tongue. Nevertheless, the possibility of their occurrence must not be overlooked. From a syphilitic gummatous ulcer a traumatic sore may be distinguished by the much larger lump and induration usually seen in gummata; by the deeper ulceration and the foul surface of gummatous ulcers; by the presence, in many instances, of more than a single gumma; and by the associated signs of past or

present syphilis, either on the tongue or elsewhere upon the body.

The diagnosis between a traumatic and a tuberculous ulcer depends on the greater depth of ulceration; on the lack of induration in many instances; on the presence of tubercles in the surrounding structures of the tongue. Primary tuberculous ulcers of the tongue are very rare, so that there are almost always other signs of tubercle in the lungs, the larynx, or in some more distant region of the body. Nor should the family history, which may throw much light on the disease, be overlooked.

Most difficult of all is the diagnosis from carcinoma, and the difficulty is not at all diminished by the fact that it is not unusual for a carcinoma to take its origin in a traumatic sore, so that a time may come when the sore is neither wholly cancerous nor wholly traumatic. The induration at its base may be actually due to ingrowth of the epithelium, but the epithelial ingrowth is not yet so strong as to stamp itself on all the deeper tissues, and appropriate treatment may yet succeed in averting the calamity. The diagnosis may be largely affected by the age of the patient, for a traumatic ulcer may occur at any age, while the occurrence of cancer is almost unknown in persons under thirty; but inasmuch as the causes which generally produce chronic traumatic ulcers are much more common and more potent in adults than in children, so traumatic ulcers are far more common in adults, and in old adults than in young adults, so that this aid to diagnosis is seldom available. In the earlier stages of the disease the traumatic ulcer may be distinguished by the visible cause which has produced it, and by the less induration which surrounds it. It is in these cases especially that I regard the examination of a scraping of the ulcer with the microscope as very useful. (*See* page 288.) As the disease advances, the characters of carcinoma

become more apparent in the increasing induration, the gradual extension and deepening of the ulcer, which is out of all proportion to the kind and amount of irritation, and the enlargement of the glands beneath the jaw. But the diagnosis may be certainly made, in the very large majority of cases, long before the glands are affected by the examination of a scraping. Amongst other signs, it must be borne in mind that carcinoma of the tongue is much more common in men than women.

The *prognosis* and *treatment* of traumatic ulcers are, for the very large majority of instances, very happy. For, although it is not unusual for carcinoma to be preceded by traumatic ulcer, it is nevertheless possible to cure nearly all traumatic ulcers if they are properly treated. The source of irritation must be as quickly as possible removed: rough teeth smoothed down, carious teeth taken out, ill-fitting and roughly-made plates altered or dispensed with. These precautions, which are desirable in every case, are doubly desirable or necessary in the cases of persons over forty years of age, for in them the possibility of carcinoma is many times greater than in persons under forty. If there are very cogent reasons against the removal of a carious tooth, the tongue must be protected from it by covering the tooth with a thin plate of smooth vulcanite or cellulose. The removal of the irritation is, in many instances, sufficient for the cure of the disease, but it is desirable to supplement it by ordering the patient to frequently paint the surface of the sore with a solution of chromic acid (ten grains to one ounce of water) or with a lotion of borax, glycerine, and water, in the proportion mentioned in the last section. If the ulcer is unhealthy and sloughy, the tongue thickly coated, and the breath unwholesome, the bowels should be freely opened, a chlorate of potash gargle used at frequent intervals,

and the patient put on tonic medicines and a liberal diet. In chronic cases, if the diagnosis between carcinoma and traumatic ulcer is very doubtful, and the ulcer does not quickly mend after the removal of the source of irritation and the use of other simple measures, I have no doubt that the best course is to remove the disease, and with it an area of at least a quarter of an inch of healthy tissues. These are the cases in which it is possible, by a timely operation, neither large nor dangerous, nor seriously lessening the utility of the tongue, to avert one of the most terrible and deadly of cancerous diseases.

Ulcers in hooping-cough.—It is stated in some works and articles on hooping-cough that it is not unusual to find ulcers in the mouth at some time during the course of the disease; but certain of the French authors have drawn attention to the frequent occurrence in children with hooping-cough of ulcers underneath the tongue, in the immediate neighbourhood of the frænum. These ulcers are described as oval, superficial, and of small size, with irregular borders and a covering of thin grey slough. Their origin and the relation they bear to hooping-cough have been discussed with much animation by the authors who have described them. On the one hand, they are said to be a specific lesion of hooping-cough; on the other hand, they are said to be no more than an accident of the disease, and to be actually due to the rubbing of the tongue against the teeth during the paroxysms of coughing. I have never seen any ulcers in the mouths of patients with hooping-cough which appeared to be due especially to that disease, but aphthous ulcers of the tongue and other parts of the mouth are not unusual, either during the preliminary catarrhal stage or when the cough is thoroughly developed; and I believe that all the sores which have been described are but aphthous and traumatic sores.

PLATE III.

Fig. 1.—Ulcer due to the rubbing of bad teeth, with sloughy surface and slightly raised red base.

Fig. 2.—Tuberculous ulcer of tip, in a woman, 45 years old.

Fig. 3.—Lupus of fore part of tongue in a woman, 23 years old, with lupus of face and nose. The mouth is opened, the lower lip is everted and the seat of a sloughy ulcer, and the tongue, which cannot be protruded, is seen through the slightly parted lips.



Fig. 11



Fig. 12



Fig. 13



Mercurial ulcers.—Ulceration of the tongue from mercury is a rare event in these days, when so much care is taken in the administration of mercury ; but it is occasionally seen in persons who are singularly sensitive to its effects, or when sufficient caution has not been exercised in taking it. It may occur, too, in workers in mercury or in persons who have been subjected to the action of the fumes of mercury. The actual ulcers are generally shallow and irregular in shape, surrounded by a red area, but sometimes they eat much more deeply into the substance of the tongue. In either case they are usually the result of sloughing, and the sloughs cover them for some time after their formation. But the ulceration is only a part of a general diseased condition of the mouth produced by mercury. The ulcers are not limited to the tongue, but affect the gums, the insides of the cheeks, and other parts. The tongue is swollen and sodden ; the gums are swollen, spongy, and separated from the teeth ; the teeth are loose and covered with pasty deposit ; there is profuse salivation, and the breath is peculiarly fœtid. These associated conditions make the diagnosis of mercurial ulcers very easy.

Recovery usually quickly follows the discontinuance of the mercury, but the cure may be expedited and the patient much relieved by the administration of chlorate of potash in ten grain doses every four hours, and by the use of gargles of chlorate of potash or of Condry's fluid. At a later stage, if the tongue remains still swollen and the ulcers are slow in healing, astringent gargles of sulphate of iron or nitrate of silver may be used ; and throughout the treatment, tonics and nourishing food, with port wine, are almost always indicated.

Tuberculous ulcers.—The occurrence of tuberculous ulcers of the tongue has been recognised and described for at least five-and-twenty years, but the

disease is so uncommon that at intervals it excites an entirely new interest, and is described almost as if it were a new disease. A wave of this kind passed over the Pathological Society of London during the course of the session 1883-4, when several cases of tuberculous ulcer were described, more than one shown as a "living specimen," and the minute anatomy and pathology of the disease discussed. It is, indeed, well that the attention of the profession should be called anew, at not too distant intervals, to the occurrence of ulcers of the tongue which are rarely seen, and which are difficult to diagnose and are apt to be overlooked.

The first description I have found of a tuberculous ulcer of the tongue under that title is by Sir James Paget in 1858. In the division which he then made of ulcers of the tongue, he described as separate diseases "strumous" and "tuberculous" ulcers, but the two affections are now described under the common title of "tuberculous" ulcers; and in a conversation which I had with Sir James Paget on this subject not long since, he told me that he did not know of any means by which the two diseases, if they occur separately on the tongue, could be distinguished.

A completely developed tuberculous ulcer, not too broken down and sloughy, presents most of the following characters: the surface is uneven, pale, and rather flabby, granulated, often covered with yellowish-grey viscid or coagulated mucus; the edges are sometimes sharp-cut, sometimes bevelled, seldom elevated, or everted, or undermined, not usually very red, but often redder than the surrounding tongue; there is very little surrounding induration; indeed, there may be none; the adjacent portions of the tongue are generally a little swollen, sometimes decidedly swollen and sodden; the outline of the ulcer has no characteristic

shape, but the borders are often sinuous, and the shape is not unusually oval or ovoid or elongated. In the immediate neighbourhood of the ulcer, and perhaps extending for some distance beyond it, are sometimes observed tiny yellowish-grey points or patches or elevations, or, in the place of these, minute ulcers, which in time increase in size. The depth of the ulcer varies much; in the earlier stages it is superficial, but as the disease advances it may eat deeply into the substance of the tongue, and eating more deeply at one part than another, may present different depths at different parts. It is almost invariably painful in the later stages, and there is almost always salivation.

In this description some resemblance may be discovered to the tuberculous ulcers of other parts of the body; in the pale and flabby granulations, the sharp-cut or bevelled edges, the absence of surrounding inflammation and induration. Weber speaks of the caseous surface of a tuberculous ulcer of the tongue which he observed, and this is sometimes seen in other tuberculous ulcers, but it is by no means constant in any part.

Tuberculous ulcers of the tongue may *commence* in several different ways: by the breaking of a small blood bleb or vesicle, or by the formation of a tiny nodule or a little yellow point or patch, which gives way before it attains the size of a pea, or even half that size. And in not a few cases the ulcer forms as the direct result of some continued irritation or slight injury. I have at this moment under my care a woman who has a tuberculous ulcer on the tip of the tongue, which is attributed to the rubbing of the lower teeth in front, and the marks of the teeth can be plainly perceived through and beyond the area of the ulcer (Plate III., Fig. 2). Yet, although it is thus continually irritated, it shows no disposition to inflame, but, bearing all the characters of a

typical tuberculous ulcer, slowly melts away the tip of the tongue. These ulcers are commonly seated at or near the tip, and from the tip may extend for some distance along the borders, or may spread back into the muscular substance. But they are not limited to the tip and borders, and may occur on almost every part of the tongue, especially on various parts of the dorsum. They attack men more frequently than women, and in this respect resemble cancerous and syphilitic ulcers. They are much more frequently observed in adults than in children, but there is no period of life to which they are strictly limited, for they have been observed in persons of all ages, from childhood up to sixty and seventy years of age. At first the ulcer (or ulcers, for there may be more than one) is indolent, not painful or very tender; but as the disease advances it grows more and more painful, and is extremely tender, the passage of the softest food over it being attended by excessive pain; and about this time salivation becomes a prominent symptom. As the sore increases and the patient's strength declines, sloughing may take place; the granular surface of the sore is lost, and it assumes more active characters. Or, without actual sloughing, it may rapidly advance, melting down, as it were, the tissues of the tongue, and laying bare the muscular fibres, so that they appear like the fibres of raw meat. The lymphatic glands beneath the jaw are enlarged perhaps in the majority of cases, but not by any means invariably, although they might be expected to enlarge from the very nature of the disease, so prone is it to affect lymphatic glands. Hitherto the ulcer has been described as if it invariably pursued a downward course, and so, as a rule, it does, and death results within a few months, or at most a year or two. But this is not absolutely sure; the superficial tuberculous ulcers may heal, even after they have existed for many

weeks or months, and have presented all the signs of tubercle, and been associated with symptoms of tubercle in other parts of the body. Yet, though they heal, their healing is, for the most part, only for a time; they break out again, sometimes after a year has elapsed, and the disease pursues its course to death. The woman of whom I spoke had tuberculous caries of the nasal bone of the right side, and the scars of numerous abscesses in the neck and beneath the floor of the mouth, and some of her glands are even now enlarged, but apparently not as a result of the ulceration of the tongue, for this has only existed a few weeks. She tells me that several of her mother's family died of consumption, and that her two only brothers died of scrofula and consumption. These associated signs of tubercle and such a family history must be sought for, and may often be obtained in cases of tuberculous ulcer of the tongue; but the absence of them must not be taken as a proof that the disease is not tuberculous.

The *general anatomy* of tuberculous ulcers of the tongue does not differ in any important respect from the general anatomy of tuberculous ulcers of other parts of the body, except that there is not, perhaps, so strong a tendency to caseation as in tuberculous disease of such parts as the lung and testicle. Nor does the *minute anatomy* of the disease differ materially from that of other parts. There is the same infiltration of the tissues with small cells, like leucocytes, the same occurrence of the so-called giant cells, the same arrangement of epithelioid cells, and the same reticulum. The bacillus of tubercle has been discovered in vertical sections through the floor of the ulcers.

The tuberculous ulcer occurs both as a *primary* and as a *secondary* manifestation of tubercle. Primary ulcers of the tongue are, indeed, extremely rare; but

several cases have been recorded in which the disease of the tongue has preceded, by several months or longer, the symptoms of tubercle of other parts of the body. Secondary ulcers are much more common : they are usually associated with tuberculous disease of the lung and larynx, or of the lung alone ; and after death, the glands, the spleen, kidneys, liver, and other organs, are often also found to be affected. The frequency with which tuberculous disease of the tongue is associated with similar disease of the lungs and larynx raises some interesting questions with regard to the relation of the lingual to the laryngeal and pulmonary disease. In the first place, primary tuberculous ulcers of the tongue are almost invariably followed by the occurrence of tuberculous affection of the lungs, and frequently of the larynx also. In the second place, secondary tuberculous ulcers of the tongue are almost invariably associated with tuberculous affection of the lungs, and often of the larynx. Are these associations merely accidental occurrences ? or do the affections of the tongue bear a direct relation to those of the lung and larynx ?

At present, the answer to the question, in so far as it relates to primary disease of the tongue, must be that there is not sufficient evidence to prove that the affection of the lungs is produced by that of the tongue. Even if it is certain beyond all possibility of doubt that the disease of the tongue is primary, and has preceded the occurrence of tubercle of the lungs, still proof is not forthcoming that the lungs have been inoculated. Unless the disease of the tongue is very extensive, and the patient very ill and unable to swallow easily, the discharges of the ulcer are not likely to find their way into the lungs, save in the smallest quantity. Conveyance by the inspired air is almost the only means by which the contagious material can reach the lungs. Evidence which might

do much to elucidate this point might be furnished by cases which have been submitted to operation. Unoperated tuberculous ulcers of the tongue may be said to end fatally almost without exception; and almost without exception by tuberculous affection of the lungs, the symptoms of which appear at a variable period before the patient's death. But if many cases could be collected of the removal of primary tuberculous ulcers, in which the patients had been observed for a year or two, or more, after the operation, without the occurrence of tuberculous disease of the larynx or the lungs, it might fairly be assumed that in those cases in which the ulcer was left and the lungs became affected, the lungs had been inoculated from the ulcer of the tongue. At present, evidence of this description is very meagre, but time and opportunity may afford much more in the course of the next few years.

The probability that secondary tuberculous ulcers of the tongue are due to inoculation from tuberculous affection of the lung and larynx is much greater. Secondary ulcers of the tongue are not very uncommon in the course of pulmonary tubercle, especially during the later stages of the disease. The discharges from the ulcers and cavities of the larynx and the lungs are continually passing over the surface of the tongue, and are charged with bacilli. And the tongue is often abraded, or even ulcerated, in these debilitated patients, so that the inoculating material may be actually applied to a raw surface on the tongue.

The *diagnosis* of a tuberculous ulcer, in the absence of any other signs of tubercle, is admitted by all observers to be extremely difficult. The diseases for which it is most frequently mistaken are syphilis and carcinoma. The signs which can be chiefly relied on in the diagnosis of a syphilitic from a tuberculous ulcer are, that tertiary syphilitic ulcers more often

affect the middle, and not the lateral, portions of the tongue; that gummatous ulcers are associated in most instances with much more tumour formation than tuberculous ulcers; that gummatous ulcers are, for the most part, much deeper, with undermined edges; that the lymphatic glands are never affected in association with syphilitic tertiary ulcers, but are not infrequently enlarged in connection with tuberculous sores. These signs, however, are thus marked only in the most typical examples of each disease. In many cases the diagnosis can only be made by observing the associated symptoms of syphilis, or by testing the effect of treatment. The history of the case and the family history of the patient may also throw light on the nature of a doubtful case.

The diagnosis between tubercle and cancer is even more difficult than between tubercle and syphilis. The same seat is common to both diseases; enlargement of the lymphatic glands may occur in both; men are more liable to both than women; and both diseases may have their origin in an injury. In typical cases, the absence of decided induration of the borders of a tuberculous sore, the sodden condition of the adjacent portions of the tongue, the pale pink colour of the surface of the sore, the presence of caseous material, and the tiny yellow points or patches in the surrounding mucous membrane, serve to distinguish a tuberculous ulcer. Tuberculous ulcers may occur, too, in persons far too young to have cancer of the tongue. But in the most difficult cases the diagnosis is almost impossible from a comparison of the general characters of the two diseases. Nedopil tells how every one of the four primary tuberculous ulcers he had seen were cut out, on the assumption that they were cancerous. The effect of treatment cannot be tested as for syphilis, for treatment has little effect on either disease, unless the treatment is

removal. These are the cases in which I believe the examination of a scraping of the surface of the ulcer is of value. It does not, indeed, prove the tuberculous nature of the doubtful sore, but it affords clear proof, in many instances, that a doubtful ulcer is cancerous. At present, tubercle can only be suspected by the absence of the distorted cells and cell-nests proper to squamous carcinoma; but it is not improbable that ere long a positive proof may be obtained of tubercle in the discovery in the scraping of tubercle bacilli. The search for the bacillus in this manner was suggested by Dr. Thin and myself at a meeting of the Pathological Society of London not long since. But I am bound to say that I have since examined the scraping of an ulcer of the tuberculous nature of which there could be no reasonable doubt, and the bacillus was not discovered. This one case must not, however, be regarded as conclusive.

The *prognosis* of tuberculous ulcer of the tongue is almost as unhappy as that of carcinoma. Not only is the disease fatal, but it is usually fatal within a few months, or from one to two years, and its downward course is accompanied by great distress and pain. The patient is to be regarded as fortunate if he is relieved by rapidly progressive tuberculosis of the internal organs before the ulcer of his tongue has become very large and painful. Yet, there can be no question that tuberculous ulcers of the tongue do heal. The cure is, indeed, but temporary; the disease returns, and the second outbreak is almost invariably incurable and fatal. Tuberculous ulcers are also prone to vary from time to time, changing their aspect with the general fluctuations of the disease, causing less pain and salivation when they are more healthy, becoming more troublesome when they are progressive. It may be wondered why the prognosis of a case of tuberculous ulcer of the tongue should be so much

worse than the prognosis of a case of tuberculous disease of the testis or of one of the bones. In the one case, death is predicted in almost every instance, and the duration of the disease is set down as probably a year or eighteen months; in the other case, the diseased organ may be repaired either with or without operation, and the prognosis, as regards the patient's life, is certainly not very bad. If the disease is limited to the affected part, even though the prognosis be bad for that part, it is for many persons not bad for the whole body. It may be said that those cases in which the prognosis is good are cases of scrofula, not of tubercle; and, for some cases, this may be correct. So, too, the apparently tuberculous ulcers of the tongue which heal may not be truly tuberculous; they may be merely scrofulous, but in their recurrence may be, or may become, tuberculous. I have already said that we have no means of distinguishing a purely scrofulous ulcer of the tongue, but I have no intention of denying the existence of such ulcers. Yet I believe that the answer to the question of the relative prognosis of tuberculous ulcers of the tongue and other parts of the body will not be found in any essential difference in the general or anatomical characters of the disease, but in the conditions with which it is associated. If the ulcer of the tongue is secondary, it usually occurs late in the course of active tuberculous disease, in persons already rapidly declining. If it is primary, the possibility of infection through it cannot be overlooked, while the ulceration itself is, or speedily becomes, a serious cause of debility, at all times interfering with the comfort of the patient, but especially hindering the taking of sufficient food.

The *treatment* of tuberculous ulcer of the tongue would probably be more successful if the impression were not so strong that the disease must necessarily be

fatal, that the ulcer itself is incurable, and that it is useless to do anything for so intractable a disease. In connection with the question which was raised regarding the possibility of infection of the lungs and larynx through the medium of the ulcer of the tongue, the further question must arise whether it would not be better freely to remove every tuberculous ulcer of the tongue which appears to be primary while it is still of small size, and easily within the reach of operation. I am strongly in favour of this course, for several reasons : first, because there is the possibility that the operation may preserve the patient from further tuberculous disease by infection through the ulcer ; second, because the disease is in most cases not difficult to reach or to remove, and the operation is far less formidable than that for carcinoma ; third, because the ulcer is itself exceedingly distressing, and, through the distress which it occasions, leads to debility and death.

I am prepared to go even farther than this, and to remove a secondary tuberculous ulcer if it is limited and small, if the associated disease is not advanced, and if the operation is likely to be well borne. And I would urge the operation, not with a view to cure, or even in the hope of greatly prolonging the patient's life, but in the hope of saving him from grievous distress. The actual cautery has been employed in some cases which might have been treated by excision, and in other cases which were not suitable for excision. The surface of the ulcer has been freely cauterised, and the operation seems to have been followed in some persons by relief. But the treatment has not been equally successful in all cases : the pain, which ceased for a while, has returned with as great severity as before the sore was cauterised ; nor is the burning usually carried so deep as to procure complete destruction of the disease, and consequent cure. Cauterisation

does not appear to offer any advantage over excision in cases in which excision is practicable. It is not less painful or less dangerous, and the slough resulting from the cautery takes several days to separate, and is usually very difficult to keep sweet.

If an ulcer cannot be cut out or destroyed by the cautery, it may, nevertheless, be improved and, possibly, healed by care and appropriate treatment. It is essential that everything which irritates or rubs the sore should be removed, or that means should be taken to protect the ulcer. Carious teeth and stumps should be removed, and rough teeth which may not be removed must be covered with a smooth and well-fitting plate. Very hot food should be avoided, and all care should be exercised in arranging the diet that the ulcer may be as little irritated in the taking of food as possible. And, that the movements of the tongue may be diminished, the solid food should be finely minced or chopped, and every mouthful should be mixed with fluid, that mastication may be avoided, and swallowing rendered very easy. If, in spite of these precautions, the taking of food is fraught with so much pain that a sufficient quantity is not got into the stomach, the patient's strength may be maintained by nutrient suppositories and enemata. (*See page 374.*) The local treatment of the sore should be absolutely non-irritating. The application of nitrate of silver and other caustics should be avoided. Borax and chlorate of potash lotions may be used at frequent intervals, and weak astringent lotions of alum or tannin or sulphate of zinc may be used if the ulcer has been healing, but is flagging. But I believe that most benefit will be derived from the following or some similar application: Finely-powdered iodoform, one grain; morphia, one-sixth to one-half of a grain; borax, three grains. Before the powder is applied the surface of the ulcer must be very carefully cleansed,

and dried with a soft brush and a little lump of absorbent cotton-wool. The powder must then be dusted thickly, or blown through a glass tube over every part of the sore. This proceeding may be repeated three, or even four, times in the course of the day, but the quantity of morphia in each powder must depend on the frequency with which the powder is used, and on the effect which it produces.

In cases in which there is extreme pain and salivation, and the ulcer is too extensive for excision, the question may arise of division of the lingual nerve. The relief which follows this operation in some cases of cancer is a sufficient inducement to practise it in lingual tuberculosis, if the disease, as is not infrequently the case, is limited to one side of the tongue.

Lastly, the administration of cod-liver oil and other general remedies for tuberculosis must be employed in cases of tuberculous ulceration of the tongue as in tuberculous disease of other parts.

Lupus ulcers.—Weber speaks of lupus of the tongue as if it were a disease not very uncommon. He says it occurs on the tongue as on the palate and larynx, but rarely occurs on the tongue without affecting the face, either as a progressive disease or in the form of scars. It is seated for the most part on the border of the tongue towards the epiglottis, and proceeds from small, isolated nodules, having a soft granular surface. Flat star-shaped scars result from the healing of the ulcers, which should be treated by free application of the hot iron or some similar means.

Most authors are silent on the subject of lingual lupus, and I cannot but think that the disease must be excessively rare. The only case of which I have any knowledge is that described by Fairlie Clarke in the twenty-seventh volume of the Transactions of the Pathological Society of London. The patient had

been in the West London Hospital for several months before he died, and at his death was eighteen years of age. He had no marks of lupus, past or present, on his face or any other part of his body. There was a deep ulcer on the left side of the tongue, with slight ulceration of the corresponding portion of the gum. The mucous membrane of the mouth was generally congested, greatly thickened, and velvety. The soft palate had completely disappeared. The epiglottis was thickened, but not ulcerated. The mucous membrane of the interior of the nose and of the cavities connected with it was thickened, and here and there ulcerated. There was not any affection of the lymphatic glands, but the salivary glands were much enlarged. There was no tubercular disease of the lungs, and death appeared to have been due to exhaustion, partly from extension of the disease, partly from inability to swallow.

I saw the post-mortem examination of this patient, and afterwards examined portions of the affected mucous membrane of the mouth. The tissues were infiltrated with small round cells, but nothing more distinctive of the disease was then discovered (1875). In the concluding sentence of his report of this case Clarke speaks as though he regarded this disease merely as a form of tubercular ulceration of the mouth, for he speaks of it as "primary tubercular ulceration;" but he must have intended to say "primary tubercular lupus." I have never been quite sure of the nature of this case. That it was a very rare disease there can be no doubt; and Sir James Paget gave it as his opinion, when he saw the patient shortly before his death, that the disease was tubercular lupus. But the enormous thickening of the tissues about the gum, and the velvety condition of the surface of all parts of the affected membrane, were unlike anything I have ever seen in lupus of the face or other parts.

After I had written the preceding paragraphs, and before they had gone to press, Dr. Forshall, of Highgate, sent down to me a young woman actually suffering from lupus of the tongue, not primary, but secondary to lupus of the face and lips. The patient was admitted into St. Bartholomew's Hospital, where a careful note was taken, and a drawing was made of as much as could be seen of the condition of the tongue. She was a well-grown young woman, twenty-three years old, horribly disfigured by the disease. All the central parts of her face were the seat of thin scar-tissue, with here and there small ulcers still unhealed. Her nose was eaten away almost to the level of the face. The upper lip was shortened, and fixed firmly to the gum behind it, and the margin of the lip and gum were ulcerated. Thence the disease extended for the distance of about an inch over the hard palate. The lower lip was enlarged; it hung down, and its everted mucous membrane was largely destroyed by an unhealthy ulcer. The upper and the lower lip had become attached together at the angles of the mouth in such a manner as to seriously diminish its size. When she opened it, it was perceived that the fore-part of the tongue was the seat of ulceration, precisely similar in its characters to that of the lips and palate (Plate III., Fig. 3). At first a thick crust covered a large part of the surface of the sore, but when this was removed, an uneven nodular surface was exposed, of a pink-red colour, masked at intervals by dried discharge. The edges were quite abrupt, very irregular, uneven, and sometimes undermined. There was no surrounding inflammation or redness or induration; but the dorsum of the tongue for a short distance beyond the ulcer was dotted with yellowish points and tiny patches. She could not protrude the tongue, at which I was at first surprised, for it was evidently not

bound down by adhesions ; but when I examined her under chloroform some days later, I found that all the tip of the tongue had been completely destroyed by the ulceration as far back as the frænum, so that there was no tip to protrude.

Her voice was gruff, and as the gruffness was of some years' duration, but had been preceded by disease of the mouth, it was fair to assume that the larynx was affected in like manner by lupus. I could not, however, owing to the impossibility of grasping and drawing out the tongue, obtain a view of it.

In addition to the extensive disease of the face and mouth, she had lost her left thumb, and her hand was still bound up on account of lupus ulcers.

In spite of this, her general health was not bad. She might have been regarded as a delicate girl, but certainly did not give us the impression that her constitution had been, or was being, undermined by the disease. The appearance of her face was rendered even more singular than it otherwise would have been by the constant movement (nystagmus) of her curious orange eyes.

She gave us a history of having been attacked by a severe cold six years previously. The running from her nose made her lip sore. Small spots formed, and soon spread on to the cheek on either side. Gradually the disease extended to the margin of the lip, and round the lip to the gum and palate. Then, about four years ago, so far as she could charge her memory, she began to touch the sore places with her tongue, on the tip of which pimples formed and broke, leaving behind them ulcers. But she was sure that her tongue had been also scratched by the loose teeth in front before they were displaced by the ulceration of the jaw, so that she fully believed that the tongue had been inoculated from the lip and gum. Three years before her admission into the hospital a sore place had



PLATE IV.

- Fig. 1.—Mucous patch, deeply grooved and ulcerated. The yellower tongue-like portion towards the dorsum shows the manner and area over which it had extended in the course of a week.
- Fig. 2.—Gummatous ulcer of border in a man, aged 25. The slough has not been completely removed.
- Fig. 3.—Large cleft or fissure-like cavity produced by the breaking of gummata in the tongue of a man, aged 39 years. The cavity is represented as it appeared when its sides were separated by the fingers.

ESCAPE IV



Fig. 1



Fig. 2



Fig. 3



formed on the left elbow, whence it had slowly extended down the fore-arm to the hand, and had seemed finally to settle in the thumb, where the bone had become so diseased that she had been forced to have it amputated.

She was an only child; her father and mother were alive and well, and there was no family history of phthisis, scrofula, or any similar disease to that from which she suffered. Her own health had been good until the appearance of the lupus, and there was no history of tubercle or scrofula in early life. She has at present one enlarged gland of small size below the jaw in the middle line.

With the whole circumstances of the case before one, there could be no possible difficulty in arriving at a correct diagnosis of the nature of the disease. But if the tongue alone had been the seat of ulceration, I do not think the diagnosis would have been easily made, if, indeed, it had been made at all. The ulcer resembled rather a scrofulous ulcer of the leg or arm, and would probably have been regarded as a scrofulous or tuberculous ulcer. The tiny yellow points and patches and the absence of inflammation of the neighbouring parts of the tongue would have lent colour to the theory of tubercle; but against it there would have been the very long duration of the disease (four years), the absence of pain, the steady progress of the ulceration, yet the comparatively good health of the individual, with the complete absence of any sign of tubercle of any other part of the body.

Quite apart from the rarity of lupus ulceration of the tongue, this case is of great interest. It has a distinct bearing on two important questions in the pathology of lupus, the relation between lupus and scrofula, and the possibility of the inoculation of lupus. It was impossible to look at the ulceration of the tongue without being reminded of a scrofulous ulcer, and the

appearance of the hand, with the destruction of the thumb by necrosis of the bone, much more closely resembled scrofula than lupus. Yet she had had no other manifestations of scrofula, and the small enlarged gland beneath the jaw presented no specific characters of scrofula, and might well be accounted for by the irritation of the end of the tongue. At present I think the balance of evidence is opposed to the opinion that lupus is merely a manifestation of scrofula; but this case shows clearly how narrow the boundary is which separates the two diseases.

The inoculability of lupus has been many times discussed, and has been denied particularly by those who consider that lupus is a new growth. Yet the tongue, in this instance, appeared certainly to have been inoculated by first wounding it upon the loose teeth in front, then pressing the wounded tip upon the open sores. The occurrence is, nevertheless, capable of another explanation. The disease of the tongue might have been a separate outbreak of lupus in a person predisposed to the disease; and in confirmation of this view, the appearance of lupus ulceration of the elbow at a point where it could scarcely have been inoculated may be advanced. I cannot, however, but believe that the tongue was really inoculated from the lips and gum; nor is this opinion in any way inconsistent with the theory that lupus is a new growth.

With regard to the treatment of the disease in this particular case, I have scraped the lower lip and the raw surface of the tongue thoroughly with a Volkmann's spoon; and if she recovers well from this operation, I intend to attack the palate and upper lip in the same manner, in the hope of being able by degrees to destroy the whole of the progressive parts of the disease.

Syphilitic ulcers.—Most of the syphilitic ulcers

of the tongue are the results of constitutional syphilis, but the initial lesion of syphilis (hard sore) does occasionally appear upon the tongue. The extreme rarity of this occurrence has already been alluded to. Demarquay thinks that the majority of those which do occur are due to inoculation from secondary sores, and this is not improbably the case. The sore is almost invariably seated on the tip or the border near the tip; it is very hard and circumscribed, and projects more or less prominently. It is generally small, not much larger than a pea or horse-bean. The base is very hard, and the lymphatic glands beneath the jaw are large and very hard. The sore itself is usually quite superficial, not inflamed, not painful, not discharging much. It may be irritated and may become inflamed, or it may even become phagedænic, but these events are unusual. There are no special features of the disease as it attacks the tongue; the point of most importance in connection with it is to bear in mind that the initial lesion of syphilis may, though very rarely, be seated on the tongue.

The ulcers of *secondary syphilis* are chiefly, if not wholly, of two kinds: those which result from the breaking down or injury of mucous patches, and mere abrasions, or cracks, or fissured ulcers on the tip and borders. I am sure that many of the latter class are due to the ulceration of mucous patches, but some of them appear, at least, to have a different origin; in the rubbing or bites of the teeth, for instance. The secondary ulcers, which are due to the breaking down of *mucous tubercles*, are generally easily recognised. They are seated on the tip or borders of the tongue; not because mucous tubercles are limited to these parts, but because the tubercles which are developed there are exposed to the rubbing and injury of the teeth, the more so that they widen or elongate the tongue at the part on which they stand, even though

very slightly, and are thus pressed upon the adjacent teeth. The entire tubercle is not usually destroyed by the ulceration, but a part, sometimes a large part, of it remains to prove the origin of the disease. Usually the central part breaks down, and a starred or long, sinuous, ulcerated crack is produced, with pearly-white, rounded, smooth borders formed by the surrounding mucous patch. Beyond the pearly-white border, which is raised to the extent of half a line to a line, there is a red areola, narrow, and fading gradually into the natural colour of the tongue (Plate IV., Fig. 1). If the irritation is continued, and if the patient is of naturally feeble constitution, especially if he is strumous, the ulcer quickly extends, both widely and deeply, and ulcers are occasionally seen with the superficial area of a horse-bean, and a depth of a third of an inch, or with a much greater superficial area, but a much less depth. The deeper ulcers have a very unhealthy aspect; their edges are sharp-cut, fissured, precipitous, and even undermined; their surface is irregular, without healthy granulations, sometimes covered with slough; the surrounding parts are infiltrated, but rarely much harder than the natural consistence of the tongue. It is worthy of note that these ulcers, however they are produced, are very seldom much inflamed. Even when they are distinctly due to irritation or injury, the inflammation is insignificant compared with that which is associated with ulcers produced by the same kind of irritation or injury in a person who has not had syphilis. I am speaking now of the general rule, but it would not be safe to deny the syphilitic predisposition in every instance in which an ulcer of the tongue is much inflamed, for the presence of syphilis does not afford an immunity from acute inflammation, whether of a part of the body actually syphilitic or not. Acute inflammation is evidently not, however,

a necessary factor in the production of even deep and ugly sores upon the tongues of persons with secondary syphilis.

The secondary affections of the *second variety* appear in the form of small excoriations of the dorsum of the tongue, generally near the tip and edges, or of the tip and edges themselves, without any very definite characters, without inflammation, and often without any signs by which they can be recognised as due to syphilis or any other constitutional malady. They appear also in the form of small cracks or fissured ulcers on the tip and borders of the tongue, and these, again, are chiefly noticeable for the absence of any distinctive characters and of surrounding inflammation. Sometimes the disease of the tongue is limited to one or two cracks or excoriations; sometimes the borders are affected in every part; but in neither case is there any essential difference in the appearance of the sores. It is very unusual to find these cracks and fissures on the dorsum, a fact which speaks strongly for the necessity of another cause than syphilis at work in their production. Syphilis is the predisposing, the rubbing of the teeth the exciting cause.

The ulcers of secondary syphilis may remain a long while unaltered, or may slowly extend; I have seen patients in whom they were almost stationary during many months, looking at one time a little better, at another time a little worse. Whether they are due to the breaking down of mucous tubercles or not, and whether they are inflamed or not, they are almost always sensitive, often extremely so. This, and the small tendency they show to spontaneous improvement, make the patients who suffer from them very uneasy. Apart from the actual distress they cause, they are in many cases a continual remembrancer of the syphilis to which they owed their origin. On

these various accounts patients are most anxious to be rid of them.

The *diagnosis* of these various secondary syphilitic sores is in most instances easy, in some instances almost impossible. Those which are due to the breaking down of mucous tubercles are easily recognised by the remains of the ulcerated tubercles, and by the other signs of syphilis which are almost invariably present on the tongue or some other part of the mucous membrane of the mouth. If the mouth is otherwise free from syphilis, it is more than probable that mucous tubercles will be found around the anus, or nodes upon the tibia, or inflammation of the iris. The entire absence, or the very modified character of the surrounding inflammation, may be almost termed a sign of syphilis; and, in some cases, at least, a history of syphilis will be obtained, and there will still be induration of the penis or soreness where the initial lesion of syphilis appeared. The diagnosis of the excoriations, cracks, and fissured ulcers which are not preceded or accompanied by the presence of mucous tubercles, or any other marked sign of syphilis on the tongue, is more or less difficult according as there is or is not a clear history of syphilis or symptoms of present or past syphilis in the mouth or some other part of the body. It has already been stated that the characters presented by these lesions are not distinctive of syphilis; but the occurrence of several or many of them on the tongue, and the almost entire absence of surrounding inflammation, are very suggestive of syphilis, especially if the teeth are not manifestly diseased. In some instances the diagnosis is made rather by the absence of the signs of other disease, and by the obstinacy of the affection than by the positive signs of syphilis.

The *treatment* of these secondary affections is, fortunately, for the most part, very rapidly successful.

But to obtain a rapid success it is absolutely necessary, in the very large majority of cases, to use local as well as constitutional measures. I have treated these patients with mercury for several months in succession without curing or greatly altering the sore places on their tongues. With the mercury I have then employed local treatment, and have seen the sores disappear within a week. Again, I have treated other patients with the same local measures from the commencement, and have cured the sores within a week or ten days. On this account I look on local treatment as essential to the rapid cure of these affections. If these ulcers occur in the early period of secondary syphilis, or if they occur in persons who have not been treated sufficiently with mercury (in fact, in the large majority of cases), I am in the habit of ordering three grains of hydrargyrum-cum-cretâ to be taken twice a day, and the sore places on the tongue to be painted at least three or four times a day with a camel-hair brush dipped in a solution of ten grains of chromic acid to one ounce of water. The effect of this treatment on the ulcers is marvellous: they cease almost at once to be painful, and in the course of a few days most of them are well. Some of them are kept up by the rubbing of carious teeth or stumps; and when that is the case, the offending teeth must be removed. It is seldom necessary to insist on special forms of food; but it is well that the patient should desist from smoking and should be very sparing in the use of alcohol. There is, I think, no special virtue in the hydrargyrum-cum-cretâ that it should be preferred to every other preparation of mercury; but I have been in the habit of using it for many years in the treatment of the earlier affections of syphilis, and I hold fast to it, on the principle that it is a good rule in practice to use the same preparation of such a drug as mercury (if one is satisfied with it) in all cases which

do not deviate much from the regular type of those diseases for which mercury is used.

On the local treatment by chromic acid I insist much more strongly. I have tried bichloride of mercury in solutions of various strength, glycerine of tannin and of borax, lotions of chlorinated soda, of black wash, and of alum, powdered iodoform, and various other applications, but I have never seen nearly so speedy or so good a result from any of them as from the solution of chromic acid. I have, therefore, employed it almost exclusively for a long time past, and the only disadvantage I have found from it has been that it usually cures the sore places in the mouth so quickly that the patients cannot be persuaded to continue the constitutional treatment nearly so long as they should do. It should be used, not only to the ulcers on the tongue, but to the ulcers and cracks which so often accompany them at the angles of the mouth and on the inside of the cheeks and lips. It must not be forgotten that the relief of the patient himself (or herself) is not the only important point to be held in view; these superficial sores of the lips and mouth, which occur so frequently in secondary syphilis, are all contagious, and as long as they exist the patient is a possible carrier of contagion to all the persons who are personally associated with him in business or in pleasure.

The healing of most of the secondary ulcers leaves *scars*, but the scars are seldom very deep or extensive. Still, they are plainly visible, smooth and shining marks, of silvery or leaden hue, slightly depressed, taking the form of the furrows, lines, and cracks of the ulcers. The margins of the tongue are in this manner often puckered and roughened, and changed in colour, affording a permanent record of past syphilis, which is not without use in the diagnosis of later affections of the tongue.

The ulcers due to *tertiary* syphilis are far more formidable than those of the secondary period, and, no matter whether they be superficial or deep, are apt to leave behind enduring records of their passage in the form of deep furrows and extensive puckering. They are nearly always preceded by gummata, but the gummata may be overlooked even when they have probably existed some considerable time, and have been of large size, for they are not usually painful, and are not sources of inconvenience in eating or in speaking. (See chapter on nodes and nodules.) Lately, I have seen a man with a large gummatous ulcer in the back part of the dorsum of his tongue, about two inches in length, and more than an inch wide when the edges were pressed apart (Plate IV., Fig. 3). It might fairly, having respect to the size of the tongue, have been described as a vast and deep cavity, for it was at least three-quarters of an inch deep; yet the man declared it had not been preceded by the formation of a tumour, but that a slight swelling had appeared almost suddenly a week before I saw him, and that it no sooner appeared than, with little or no distress of pain, it burst, leaving the cavity which he exhibited. In place of one, or two, or three large gummata, there may be many small gummata, quite superficial, forming irregular lines on the dorsum, hardly recognisable as gummata, on account of their small size and close neighbourhood to one another. They are more like hard and knotted cords in or immediately beneath the mucous membrane. These superficial gummata break down, as do the deep gummata, and may form long lines or fissures, more or less deep, running for the most part in a longitudinal direction, often sinuous and branched, the branches passing sideways into the substance of the tongue from the convexities of the sinuous lines formed by the main ulcers. Although the long fissures are often

at first shallow, they may deepen, and at the same time may widen, but their deepening is generally greater than their widening, so that they retain or even increase the appearance of fissures which they presented from the beginning. Several of these long ulcerated tracks may form in the dorsum, and may plough it up until its natural aspect is wholly destroyed. The ulcers have sharp-cut and perpendicular edges, or the edges may be undermined, and until they are separated the real extent of the ulceration is concealed. The surface is then seen to be ragged, or partly covered with slough or coated with discharge; there are not any healthy granulations. The surrounding parts are usually swollen and indurated, but not very hard, and there are often plaques and furrows or fissures due to sclerosing glossitis associated with the gummata. There is not, as a rule, any inflammation about the cracks, but they are liable, though rarely, to become inflamed, and they are often very sensitive, so that mastication may be fraught with great suffering, and salivation may be profuse.

The deep and large gummata produce, in breaking, ulcers which look much more formidable, but they are in reality often less so than those left by the superficial gummata or the small and numerous gummata, which are more deeply placed. When a large gumma softens and discharges, it usually opens through a comparatively small opening, but the opening quickly enlarges by melting down of the infiltrated and unhealthy tissues immediately around it (Plate IV., Fig. 2). A cavity is exposed, with precipitous, ragged borders, which are often undermined, with a ragged and sloughy surface, with perhaps, but not always, a large slough in its interior, with thickened and generally hardened tissues for some distance around it. It may vary much in shape, may be

angular, or cleft-like, or quite irregular, but very rarely exhibits the typical rounded shape of a gummatous ulcer of other parts of the body. After a while the sloughy and ragged appearance of the walls and surface disappears; it is replaced by a smooth surface, with few or imperfect granulations; the surrounding parts remain for a long time thickened and indurated, and the appearance of the disease is that of an indolent and chronic ulcer.

The *diagnosis* of the linear ulcers and fissures, when they are extensive and numerous, and especially when they are deep, is certain: there is no disease for which they can possibly be mistaken. A single deep fissure may be due to tubercle, or perhaps even to carcinoma; but the ploughed-up dorsum, such as one sees in old cases of syphilis, has no counterpart in any other disease.

The diagnosis of the larger gummatous ulcers is beset with great difficulties in certain cases: they may be taken for tuberculous and cancerous ulcers; and it is not always easy to be sure whether an ulcer is due to the destruction of a gumma or to the injury of a tooth. The diagnosis from tuberculous ulcer has been already considered (*see* page 97), and the diagnosis of syphilis from carcinoma will be considered at length in the chapter on carcinoma. It will suffice to point out here that all tertiary affections of the tongue have as great a liking for the dorsum as for any other part, and not infrequently occur far back in the middle of the dorsum; and in this respect they differ from all the ulcers for which they are liable to be mistaken. They may also form in the floor of the mouth, beneath the fore part of the tongue. Gummatous ulcers are much more common in men than women, and attack persons who are at or about the middle period of life, but they may occur much earlier, and have been observed, though rarely,

in the tongues of children as the result of inherited syphilis. Associated signs of syphilis may be observed in persons who have gummatous ulcers, if not in the tongue, yet in another part of the body. But the presence of associated signs cannot be relied on, and the history is often quite misleading. The lymphatic glands are not affected in association with gummatous ulcers.

Gummatous ulcers may heal spontaneously, but they rarely do so. They may remain in an indolent condition for an almost unlimited period, neither extending materially nor healing, unless it be over a small area here and there. They may become inflamed and slowly extend, or may become phagedænic, and, quickly increasing, may eat away a large portion of the tongue. The course which they pursue will depend very much on the condition of the patient, and, to a less degree, on the local conditions which surround the ulcers. The effect of lowered health upon them is proved, in an inverse manner, by the amelioration which is consequent on improvement of the general health, even though no anti-syphilitic remedies have been employed. The most rapid *cures*, however, are effected by a combination of tonic and anti-syphilitic treatment.

In the very large majority of cases iodide of potassium is administered, and those persons with whom the iodide agrees are usually rapidly cured by it. Doses of five grains may be ordered at first, and if the ulcer heals it will not be necessary to increase them; but if the small doses are well borne, and the patient does not quickly mend, it is advisable to increase the dose to ten grains, then to fifteen and twenty grains. It is seldom needful to administer a larger dose than twenty grains three times a day. If the iodide of potassium produces salivation and coryza, the iodide of sodium is sometimes recommended, but I have not

seen any good results from it. I believe it is far better at once to order some form of mercury; the hydrargyrum-cum-cretâ for the patients who are in fair condition, in doses of two-and-a-half to three grains twice a day, the solution of bichloride in doses of half-a-drachm to a drachm three times a day, with bark in largely diluted draughts, so that it shall soak into all the tissues. To the most debilitated subjects cod-liver oil should be administered. And a liberal diet should be ordered, with stimulants, if the general condition of the patient seems to require them. The food should be soft and as little irritating as possible, but the precautions which are essential in the treatment of such sensitive ulcers as the tuberculous are only occasionally needful for tertiary syphilis.

Various local remedies are recommended in the treatment of tertiary ulcers, but the chief reliance must be placed on constitutional measures. Nitrate of silver is used by some surgeons in rather strong solutions, but it appears only to be useful in stimulating very indolent ulcers; and even for them the best plan is to increase the strength of the medicine or to alter the form of it. Bryant recommends a mass of blue pill to be rubbed once or twice a day over the surface of the sore. There are some ulcers which certainly are benefited by local applications: deep fissured ulcers, which are extremely sensitive, so that the movements of the tongue, especially in eating and in speaking, are performed with grave distress. It is not possible to say certainly whether such an ulcer will be most relieved by soothing applications, such as honey and borax, or astringents, like alum and sulphate of copper, or by the frequent use of such a powder as was recommended for tuberculous ulcers. Each of these must be tried in turn until the remedy which seems most useful is discovered.

Cancerous ulcers.—The description of cancerous ulcers, which follows naturally here, is so large and important a subject that it must occupy a separate chapter.

CHAPTER IX.

PATCHES AND PLAQUES.

Smoker's Patch—Leucoma—Leukoplakia, Psoriasis, Ichthyosis, Tylosis, Keratosis, Plaques Opalines—Ichthyosis—Chronic Superficial Glossitis—Ringworm, Wandering Rash, Circular Exfoliations, Benign Plaques, Geographical Tongue, Lichenoid, Circulus or Annulus Migrans—Mucous Patches or Tubercles—Tertiary Syphilitic Plaques—Lichen of the Tongue—Diphtheria of the Tongue—Leprosy of the Tongue.

THE title of this chapter requires some explanation, and it is necessary to define the meaning of the terms patches and plaques.

There occur on the surface of the tongue, particularly on the dorsum, certain marks and alterations of its colour and consistence, which may be neither much raised nor much sunk, and which often look as if they were pieces of a separate material let in. They have, indeed, the appearance of patches, and although they vary considerably in some of their characters, the common term "patch" befits them well.

Again, raised areas, or plates or plaques, arising from different causes and of very different kinds, form on the dorsum and the sides, such, for example, as mucous tubercles and the plaques of leprosy; and for these I think no fitter name than "plaques" may easily be found. The word "plateau" would perhaps more exactly indicate some of these conditions, for it means an elevated plain or table-land; but it refers usually to much larger areas than those which are found on the human body, and has seldom or never been applied in anatomy, whereas the word "plaque" has frequently,

of late years especially, been used to denote some of these conditions of the surface of the tongue.

In this chapter, then, will be found an account of the "smoker's patch," of leucoma, and the various diseases or conditions which are included under the names of leucoma, leukoplakia, psoriasis, ichthyosis; of chronic superficial glossitis, ringworm, or wandering rash, or geographical tongue; of mucous tubercles and tertiary syphilitic plaques (sclerosis); of lichen of the tongue or the patches which occur in association with lichen; of diphtheria of the tongue; and of the plaques which affect the tongue in leprosy. Such diseases as thrush and aphthæ, which might fairly claim to be discussed here, are merely mentioned in order to indicate where the description of them may be found.

Smoker's patch.—Under this name is understood an altered condition of the epithelium of the dorsum of the tongue, due to smoking. In the most typical instances it appears about the middle of the front part of the dorsum, but on one side of the middle line, just where the end of the tobacco-pipe rests, or where the stream of smoke from the pipe or cigar impinges on the surface of the tongue. At this point there is noticed a patch or slightly raised area, generally of oval shape, and at first of very small size, not more than a quarter to half an inch long, and about half as broad as it is long. The surface of the patch may exhibit a perfectly smooth red or livid aspect, not ulcerated, or even excoriated, but looking merely as if the papillæ had been removed. It is not obviously swollen, but rather appears depressed in the midst of the furred papillæ by which it is everywhere surrounded. By-and-by it becomes covered with a layer of yellowish-white or yellowish-brown material in the form of a thin crust, which grows thicker, until at length it peels off or is removed, and the red smooth spot is again exposed.

In other cases, instead of a red or crusted patch, there appears a bluish-white or pearly patch, without any surrounding redness or sign of inflammation. It is usually perfectly smooth, and quite as sharply defined as the red patch, and is very evident, unless the dorsum of the tongue in the immediate neighbourhood is covered with fur of the same tint. Even then the smoothness and pearly aspect of the patch distinguish it from the natural surface of the tongue.

The affected area is not always limited to the region of the dorsum near the middle line, but has a tendency to spread very slowly over the surface of the dorsum, until the whole of the upper surface in front of the circumvallate papillæ may be affected. The inside of the cheeks is liable to become similarly diseased, particularly along the line where the teeth meet, a circumstance which may be ascribed partly to the fact that the smoke reaches this part of the inside of the cheeks more directly than any other part, and that this line is more exposed to injury from the teeth than the higher and lower lines. The mucous membrane of the cheeks is so readily affected that it is often the seat of disease, when only a single small patch is apparent on the surface of the tongue. When the entire surface or large areas of the dorsum are affected, the disease ceases to be called "smoker's patch"; it is known by the names psoriasis, leucoma, leukoplakia, etc. The fully-developed disease will be considered in the next section, and only the limited affection to which the name "smoker's patch" is given will be discussed here.

The smoker's patch is not at all painful or tender, unless it has been irritated and made raw, and its presence is often only accidentally discovered. If the end of a pipe, especially if the pipe is made of clay, is allowed constantly to rest on it, it then not uncommonly is a little tender, and the slight tenderness draws the attention of the smoker to it.

PLATE V.

- Fig. 1.—Leucoma in a man, 41 years old, of about two years' duration.
- Fig. 2.—Leucoma in a man, 34 years old, with abrasions and raw areas along the borders, due to an acute attack of inflammation in an old diseased tongue.
- Fig. 3.—Leucoma covering the entire dorsum and borders of the tongue, with a little warty growth not yet become cancerous.

Plate V



Fig. 1.



Fig. 2.



Fig. 3.



The patch may remain in one of the conditions described during very many months or years : indeed, I believe the bluish patch may remain, with little alteration, the same during many years, and the crusts may form on the red patch and peel off for years ; but it is much more usual for the disease to spread over the surface of the tongue if the irritation is continued. On the other hand, I have no doubt that the red patches may be quite restored to their normal condition, and even that the bluish-white patches may undergo resolution, although that is far less probable.

Smoker's patch is apparently a patch of inflamed mucous membrane of the dorsum, produced by the irritation of the column of smoke impinging on it, or if produced by the contact of the stem of a tobacco-pipe, yet certainly maintained in great part by the irritation of the tobacco. The inflammation is so chronic, and the changes are so slow and, one may almost say, so trivial at first, and for a long time, that they excite no annoyance, and are not noticed until the condition has existed a considerable time. The consequence is that the disease, trivial as it is at first, has gained a tolerably firm footing, and slight thickening of the deeper layers of the epithelium and of the superficial layers of the cutis of the mucous membrane, not perceptible to touch, are already present when it is discovered. Even if the use of tobacco is abjured, or if care is taken to protect the affected spot from the impact of the smoke or the contact of the pipe-stem, the diseased area is not always resolved. It may remain with little alteration, or may extend over the surface of the tongue.

The *treatment* of the less extensive patches and of those in which the disease appears only to have been present for a little while (in which, for example, the area is still merely redder than natural, and smooth) consists in taking precautions to prevent the pipe-stem

or column of smoke from directly touching the affected spot; it is not necessary to forbid smoking, but if the patient is an inveterate smoker, the amount of tobacco and the form in which it is smoked may be advantageously altered. He should be restricted to fewer cigars or pipes, and the pipe he smokes should not be very short, and its stem, particularly that part of it which is held within the mouth, should be very smooth, and made of the least irritating material possible. He should certainly hold his pipe or cigar in the side of the mouth opposite to that on which the affected area is. The patch may be painted occasionally with a solution of chromic acid, about five or ten grains to the ounce, or with a weak solution of tannic acid or alum, applied with a soft camel-hair brush.

If the disease is more extensive and appears to be extending on the tongue, or is present at several points on the tongue, and perhaps upon the inside of the cheeks as well, a more decided plan of treatment must be adopted. The patient must be urged to forbear smoking, not only on account of the disease actually present, but of the probability that, if the irritation is not removed, it will extend widely and become a serious mischief, the precursor, possibly, of much more serious trouble. If the patient refuses to obey the order not to smoke, he must at least be considerably restricted in the use of tobacco. In addition, every precaution must be taken, by careful attention to diet, to prevent the surface of the tongue from being irritated by too sweet, too sharp, or sour, or strong foods and drinks. Spirit, unless largely diluted, is decidedly prejudicial, and strong wines, like sherry and port, are injurious. The tongue should be painted three or four times in the day with a solution of chromic acid or with borax and honey, or with a weak astringent. Chlorate of potash lozenges or the tablets prepared by Messrs Wyeth may be sucked at intervals. The

bowels must be gently opened once or twice in every day, and if the general health is not good, and the patient comes of a gouty or rheumatic family, or if he has had syphilis, the constitutional treatment must be directed to the bettering of his condition. It may seem almost ridiculous to enforce or recommend so many rules for the relief of so trivial an affection, but there is ample reason for the exercise of every possible care in the early stages of the disease. If it is curable, it is only in the earlier stages ; and if it extends so as to cover a large area of the tongue, it becomes a source of serious annoyance to the patient, which, from the difficulty or impossibility of curing it, lasts his whole life through ; and it may, if neglected, be a strong predisposing cause of cancer. Patients who are not disposed to deny themselves the smallest luxury when the disease is in an early stage are often forced in later life to live very careful lives, forswearing tobacco and stimulants, besides using every care in the kind and condition of the food they take. To avoid so much distress in later life, it is worth while to use self-denial for weeks or months when the disease is just commencing.

The two following cases are admirable illustrations of two varieties of smoker's patch, one from my own practice, the other from the practice of Sir James Paget, who has very kindly permitted me to use his manuscript notes of it.

Cases.—A gentleman, fifty-four years of age, consulted me on account of two tiny patches on the dorsum of his tongue. One of them was in the front part of the median furrow, and could not be seen without separating the sides of the furrow, which was rather deeper than usual. The other was situated about half an inch to the right of the furrow, and not far from the tip of the tongue. It was about three-quarters of an inch long, by a quarter of an inch in

its broadest part. Both patches presented precisely similar characters; they appeared to be mere alterations in the superficial layers of the mucous membrane, and were neither raised above nor depressed below the level of the healthy surface. They were bluish-white, opalescent, and slightly papillated or warty on the surface, and were as soft and pliable as the natural textures of the tongue. There were no signs of inflammation in or around them, and they were quite free from pain or discomfort, with the exception that occasionally they smarted a very little. The degree of discomfort attending them was so trivial that he had only noticed them by accident. On the mucous aspect of the cheeks, along the line where the teeth meet, were patches of the same nature, but differing slightly from them, in that they were whiter, rather more opaque, a little raised above the level of the surrounding membrane, and even softer than the patches on the tongue. It was impossible to say how long these patches on the cheeks and tongue had existed. They had been first noticed about six months previously, when he was at Malvern, and smoking rather more than usual. He was at all other times rather a moderate than a great smoker, smoking three cigars and one pipe a day, but almost invariably on the right side of the mouth, in such a manner that the column of smoke directly struck that part of the dorsum on which was the larger of the two patches. During the week or two before I saw him he had been applying some caustic to them, but it did not appear to have materially changed their aspect, for he said they looked precisely as they had done ever since they had first been discovered. It is worthy of note that this gentleman was a gouty subject, and had been several times under the care of my colleague, Dr. Dyce Duckworth, who sent him to me.

His disease appeared to be due to the irritation of

smoke in a gouty subject, and the local treatment which I advised was to diminish his tobacco to one pipe and one cigar (smoked through a holder) daily, chlorate of potash lozenges, and a paint of about eight grains to the ounce of chromic acid. I have not seen him since, but have heard from Dr. Duckworth that his tongue gives him little or no trouble.

Sir James Paget's case I quote as nearly as possible in his own words. He says: "G. N., my pupil (this was in 1851), showed me near the middle of the dorsal surface of the tongue a diseased spot, which he ascribed to the frequent contact of the end of his tobacco-pipe. The spot was oval, about half by a quarter of an inch; nearly half was quite smooth, shining, pinkish-purple, looking not excoriated or as if ulcerated, but as if the papillæ were wasted and levelled down; it was exactly levelled and smooth. The rest was covered with a thick (third of a line), dirty, brownish-yellow layer, composed apparently of epithelium, like a fur on the tongue. No hardness or other change was perceptible, and the rest of the tongue appeared quite healthy.

"The disease had been observed about six months, in which time his description implied that the layer-like thick epithelium had often formed, and been spontaneously detached, and been again formed. It had given him no trouble, and he had continued to smoke daily once or more, and often repeatedly in the day, and always rested the end of his pipe on this spot. It was not a clay pipe.

"I told him he would certainly have cancer of the tongue if he went on smoking, and he promised to discontinue it."

Leucoma, leukoplakia, psoriasis, ichthyosis, tylosis, keratosis, plaques opalines.— Under these many headings are understood white and bluish-white patches, plaques, and plateaus which

occur upon the surface of the tongue. The smoker's patch belongs to the same class of disease, and is probably only an early stage of these affections. Mr. Hutchinson was the first to suggest the term leucoma for the white smooth patches. The term leukoplakia was, I believe, put forward by Schwimmer. Psoriasis is generally employed by the French writers, as well as the term "plaques opalines." And ichthyosis was the name used by Mr. Hulke, who was the first person to draw attention to the warty form of the disease. In this section I propose to discuss all the white and pearly smooth patches, and the conditions which are more immediately associated with them, and in another section, or rather, an addendum to the present section, to devote a few lines to the variety of the disease which was first described by Hulke, and in another section still to describe generally the characters of the disease, chronic superficial glossitis, of which all these conditions are probably manifestations.

Throughout this section I shall use, as far as possible, the term leucoma, taking it to mean a whiteness or white opacity of the surface of the tongue, and preferring it to leukoplakia (which I suppose means a white patch, or plaque), on the ground that it is shorter and less cumbersome to use. Both these terms are preferable to psoriasis, which seems to imply, even if it is not intended to do so, that the condition of the tongue is of the same nature as psoriasis of the skin. The terms tylosis and keratosis do not describe the character of the patches so well as either leucoma or leukoplakia, and are, therefore, not so fitting.

Leucoma may appear on the dorsum of the tongue in several, or even many, *different forms*, and these varieties are not necessarily directly connected with each other. They are not all of them different stages of the same form of disease, although they all, probably, own one common cause. Taking as examples the

cases from which Mr. Godart has made for me water-colour drawings, two very different conditions are evident, and of each of these two, two sub-conditions, or varieties, might be made. The first sketch represents a protruded tongue, the entire surface of which is deprived of its natural covering of papillæ, and which has no fur upon it, although a superficial observation might lead one to believe that it is entirely covered with thin fur; for, instead of its natural red colour, it has everywhere a bluish-white colour (Plate V., Fig. 3). But when the surface is carefully examined, the mucous membrane (or in any case its superficial layer) is found to have undergone a singular change. It is quite smooth, except where there are superficial furrows and markings on it, and is actually transformed into a thin bluish-white, or pearly, opalescent pellicle, which is in most places so thin or so translucent that the red colour of the tongue can be seen through it. It is not separable from the part on which it rests, at least, not without such scraping as will leave the subjacent surface raw and bleeding. It is quite soft and pliable, and in this respect seems to differ little, if at all, from the natural mucous membrane. Here and there the shallow furrows are very slightly sore, and look raw; but were it not for this, and for the wart which projects from one part of the dorsum, the patient would not be conscious that there was anything the matter with his tongue. So little annoyance has he suffered from it, that he can give no idea of the duration of the disease, and has only noticed that at intervals for a very long time past he has felt some trivial soreness of the surface of the tongue.

In this case the alteration of the mucous membrane extends over the entire surface of the protruded tongue, quite up to and over the borders; but in the case from which the second sketch is taken the disease

is limited to the papillary area. The entire area is deprived of its papillæ, and is transformed into the same opalescent pellicle as in the last tongue, but the tip and borders of the tongue are red and natural, or, may be, somewhat too red to be quite natural (Plate VIII., Fig. 1). The leucoma is strictly limited, but it changes colour towards its border, becomes less blue and more opaque, and ends abruptly in a thick, opaque, dentated yellow margin. The appearance is as if the margin of the leucoma could be raised with small difficulty from off the red tongue beneath; but the appearance so far belies the truth that the raising would cause pain and bleeding, and would leave a raw surface behind. This patient knows that his tongue has been "wrong" for years, but he does not suffer much from it, and certainly would not have sought relief had it not been for the development of a warty growth upon the dorsum.

The third sketch presents a very different appearance. Occupying some three or four square inches of the middle of the papillary region of the dorsum is a dense white patch, with a very faint blue tinge perceptible in the white. It is slightly raised, especially in the centre, where it is thicker than at the sides; and here, too, it is whiter and more opaque. The whiteness and thickness diminish towards the borders of the plaque, and it ends abruptly on all sides in sharply defined, fringed, or deeply dentated margins. The contour of the front and sides of the patch correspond with the contour of the tip and border of the tongue, so that it is rounded in front, but at the back it is V-shaped, with the apex of the V directed forwards (Plate V., Fig. 1). The whole patch is mapped with shallow furrows, in which a dull blue or reddish tint appears; and the general aspect is that of a layer or dab of paint, which has hardened, dried, and cracked. It felt, both to the patient and myself,

much drier and harder than the surrounding mucous membrane, which was natural, papillated, and covered with a very thin layer of fur.

The last of the four represents a condition which might well be regarded as a more advanced stage of the preceding. All the fore part of the tongue, from the very tip as far back as the teeth, is covered with a dense and opaque white coating, except at the borders and at three spots in the middle, where it looks as if it had been rubbed or scraped off. The coating has not the appearance of fur, for it is denser, closer, and firmer, and more compact. It looks much more like a double or treble coating of white paint, soiled and discoloured over a great part of its surface. Like the patch in the last case, it is furrowed, but its surface is not mapped with furrows, and the furrows are much finer and more delicate. The edges of the patch are very sharply defined and notched, as if the coating had been chipped away at the sides and at the central red spots (Plate V., Fig. 2.) And, where the tongue is uncovered, it is unnaturally red and raw, and in parts excoriated and very sore. This patient suffered much more than the last, who, indeed, complained chiefly of the sense of dryness, the want of pliability, and of a continual thirst; whereas this man was in great distress on account of the soreness of the parts of the tongue which were uncovered by the coating. The destruction and removal of part of the leucoma, and the consequent exposure of the raw surface of the tongue, was probably accidental, due, perhaps, to an acute attack of inflammation on an old diseased tongue; but it appeared that such attacks were of common occurrence, and that his tongue was frequently very sore and troublesome.

As examples of much more limited leucoma, the tiny smoker's patches described in the last section may be taken, and between these and the conditions which

have been just described every gradation may be observed. A single patch may increase in thickness and intensity of colour, and may develop crusts which peel off from time to time, and leave behind red, and perhaps raw places ; or numerous thin bluish-white or pearly patches may form at many different points on the dorsum of the tongue, and, without coalescing or becoming thicker, may maintain their size and colour and appearance during long periods. Yellow leucomas are much more rare than blue or pearly patches, and when they do appear, are almost always yellow, from the colouring of the patch by tobacco or some other extraneous substance.

The opportunity very rarely occurs of studying the earliest stages in the *development* of leucoma. Even the patient very seldom notices the actual commencement of the formation of the patches, and when they are shown to the doctor, they are usually decidedly leucomatous patches, either white, or bluish-white, or pearly. I must confess that, although I have seen a goodly number of cases in almost every stage and of all varieties, I have never seen an earlier condition than the bluish or pearly patch, or a small red area wholly or partially covered with crust. There may be an earlier condition than this ; but if there is, I have not seen it. I am, therefore, rather surprised to find that Schwimmer and, following him, Barker describe a first stage of dark red spots or reddish patches, and speak in such familiar terms of this stage that one cannot but believe that both observers must have seen and studied it at least a score of times. I am, therefore, comforted by finding that most, if not all, other authors who have written good monographs or papers on the subject, and among them Debove and Nedopil, agree in regarding the formation of white or bluish-white patches as the first perceptible stage of the disease. It is quite possible, nevertheless, that some of the patches

are preceded by the development of smooth red areas, like those which are left after the removal of the crusts of a smoker's patch. But however this may be, the first stage which is observed is almost invariably that in which variously tinted white, and not red, patches are present. The extension of the disease appears to be also by the formation of bluish-white, and not red, patches. Patches of bluish-white appear in the neighbourhood of the original patch, or are formed on more distant parts of the dorsum of the tongue. They may, too, become smaller again or disappear; and are, therefore, not (what at one time I believed them to be) thin superficial scars resulting from the healing of inflamed or excoriated areas.

From what has been said of the relation of leucoma to smoker's patch, it will be evident that this disease may originate in the irritation produced by tobacco and tobacco smoke, but there is no evidence to prove that smoking is the sole *cause* of leucoma. Even those patches which are clearly due to the irritation of the pipe-stem or the column of smoke do not by any means invariably extend and form large areas of leucoma; while, on the other hand, leucoma is not very uncommon in persons who do not smoke, and who never have smoked. Of other exciting causes, syphilis, acting locally upon the tongue, the frequent use of ardent spirits undiluted, the taking of very hot and highly-spiced meats or drinks, and the rubbing of rough plates of teeth, or of plates composed of irritating material, may be held to be the most important. Yet these causes, whether singly or combined, produce so little effect on the tongues of the large majority of persons who indulge them, that I agree with Debove in believing that there is in most patients some predisposing cause. I suspect that the mucous membrane of the tongue in leucomatous subjects is from the first less thick and stable, more easily

irritated than in the majority of persons. As some persons are known to have irritable and delicate skins, easily inflamed and prone to eruptions, and as some of these persons develop affections of the skin which are very chronic and difficult to heal, so I believe other persons have tongues whose mucous membrane is abnormally delicate, prone to chronic inflammation, and difficult to cure when the disease has been excited. There does not appear to be sufficient evidence to prove that this condition is associated with a gouty or rheumatic disposition ; nor does it seem to be frequently connected with chronic dyspepsia. The reason for imagining the existence of such a predisposition is the facility with which leucoma is excited in some persons, and the difficulty, or almost impossibility, of exciting it in other persons. On the one hand, there are individuals suffering from leucoma who have never had syphilis who have smoked little or not at all, who have never been in the habit of drinking spirits, unless largely diluted, who, nevertheless, from some slight casual irritation, or without any perceptible cause, suffer from leucoma, at first very slightly, but later much more severely. On the other hand, there are persons who habitually eat highly-seasoned food, women who day after day drink many cups of scalding tea, men who are never without a pipe or cigar or cigarette between their teeth, both men and women whose tongues have been again and again the seat of syphilitic lesions, and who show no signs of leucoma. The greatest smoker I have ever known, who smoked both pipes and cigars, had a perfectly natural tongue, except that it was a very little stained by the tobacco.

There are two other powerful predisposing causes of the affection : one age, the other sex. Leucoma is almost unknown in persons under twenty years ; it appears rarely to commence in persons over sixty ; and it very rarely attacks women. On these points

every author is agreed ; and they seem to show that, even if there is a predisposition to the disease, it is rarely sufficient alone for its production. The exciting causes which have been mentioned are much more common in men than women, and in men than boys.

As to the *frequency* of leucoma, there is a general impression that it is on the increase, but I know of no facts to prove this. Medical men are much more alive to the importance which it may assume, are more ready to recognise it in its less aggravated conditions, and, therefore, record more cases and talk more about it than they did. It might almost be said never to have been recognised until a few years ago. The only facts at all approaching statistics with which I am acquainted are contained in the statement of Schwimmer, that he had examined 5,000 persons for leucoma in the course of nine years, and had discovered it only in twenty of them. But every one of the twenty cases was a genuine case of leucoma, or what he calls leukoplakia buccalis, for he did not include in his estimate small plaques due to irritation of various kinds, which from long observation were known to have remained unchanged in the lapse of years. Schwimmer's observations were made in Germany, and there are no statistics to show whether the disease is more or less common in other continental countries, and in what relation these countries stand to England and America.

In the larger number of instances leucoma affects the tongue alone ; but it is not at all unusual to find that other parts of the interior of the mouth are similarly diseased. Above all other parts, the inside of the cheeks are likely to suffer, particularly along the line where the teeth meet ; and next to the cheeks, the inside of the lips, especially the lower lip and near the corners of the mouth. The disease occurs sometimes, though rarely, on the gums and palate,

and in one instance it has been discovered on the vulva.

In addition to the fact that it occurs on other parts of the inside of the mouth besides the tongue, it must be borne in mind that it has been observed in persons suffering from affections of the skin, not merely acute affections which might be regarded as accidental associations, but very chronic and obstinate eruptions, such as eczema, psoriasis, and ichthyosis. In these cases one might suppose that the mucous membrane of the tongue and the skin are both equally disposed to chronic and tedious affections, easily lighted up by comparatively trivial causes.

The *subjective symptoms* of leucoma are in most persons very slight, particularly when the disease is not very advanced, and when the coating is thin, and pliable, and soft. Often there are absolutely no symptoms, and the patient does not know that there is anything amiss until one day he perceives the patch or patches on his tongue. When his attention has been attracted to it, and especially if he has been told that leucoma may possibly be the precursor of carcinoma, he begins to experience some distress, but it is much more of mind than body. One of my patients said that usually he had no discomfort, and would not have been aware that his tongue was not perfectly natural; at times there was a slight sense of dryness and harshness, and a very slight burning or smarting when he ate or drank hot food. In the more advanced stages, and when the leucoma is very thick, compact, and unyielding, a good deal of discomfort is experienced. The surface of the tongue feels always harder and drier than natural; the movements are not so readily and smoothly executed as they ought to be, and sometimes there is distressing thirst. There is not, as a rule, actual pain, even in eating, unless there is some accidental inflammation of the tongue, and salivation

seldom occurs unless from the same cause. As to the effect of leucoma on the sense of taste, regarding which very different opinions have been expressed, the truth lies, so far as I have been able to ascertain, in this: that the taste is not at all noticeably impaired in the lighter cases of leucoma, but that a large area or great thickness and hardness of the coating decidedly impair the perfection of taste in those parts of the surface which are covered.

Of the *course* and possible *terminations* of leucoma, it must be said, first of all, that it is very doubtful, when the disease is actually confirmed, whether it is possible to cure it. Schwimmer is the only author who speaks confidently of the prospect of curing undoubted cases of leucoma, and he asserts that not only the red patches which he describes are capable of being cured, but that even well-marked white patches may be resolved. As, however, his remarks on therapeutics contain nothing new, not even a new suggestion for the use of old remedies, it can only be supposed, either that he has met with some very amenable instances of the disease, or that he has been mistaken in his diagnosis, or that he has followed up his cases for a much longer period than most other surgeons, and has certainly discovered that some of them recovered. Although I cannot say that I have ever observed the recovery of an undoubted instance of leucoma, where the disease was more than a small smoker's patch, yet I am not indisposed to believe that recovery is possible in certain cases; in cases, for example, in which the disease consists only of very thin and soft and pliable bluish-white patches. The fact that these patches vary from time to time in size and shape, and sometimes change their place upon the tongue, is strong presumptive evidence that they are capable of being resolved. The certainty that they may form again over the parts from which they

have disappeared is not opposed to the opinion that they may be cured, for the second development of the patch is probably due to a continuance or renewed occurrence of the cause which produced the first patch. Remove or prevent the cause, and the presumption is that the patches would not be re-formed. The course of the cases which do not recover has been, either to remain stationary, or nearly so, or to grow slowly worse. It is not unusual for the surface of the tongue to remain for many years so far in the same condition that the leucoma patches extend very, very slowly, and the disease gives rise to no inconvenience, and is scarcely, or not at all, noticed. The entire dorsal aspect of the tongue may become covered with the same kind of thin bluish or pearly layer as that which is described in the first of the sketches in this section. In other cases the disease fluctuates: it breaks out in one place as it disappears from another; the hope of a cure is continually excited, but the hope is seldom, if ever, fulfilled. In other cases, again, the leucoma, after remaining for a long time stationary, almost suddenly spreads quickly over the surface of the tongue. The manner in which such a case as this commences, in the form of a single patch, remains stationary for a long time, perhaps many months, or even years, then suddenly spreads over the surface of the tongue, either continuously or in patches, more or less isolated, reminds one of the manner in which an eczema of the leg, due to some local cause, which has remained for a very long period quite stationary, sometimes suddenly spreads over the whole leg, and at the same time appears in other more or less distant parts of the body.

Again, the first formed patch may slowly increase in thickness and intensity of colour, and may, still more slowly, extend over the dorsum of the tongue, sometimes remaining stationary during a long period,

then extending once more, perhaps with renewed vigour. When the entire surface of the tongue is covered, there may seem nothing left for the disease to do, unless, perhaps, to thicken and harden. Unfortunately, the coating is subject to accidents: it is easily irritated, and readily inflames; or perhaps it would be more correct to say that the surface of the tongue beneath the crust is irritated, and inflames. Portions of the crust die, and are cast off, and the raw bed on which they lie is exposed, and the exposed areas are extremely sore. Some persons are much more liable to these accidental attacks of inflammation than are others, either on account of some peculiarity in the leucoma, or because they are not so cautious in diet, and in abstaining from whatever is likely to excite the tongue. Most of the troubles and real distress which patients with leucoma suffer is connected with these occasional inflammations, and the excoriations and ulcers which are associated with them.

These, however, are not the worst results of leucoma. A much more serious evil may arise, for the tongue may be attacked by cancer, and the leucoma is, undoubtedly, a strong predisposing cause of the cancer. Attention has now for a long time past been called to the connection between the two diseases, and it may almost be thought that the possibility that carcinoma may be developed in connection with leucoma has been exaggerated, so much has been said and written of it lately. But I have a strong suspicion that the frequency of the event, so far from having been exaggerated, has been under-rated, and that the records of the next ten or twenty years will show a much larger proportion of carcinomas which have been preceded by leucoma than the last period of equal length has shown. The development of the carcinoma may take place in several different ways:

either by the formation of a small lump, or a wart, or a sore. The lump and wart ulcerate, the sore deepens, and the ulcer, however formed, becomes surrounded by induration. Strange to say, it is not always, or I think most often, the irritable and sore leucomas from which carcinoma is developed. An actual sore which forms in connection with one of these leucomas may certainly become carcinomatous; but it as frequently happens that the leucomatous condition of the dorsum of the tongue has not excited marked attention until the formation is observed, which may be termed the initial lesion of the carcinoma. In the chapter on carcinoma of the tongue I have stated the number of times in which carcinoma was known to have been preceded by leucoma or chronic superficial glossitis, and have there said that I believe the proportion of these cases is very much lower than it ought to be. Many of the cases in my tables* were reported at a time when little or nothing was known of these diseases; and I feel assured that an equal number of cases of carcinoma recorded by competent observers in the next five or ten years would contain a very much larger proportion of cases of leucoma and chronic superficial glossitis. The series of histological changes by which the transformation of a limited area of a leucomatous or superficially inflamed tongue into carcinoma is accompanied have been described by Mr. Eve, and have been referred to in another chapter. It need only be said here that they consist in the ingrowing of the columns of epithelium, and that these columns soon contain in their interior epidermic globes (cell-nests).

Many different opinions have been expressed regarding the essential *nature* of leucoma. It is held by some authors to be an eruption on the surface of the tongue, similar in its appearance and all its

* "Sarcoma and Carcinoma."

characters to psoriasis of the skin. It is believed by other authors that it is a simple hypertrophy or overgrowth of the epithelial elements of the superficial layers of the epidermis of the tongue. And it is supposed by another school to be the result of a very chronic inflammation of the superficial structures of the tongue; to be, indeed, one outcome of chronic superficial glossitis. Although I can quite understand that there are good reasons for believing that leucoma is an eruption closely allied to psoriasis, yet there are other sufficient reasons for regarding it as very different from psoriasis. The many cases in which the eruption consists merely of a very slight alteration in the colour and appearance of the surface of the mucous membrane, without any base like that on which the white patches of psoriasis habitually rest; the frequency with which the leucoma spreads slowly from a single patch over the entire surface of the tongue; and the rare occurrence of several thick patches on the dorsum of the tongue like the patches of psoriasis, which are scattered over the surface of the body, are opposed to this theory. After all, the views of Nedopil are, in the main, the views of most of those who hold that the disease is a chronic inflammatory affection; for, after describing the disease, he says that it is due to, and is long preceded by, a chronic inflammation of the mucous membrane. Without, therefore, further discussing the analogies of this disease with psoriasis, eczema, and other affections of the integument, it may suffice to say that it is regarded by most observers as the result of a long-continued and very mild inflammation of the mucous membrane of the tongue. This view accords with most of the phenomena which are observed in connection with it; the readiness with which it is excited by slight, but long-continued irritation (in certain persons); the great differences which appear in its outward

characters ; the frequency with which it is associated with excoriations and ulcers ; its slow progress, and resistance to treatment ; and, last, the histology of the affected parts. Without entering deeply into the *minute anatomy* of leucoma, it may be said that the observations of all those who have examined leucomatous patches, whether thick or thin, agree in discovering that the papillæ are almost, if not quite, obliterated ; the cells of the epidermis are altered in character, and the horny layer is more marked, more like that of the skin ; that the processes of epithelium which dip downward between the papillæ are shorter than natural ; and that the corium is infiltrated with small round cells (leucocytes). There are differences of opinion regarding the thickness of the epidermis, which most observers think is thickened, but which I believe is, in most instances, decidedly thinner than the normal epidermis. I believe that a false estimate of the thickness of the mucous membrane of the natural tongue has led to an equally false estimate of the relative thickness of the epidermis of leucomatous tongues.

The one circumstance which appears to be opposed to the inflammatory theory is the white or bluish colour of the patches from the very commencement of the disease in the large majority of instances ; but this may be explained by regarding the disease as essentially due to a chronic inflammation, commencing in the corium, immediately beneath the epidermis, and by supposing that the first changes in the epithelium are produced by alterations in its nutrition produced by the influence of the subjacent affection, and that these alterations are displayed in an alteration in the thickness, density, and transparency of the epithelial cells, of those layers of the epidermis which are exposed by the shedding of the appendages of the papillæ.

The *diagnosis* of leucoma is not, in the large

majority of instances, very difficult. The very chronic course of the disease, its occurrence only in adults (very rarely in women), and the character of the patches, serve to distinguish it from the diseases for which it is possible to mistake it. Thus the diagnosis from mucous tubercles of the tongue rests on the much more rapid formation and spreading of the mucous tubercles, the fact that they are usually much more raised, and are plateaus rather than patches, on the difference of colour, the mucous patch being dead white or yellowish-white, while the leucoma almost invariably has a blue tint, unless it has been stained by tobacco. The more recent patches of leucoma are more translucent than the new-formed mucous tubercles. There is a greater difficulty in distinguishing between a mucous tubercle and a smoker's patch which is covered with a thicker crust than usual, especially when the crust, as is not uncommonly the case, presents a yellowish-white colour. The situation of the patch, the peeling off of the crust, the fact that it shows little or no tendency to extend, and the absence of associated signs of syphilis, especially on the dorsum of the tongue, are the points on which the diagnosis chiefly depends.

The scars of past syphilis, when they occur over a larger area of the surface than usual, and when they present a bluish tint, are sometimes mistaken for leucoma. In this case the diagnosis is not so easy, for, in fact, these marks really are leucomas, in so far as they are whitish patches; but they differ from the disease which we have been considering under this name in several important particulars. When once formed, they are stationary, occurring only where the syphilitic lesions formerly existed, and neither spreading nor altering their characters materially unless they are irritated or inflamed, and so break down again. They are also depressed, and they occur much

more frequently upon the borders than the dorsum of the tongue. Of course, I am not now speaking of the scars of deep tertiary ulcers, but of the thin, bluish, slightly depressed scars which result from the ulcers which so frequently form on or near the borders of the tongue in secondary syphilis.

Syphilitic sclerosis is mentioned by some authors as a condition which is not unlikely to be mistaken for leucoma; but I scarcely know what condition of sclerosis due to tertiary syphilis can be confounded with it. Certainly not the depressed patches due to the shrinking of old tertiary inflammatory material or to the healing of tertiary ulcers; and as certainly not the plateaus formed on the dorsum of the tongue in some rare instances of tertiary syphilis, of which I shall speak presently. Other than these, I know of no conditions of tertiary sclerosis.

Even aphthæ have been spoken of as an affection which may be mistaken for leucoma, but it is difficult to imagine how such a mistake can arise. One is essentially a disease of children, and is acute; the other is a disease of adults, and is extremely chronic. The characters of the eruption in the two diseases are, too, so different that only a very imaginative person is likely to mistake one of them for the other.

After what has been said of the course and possible terminations of leucoma, it seems almost wholly unnecessary to devote a paragraph to the *prognosis* of the disease; but a few words will not be amiss. In the first place, there is very small probability of the cure of any confirmed case, but the most likely cases for recovery are those in which the patches are not thick or raised, and in which they are soft and pliable, and alter their position on the dorsum. In the second place, the disease may remain almost in the same condition for years, or may spread extremely slowly over the surface of the tongue, and form a very

thin continuous layer, which gives rise to scarcely any trouble, and is almost unnoticed by the patient. It is said that such conditions have existed for as long as forty or fifty years. Other patients will be liable to frequent attacks of inflammation, and will on this account require constant attention and treatment. And, lastly, carcinoma will develop in a certain proportion of cases, and the patient should be warned that the appearance of an ulcer that does not quickly heal, or of a hard lump, or of a wart or warty lump on the surface of the tongue, is in him a serious symptom, which should lead him to seek medical assistance without delay.

The *treatment* of leucoma is naturally almost entirely palliative, and the means of palliating may be divided into hygienic and medical. First, it is necessary to forbid smoking and chewing tobacco to those persons who suffer from the disease in its severer forms, or in whom the leucoma patches are spreading quickly, and threatening to become a serious annoyance. In the milder cases, the patient may continue to smoke, but not to chew, but the number of pipes or cigars must be diminished, and he must smoke through the least irritating stems and holders, and on that side of his mouth on which the disease is least advanced. Then he should avoid spirits and the stronger wines, unless they are very largely diluted. With regard to diet, I believe that no better advice can be given than that he should not take anything very sweet or very sour, or very sharp or very strong. Extremely hot and extremely cold substances are alike injurious; and if he finds that certain articles of food cause smarting or tingling, he should eschew them.

Great care should be taken to remove any source of irritation, such as rough teeth or stumps, badly fitting and rough plates, and other similar irritating objects.

Of constitutional treatment, I know of none which is likely to be of general use ; but if the patient has the signs of any decided constitutional malady, such as syphilis, or is subject to rheumatism, gout, or other similar affection, or comes of a family in which a certain diathesis is very prevalent, the constitutional treatment which is likely to correct his constitutional tendencies should be adopted.

Although very little can be done in the majority of instances by constitutional treatment, much may be done by local means, if not to cure the disease, yet certainly to relieve it. In the lighter cases, the patient will probably do nothing more than wash the mouth occasionally with a solution or gargle. For this purpose he may use a solution of fifteen or twenty grains of bicarbonate of potash to an ounce of water ; or if he has suffered from syphilis, a weak solution of chromic acid (one or two grains to the ounce if used as a wash, five to ten grains if used as a paint), or a weak solution of bicyanide of mercury (one or two grains to the ounce). In more severe cases the tongue should be painted or washed frequently with such an alkaline wash as the solution of bicarbonate of soda, or a similar solution of borax. A very weak solution of alum, two grains to the ounce, may be used, or a solution of chloride of sodium, about two grains to the ounce. *Mel boracis* suits some tongues better than the simple alkaline solution ; and when the tongue is very sore as the result of passing inflammation, or is perhaps excoriated or ulcerated, *mel boracis* or a solution of chromic acid may be painted several times a day over the sore areas with the greatest benefit. As a general rule, alkaline solutions give greater relief in old-standing leucomas than any other solutions ; but the solution which affords relief in most instances is not the best for all. A little care and the trial of several different remedies will soon decide which of

them is the most suitable to an individual case; and when the tongue is extremely sensitive, the changes must be rung until a solution which gives relief is found. One general rule holds good for all cases of leucoma, viz. not to use caustics. Whatever danger there may be of the development of carcinoma is certainly increased by the employment of nitrate of silver and other caustics.

Finally, the question may be raised whether leucoma of the tongue should be treated by excision of the patch. To this question the *general* reply must be "No." The removal of a leucoma is followed by scarring, which is liable in such a tongue to give rise to as much trouble as the patch which was removed. And if the disease is extending, it is to be feared that the parts of the dorsum in the neighbourhood of the scar will be affected with leucoma just as if the primary patch had not been removed. Yet I am not sure that a patient might not sometimes be benefited by cutting out freely a very thick and circumscribed patch, especially when this is very obstinate, and scarcely at all relieved by treatment. And I have no doubt that indurations, and warty growths, and very obstinate ulcers, particularly when they present the slightest increase of induration about their bases, ought to be removed freely and without delay. They must be regarded as young cancers, and must be dealt with as if they were in truth cancers. The adoption of decided treatment on the first appearance of such threatenings of cancer would save the lives of a goodly number of those who now perish from cancer of the tongue.

Ichthyosis.—The condition which was first described by Mr. Hulke in the Transactions of the Clinical Society (of London) under the name of ichthyosis of the tongue, differs from the patches of leucoma which have been described in certain of its characters. In the place of a white or bluish-white patch, there

is an area of disease over which the papillæ are greatly hypertrophied; the surface of this part of the dorsum is warty, on account of the overgrowth of the papillæ, which, instead of preserving their natural consistence, are much harder than natural, and are sometimes quite horny. The diseased area may be very limited in extent, but several similar areas may be present on the same tongue. In the case which Mr. Hulke described there were at first two areas of disease, and the larger of the plaques gave the patient so much trouble when it grew very thick that he had been accustomed to shave it down with a razor from time to time. Mr. Hulke cut out the smaller of the two plaques, and the wound healed well and quickly. He described it after removal thus: "The wart is three lines thick at the centre and one and a half lines at the edge. It consists of the natural elements of the mucous membrane greatly hypertrophied. The papillæ and their epithelial sheaths are both involved." In the account of the structure of this and two other plaques, which were removed from the same tongue at a later period, Mr. Hulke says: "The excised plaques had essentially the same structure as that removed in 1861, viz. extreme hypertrophy of the filiform papillæ and their sheaths. These composite papillæ had an average diameter of $\cdot 1$ inch at their base, and the average length of $\cdot 25$ of an inch. The epithelial sheaths of the secondary papillæ, instead of ending separately in brushes, cohered in solid masses, etc." The difference between this and the forms of leucoma described in the previous section is in the much more warty condition, owing to which Mr. Hulke thought fit to give it the name ichthyosis. These warty conditions are much more rare than the other varieties of leucoma. Very few of them are described in the accounts of cases of leucoma or ichthyosis; and I can only recollect

one or two of them, although I have seen many cases of leucoma. Since the appearance of Hulke's paper, it has, however, been usual to apply the term ichthyosis to all the varieties of leucoma, whether they are warty or smooth; and it is now considered as synonymous with leucoma, leukoplakia, psoriasis, etc. It certainly appears to be of the same nature as leucoma, for later investigation has shown that there is no essential difference in the minute anatomy of the diseases; that the ichthyotic patches are at their borders smooth, and in all respects similar to the patches of leucoma; and that the course of the diseases is in all respects the same, even to the tendency both show to develop carcinoma.

With regard to treatment, there is little to add to what was suggested in the last section. The question, however, thrusts itself more prominently forward, whether it would not be well to excise these very hard and warty patches before they attain a large size. Three of them were excised from the tongue of Mr. Hulke's patient; and although the wounds bled freely, they healed well, and left scars which were soft and free from disease long after the operations. The spread of the disease was from the patches which were left behind; and it may be argued that if the whole of every patch had been removed at an earlier stage of the disease, the patient might have been cured of ichthyosis, and have been saved from the later development of carcinoma, of which he died. I think the treatment by excision should be more largely employed in cases of limited leucoma and ichthyosis than it has been, especially when the tongue has upon it only a single patch.

Chronic superficial glossitis.—The whole, or a large area, of the dorsal aspect of the tongue is much smoother than natural: indeed, the papillæ have entirely disappeared. The mucous membrane is

redder, and not of the same uniform tint as in the natural state. It is uneven, too, and often presents smooth and elevated areas. Since there are no papillæ, there is, of course, no fur. There are, not uncommonly, excoriations or superficial ulcers in the affected region; sometimes the entire tongue appears too large for the mouth, and its borders are marked by the pressure of the teeth; in other cases there is no evidence that it is increased in size. The surface looks glossy, and there are frequently thin bluish-white patches on it. The subjective symptoms of this condition are often much more distressing, or, at least, annoying, than those of leucoma. Although there is no apparent alteration in the softness and pliancy of the tongue, it feels stiff and uncomfortable, perhaps because, as Clarke has said, the secretions of the mouth are more viscid and thicker than in the normal condition of the tongue. Movement is irksome, and much more discomfort is experienced in taking food than when the patient suffers either from leucoma or ichthyosis. All the various irritating kinds or conditions of food which have been indicated in the paragraph on the treatment of leucoma are infinitely more hurtful to these tongues. Spirits, especially, and smoke cause very great distress; so that the patients of their own free-will often abstain from the use of them, though they were largely addicted to them formerly. Indiscretions in diet quickly and certainly induce fresh inflammations of the dorsum of the tongue. Nor will this appear strange when the minute anatomy of the disease is studied. The epidermis is reduced to a thin, tolerably uniform layer, and consists of two parts, a horny and a mucous layer, the intermediate layer of larger, more translucent cells, such as exists in the normal tongue, being generally absent. The downward processes of epithelium between the papillæ are very much smaller than

in the natural tongue, and the aspect of a perpendicular section rather resembles a perpendicular section of the skin. The corium is decidedly increased in thickness, more vascular than the normal corium, and is thickly infiltrated with round cells, like leucocytes. The extreme thinning of the epidermis, and the excited and excitable condition of the corium, to which the increased vascularity and cellular infiltration bear witness, thoroughly explain the readiness with which the mucous membrane is lighted up into repeated inflammations. Inflammable material is at all times collected together in the parts immediately beneath the epidermis, and the epidermis is too thin to thoroughly protect the parts beneath from the exciting influence of many irritants, which, with a thicker and more perfect epidermis, would pass over it without producing any serious disturbance.

A comparison of the minute anatomy of this disease and of leucoma and ichthyosis shows that their essential characters are the same. In all there is thinning of the epidermis, except perhaps in some of the most typical instances of ichthyosis; in all there is a well-marked horny layer of the epidermis, and all of them exhibit increase of thickness, vascularity, and cellular infiltration of the corium. The appearances are in each case those of inflammation of the mucous membrane of the tongue, and the difference which is observed in the outward appearance of the surface of the tongue in the different diseases must be attributed to the influence of some, probably imperceptible, difference in the chemical or physical structure of the affected membrane. Differences analogous in kind may be observed in the reaction to irritants and injuries of other parts of the body. Under the influence of a hot sun, the skin of one man browns, the skin of one of his companions reddens, and of another companion peels off. Two workers

in sugar suffer from grocer's itch. In both of them the disease is, or soon becomes, chronic ; but in one of them the eruption is dry and thin and scaly, in the other it is thick and scabby. Yet there was probably no perceptible difference in the appearance of the skin of the hands of the two men before the occurrence of the eruption, and almost certainly no difference could have been detected by microscopical examination. Such examples might be multiplied almost without limit, but these two will suffice to show that there is not a sufficient reason to be found in the differences of outward appearance of these diseases of the tongue for separating them pathologically from one another. In all of them there are the signs of inflammation of the mucous membrane ; and the only difference is in the effect of this inflammation on the surface of the membrane.

The term chronic superficial glossitis might be applied with equal propriety to all these conditions of the tongue, for they are all due to chronic inflammation of its superficial structures. But whereas leucoma and ichthyosis have been so named on account of their peculiar and characteristic aspect, the term chronic superficial glossitis has been limited in its application to the condition which is described in this section.

Chronic superficial glossitis is not more amenable to treatment than leucoma or ichthyosis ; indeed, it is in some respects more difficult to treat than either of the other two. The liability to renewed attacks of acute or subacute inflammation, and the much greater sensibility of the surface of the tongue, render it necessary continually to apply remedies for the relief of temporary pain and tenderness and salivation. Much greater care in diet is obliged to be taken by those who suffer from this disease. The plan of treatment is the same as that recommended for

leucoma. Of the local remedies which were mentioned, those which appear to relieve the patients more certainly and quickly than any others are solutions of chromic acid of about five grains to the ounce of water, or the mel boracis of the Pharmacopœia. It must be borne in mind that chronic superficial glossitis, like leucoma and ichthyosis, may be the precursor and predisposing cause of lingual carcinoma, and that warty growths, indurations, and indolent ulcers which become indurated are all to be regarded as in the highest degree suspicious, and to be treated on the assumption that they are cancerous if they do not quickly yield to simple treatment.

Wandering rash, ringworm, circular exfoliations, benign plaques, geographical tongue, lichenoid, circulus or annulus migrans.—Under one or other of these different names a very singular condition of the dorsum of the tongue has during the last few years been described. I believe the first descriptions of it came from France, and were published by Bridou in an Inaugural Dissertation in 1872, and by Gubler in the "Dictionnaire Encyclop. des Sciences Médicales" (art., "Bouche"). But the articles of Bridou and Gubler excited very little attention, unless perhaps in France; and it is only during the last five years that papers and accounts of cases have been published in this country and in Germany. Of the many names which have been given to the affection, it is difficult to select one which is really suitable. The eruption has no relation to ringworm, nor does it resemble lichen. The term "geographical tongue" is scarcely such a term as one likes to denote an actual disease; it is a German name, applied to the disease partly because it is difficult to find a thoroughly suitable name for it, partly on account of the peculiar effect produced by the marks on the surface of the tongue. Benign

plaques, the name given to the disease by Caspary, certainly applies to the appearance and some of the characters of the disease, but it applies equally well to many other conditions which bear no resemblance to this disease. On the whole, I am inclined to adopt the name recommended by Barker, "wandering rash"; for the peculiar markings on the tongue may be regarded as a rash or eruption, and the way in which they change their position on the surface of the tongue justifies the term "wandering." The name must, however, be accepted merely as a temporary name, which may be replaced by a more suitable term when the precise nature of the affection has been ascertained.

Wandering rash is *not* by any means a *common* disease; and it is very seldom observed by men engaged in large general hospitals, for it occurs much less frequently in adults than in children. The best opportunities for studying it are afforded by children's hospitals and foundling establishments, and it is seen much more frequently in the out-patient departments of the children's hospitals than in the wards. Yet, although it is essentially a disease of children, it has been occasionally observed in adults. Both sexes appear equally liable to it.

The *disease consists* of one or more patches on the dorsum of the tongue, which at first are very small, having no greater diameter than that of a pea. They are then smooth, red, and on the same level as the surrounding surface of the tongue, although they may appear to be slightly depressed, or even a very little elevated, according to the condition of the dorsum and the thickness of the fur. The filiform papillæ have been shed, but the fungiform papillæ may remain, and may even appear more prominent by reason of their isolation. The patch soon spreads, and becomes a ring, either circular or oval. All the centre of the

PLATE VI.

Fig. 1.—Wandering rash in a boy, aged 9 years.

Fig. 2.—Mucoous patches in secondary syphilis.

Fig. 3.—Mucoous patches on the under aspect of the tip of the tongue in secondary syphilis.

Plate VI



Fig. 1



Fig. 2



Fig. 3



ring is smooth, and generally a little redder than the normal mucous membrane, but it is not unusual for the redness to grow more intense towards the border of the ring. The border itself, however, is not red, but faintly or more decidedly yellow; it is even described by some of those who have written on the subject as golden yellow; and is usually slightly raised, sharply defined. The patches form almost invariably on the dorsum of the tongue, and are more commonly observed towards the tip than elsewhere; but they may affect any part of the dorsum in front of the circumvallate papillæ (Plate VI., Fig. 1). They are not inflamed, and do not present any evidences of surrounding inflammation, either past or present. Occasionally they are observed on the under aspect of the tongue, near the tip, but they have generally extended to the under aspect from the dorsum.

If one of the patches or rings is watched, it is observed to grow larger, until, widening out, it reaches the border of the tongue. Then losing its circular or ring shape, it forms the segment of a circle, the other segment of which may be found on the under surface. Several rings on the same half of the dorsum, thus widening out, intersect each other; but the intersection is not complete, for where they come in contact the border of one of them ends abruptly, while the border of the other, as if stronger than its neighbour, continues to advance unbroken. The meeting of the rings and the peculiar marking of the dorsum of the tongue which is produced by it led to the name "geographical tongue." As the circles widen out, so may they contract again, until each and every circle may disappear from the surface of the tongue; but the rapidity of the subsidence is often so great that the surface of the tongue does not instantly regain its normal aspect; it is slightly redder and smoother than natural. Again, as the circles expand

fresh patches may form in their interior, and widening out in turn, may form rings within rings. So, fresh rings may form in areas from which the former rings have only lately disappeared. In all these changes the circles preserve their original character of smooth red centres and slightly raised whiter or yellowish borders. The regularity of the outline of each ring is not, however, always strictly maintained; it may be crenate, or present projections here and there.

The wandering rash produces so few *subjective symptoms* that it is frequently present for a long time before it is discovered; or, to speak more correctly, it is frequently discovered only by accident, either by the parents of the child or by the doctor when the tongue is examined for some other reason. Indeed, in many cases there are absolutely no subjective symptoms. Occasionally itching is complained of; and the two patients whose cases are recorded by Barker suffered extremely from the itching of the patches. In these cases, too, the itching was accompanied by very troublesome salivation; but these symptoms are unusual.

Of the *cause* of the disease little or nothing is at present known. It was for a long while believed to be parasitic, but the parasite has yet to be discovered. It has repeatedly been maintained to be due to syphilis; and Parrot, who has had many opportunities of observing it, was a very strong believer in the syphilitic origin. But Parrot was so firm a believer in the syphilitic origin, that the appearance of the eruption on the tongue of one of his foundling children appeared to be a sufficient reason for declaring the child to be affected with congenital syphilis. The evidence of all observers who have studied the rash from a wider aspect is to the effect that it is not due to syphilis, congenital or acquired. The only condition

which can in any way be regarded as a cause, either predisposing or exciting, is debility. Unna, Barker, and Caspary have all seen cases of wandering rash in delicate children; but there is no further evidence to show in what manner the disease is related to debility: it does not appear especially to depend on a weak digestion. Unna thinks that it is connected with dentition, but it occurs in some children before the period of the first dentition.

It is not surprising that the rash should have been regarded as due to the effect of a parasite; it resembles ringworm in the rings it forms, in their slightly raised borders, and in the appearance of spreading at their borders which the rings present. And it is so easy to discover parasites (*schistomycetes*) on the surface of the tongue, since so many of them exist there naturally. But the most careful examination has failed hitherto to discover a parasite which is not of common occurrence upon the surface of the normal tongue. The parasitic theory has therefore been almost universally abandoned, and the pathology of the disease is still an open question. The microscopic anatomy has been described by Parrot, the only person who appears to have had an opportunity of examining a section of the tongue affected with wandering rash. He says that the epithelium at the level of the patches is tumified and thickened; the cells of the horny layer are augmented in size; the cells of the Malpighian layer are also augmented, and exhibit signs of proliferation. In the papillæ and the subjacent portions of the derma around the vessels are a large number of lymphoid cells. He regards the derma as the essential seat of the disease, and in this opinion Caspary agrees with him; for, as Caspary truly says, the red spot is often found without the whitish or yellow border, the border never without the red spot. It may be considered to be a subacute papillitis, as Vanlair calls it, or, in other

words, a subacute inflammation of the derma of the mucous membrane of the tongue. And the cause of the inflammation may fairly be sought, as most of these authors are agreed in thinking, in some peculiar nervous influence. One great reason for accepting the theory of nerve influence is, undoubtedly, the complete absence of any indication of another cause; but the symptoms which were especially noticeable in Barker's cases (the itching and salivation) lend colour to the theory. Beyond these points, the morbid anatomy and the pathology of wandering rash are absolutely unknown.

The *course* of the disease is, so far as it has been observed, to remain uncured for many months or years. It appears to be most obstinate and unyielding to remedies, whether local or constitutional. It is, however, subject to very great fluctuations. At one time there are few or no rings visible on the tongue; at another time the dorsum is mapped out by them. When they are present they often extend over the surface of the tongue with great rapidity; even considerable changes may be observed in the course of a few hours. Parrot speaks as if each ring had a natural existence of about six or seven days, and says that the entire disease may disappear entirely for many months, or even for years, and then break out again. Fortunately, although it is extremely obstinate, and may be regarded as incurable, so far as remedies are concerned, it is not by any means a serious evil. The worst symptoms it produces are itching and salivation, troublesome enough, in truth, yet not grave. And in so far as the disease is scarcely ever observed in adults, or even in children over six or seven years old, the probability is strong that it undergoes spontaneous cure; for the only alternative would be that all the children who are affected with it die. Caspary indeed draws a more serious picture of the later stages of

the malady, and tells how it forms deep and numerous cracks and fissures along the borders of the tongue, so that the previously mild complaint becomes a grave and important disease. But I have never seen this serious final stage, nor have I met with any other confirmation of it than appeared in the presence of several furrows and fissures along the borders of the tongue of a child who suffered from the disease. She was a patient of Dr. Collocot Fox, who has written an excellent paper on the affection, and who kindly sent her to me for examination. Unless, then, the future brings with it a very different experience to the past, I shall continue to believe that the wandering rash is, clinically, a very insignificant disease, and that it is never likely to become serious, and that it undergoes spontaneous cure after it has existed a considerable period. I do not think that Caspary even has suggested that it may, like leucoma, be a precursor of carcinoma.

Before proceeding to consider the diagnosis and treatment of the wandering rash, it is worthy of notice that Vanlair has experimented on the effect of the eruption on the sensibility of the parts of the dorsum which are affected, and finds that neither the sense of touch nor of taste appear to be in the slightest degree impaired, but that sensibility to pain is in some instances decidedly exaggerated. This again favours the theory of the nervous origin of the disease.

The *diagnosis* of wandering rash is singularly easy. From syphilitic mucous tubercles (which occur in children as well as in adults) it may be told by the general grey surface of the tubercle, and by its much greater elevation above the level of the surrounding parts; and when the tubercle, as is not uncommonly the case, has lost its grey covering by being rubbed against the teeth or roof of the mouth,

by the greater elevation of the tubercle, its persistence compared with the rash, and by the presence of other signs of syphilis. In children these other signs will, of course, be almost always those of congenital, not of acquired, syphilis. The diagnosis from leucoma depends first on the fact that leucoma is a disease of adults, wandering rash of children; leucoma consists of pearly patches, which sometimes have red borders and always red bases after the removal of the coating, while wandering rash consists of red patches, which have usually a whitish or yellowish border; leucoma advances very slowly, while wandering rash changes from day to day, and sometimes from hour to hour. Leucoma and smoker's patches occur, too, on other parts of the inside of the mouth besides the tongue, while wandering rash has never yet been observed on any other part than the tongue. The condition, for it can scarcely be called a disease, most likely to be mistaken for this disease is the circumscribed bald patch which is occasionally seen on the tongues of children and adults, and which is described under the heading of smooth tongue. Indeed, I believe that some of the cases of wandering rash which have been recorded in adults were really such smooth patches as those I have described. The distinction is chiefly in the absence of the whitish or yellow collar in the simple smooth patch, and in the circumstance that the simple smooth patches do not necessarily form complete rings, and when they do so, the centre of the patch or ring is not bald all over.

It has already been more than once remarked in this section that wandering rash is very little, if at all, amenable to *treatment*, whether local or constitutional. In fact, so far as local treatment is concerned, I know of no remedy which appears to exercise any influence on the course of the disease. Even the symptoms of itching and salivation do not seem to be allayed by any

of the local remedies which are usually employed in the medication of diseases of the tongue. It is well, however, to try the effect of remedies when the eruption is accompanied by these annoying symptoms, since it does not follow because they are not generally useful that they never will be of use in an individual case. Slightly astringent lotions, tannin, alum, sulphate of zinc and chloride of zinc; soothing lotions, borax, chlorate of potash, solution of chromic acid, etc., may all be used in turn, together with any other remedy which may seem desirable.

The constitutional treatment which is indicated in most cases is tonic; and iron and cod-liver oil may be administered with advantage to the children who suffer from wandering rash. The administration must be maintained over a long period of time if a hope is entertained of curing the disease, or even of producing a decided effect upon it.

When the almost, and in some cases quite, trivial character of the affection is considered, the treatment which is recommended by some of the authors who have been quoted is almost ludicrous. Vanlair, for example, after saying that the treatment cannot yet be formulated in a definite manner, proceeds to recommend that arsenic and sulphur should be tried in the form of mineral waters, with purifying medicines and general baths, and that the iodides and bromides should also be employed. Locally, he recommends honey, gum, and guimauve, and later tannin, chlorate of potash, and other lotions. And for diet: milk, soup, eggs, green vegetables, fruits, white meats, water, light wine and water, and slightly alkaline mineral waters (Schalheim, Apollinaris, Bilin, Vals). For children under three years old this treatment seems a little advanced, to say the least of it.

But the local treatment recommended by Unna is still more peculiar, when the extreme youth of most of

the patients is borne in mind. The following solution is to be prepared : Aq. sulphuros ; aq. menth., āā. 100 ; flor. sulph. ; syrup. simpl., āā. 20 ; gum tragacanth, 2. The mixture is to be well shaken before it is used. Three times a day, after careful cleansing of the mouth, the patient takes a mouthful, holds it in the mouth about five minutes, and works it into all the corners and angles. This washing may be carried out three or more times in succession. Whilst it is being done, a sediment of sulphur and sulphurous acid collects in the glass ; the fluid is poured off, and the sediment is taken up on a tooth-brush, and brushed gently over the surface of the tongue.

Mucous patches or tubercles.—An affection belonging to secondary syphilis, for which the better term would be mucous plaques, for they far more often assume the form of plaques than of patches or tubercles. As, however, they are almost invariably spoken of as “mucous patches,” it will be more convenient to retain the term “patch” in this section. They may occur at any time during the period of secondary syphilis, but belong rather to the middle and later than to the earlier symptoms. Yet they may occur quite early, associated with affection of the throat and other parts of the interior of the mouth, with the first outbreak of eruption, and with the falling-off of the hair.

Mucous patches may form on any part of the tongue, on any part of the dorsum, on the borders, at the tip, and on the under aspect ; but they occur more frequently on the border than elsewhere. They may be met with at any age, for they belong to congenital as well as acquired syphilis ; but they are much more often seen on the tongues of young adults than at any other time of life. They may be found in both sexes, but are more often observed in men than in women.

Mucous patches are usually multiple, and are accompanied by other signs of secondary syphilis, by similar patches or ulcers on the inside of the lips and cheeks, or on the palate, by ulceration and mucous patches on the tonsils, by sores at the angles of the mouth, and by symptoms of syphilis on other parts of the body. Occasionally, however, a single patch occurs on the border of the tongue, and, for the time at least, no other sign of syphilis is present. Attention will be again called to this point when the diagnosis of the disease is considered.

The *appearance* of mucous patches varies considerably, and depends largely on the part of the tongue on which they rest. The best examples are those which occur far back on the dorsum or on the under aspect near the tip, for in these parts they are very little liable to be injured or modified by the rubbing of the teeth. A typical mucous patch on the dorsum, near the circumvallate papillæ, is generally rounded or oval in form, and appears as a greyish-white plaque, raised to the extent of perhaps half a line above the level of the surrounding parts (Plate VI., Fig. 2). It is sharply defined, but the border is not usually perfectly smooth, but is wavy or projects at irregular intervals. Nevertheless, the oval outline is, on the whole, tolerably well maintained, even when the patches are of considerable size. Immediately beyond the border of the patch the tissues are quite natural; there is no redness or swelling, unless there is an accidental inflammation. The surface of the patch is sometimes quite smooth and even, but is not unusually broken by depressed lines, by cracks and fissures. The whiteness is not opaque, but it is not nearly so transparent as the bluish-whiteness of the patches of leucoma, and it has a faintly granular aspect in many cases. The white layer may be more or less completely removed, and

may leave behind a smooth, red, slightly raised base, which is defined by its smoothness and greater redness from the surrounding parts.

On the under aspect of the tongue, where the patches are as little as possible disturbed, either by the teeth or by the passage over them of food, they not infrequently appear as excellent examples of condylomata, warty, and like cauliflower (Plate VI., Fig. 3). The surface of each growth is white, and as a rule a more dead white than that of the patches on the dorsum. The base of each is often slightly constricted, but they are very rarely much elevated, for the conditions under which they grow and the soft materials of which they are composed are not favourable to large development. If they reached a greater height than a quarter of an inch, they would speedily be rubbed down and flattened out by the surrounding gums and teeth. These little condylomata, like the mucous patches on the dorsum, are absolutely free from any signs of inflammation.

On the tip and borders the characters of mucous patches are often so modified that the appearances they present are very different from those which have been described. The patch is still raised and still white, and often roughly retains its oval shape, but the borders are frequently sinuous or deeply notched, and immediately beyond is a bright red areola, extending for about an eighth of an inch into the surrounding natural red, in which it gradually fades (Plate IV., Fig. 1). The surface of the patch, instead of being smooth or warty, is ulcerated, or deeply grooved and hollowed out, or marked by vertical lines of red and white alternately; and all this is due to the pressure or rubbing of the teeth or stumps of teeth. The extent to which a patch on the border of the tongue may be altered

depends, of course, on the thickness or height of the patch, on the condition of the teeth, and on the condition of the tongue, which may be generally larger than it ought to be, so that the patch is pressed outwards against the teeth. The ulceration may be merely superficial, and may affect only a part of the surface of the patch; or it may be so deep and so extensive that it not only almost wholly destroys the patch, but eats deeply into the substance of the tongue as well. On the other hand, I have seen patches on the borders which, on account of their very slight elevation, and of the small size of the tongue and smoothness of the teeth, were nearly as well preserved as the patches far back upon the dorsum.

The first appearance of the mucous patch is usually in the form of a very small and slightly raised white-grey spot, perhaps not larger than a small split-pea; but it quickly enlarges, without any sign of inflammation, and, unless it be ulcerated or injured, is probably for a long time unnoticed by the patient. Several patches may coalesce, and in this manner some of the large and most irregularly-shaped patches are formed. The entire patch may continue to enlarge in all its diameters so as to preserve the original shape of that which first appeared; or it may put forth tongue-like projections, which spread over the adjacent surface of the tongue, and are recognised by their yellower colour and less thickness when compared with the original patch. If they are left untreated, mucous patches may remain for a long time very little altered, or they may slowly extend until a large part of the surface of the tongue is covered by them, or they may undergo some of the changes which have been described, may lose their white coating, or may ulcerate on account of the irritation they are subjected to. I have no doubt, too, that they may heal spontaneously, for many persons pass through the entire period of secondary syphilis

without treatment, and all the symptoms disappear. The worst cases, however, come under treatment, and I can certainly say that I have watched mucous patches, especially the condylomata on the under aspect of the tongue, for many months, and have noticed no alteration in them, although afterwards an application of chromic acid has caused them to disappear entirely in the course of a few days.

It must be borne constantly in mind that the secretion which comes from these mucous patches and the discharge which proceeds from the ulcers which form in them is *contagious*. A person, therefore, who is suffering from mucous patches and other secondary affections of the interior of the mouth, especially from secondary sores on the lips and at the corners of the mouth, is dangerous to those with whom he lives and with whom he works. He should be warned against kissing when his mouth is sore, against allowing other persons to use the same glass and pipe as he uses, the same fork, and the same tools, if they are used within the mouth. Not long since Mr. Hulke told me of a boy under his care who had contracted syphilis by using his neighbour's blow-pipe in the shop in which they were employed. So, also, I saw a few months ago a young woman with a primary sore upon her nipple, which she said had been produced by a child which she had taken to bed with her for several nights seizing her nipple in the night and sucking it. The child was brought to see me in the following week, and I found that it was suffering from syphilis, and had mucous patches on the tongue and at the corners of the mouth. Such accidents cannot be too carefully guarded against; both the patient and the patient's friends must be warned of the danger, even at the risk of exposing the character of the disease from which the patient suffers. This, indeed, is seldom necessary; it suffices usually to state decidedly that the disease is

contagious, and to point out the manner in which it may be contracted.

With regard to the *frequency* of mucous patches on the tongue, they are not nearly so common there as about the anus and the vulva. Bumstead and Taylor, quoting from the statistical tables of Bassereau, find that in one hundred and thirty men mucous patches were found around the anus 110 times, upon the tonsils 100 times, and upon the tongue only 18 times. Further, they refer to the statistics of Davasse and Deville, who examined one hundred and eighty-six women, with the result of finding mucous patches upon the vulva 174 times, about the anus 59 times, on the tonsils 19 times, and upon the tongue only 6 times. The much larger proportion of men suffering from mucous patches on the tongue has led to the conclusion that probably an exciting cause, as well as the predisposing syphilis, is active in producing mucous patches on the tongue. This cause may be found, as Bumstead and Taylor suggest, in the use of tobacco by men. Chewing and smoking are liable to irritate the surface of the tongue, and the slight irritation or congestion determines the formation of a mucous patch. This, however, would scarcely account for the frequency with which the patches are found on the borders of the tongue; it is probable that the irritation of the teeth produces quite as considerable an effect as the irritation of tobacco. Certainly I have more than once seen mucous patches on the border of the tongue directly opposite a rough tooth or stump, the only rough or carious tooth on either side.

In the large majority of cases the *diagnosis* of mucous patches is easy. The patches themselves are very characteristic, and the accompanying signs of syphilis render it impossible to err. But occasionally they may be mistaken for leucomata, or aphthæ, or wandering rash, or even warty growths. The diagnosis

from leucoma depends partly on the difference in the colour of the patches, which are not pearly, like leucomatous patches, but greyish-white, as if they had been painted over with a nitrate of silver stick. Mucous patches occur much more often on the borders, leucoma patches on the dorsum of the tongue; mucous patches are much more often deeply ulcerated than leucoma patches. Leucomas, when thick and white and raised, and, therefore, most likely to be taken for mucous patches, are, as a rule, much harder and drier than mucous patches. Leucoma usually runs a very slow course, mucous patches a comparatively quick course. But the presence of associated signs of syphilis in the large majority of instances makes the diagnosis perfectly clear. In aphthæ and in mucous patches there are white patches, but the white patches of aphthæ belong almost exclusively to children or to adults who are suffering from very severe illness, while the white patches of syphilis occur almost exclusively in adults, and, for the most part, in adults who are in good, or, at least, not in bad health. The white patches of aphthæ are surrounded by bright red areolæ, those of syphilis are peculiarly free from any sign of surrounding inflammation, unless they have been irritated, and are accidentally inflamed. Aphthous ulceration is acute, mucous patches are chronic. And, once again, the associated signs of syphilis are rarely absent. The diagnosis from wandering rash was described in the section on wandering rash. The diagnosis from that very rare condition, diphtheria of the tongue, must depend on the swelling of the base of the diphtheritic patch, the general fever, and on the presence of associated signs of diphtheria in the neighbouring parts. In the case of diphtheritic inflammation, and the formation of membrane over a wound, the history of the wound and the general illness of the patient tell the character of the disease. Lastly, it

may sometimes happen that warts or warty growths are mistaken for the warty syphilitic tumours. True warts are more common on the dorsum of the tongue, are usually of very slow growth, and are often decidedly of papillary origin. But the diagnosis is rendered easy by the presence of associated signs of syphilis, and by the result of treatment, which is speedily effectual in removing syphilitic warty growths, but is almost useless against actual tumours.

The *treatment* of mucous patches was at one time, and, indeed, until quite lately, regarded as very unsatisfactory, not because the patches could not be cured, or because they led to deep ulcers or to serious mischief, but because they remained so very long uncured. I have already mentioned that I have seen syphilitic condylomata, and I may also say mucous patches of the flat type, remain almost in the same condition for many months. Yet the patients were treated with mercury in sufficient doses, and, being anxious to be rid of the trouble in the mouth, appeared to have taken the medicine regularly. Many local applications were employed without avail, until it occurred to me to try the effect of a solution of chromic acid on them. The result was magical, for the patches and warty growths, which had remained unmoved during many months of treatment, now disappeared in the course of a few days. Since that time I have used a ten-grain solution of chromic acid largely in the treatment of secondary syphilitic affections of the interior of the mouth, and especially for the relief of mucous patches, and almost invariably with a good result. A few cases have resisted the effect of the acid, and it has then been found necessary to remove some source of irritation; a carious tooth, for example. The patches appear to melt away under the influence of the acid. I have never, indeed, used the chromic acid without, at the same time, treating the patient internally

with mercury in the form which seemed most suitable to his individual case, so that I cannot say whether the chromic acid would be equally effectual if used alone.

In out-patient practice the only objection I have found to the use of chromic acid is that it relieves the patients too quickly of the annoyance which the mucous patches cause them, and they are, therefore, unwilling to attend sufficiently long to be thoroughly treated for their constitutional syphilis. This objection, which I should be disposed to regard as trivial had I not often found it to be the case, is, however, more than counterbalanced by the advantage to the community of removing as speedily as possible a source of syphilitic contagion.

It is not needful to enter into the constitutional treatment of syphilitic patches; it differs in no respect from that which is adopted for the cure of constitutional syphilis generally. I am in the habit of giving, in the large majority of cases, three grains of mercury and chalk twice a day, and of continuing the administration of mercury in some form for quite a year and a half, with occasional intermissions. For details of constitutional treatment the reader may be referred to Mr. Jonathan Hutchinson's treatise on Syphilis in this series.

Tertiary syphilitic plaques.—The affection I am about to describe under this name is scarcely mentioned either in works on syphilis or on the tongue. It is, however, carefully described by Fournier, and the account of it which he has given deserves to be studied. I have only seen a few instances of it, and yet I imagine it must be more common than the small number of cases I have seen, and the absence of descriptions, would lead me to believe. For the tertiary plaques are said by Fournier to precede, and be the cause of, the deep fissures and furrows which one sees in old disfigured tongues, where the surface of the

tongue has been absolutely ploughed up by past syphilis.

Let me describe two cases, of which I have sketches by me at the present moment, and which may be taken as corresponding to the deeper sclerosing glossitis of Fournier.

The first is the case of a man, fifty-six years old, who was under my care in the out-patient room at St. Bartholomew's Hospital in February of 1882. He had suffered from syphilis many years previously, and had been accustomed to smoke and drink a good deal, although lately his tongue had been so tender that he had been compelled to diminish largely the amount of spirit and tobacco. As far as could be ascertained, he had suffered from superficial glossitis for many years, but when he came to the hospital he was quite ill, on account of an acute attack which had supervened upon the old inflammation, and which had produced sloughing of the surface at three separate points: in neither of them deep destruction, but in all sufficiently deep to leave shallow ulcers and to give the man great pain, especially when he took food into his mouth. But the feature of the disease which interested me more than any other was the presence of a singular plaque, or tubercular mass, in the middle of the dorsum. It was of oval shape, and measured about an inch and one-third by one inch, and in its central parts, which were the most elevated, it stood about one-eighth of an inch above the level of the surrounding dorsum. It had the appearance of having been formed by the meeting of half-a-dozen flattened tubers, one in the centre and five around, for there were deep furrows or clefts, breaking up its surface into several different segments, but of different sizes. Each segment was smooth, dull red, flattened on the summit, but rounded where it met the adjoining segments. The whole of the plaque was firm and

elastic, and quite insensitive, except where it was affected by the acute inflammation which had seized the fore part of the tongue. And only at this inflamed part was there any sign of ulceration which was not deeper than the superficial ulceration of the fore part of the tongue. The patient was not sure how long this plaque had existed, for it had given him no trouble, and he would not have applied at the hospital on account of it had he not been driven there by the sharp attack of inflammation which caused him so much distress. As soon as he was relieved of this, his visits ceased, and I have not seen him since.

The second case is more interesting for several reasons, for I watched the progress of the disease from first to last, and the objection which may be made against the first case that the diagnosis was not absolutely certain (of syphilis) cannot be maintained in this. The patient, who was thirty years of age, was also under my care in the outpatient department of St. Bartholomew's Hospital for a very long time on account of extremely severe tertiary syphilis. He first came to me in February, 1881, when he was suffering from several smooth plaques on the left half and border of the tongue. The plaques were three in number, of irregularly rounded shape, very smooth, raised to the extent of half a line to a line, and rather higher in the centre than at the borders, and redder than the surrounding parts; even where there was no fur, they were well defined. I thought at first that they were ordinary gummata, but found, on closely examining them, that, although they measured from a quarter to three-quarters of an inch across, they had scarcely any depth; they were, however, firm and almost parchment-like. The primary attack of syphilis had been about four or five years previously, and the secondary symptoms had lasted for rather more than a year.

Since that time he had had ulceration of the scalp and skin of the forehead, and while he was under my care ulcers broke out in various parts of his body as well as on his tongue. The patches on his tongue had been noticed for about two months past; first one of them had appeared, then the other two, and they had slowly increased in size. I was not sure whether they were superficial gummata or whether they corresponded with the tertiary tubercular syphilide which one sees not uncommonly on the face and other parts of the surface of the body. In either case the treatment was the same, so he was put on iodide of potassium, and the plaques were painted with bicyanide of mercury. Under this treatment they soon improved, but, owing to his irregular attendance at the hospital, and consequently to his being without medicine for a week or more at a time, the largest of them grew larger still, and without becoming more prominent, broke down into ulcers, not absolutely superficial, yet not deeper than the eighth of an inch. Under renewed and more regular treatment they soon healed, leaving superficial, yet clearly discernible, scars. The other plaques disappeared without ulcerating. In November of the same year he returned to the hospital with a fresh outbreak of syphilis of the scalp and neck, and a singular plaque in the middle of his tongue, which Mr. Godart was good enough to paint for me. When I first saw it it was about an inch long, and made up of two separate oval plaques, which afterwards coalesced, and increasing considerably in size, formed a single plaque, measuring two inches long by three-quarters of an inch across. It rose almost abruptly from the dorsum, and in the centre reached a height of about one-eighth of an inch, but was a little less elevated at the sides. It was perfectly smooth and of a deep red colour, but with a decided purple

tint. Down the centre ran the groove formed by the meeting of the two original plaques. The whole plaque was glazed and shiny, and was at no point broken or even slightly cracked (Plate VII., Fig. 1). It felt very firm, but the firmness did not extend far into the substance of the tongue. The rest of the dorsum was healthy, except for the trivial scars on the left half, and two lumps, gummatous, on the right border. There were no signs of inflammation about the central plaque or in connection with the gummata. Five grains of iodide of potassium and a drachm of the liquor hydrargyri bichloridi were administered three times a day, and the surface of the tongue was ordered to be painted several times daily with a ten-grain solution of chromic acid; but at the end of a couple of months there was no improvement. He was then put on ten grains of iodide of potassium and half-a-drachm of the bichloride, with the result that, although the chromic acid was left off, and no external application was employed, the plaque quickly diminished in size, and at the end of another month had melted away. There was never at any time ulceration; the plaque disappeared, without leaving any trace of its existence. Of course I cannot say what course it might have pursued had it been left untreated.

Fournier's account of the sclerosing glossitis of tertiary syphilis is that it produces cellular hyperplasia, which infiltrates the tissues of the tongue. In process of time these patches or areas of cellular hyperplasia multiply, then become organised, condensed, and end by forming a fibro-plastic, fibroid frame. With the organisation and condensation of the frame there occurs contraction, so that the natural tissues of the tongue are strangled and atrophied, and in this manner cirrhoses, or more properly scleroses, are produced.

He divides the lesions into superficial or cortical and deep or parenchymatous.

The superficial sclerosing glossitis takes the form of superficial indurations, which are developed in the derma of the mucous membrane. They are extended and lamelliform; either isolated plaques of variable extent and form, from the size of a threepenny-piece to that of a haricot, usually rounded or oval, easily perceptible to touch, like discs of parchment, of deeper cherry red than the normal surface of the tongue, uniform and smooth, without papillæ, often not at all elevated above the surrounding surface. Or they form continuous plaques, covering two to four square half-inches, or even more, and presenting similar characters to the isolated plaques. Both the isolated and the confluent plaques are prone to break down with the production of fissures, chaps, chinks, erosions, and ulcers. The sore places are not usually painful. The disease is very chronic, and leaves behind milk-white patches.

The deep or parenchymatous sclerosing inflammations are generally both deep and superficial, but they may be limited to the deeper parts. They are characterised by swelling on the dorsal aspect of the tongue, which is later followed by atrophy. The surface of the dorsum is mammilated and lobulated, and the lobulation is like that of the surface of the liver in cirrhosis. It is so frequent a symptom of syphilitic sclerosis that it is almost pathognomonic of syphilis. The central parts of the dorsum are the most frequently affected, but the borders may also be attacked, in which case the dental arcade is marvelously reproduced upon the tongue. Another character is deep induration of the affected parts, not unlike that of cancer. Lastly, there is morbid redness, of a vinous hue, of the mucous membrane, which is smooth and without papillæ. Erosion and ulceration may

occur from various causes, and are especially liable to affect the furrows and fissures which result from contraction of the organised tissue.

A rare variety of sclerosing glossitis is that in which the disease is generalised, when, with the preceding signs, the entire tongue is enormously swollen and hard.

The course of all the sclerosing inflammations of the tongue is essentially chronic; and if they are left untreated they are prone to break down and ulcerate, but the ulcers are rarely deep or difficult to heal. The lymphatic glands are practically never enlarged in association with them, although it is not impossible that inflamed and ulcerated plaques may produce enlargement of the glands.

Fournier gives an elaborate account of the *diagnosis* between these sclerosing inflammations and various other affections for which they may possibly be mistaken. In this category he places indurated lingual chancre, lingual psoriasis, smoker's patch, and dental glossitis. But it is difficult to understand how any of these diseases can be mistaken for the disease which has been described. Nor do I see how canceroid (epithelioma) of the tongue is so likely to be mistaken as Fournier supposes, unless in those rare cases in which the syphilitic affection is much deeper and more gummatous than usual. The local condition is for the most part quite characteristic, and when there is doubt, there are almost always other signs of syphilis, either of the tongue or of some other parts of the body, which help to solve the question of the nature of the disease. The effect of treatment is, too, speedily useful in determining the syphilitic origin of the plaques. At a later period, when the tongue is fissured and furrowed by the contraction of the plaques and trabeculæ of syphilitic new-growth, there is little fear that any other disease will be taken for this.

The *prognosis*, if the disease is extensive, or if it has been untreated or has been imperfectly treated, is bad, for the tongue is generally horribly disfigured by the subsequent contraction. The plaques of sclerosing glossitis are, too, almost always associated with the formation of gummata in the tongue, and these, breaking down, increase the deformity. But if the affection is treated early and thoroughly, the result is generally good. In the same way that gummata are completely removed under appropriate treatment, provided the treatment has not been too long deferred, the plaques of sclerosing glossitis apparently may be resolved by treatment. The example I have brought forward from my own experience shows how resolution may be hoped for, even in a patient not only heavily smitten with syphilis, but very weak and ill at the time the plaques appeared upon his tongue. In his case the largest and most important of the plaques entirely disappeared without ulcerating, and, up to the time I saw him last, without leaving either a depression or a scar.

In the *treatment* of sclerosing inflammations, whether superficial or deep, iodide of potassium plays by far the most important part. It may at first be administered in doses of five to ten grains three times a day; and if a decided effect is not speedily produced, the dose may be increased rapidly to twenty-five or thirty grains. With iodide of potassium, solution of the bichloride of mercury may be given; and in most cases cod-liver oil and tonics are useful, for the patients are usually in defective health. In the stage of the disease in which contraction has taken place little or no benefit is to be expected from anti-syphilitic treatment. The disease has done the worst of which it is capable, and the only result which can be hoped from treatment is to palliate symptoms as they arise. In the majority

of instances local treatment is not necessary, and, indeed, can do no good. But when the plaques are ulcerated and are sore, they may be painted with a solution of chromic acid, or may be rubbed, as Bryant recommends for gummata, with a mass of blue pill.

It may seem that I have devoted too little space to the treatment of these tertiary syphilitic plaques. But the truth is that they usually yield readily to iodide of potassium, if not in small doses, yet certainly in large doses; so that the treatment is almost entirely by the administration of the iodide.

Lichen of the tongue.—In some cases of lichen, small patches or plaques occur on the tongue. Mr. Hutchinson has described several cases of lichen-*psoriasis* (*lichen ruber*) in which there were white patches on the tongue. They occurred generally on the lateral portions of the dorsum, and were at first punctate, but by confluence, as is the case with the eruption on the skin, they became confluent. They were leucomata of a dirty white or French-white colour, usually a little raised above the level of the mucous membrane. In more than one case they occurred in the form of streaks as broad as the end of the finger, and one of the patients complained of soreness of the affected parts. There were almost invariably associated with them small punctate leucomata in the pouches of the cheeks.

If the patches occurred alone, there would be no means of distinguishing them from the more common patches of leucoma, but the diagnosis depends on the presence of the eruption of *lichen ruber*. In so far as the leucomata of *lichen ruber* are more amenable to treatment than the ordinary forms of leucoma, it is well, in making the diagnosis of a case of leucoma, to examine or enquire for eruptions on the skin. Usually, however, the cause of the patient's visit to a

doctor is the skin eruption, not the affection of the tongue, for the latter produces very little, if any, inconvenience.

The affection of the tongue in lichen ruber does not seem to be so obstinate or absolutely unyielding to treatment as the similar patches which have been described under the heading of leucoma. In those cases in which the results of treatment have been noted, the patches on the tongue have usually disappeared at or about the same time as the eruption on the body.

The *treatment* is such treatment as is good for the cure of the eruption on the skin. Above all things, arsenic appears to be beneficial. Under its influence the patches on the tongue slowly disappear. Seeing this effect of arsenic on the leucomata in association with lichen, one is tempted to wonder whether arsenic might not be a useful remedy in patches of simple leucoma. I must confess that I have never largely tried it, but I have used it in increasing doses in one or two cases of chronic superficial glossitis which were complicated with eczematous affections of the skin; but although a large dose was reached, no effect was produced upon the affection of the tongue. I have, too, seen a case of multiple leucomata of the tongue associated with lichen ruber which was not at all benefited by the internal administration of arsenic. The treatment had been conducted under the direction of a very distinguished surgeon, who fully appreciated the importance of method in the administration of the drug, and who had ordered such dietetic and hygienic arrangements as seemed most suitable to the individual case.

Leucomata of the tongue are described by Mr. Hutchinson in a case of pityriasis rubra under the care of Dr. Sparks, the notes of which were taken by Dr. Mitchell Bruce. This patient was quite cured of

her skin eruption, but no statement is made of whether the tongue was cured or not.

It may not be uninteresting if I give an account of the only case of leucomata in association with lichen ruber which I have seen, for the concurrence of the two conditions is very rare. The patient was a gentleman who was brought to me about the beginning of 1884 by Mr. Atkinson, of Earl's Court road. He came on account of the condition of his tongue, which alarmed him very much, although it did not cause him any serious trouble. About a year before the time at which I saw him he had noticed a white place on the tongue after a visit to the dentist. Nitrate of silver was applied to it, and he forgot all about it for a month. He then took arsenic, but it continued to increase. So he consulted an eminent surgeon, who said it was a very rare disease, and ordered him to take three minims of liquor arsenicalis three times in the day, and gave him a lotion of chromic acid to apply to the patches on the tongue. In spite of this, the disease extended over other hitherto unaffected parts of the dorsum of the tongue, and attacked also the inner surface of the cheeks. But it never affected the inside of the lips or the roof of the mouth. At times his tongue felt slightly dry, and perhaps sore, but the disease caused him scarcely any annoyance, had it not been for the fear he had that it would turn to cancer. He had not smoked for years; he never drank much, and was often a teetotaller for months together; and he had never had syphilis. His general health appeared to be good, and he was not particularly dyspeptic.

But he had had an eruption on his chest for several years.

He had also suffered a good deal from decayed teeth, and for some years past had worn a plate of teeth.

There was no family history of any similar disease, either of the tongue or of the skin, but his father had suffered from rheumatism. He himself had no signs of gout or rheumatism.

When I saw him, he had many small bluish-white areas of leucoma on his tongue, of irregular shape, most of them slightly depressed, and smooth, and thin, some of them a little thicker. There were no signs of inflammation in connection with any of them, nor were any of them raised or in the least degree indurated. He showed me, however, a slightly raised indurated lump the size of half the kernel of a medium-sized nut, the surface of which was slightly discoloured, but which had some papillæ over it, which he said had been the seat of a white patch a few days previously. The disease was chiefly situated on the borders of the tongue, about half-way back, and on the left half of the dorsum, not far from the border. There were also patches of similar kind on the inside of both cheeks and on the gums, but they were not nearly so numerous as the patches on the tongue. The patient told me that the patches on the tongue sometimes disappeared or changed their place; but the disease, on the whole, had increased rather than diminished.

The plate of teeth he wore was perfectly smooth, and as little irritating as a plate could be, but he complained of being forced to thrust it up into its place with his tongue from time to time, because it was too loose.

One or two of the patches on the inside of the cheeks were a little rougher than those upon the tongue, and were so papillary that they bore somewhat the appearance of typical ichthyotic spots.

On the front of his chest and the upper part of his back were a number of spots of a dull red colour, some of which looked like ill-formed psoriasis, others more

like tubercular lichen. The dull red colour of the spots, and the dirty and ill-formed scales on some of them, might have led to the belief that they had a syphilitic origin, but there were ample reasons against this view.

I only saw the patient once, as he lived at some distance from London, and having been re-assured against the probabilities of carcinoma, preferred to continue the palliative treatment for his lingual malady.

Diphtheria of the tongue.—By this term I have no intention of implying that the tongue is liable to diphtheria when the fauces are not affected. Indeed, the liability of the tongue to diphtheritic patches, even when the tonsils and fauces are thickly and extensively covered with membrane, is very small. Any one may convince himself of this by a glance at the tables of cases of diphtheria and membranous croup, published by the Scientific Committee in the sixty-second volume of the Transactions of the Medico-Chirurgical Society of London; and works on diphtheria and on the tongue contain only a passing allusion to the possibility of the tongue being affected. When the membrane does appear on the tongue, it is almost invariably at the back part, close to the root, and it spreads on to the tongue directly from the fauces, so that the layer of membrane on the two parts is continuous. No special characters have been noticed in the membrane on the tongue, and there are no difficulties in the diagnosis, for the nature of the case is apparent from the presence of membrane on the adjoining parts, and from the constitutional symptoms of diphtheria. Nor is any special treatment necessary. The cases, therefore, in which the tongue is invaded by diphtheria are merely of interest as showing that there is no anatomical reason why the tongue should be exempt, although the line of march of the disease is very rarely

in the direction of the tongue, or, indeed, so far forward as the tongue. The disease has a very much greater predilection for the air passages.

There is another condition which is sometimes spoken of as diphtheria of the mouth and tongue that in which a wound of the tongue (whether an operation wound or the result of accident) becomes covered with a layer of white membranous material. When diphtheria is rife in the district or in the hospital where an operation on the tongue has been performed, it is not at all impossible that the operation wound may become diphtheritic ; but it is not at all probable that many of the cases which have been spoken of as diphtheritic affections were really instances of that disease.

Thrush.—The account of the white patches of thrush will be found in the chapter on parasitic diseases of the tongue.

Aphthæ.—The account of aphthæ will be found in the chapter on ulcers of the tongue.

Nigrities of the tongue or black tongue is described in the chapter on discolorations of the tongue.

Black patches on the tongue in Addison's disease, and **yellow patches** on the tongue in jaundice, are also described in the chapter on discolorations of the tongue.

Leprosy of the tongue.—Intubercular leprosy the surface of the tongue may be the seat of tubercles or patches formed of tubercles. Vandyke Carter says that the dorsum of the tongue may be studded with distinct pale tubercles ; and, as on the palate, superficial ulceration may co-exist. The sense of taste appears to be seldom impaired, but one patient complained of a feeling of heat in the mouth while eating, and another declared he could not taste even pungent condiments. Campana has lately reported a case of a

youth, fifteen years old, born of leprous parents, who for five years had suffered from maculo-nodular leprous eruptions of the skin of the face and limbs. The same eruption appeared on the tongue as a group of little papilliform tumours, forming together an oval patch, the size of a half-penny, slightly raised, with a knotty and villous surface. They varied in size from a lentil to a hemp-seed; some were conical, some rounded; they were rose-coloured and painless. They were examined microscopically, when numerous characteristic leprosy bacilli were discovered.

In looking through the records of cases of leprosy, the occurrence of these patches on the tongue appears to be very rare; nor can I discover any case in which the affection of the tongue preceded the eruption on the face and body. It cannot, therefore, be regarded as a warning of the probable occurrence of leprosy. The diagnosis must depend on the associated symptoms of leprosy, for there are not any specific characters by which the eruption on the tongue can be recognised.

CHAPTER X.

NODES AND NODULES.

Dental Nodes—Tuberculous Nodes—Syphilitic Nodes and Nodules
(Gummata and other Tertiary Nodes).

UNDER this title I propose to consider the various knots and lumps which occur either close to the surface of the tongue or deeper down, such, for instance, as gummata and tuberculous knots. With the exception, however, of unbroken gummata, most of them are described in other chapters, therefore only a short mention will be made of them, and the reader will be

referred to those parts of the book in which they are more fully treated of.

Dental nodes are described in the chapter on ulcers of the tongue, for they rarely exist long before ulceration takes place. Indeed, the first effect of the irritation of a tooth is usually an ulcer, and the swelling and induration which constitute the node form later around the base of the sore. Occasionally, however, it happens that, owing to the rubbing of a rough or prominent tooth, a lump is formed on the border of the tongue opposite the offending tooth. It is not usually very large or very hard, but is an indolent mass, about the size of a small nut, projecting from the border of the tongue, but only to a limited extent, for it lies rather in the substance of the border than upon it. Even if it is not actually ulcerated, it probably is indented by the pressure of the tooth.

It is not always painful or particularly tender. Unless the source of irritation is removed or so altered that it no longer harms the tongue, the lump is sure to ulcerate, with the formation of such a sore as is described in the chapter on ulcers.

The unbroken lump is recognised by its indolence, its situation on the border of the tongue, and the indentation of the tooth. It is distinguished from a tumour by its tendency to break down rather than to increase in size, and from a gumma by its situation opposite a rough tooth, and by the absence of any other signs or history of syphilis. The gumma, too, is usually much more tumour-like, more circumscribed; but it is sometimes difficult to distinguish between the two diseases until the effect of medicine has been tested. It may be very difficult to distinguish it from carcinoma, for the reason that a carcinoma may commence as a similar innocent lump, and may ulcerate in the same way; but the carcinomatous lump is more indurated, and extends more deeply into the

substance of the tongue. In such a case the age and sex of the patient may have much to do in determining between the diseases.

The cure of these dental nodes is easily effected by removing the cause which led to their formation.

Tuberculous nodes or nodules.—Although the condition in which tuberculous disease of the tongue, whether primary or secondary, appears to the practitioner as almost always that of ulceration, yet the ulcer is said by most of the patients to have had its origin in a tiny lump or nodule. In some instances these nodules have been observed by the doctor. They are described as small, not larger, perhaps, than a pin's head to a pea, firm, prominent, and sometimes of a distinctly yellowish colour. Usually only a single nodule is present, and from the breaking down of this a single ulcer results; but in some cases several nodules have appeared at the same time, and, simultaneously breaking down, have produced as many ulcers, but the ulcers, being near together, have coalesced, and formed a single sore. The seat of the nodule is much more often at the borders or near the tip than in the substance or upon the dorsum of the tongue; but it may occur upon the dorsum or, indeed, at any part of the surface. I do not know of any instance in which a tiny nodule has increased to any considerable size without ulcerating, even to the size of a bean or small nut. On this account tuberculous disease of the tongue is described in the chapter on ulcers of the tongue.

In the same chapter will be found a description of the tiny nodules or patches of yellowish colour, so small that they have been called points, which form in the immediate neighbourhood of some tuberculous ulcers of the tongue, and which have been regarded as pathognomonic of tuberculous disease. Trélat, who first drew attention to them, speaks of them as slightly

prominent, round, from one to three or four millimetres in diameter, and of a yellowish colour. I have no doubt that when they are present they are highly suggestive of tuberculous disease, perhaps even pathognomonic, but they are by no means invariably present; and although I have now seen several, I might almost say many, cases of tuberculous ulcer of the tongue, I have rarely been so fortunate as to see a case in which these nodules or patches were around the ulcer.

If tuberculous disease of the tongue commences in the form of a nodule, and if the nodule comes under the observation of the medical man, the probability is that a correct *diagnosis* of its nature will not be made until it has broken down and become an ulcer. It is pointed out in the chapter on ulcers how very difficult it is in many cases of actual tuberculous ulcer, even when the disease has existed for some long time, to diagnose correctly the nature of the disease, and how much the diagnosis must depend, in certain cases, on the associated signs of tubercle and on the progress of the sore. If the diagnosis of the actual sore is difficult, that of the nodule is infinitely more so, for the only characteristic is the yellow colour, which is not always very decided, or perhaps at all perceptible. If, in a tuberculous patient, or in a patient whom there is reason to suspect of tubercle, a yellowish nodule forms on the border of the tongue, the suspicion will be very strong that the nodule is tuberculous, and that it will soon break down, and become a tuberculous ulcer; but I do not believe that it is possible at present to distinguish primary tuberculous disease of the tongue while it is yet in the condition of a nodule.

In so far as the diagnosis will probably be, at best, very uncertain, it is not possible to speak decidedly on the question of treatment. I have, however, very little doubt that in the case of primary tuberculous disease of the tongue the best plan would be to remove

the nodule before it has actually broken down, or if that opportunity has not been taken, to remove it as early afterwards as possible, while it is still a very small and insignificant sore.

Syphilitic nodes and nodules; gummata.—

Nodes and nodules of syphilitic origin may occur on the tongue at any time during the period of tertiary syphilis, but they do not belong to the period of secondary syphilis, unless sometimes mucous tubercles and condylomata take the form rather of lumps than of plaques or of warty growths. The tertiary lumps may appear in one of two forms: first as gummata, when the syphilis is still active in the patient; second as lumps of various size and shape, which are produced by the contraction of past syphilitic lesions, when the syphilis is no longer actively present in the system. The first condition is infinitely more common and far more important than the second; the diagnosis is not always easy; the effects are often very destructive, and the treatment is very successful. The second form is frequently very distressing, and the tongue is horribly disfigured, but the diagnosis presents no difficulties, and the disease is not amenable to treatment, except in so far that active symptoms which arise from time to time may be successfully dealt with.

Gummata.—In the chapter on ulcers I have described gummata when they have broken down, and now, in accordance with the scheme of this volume, I intend to describe gummata during the earlier period of their existence, when as yet there is no ulceration.

Unbroken gummata may be quite superficial or deep (or, as they are sometimes called, parenchymatous). Both forms are much more frequently observed in males than females, and may occur at any time during the period of tertiary syphilis, but on the whole are seldom observed until several (four or five) years have elapsed since the appearance of the primary

disease. The *superficial gummata* occur more frequently upon the dorsum than at the tip or borders. They form nodes and nodules of very various size, from a pin's head to that of a pea, and project in the mucous and submucous tissue, where they may be seen and felt as little hard bodies, not always very well defined, often, indeed, continuous with the tissues of the tongue, not movable apart from the surrounding tissues. They are at first quite indolent, not causing any pain, and perhaps not noticed unless they project more than usual, or are larger than usual, or are irritated. The mucous membrane covering them is at first papillated, if they occur in the papillary area ; but if they are very superficial, or when they extend towards the surface, it becomes quite smooth. At first, too, it has the natural colour of the dorsum, but by-and-by it becomes redder. It is very unusual to find a single superficial gumma ; they are almost always multiple, and a large number of them may be found on the surface of the tongue. In the course of time they break, and, before doing so, grow redder, softer, and more prominent, or perhaps assume a yellowish colour. They may, however, remain for a long time unbroken, continuing in some persons for many weeks or months unchanged ; but this is more usual in deep than superficial gummata. The ulcers, which are produced by the breaking of the little lumps, are similar in character to those which are produced by the breaking of the larger masses, but their depth depends naturally on the depth at which the gumma lies, and the very superficial gummata are apt, in breaking, to destroy, proportionately, a much larger area of the mucous membrane than the deeper tumours, and therefore to present a less apparent depth.

The *diagnosis* of the superficial gummata is not, I think, nearly so difficult as of the deep masses. They are so much more commonly multiple than single ;

they are often situated in parts of the surface of the tongue which are not easily irritated ; they tend to break down at an early period ; and they are so frequently accompanied by other signs of syphilis that they are generally easily recognised. A single small superficial gumma, especially if it is situated on the border of the tongue, may be more difficult to diagnose ; it may be mistaken for a carcinoma in a very early stage, when it has scarcely yet become a cancer, and is rather in the pre-cancerous stage. If there is a rough tooth opposite the little tumour, the diagnosis can hardly be made in the absence of a history or other signs of syphilis. But the real nature will soon appear on removal of the tooth and the administration of iodide of potassium.

The *deep*, or *parenchymatous gummata* are usually much more formidable affections, more difficult to diagnose, and much more destructive than the superficial, unless the latter are very numerous. They may occur in any part of the muscular substance of the tongue, but tend almost exclusively to the dorsal aspect, whether they are situated near the borders or towards the middle line. They occur as often at or near the borders as near the middle line, although they are generally said to affect the central parts of the tongue. They attack, for the most part, men, and rather men at or about the middle period of life ; but they are met with in women as well as men, and are not unknown in children, for they may result from congenital syphilis. They have even been met with in the tongues of infants, but very rarely. Deep gummata vary very much in size. They may be quite small, or they may attain the size of a nut, or even a small walnut ; but the very large gummatous masses are generally the result of the conglomeration of several gummata. Although they may vary thus in size, large size is the rule, small size (such as the size

of the superficial gummata) the exception. They may lie at almost any depth in the substance of the tongue, and when they are very deep, are scarcely appreciable to sight, as they form only a slight bulge or rounding of the dorsum. But they can be felt as rounded or oval tumours, not very clearly defined, feeling almost like a foreign body in the substance of the muscle surrounded by a layer of inflamed tissue. They are also very indolent, producing very little or no spontaneous pain, and are not usually tender when handled. The mucous membrane covering them is unchanged, unless they are threatening to break. Such gummata may be single or multiple. Perhaps multiple gummata are rather more frequent than single gummata; and when they are multiple, the tumours may be either separate, and lie far apart, or may be close together. They may, as has been stated, become conglomerate, and so produce very large, irregular masses. The natural tendency of gummata, whether superficial or deep-seated, is to break and produce ulcers; but they may remain a very long time unbroken. It is not unusual for the deep gummata to remain un ulcerated for several months, and cases are on record in which they have remained unbroken for several or many years. It has been said by Fairlie Clarke that they may become calcareous, and remain quiescent for an interminable period; but the evidence on which this statement rests appears to me to be extremely slender; hardly more, in fact, than that there are two or three cases recorded in old books of calcareous masses which were removed from the substance of the tongue, and were certainly not salivary calculi.

The more superficial of the deep gummata project as prominent rounded masses on the surface of the tongue, almost invariably on the dorsal surface (Plate VII., Fig. 1). Their characters are similar to those of the deeper tumours, but their limits are

easier to define, and their hardness is more evident. The mucous membrane over them is generally smooth, and if they are very near the surface of the papillary area, is often devoid of papillæ. But unless the tumour is softening the colour is not usually changed.

In the progress of the disease the tumours become softer, and approach more nearly to the surface. They still retain their rounded or oval form. They enlarge, and the mucous membrane becomes smoother and redder over them, and sometimes they become tender, but very seldom painful, before they break. Fluctuation may sometimes be plainly detected in the larger tumours.

The mere presence of one or more gummata may be the cause of general swelling of the whole or a large part of the tongue, when the tumours press upon the main vein. And when several gummata co-exist in close proximity, and produce a large tumour, the tongue may be very greatly swollen, especially when the tumours are making their way towards the surface, and are about to become fluid. Instances are on record in which the tongue has attained so large a size as the result of the presence of gummata that it could not be contained within the mouth, but hung out, like it does in macroglossia. Such a condition is extremely rare; for in the very large majority of cases the natural textures of the tongue are only affected in the immediate neighbourhood of the tumours. When it is observed, it is almost always due to the presence of a large number of gummata in all parts of the tongue, and to their confluence, so that the whole tongue is distorted and enlarged by being stuffed with syphilitic tumours.

The *diagnosis* of deep gummata may be so clear that it is impossible to be mistaken in it; and, on the other hand, it may be so difficult that it may be quite impossible to arrive at a correct conclusion. The

two conditions which are most likely to be mistaken for gummata are innocent tumours, such as fatty and fibrous tumours and carcinoma, especially in the early or pre-cancerous stage. The innocent tumours are very often polypoid ; gummata are never so. Innocent tumours are almost always clearly defined, elastic, separate from the natural structures of the tongue ; gummata are usually less sharply defined, are indolent and inelastic, and are not separate from the surrounding textures. Innocent tumours are more often single, gummata more often multiple. Innocent tumours are sometimes lobulated ; gummata are never lobulated, although a false aspect of lobulation may be given to a gumma by the close proximity of two or more of them. A cancerous lump may be distinguished from an unbroken gumma by the fact that the cancerous lump is almost invariably single, the gumma more often multiple. The cancer very often forms opposite, and as the result of the irritation of, a carious tooth ; the gumma has no connection with bad teeth. The cancer more often occurs at the borders of the tongue ; the gumma as often affects the middle parts. The cancer usually is a disease of persons more than forty years of age ; the gumma is frequently observed in persons between twenty-five and thirty-five years old. In all doubtful cases the presence of other signs of syphilis, past or present, must be carefully sought for, and the history of syphilis enquired for.

A gumma may be mistaken for a chronic abscess, but the abscess is usually more clearly defined than the gumma, and has a more distinctly-rounded shape. Unless, however, there are associated signs of syphilis, it is probable that the diagnosis will not be certainly made without puncturing the tumour, or testing the effect of iodide of potassium.

Again, it is possible that a gumma may be mistaken for a foreign body, or, more probably, a foreign body

may be taken for a gumma. The history of an accident, and the long continuance of the tumour in an unaltered condition, together with the absence of history and signs of syphilis, are the conditions on which the diagnosis will depend. The question is one that will not often arise, for foreign bodies are very rarely embedded in the substance of the tongue.

The *prognosis* of an unbroken gumma is almost always good if the case is treated before the gumma has begun to soften, and if the condition of the patient is even fairly good. Under the influence of iodide of potassium, especially if administered in large doses, the tumour usually rapidly subsides. And if to iodide of potassium and other anti-syphilitic remedies there are added, in cases where the patient is debilitated, tonics, the prospect of curing the disease without ulceration is decidedly favourable. On the other hand, an untreated gumma will almost certainly break down in the course of a few weeks or months, and the extent of the ulceration and its kind will depend largely upon the general state of the patient's health. Multiple gummata only render the prognosis more grave when ulceration takes place; they yield as readily to treatment as a single gumma. And even the great swollen tongues which are sometimes met with, overloaded with gummata, and enlarged in all directions, usually subside rapidly under appropriate treatment.

Nodes and nodules, which occur as the result of past syphilis, are, in truth, nothing more than prominent areas of the tissues of the tongue, which are, as it were, squeezed up on the dorsum and borders of the tongue by the contraction of tracts of fibroid tissue between and around them. The condition is described in the chapters on furrows and fissures, and in that on patches and plaques, and the manner in which the alteration of the surface of

the tongue is produced is there discussed; for the essential process of the diseased condition lies in the depressions, not in the elevations. The latter are of very irregular shape and size, sometimes quadrilateral, of tolerably equal size, and not much raised, rather mammillary in their aspect. But in some tongues they are of large size, rounded, looking like great tubers, or like large projecting gummata. Since the furrows and fissures more often run along the long axis of the dorsum, the tubers or nodes are often elongated, rather interrupted ridges and folds than a series of nodes (Plate II., Figs. 1 and 2). The mucous membrane over these elevations of past syphilis is generally smooth, and may be of normal redness, but is more often redder than natural, sometimes ulcerated or excoriated. The consistence of the lumps is firmer far than of the normal tongue, but varies according to the degree of tension around them, and according to their actual condition at the time of examination. If there is accidental inflammation, they are harder than at other times. It must not be forgotten that, although these are described as the results of past syphilis, they may be associated with fresh outbreaks of syphilis, and gummata, or new tracts of embryonic tissue, may be developed in any part of the diseased tongue. By this means the character of the elevations, and, indeed, of the entire tongue, may be modified.

The *diagnosis* of these old syphilitic tongues usually admits of no question. The scarring and consequent fissures, the unequal elevations over much or the whole of the surface of the tongue, the disfigurement due to the combination of the two conditions is not found in any other disease, or as the result of any disease other than syphilis. Chronic inflammation may produce some deformity of the dorsum of the tongue, but never the deep and indelible furrows of

syphilis, and the bosses, ridges, and nodes between them.

These old tertiary tongues are incurable, so far as the removal of the disfigurement is concerned; but much may be done to allay the irritability of the tongue, to lessen its liability to recurrent inflammations, and to relieve the distress occasioned by excoriation and ulceration of the surface of the elevations.

The *treatment* of the different syphilitic nodes and nodules will be almost entirely constitutional for the gummata, chiefly local for the elevations which have been just described. Taking the local measures first, they are such as are described as suitable for cases of leucoma and chronic superficial glossitis; and the diet and hygienic arrangements are the same for all these conditions. The chief danger is of recurrent attacks of inflammation. Non-irritating diet and soothing applications are, above all things, to be recommended.

Constitutional treatment of old, scarred, and disfigured tongues is, as has been said, scarcely ever of use, unless there is a renewed outbreak of syphilis, when iodide of potassium and mercury must be administered. Gummata are singularly amenable to the influence of iodide of potassium, and this is accordingly the drug which is employed most largely in treating them. It may be given in doses of five to ten grains; but if an effect is not speedily produced on the tumours, the dose should be increased to fifteen, twenty, or even a greater number of grains, three times daily. With the iodide of potassium tonics may be advantageously combined, and in broken-down constitutions cod-liver oil is very useful, given in doses of one or two drachms twice a day.

Mercury is useful in two classes of patients suffering from gummata: those who cannot take iodide of potassium, and those in whom the gummata have

appeared early in the course of syphilis, and who have not been treated systematically with mercury in the earlier stages of the disease. The very large majority of persons bear iodide of potassium well, even in the largest doses, but occasionally one meets with patients who are iodised by doses of three to five grains, in whom, therefore, it is impossible to push the drug. To these patients solution of bichloride of mercury may be given in doses of half a drachm to a drachm or a drachm and a half; or mercury and chalk, in doses of one to three grains, may be administered, according as they are feeble or apparently in good health. With either form of mercury, to the feeble and broken down, tonics and good food should be given, for the success of treatment will depend largely on the patient's general condition. To the second class of patients I am in the habit of giving hydrargyrum-cum-cretâ, in doses of two or three grains, and continuing the use of the mercury long after the tumours have disappeared. The treatment, in such cases, if the patient will submit to it, should be continued over many months or more than a year; the form of the mercury may be changed, but mercury in some form should be administered.

Lastly, mercury may often advantageously be combined with iodide of potassium, in the proportion of half a drachm or a drachm of the solution of the bichloride to five grains of the iodide, in cases in which large doses of iodide of potassium cannot be tolerated, but doses of a few grains are easily borne.

Usually unbroken gummata require no local treatment: they disappear as if by magic under the influence of internal remedies and an improved condition of the health. It has, however, been recommended that a ball of blue pill should be rubbed over the surface of the swellings daily. Bryant suggests that gummata, when they fluctuate, should be opened, but if this is ever done, it should certainly be delayed

until a sufficiently long course of internal remedies has been tried, for it is surprising how even the soft and apparently fluid gummata are sometimes influenced by iodide of potassium.

Cancerous nodes and nodules are described in the chapter on carcinoma. It may be well to point out here that those which form on the borders of the tongue usually form as the result of the irritation of a tooth, while those which form upon or beneath the dorsum may have no direct or perceptible relation to irritation, but are not unusually developed in connection with chronic superficial glossitis in one of its various forms.

The indolent character of these lumps, their slow progress at first, their increasing depth and induration, and their tendency to early ulceration, are alluded to elsewhere. And the importance of dealing with them while they are still small and easily removed, while, indeed, they are in what has been termed the pre-cancerous stage, has also been more than once insisted on.

Chronic abscess, which appears often on the dorsum of the tongue in the form of a rounded node, is described in the chapter on cysts of the tongue.

Nodes produced by the presence of foreign bodies are naturally of extremely rare occurrence. Their characters are mentioned in the chapter on accidents.

CHAPTER XI.

SMOOTH PATCHES AND SMOOTH TONGUES.

ONE example of smooth tongue is found in the disease described in the section on chronic superficial glossitis. In that disease the smoothness of the surface was due

to chronic inflammation of the mucous membrane ; but there are several conditions in which the dorsum of the tongue exhibits smooth patches or is quite smooth all over, and in which there is no sign of inflammation, past or present. A single smooth patch may occur on the dorsum of the tongue apparently as the result of accident, perhaps from taking into the mouth some too hot solid or fluid, which destroys the appendages of the papillæ over a certain limited area of the dorsum. Such bald areas vary in shape and in extent. The fungiform papillæ sometimes remain after the removal of the filiform papillæ, but usually both are destroyed or shed. That these bald patches are not invariably the result of accident, but are due to some slight temporary disease or defect of nutrition appears to be proved by the fact that they sometimes occur without any knowledge of their existence by the patient, and even when they are observed they are not at all painful or tender, nor are there any signs of inflammation about them. Of the actual cause which produces them under these circumstances it is difficult to form a conjecture. They may occur on the tongues of persons who are otherwise in excellent health, and need not be associated even with the most passing disturbance of digestion. As they very seldom give rise to discomfort, they are not closely watched by the persons on whose tongues they appear, and their precise course is not clearly known ; but they disappear usually in the course of a few days. They require no treatment.

Smoothness of the entire dorsum is not often observed, unless as the result of inflammation of the tongue or of some general condition which produces exhaustion. I have seen it in cases in which the patient was exhausted by long-lasting diarrhœa, by bearing children in rapid succession with flooding at more than one confinement, and in some very old

people who were suffering from senile decay. In all these cases the tongue was as nearly as possible devoid of papillæ: the filiform papillæ had especially disappeared, but sometimes a few fungiform papillæ remained and the circumvallate papillæ had not disappeared. The tongue was soft and lissome, not impaired in its movement or sensation or faculty of taste. It was not, in most of the cases, sensitive beyond the natural sensibility of the tongue; but in one of the patients it was tender and felt dry and stiff (although it was to all appearance naturally soft and moist), and occasionally excoriations formed at the tip and borders.

In most of those who have such smooth tongues, the unnatural smoothness produces no annoyance, and they are not conscious of it. It is a matter merely of pathological curiosity, and requires no treatment. When the tongue is tender and inclined to become excoriated, care must be taken in diet, and an alkaline lotion must be used or a solution of chromic acid.

So far as the pathology of these very smooth tongues is concerned, I know of no observations which throw any light on the subject, nor have I ever had the opportunity myself of examining such a tongue, whether partially or completely bald. But I imagine that microscopical examination would not reveal much more than is evident to the unaided eye. The superficial parts of the papillæ are shed, and with the shedding of the papillæ naturally disappears the fur, for there is no longer anything to which it can adhere. Other than this, no change is visible, and probably no important change takes place.

At first it seems very strange and difficult to understand why the superficial parts of the papillæ are so readily shed; but I think analogous conditions may be found in the loss of the hair and the partial or complete baldness of the scalp. In old age it is

not unusual for the hair to fall off and leave the scalp wholly or partly bare. So, many of the bald tongues I have seen were in very old and decaying people. In a visit to the wards of the Holborn workhouse several years ago, where I went by the kind permission of Dr. Norton for the purpose of examining the tongues of old persons, I quickly picked out several tongues which were very thinly covered with papillæ, or which were quite smooth. As the hair falls out and leaves the scalp quite bare after certain fevers in some persons, so do the papillæ disappear from the dorsum of the tongue, or fine down after some depressing diseases. As the hair grows anew after it has been thus lost, so may the papillæ be regenerated. The bald patches which occur without any very definite cause may perhaps more fitly be compared with some conditions of alopecia; but the uncertainty which prevails respecting their duration, and the general conditions with which they are associated, render it more difficult to apply the analogy. The ease with which the appendages of the papillæ are removed need not surprise any one who is familiar with the ease with which the hair sometimes comes out. For although the papillæ are set on a broader base than are the hairs, each individual hair is much more firmly fixed in its sheath than each papilla is set upon its base.

CHAPTER XII.

ATROPHY.

I AM not aware that atrophy as a primary and distinct affection of the tongue ever occurs. The only case in which it may be imagined that such a condition existed is described by Chapman in the "Archives of

Laryngology." A gentleman, fifty-seven years old, found the greatest difficulty in swallowing any solid food. The apparent cause of this was the general atrophied condition of his tongue, and the consequent great depth and extent of the lingual sinus in front of the epiglottis. Here the food collected, and the patient ultimately found relief by clearing out the sinus with a brush or with his finger whenever it became overloaded. There is not, however, sufficient evidence in the account of this case of the cause of the fineness of his tongue or of how long it had existed, whether it was progressive, and several other circumstances which are important in determining the nature of the affection.

Atrophy of the entire tongue, as the result of accident or disease of the vascular or nerve supply is very unusual; for, although paralysis of both halves of the tongue occurs, the patients often do not live sufficiently long afterwards to permit of the occurrence of secondary atrophy.

Atrophy of half the tongue (hemi-atrophy) is not of very uncommon occurrence. It may be the effect of central or peripheral causes.

Central hemi-atrophy may be due to various causes, such as softening, hæmorrhage, syphilitic and other tumours in the region of the hypoglossal nucleus. It is, of course, very unusual for the hypoglossal nucleus to suffer alone. Other nuclei are almost invariably affected at the same time, those of the seventh and eighth nerves especially, and the paralysis and consequent atrophy of the tongue are only part symptoms of a more or less grave lesion of the medulla oblongata. Thus, it is one of the signs of progressive muscular atrophy, of bulbar paralysis and of locomotor ataxy; and it occurs in cases of hemiplegia, in which one half of the tongue has been paralysed together with the corresponding half of the body. As a rule, this

hemi-atrophy is a sign of past disease of the brain or medulla, or is one of a number of symptoms denoting progressive disease. But attention has been drawn by Ballet in the *Progrès Médical* to the possibility of hemi-atrophy of the tongue preceding all other signs of central disease. Ballet has noticed this singular occurrence in several cases of tabes dorsalis; the atrophy of one half of the tongue was well-marked when as yet there were no other signs of the disease, or when the other signs were so trivial that they had not attracted the notice either of the patient or the doctor. He therefore considers that hemi-atrophy may sometimes be a valuable indication of approaching mischief, and advises that when it is observed, a careful search should be made for other signs of tabes, and, in the absence of a definite cause of the atrophy, the suspicion of tabes should always be entertained. In the "Archives de Neurologie" of the present year (1884), Ballet has supplemented the short notice in the *Progrès Médical* by a thoughtful and elaborate article, which contains the account of several cases of tabes in which hemi-atrophy of the tongue was the first or the most prominent symptom.

Peripheral hemi-atrophy is much more rare than central. It may occur as the consequence of injury to the ninth nerve in any part of its course, or of pressure upon the nerve. I do not know of any instance in which it has resulted from ligature of the lingual artery, although the effect of the application of a ligature is to diminish for a time at least the size of tumours of the tongue, and to retard their growth. The operation of ligature of the lingual is, however, so very rarely performed unless for hæmorrhage from the tongue in cases of cancer, or as a preliminary measure in removal of the tongue, that there are very rarely opportunities of observing the

effect of a large diminution from this cause in the supply of blood to the tongue.

Hemi-atrophy of the tongue is not difficult to discover, if the condition is at all marked. The affected half of the tongue is not only smaller than the other half, but is wrinkled and curiously furrowed, probably from the fact that the covering has not wasted in proportion to the substance, and therefore lies loose and wrinkled over it. It is, too, often animated by a slight trembling and fibrillar contraction. As a rule the other half remains unaffected, neither enlarging nor diminishing in size; but, in a case of hemiatrophia facialis, of which an account was published by Messrs. Oswald Browne and Jessop in the 18th volume of the St. Bartholomew's Hospital Reports, the right half of the tongue appeared to have undergone compensatory hypertrophy, for it completely filled, with the help of the very shrivelled left half, the cavity of the mouth, just as any normal tongue might do. I have lately seen this patient, and although I could not at first resist the fascination of the theory of compensation by hypertrophy, careful examination led me rather to the belief that the enlargement of the right half of the tongue was more deceptive than real, and that sufficient allowance was not made for the diminution in capacity of the left half of the interior of the mouth.

The functions of the tongue are rarely perceptibly impaired by atrophy of one half. Speech, mastication, and deglutition are performed without difficulty; therefore the patient may be unaware that there is any defect in the condition of his tongue. Hemi-atrophy, on this account, calls for no treatment, even if it were possible to benefit it by treatment. It is for the most part interesting as a symptom of some central affection, and useful to the physician in assisting in the formation of a correct diagnosis. In

this relation it may be well to mention that there is nothing in the appearance of the atrophied tongue itself to indicate whether the cause of the atrophy is central or peripheral, or to aid in discovering the exact nature of the central lesion on which it may depend.

CHAPTER XIII.

HYPERTROPHY OF THE TONGUE.

Macroglossia—Inflammatory Hypertrophy—Syphilitic Hypertrophy.

MACROGLOSSIA (hypertrophy of the tongue, prolapsus linguæ, lingua vituli, lingua propendula, lymphadenoma cavernosum, lymphadenoma simplex), a very rare disease of the tongue, which in its earlier stages produces a tongue which is a little too large for the mouth; in its later stages produces an enormous enlargement of the entire tongue.

The disease is generally congenital or is noticed first in early infancy, so much so that some authors have inclined to believe that it is invariably a congenital affection. But the first appearance of the enlargement has been noticed in persons between twenty and thirty years of age, and, in many cases in which the disease has occurred in young subjects, it has followed so closely on various general and local maladies, and has appeared so clearly to owe its origin to them, that the theory of congenital origin can scarcely be maintained successfully for every case. Of the local causes to which it has been attributed, abscess, ranula, mercurial salivation, slight and more severe injuries, are the most common. Of the constitutional causes, chicken pox, scarlet fever, hooping-cough, and epileptic fits have all immediately preceded

the enlargement of the tongue. Although these and similar conditions have in many cases acted as exciting causes of macroglossia, it is quite possible that there has been a predisposition to the disease inherited by some, if not many, of the patients. And it is further possible that the tongue has been slightly enlarged from birth in some of the patients, but the enlargement has been overlooked until some local or constitutional affection has led to the examination of the tongue by a person competent to detect the slight enlargement.

A slight condition of hypertrophy of the tongue is not uncommonly observed in idiots and cretins; and Chalk described, many years ago, the case of a woman, thirty years of age, who, with various nervous symptoms, and, finally, amaurosis and epilepsy, suffered from general enlargement of the tongue, which continued until it was always protruded, and produced deformity of the lower jaw. I do not know that there is any proof that the hypertrophy of the tongue in this case and in the cases of idiots and cretins is of the same nature as the hypertrophy of macroglossia. There may be no other relation between the diseases than the mere enlargement of the tongue, but I suspect there is no essential difference between them. Again, hypertrophy of one half of the tongue has been recorded in a child who had enlargement of the whole of the same side of the body (Maas). In this case the hypertrophy of all parts was congenital, and the overgrowth of the left half of the tongue was due chiefly to muscular hypertrophy, and was, consequently, wholly different to the hypertrophy of macroglossia, as will presently be seen. This condition appears to be much more rare than true macroglossia.

Both sexes appear almost equally liable to macroglossia.

In the earlier conditions of the disease the tongue

is still retained within the mouth, but it is obviously too large; it looks so when the mouth is examined; and speech is affected, so that it is slovenly and rather difficult to comprehend. But the most careful examination fails at this time to discover any other notable alteration. The entire tongue is larger than it ought to be, and, with the general enlargement, the papillæ are hypertrophied. But the structures are otherwise natural in appearance, and there is no functional disturbance except that of speech. As the tongue grows larger, it can no longer be retained within the mouth; it protrudes, or, as it is termed, is prolapsed. The mouth is now constantly open, saliva dribbles away, and the condition of the patient becomes most pitiful. The surface of the tongue, exposed continuously to the air, loses its natural aspect and consistence; it becomes dry and hard, cracked and fissured, and the mucous membrane is thickened, and discoloured blue or brown. Even now the functional disturbance is not nearly so great as might be imagined, for speech is possible, and swallowing can be accomplished, though with difficulty, for the patient is often obliged to thrust the morsels of food far back into the mouth with the finger; when once they are at the back of the throat, the difficulty is overcome, and the food is carried without effort into the stomach. The enlargement is not usually the occasion of much pain, unless the tongue (and this not unfrequently occurs from its exposed position) is irritated or injured. It is then very prone to inflammation and ulceration, and, on this account, may be very painful and tender. With every attack of inflammation the tongue grows larger. Not only does the swelling, which is the direct result of the inflammation, tend to become permanent, but the disease itself is aggravated by the attacks. When the tongue has protruded from the mouth for a considerable period, the most lamentable effects are liable to

follow. The lower jaw is slowly flattened by the weight of the mass which constantly rests upon it; the teeth look forwards and outwards instead of upwards as they ought to do, and are more widely separated from one another than is natural. In time the gums swell, the teeth become coated with tartar, grow loose, and finally fall out. Undoubtedly, the deformity of the jaw occurs more readily by reason of the youth of the patient. The effect is produced by the gradual moulding of a bone which is growing and developing, which, therefore, yields quickly to the force at work upon it. But the same effect is possible on a bone which has long ceased to grow; the patient described by Chalk was thirty years of age when her tongue began to enlarge, and a year later the jaw had assumed the flattened shape proper to this disease.

It must not be imagined that macroglossia runs a rapid *course*, or that the effects which have been just described are produced in a few weeks or even months. It is a very chronic malady, slowly advancing during months and years, sometimes stationary for long periods, then quickly enlarging after an attack of inflammation; sometimes steadily, though very slowly, advancing. The worst effects are seldom seen until several years have elapsed. After slowly increasing during many months or years, the tongue may become stationary and cease to grow; but I am not aware of any instance of a well-marked example of this disease diminishing and undergoing spontaneous resolution.

For some years past the *pathology* of macroglossia has excited a large share of attention. The disease was for a long time regarded simply as a hypertrophy of the tongue. Humphry, Weber, and Clarke all speak of it as if the enlargement was composed of the hypertrophied normal constituents of the tongue, the papillæ, the connective tissues, the fat, and the muscular fibres. There was indeed a difference of

opinion regarding the condition of the muscular fibres, which were stated by some observers to be increased in size and number, by others not to be larger or more numerous than in the normal tongue. The general appearance of many of the tongues after removal accorded with the theory of hypertrophy, for they appeared to be solid masses, not differing in any important respect from the natural tongue. Some of the removed tongues, however, presented a different aspect; they contained a number of small spaces which were plainly visible to the naked eye, and a few of them presented, on section, a distinctly cavernous tissue. Virchow, in 1854, drew attention to this structure in two hypertrophied tongues which he examined. They consisted of a pale cavernous tissue, the spaces of which contained a tolerably clear, golden albuminous fluid, and occasional transparent clots. And in one of these tongues some of the spaces contained blood clots. A careful microscopical examination convinced him that the spaces of the cavernous tissue were lymphatic, not blood channels, for they had no epithelial lining, and differed widely from the dilated and thickened blood-vessels, which were easily discernible. In addition to the dilatation of the lymph vessels, there was an increase of the connective tissue, which was in one case more fibroid, in the other case more cellular. The muscular tissue did not appear to have undergone any change. Maas, writing in 1871, maintained that the cavernous structure in three cases of macroglossia which he had examined was due to dilatation of the blood-vessels and not the lymphatics. But Virchow's observation has been confirmed by O. Weber, Arnstein, Arnott, Wegner, and Maguire. Above all, Wegner demonstrated, on specimens taken from the cases examined by Maas, that the spaces were really dilated lymphatics. Even the tongues which, to the naked eye, appeared solid,

were found to possess the same minute structure as the cavernous tongues, so that the opinion now generally prevails that in every case of macroglossia there is dilatation of the lymphatic vessels. In some tongues the dilatation does not produce sufficient alteration in the appearance of the cut tongue to be distinguished by the naked eye; in other tongues it produces a decided cavernous structure like that described by Virchow. In addition to the dilated lymphatics, the blood-vessels are also more numerous, and many of them are dilated, especially the smaller arteries, the coats of which are thickened. The connective tissue, especially around the dilated lymphatics, is hypertrophied and infiltrated with lymphoid cells, and Arnstein says that there is also adenoid tissue in the same parts of the tongue, very rich in lymphoid cells. The muscular fibres are not, so far as can be judged, enlarged. They are often separated more widely from each other, but the increase in the size of the tongue is not due, as was formerly supposed, to increase in the size and number of the muscular elements. The connective tissue of the mucous membrane is, like the connective tissue throughout the substance of the organ, increased in thickness, and the epidermis is extended to cover the larger area. The spaces are evidently dilated lymphatics; their form, their walls, and their contents prove this almost beyond a doubt. But there does not appear to be an increase in the number of the lymphatics, or any new formation of lymphatic vessels or spaces; only a dilatation of those which previously existed.

The only exception to this general rule of the structure of the macroglossic tongues is found in those cases in which the enlargement of the tongue is associated with a corresponding hypertrophy of other parts of the body, as in the case mentioned by Maas, in which the left side of the tongue was hypertrophied

together with the whole of the left half of the body. In this and similar cases the hypertrophy appears to be a true muscular hypertrophy.

Speaking broadly, the changes which are most decided in macroglossic tongues are connective-tissue hypertrophy and dilatation of lymphatic spaces. The enlargement of the blood-vessels is quite secondary in importance, and may be accounted for by the greater supply of blood which is needed for the nourishment of the hypertrophied organ. Hypertrophy of the connective tissue, especially if it occurred in certain portions of the tongue, might possibly produce secondary dilatation of the lymphatic spaces, but a general hypertrophy of the connective tissue throughout the tongue would be much less likely to produce it than a localised hypertrophy at the root. Indeed, a general hypertrophy of the connective tissue tends rather to occlude the lymphatic vessels passing through the hypertrophied parts. On the other hand, if the lymph vessels are from any cause dilated, there follow, almost as a matter of certainty, thickening and infiltration of the connective tissues through which the dilated vessels run. Most authors are agreed that the diseased condition of the lymphatics is the essential element in macroglossia, and that all other changes which are observed are secondary to this. To account for the lymphatic dilatation, it is necessary to assume that the return of lymph is obstructed, either, as Wegner suggests, by imperfect development of the lymphatics, or by thrombosis, or by inflammation. To the obstruction follows passive dilatation, and to dilatation distension. As the changes advance, the endothelial lining is gradually stripped off the walls of the distended channels; the lymph makes its way into the surrounding tissues. The presence of blood clots in some of the lymphatic spaces may be accounted for by assuming that they are the result of

hæmorrhages, or that an abnormal communication has formed between some of the spaces and the blood-vessels. Virchow has likened this disease in some respects to elephantiasis (congenital and acquired), and the analogy seems just when the lymphatic relations of the two diseases are considered. In both there is dilatation of lymphatic vessels and connective-tissue hypertrophy; in both the affection seems capable of being excited or aggravated by attacks of inflammation.

In a few cases, there has been actual proof of disease of the lymphatics in parts neighbouring to the tongue. Thus, Virchow tells of a little girl, two years old, under the care of Von Textor, who, with macroglossia, had an enlarged (?) gland beneath the jaw containing clear lymph. And Maguire describes the case of a girl of the same age whose macroglossia was associated with a cystic hygroma on both sides of the neck. In this case, the death of the child afforded an opportunity of examining the disease, both of the tongue and of the neck. Valenta has recorded a somewhat similar case.

The theory of lymphatic obstruction makes it more easy to understand the relation between macroglossia and such apparently trivial causes of the disease as ranula, abscess, and other affections producing swelling of the floor of the mouth. They tend to produce obstruction to the return of lymph from the tongue, and thus to induce the sequence of events which leads to macroglossia. In reference to the observation of Virchow, already alluded to, regarding the analogy of this disease to elephantiasis, it is worthy of remark that in those countries in which elephantiasis is of frequent occurrence macroglossia does not seem to have been frequently observed. Fayrer especially remarks, in his observations on a case of macroglossia which he had seen in a Bengal Brahmin,

that this was the only case he had seen of this kind in India.

The *diagnosis* of macroglossia is, when the disease is advanced, unmistakable. There is, indeed, no disease for which it can be mistaken. The chronic course of the enlargement, the large size and constant protrusion of the organ, its consistence and general aspect, the deformity of the jaw in the worst cases, are all characteristic of this disease, and of no other. But when the tongue is still confined within the mouth, and bears a natural appearance, there may be difficulty in detecting, not the difference between this disease and others, but that any disease is present. The tongue is merely a little larger than natural, and if it does not continue to enlarge, no one would be inclined to regard the condition as a disease. The diagnosis of macroglossia can only be certainly made by watching the progress of the case. Continuous increase, and the occurrence of occasional attacks of inflammation, betray the nature of the disease. The *prognosis* is, on the whole, very good, even in advanced cases; for although there is no reasonable prospect that the enlargement will subside, the results of treatment are almost invariably happy.

As long as the tongue is still retained within the mouth, there is a fair prospect that the disease may be *cured, or the hypertrophy arrested*, without an operation. The mouth must be kept constantly closed, except at meal times, by means of a bandage, so that the tongue is subjected to the pressure of the teeth and gums on all sides, and to the pressure of the roof and floor of the mouth above and below. The ordinary four-tailed bandage used in cases of fracture of the jaw is the best for the purpose, and, to produce the desired effect more certainly, a guttapercha or pasteboard splint should be applied beneath the jaw. The apparatus must be kept on during many weeks,

or even months. A shorter period may suffice to arrest for the time the progress of the disease, but will not affect it permanently. Even when the organ has attained so large a size that the mouth cannot be quite closed upon it, this treatment may be successful; but the lengthened period during which treatment is required, and the distress which is at first occasioned by it, deter one from employing it.

The more advanced cases should be treated by removal of the protruding portion of the tongue, all of it, in fact, which projects beyond the line of the teeth. The removal may be made with the knife, the scissors, galvano-cautery, or *écraseur*. All these instruments have been employed for the purpose, and each of them has its advocates. I confess I prefer the knife. The parts are easily within reach, and the hæmorrhage, which is seldom severe, is quickly under control. The scissors present no advantage over the knife, and the knife is, to a surgeon, a much more acceptable instrument for a cutting operation than a pair of scissors. The tongue should be drawn as far forward as possible by means of two silk ligatures passed through its substance behind the line of incision, which has been previously determined on, and marked. The incision should be slowly made, if the patient is a child, and each vessel be taken up with clamp forceps, or tied, as soon as it is cut. If the patient is an adult, it is not necessary to observe this precaution. If the patient is a very young child, or very delicate, it is safer to use the galvano-cautery or *écraseur*; for, in such cases, the sloughing which follows these instruments is less to be feared than the bleeding at the time of the operation. Whichever instrument is used, an attempt should be made to restore to the tongue something, at least, of its natural shape. The incision should be rounded, and this can be much more readily done with the knife or scissors

than with the galvano-cautery or *écraseur*. Even with these instruments a pointed tongue may be made by using two loops, either together or one after the other, and carrying the incisions obliquely from the middle of the line of incision back along each border, so as to make a wedge-shaped end. The tongue may be made still more shapely by carrying out Boyer's recommendation of removing the end of the protruding organ by two wedge-shaped incisions, one vertical, the other horizontal.

No special after-treatment is required. The cut surface must be kept as clean as possible by dusting it with iodoform, finely powdered, or by frequent irrigation with weak carbolic acid or Condy's fluid; and, if there is much inflammation, it may be allayed by icing the fluids which are used. The diet must be liquid, and if the patient cannot take enough by the mouth, food must be administered by the rectum. It is strange that the removal of large portions of these hypertrophied tongues is very rarely fatal. The patients seem very little liable to pneumonia and septic poisoning, an immunity which may, perhaps, be ascribed to the fact that the incision is quite at the front of the tongue, and therefore is easier to keep clean and drain. Many of the patients, too, are children, and although they may be delicate, are better subjects than the broken-down men from whom we often remove cancerous tongues. As Paget has pointed out, children enjoy a singular immunity from pyæmia, septicæmia, and similar blood-poisonings, unless when they are suffering from acute necrosis.

In at least two instances, one recorded by Vernon, the other by Weber, recurrence of the enlargement speedily followed the removal of a portion of the tongue. In both instances the operation was repeated, and the second operation was successful. It is not unlikely that the inflammation which was subsequent

to the operation was one of the chief causes of recurrence; indeed, Vernon expressly mentions that his patient, whose tongue was removed by Paget, was attacked by severe inflammation after the operation, and during, or immediately after, the inflammation, the tongue again enlarged. If there appears a disposition to renewed hypertrophy of the tongue some time after removal, when the patient has completely recovered from its effects, and the wound is firmly healed, the case may be treated in the manner recommended for the less severe cases of macroglossia, by constant closure of the mouth.

Bryant recommends the internal administration of mercury or iodide of potassium in cases of macroglossia in which the disease is not too far advanced. He has employed mercury in one case, iodide of potassium in another. Both patients were cured, but the one to whom the iodide of potassium was given narrowly escaped death from the excessive swelling and inflammation occasioned by the drug. His account leads one to believe that removal of the protruded portion of the tongue would not have been more dangerous.

Inflammatory hypertrophy.—Under this heading may be mentioned those enlargements of the whole or a part of the tongue which are the result of an attack of acute inflammation or which are produced by continual or repeated attacks of chronic superficial inflammation. They are essentially different from macroglossia, inasmuch as the enlargement is not dependent on dilatation of the lymphatic system of the organ. They have no tendency to increase continuously.

As a general rule, after an attack of acute glossitis, whether of the whole or only of one half of the tongue, the swelling rapidly subsides, but the subsidence is not in all cases complete. One half of the

tongue may remain permanently larger than the other, or an indurated lump may be left in the middle of one side of the tongue. These enlargements may never disappear, but they are not sufficiently great to cause the patient any annoyance or even to affect his speech. Nor am I aware of any instance in which one of these enlarged and slightly indurated parts of the tongue has become the seat of carcinoma at a later date.

The subsidence of the swelling after inflammation may be complete, but yet much slower than is usual. The most notable instance of this is in a case recorded by Williamson of a man, thirty years of age, who was attacked by severe inflammation, which proceeded to suppuration at the root of the tongue at the end of a week. When the abscess burst, it might reasonably have been expected that the patient would be relieved and the swelling would speedily disappear. But this was not the case. At the end of 28 days the tongue still protruded to the extent of two and a half inches, was very large and brawny, and could not be retracted. On its under surface was a deep ulcerated fissure where the two lower incisors supported it. It is probable, as Williamson suggested, that the enlargement was kept up by the injury done to the tongue by these two incisors; for, when they were covered with a piece of guttapercha and thus separated from the tongue, the enlargement subsided in the course of forty-eight hours.

The very chronic and abiding enlargements do not usually require to be treated, for they produce no serious inconvenience or annoyance. Nor does it seem probable that treatment would do much for them, since the only treatment which could be expected to diminish the hypertrophied part, namely pressure, could scarcely be applied in such a manner as to be successful.

Syphilitic hypertrophy.—I have no intention of describing here those local hypertrophies which are due to the presence of one or several gummata. These are merely passing conditions, which may rapidly give way to treatment, or which may be succeeded by atrophy or deep scarring of the affected portion of the tongue.

But a large portion or the whole of the organ may be enlarged as the result of syphilis. The enlargement may be due to the presence of a vast number of gummata in the muscular substance, and may cause the tongue to protrude from the mouth. The nature of the hypertrophy is recognised by the tuberous condition of the tongue. It readily yields to treatment. Again, those conditions which produce deep and long furrows in the dorsum of the tongue are especially prone to produce hypertrophy of the parts of the tongue between the furrows. When the furrows are extensive and deep, the hypertrophy of the intervening parts may be very considerable and permanent. During the healing of the ulcers which produce or deepen the furrows, the return of lymph and blood from the intervening parts is probably interfered with; swelling and œdema naturally result, and the parts, like some feet and legs whose circulation has been similarly interfered with, remain permanently swollen. The mischief is further increased by the occasional attacks of renewed inflammation to which such tongues are liable. There is no difficulty in recognising the hypertrophies which are due to this cause; they bear the marks of syphilis deeply graven on them.

Unfortunately, the treatment which tends to cure the ulcers does not always tend to lessen the hypertrophy; on the contrary, it may increase it, for the constriction on which the hypertrophy depends increases with the tightening of the scars which follow the healing of the ulcers. Even the iodide of

potassium which is administered for the cure of the syphilis may aggravate the swelling of the tongue. I believe such cases, when ulceration is actually present, are best treated by the internal administration of small doses of mercury and chalk or by drachm doses of the solution of bichloride of mercury, and by using every care to prevent the dorsum of the tongue from being irritated and inflamed, whether by food or any other cause. I do not know of any means which can be employed with a reasonable hope of reducing the swelling in any great degree.

It may fairly be questioned whether the word "hypertrophy" is applicable to any of the three foregoing conditions. They are, all of them, hypertrophies in so far as they are enlargements of the tongue, but they are not hypertrophies in the true sense of the term; they are not characterised by an increase of all the constituents of the organ. The term "hypertrophy" ought rightly to be restricted to such a condition as that mentioned in the section on macroglossia, in which half the tongue and the corresponding side of the body were larger than the same parts on the other side. The enlargement of the tongue in this case was due to an increase of all its constituents, the muscular tissue as well as the connective tissue and the constituents of the mucous membrane. I have used the term "hypertrophy" here in what may be called its popular sense, to denote an increase in the size of the whole or a large part of the organ, and without reference to the exact nature of the enlargement.

CHAPTER XIV.

CYSTS OF THE TONGUE.

Mucous Cysts—Blood Cysts—Cysticercus Cellulose—Echinococcus (Hydatids)—Chronic Abscess.

Cysts of the dorsal aspect or the borders of the tongue are uncommon, but several different varieties have been observed. Among the most frequent are the

Mucous cysts, which might be expected to occur more frequently than they do, for there are numerous mucous glands beneath the surface on the back part of the dorsum. When they do form, they are generally situated behind the middle of the tongue, are single and of small size. They may attain the size of a nut or almond, but are rarely larger. The mucous membrane over them is smooth; the shape of the cyst is rounded or spheroidal; and its outline is well defined. The larger cysts, unless they are very tightly filled with fluid, fluctuate, and, if they are prominent enough to be easily seen, are translucent. They are painless and probably escape observation until they have attained a tolerably large size. Mucous cysts are more commonly observed in the tongues of adults than of children, but their occurrence is not limited to any age. They increase very slowly in size, and their contents, which consist of a clear, viscid and heavy fluid, probably alter very little in character.

The *development* of mucous cysts may be due either to too great a secretion of fluid by the glands, or to obstruction of the ducts. In both cases the result is dilatation of the follicle or follicles by the secretion, and in time the formation of a definite tumour. It is

not essential to the formation of such cysts that the ducts should be occluded; for I have seen similar cysts on the inside of the lower lip, where they could be easily reached and thoroughly examined, and have found it possible to squeeze out through one or more openings some of the contents of the sac, and that without painful pressure.

The *diagnosis* of a mucous cyst may be very difficult. When, for example, the cyst is small, rather more deeply placed than usual in the submucous tissue, very tense, and situated far back on the dorsum, it is quite impossible to be sure whether it is a mucous cyst, or indeed to be sure that it is a cyst at all. It may be taken for a solid tumour, such as a fatty or a fibrous tumour, and the mistake may be discovered only when it has been punctured. It may be taken for a chronic abscess; and, again, I know of no means by which the diagnosis can be made unless by an exploratory puncture. It is, however, usually more clearly defined than an abscess, and is situated almost always at the back part of the tongue, while the abscess is often in the fore part of the dorsum. When, on the other hand, the cyst is superficial, of large size, prominent, and translucent, there can scarcely be a disease more easy to distinguish. The only diseases for which it can be mistaken are the cysts formed by *cysticercus cellulosa* and *echinococcus*. The former is almost unknown in the tongue. The latter occurs occasionally, but it lies much more deeply in the substance of the tongue than the mucous cyst, and is situated more often in the front than in the back part of the dorsum, where, indeed, it usually presents. It is very rarely, if ever, translucent.

A simple incision may suffice for the *cure* of a mucous cyst; but to make the cure more certain and complete, it is well to introduce a tiny strip of

guttapercha tissue or even of lint into the cavity in order to excite inflammation and to ensure healing of the sac from the bottom.

Blood cysts.—The only instance of what appeared to be a blood cyst is related by Bryant in the 41st volume of the Guy's Hospital Reports. The patient was a girl, 18 years of age, who had a fluctuating swelling at the back part of the tongue reaching as far forwards as the circumvallate papillæ. It was smooth and rounded. It had been noticed only four or five months, and during that period had slowly increased in size, but Bryant thought it had probably been there for a much longer time. During the last ten days before admission she had bled to a considerable amount from the nose and mouth.

The cyst was opened, but only blood escaped. The cavity was plugged with lint, and by-and-by filled up from the bottom. Some time afterwards she came to the hospital to report herself as well.

Several reasons concur to render it probable that this tumour was a mucous cyst which had been transformed into a blood cyst by hæmorrhage into it. It was situated in the back part of the tongue, the seat of election of mucous cysts. The girl had bled freely from the mouth and nose shortly before admission; and, as she bled externally, might also have bled internally into the cyst. And this is the only case of blood cyst of the tongue of which I have found an account in surgical literature.

Cysticercus cellulosa.—I have only discovered one record of the occurrence of cysticercus in the tongue, and that is not nearly so fully reported as might be desired. Hofmohl in 1877 mentioned the case of a boy, from whose tongue a cyst was extirpated, which proved to be a cysticercus cellulosa. In the skin of the breast were two little nodules which were regarded as possibly of the same nature, but the

diagnosis was not put to the test by examination of either of them.

Echinococcus is also a very rare cause of the presence of cysts in the tongue, but is not nearly so uncommon as *cysticercus*. It occurs in adults much more frequently than in children, and in this respect accords with the occurrence of hydatids in other parts of the body.

It forms a single small cyst, situated in the muscular substance of the tongue, and projecting on the dorsal aspect, usually near the middle, as a smooth and rounded tumour. The tumour may fluctuate, but is generally so tense that, in the soft textures of the tongue, it is not possible to detect fluctuation. For the purpose of diagnosis, or for treatment, an incision is made into it, and there escapes clear fluid or pus, in which is seen a globular hydatid or a collapsed cyst, or some of the thick ochre-like substance which is found lining some hydatid cysts. The disease begins as a tiny lump, at first not clearly cystic, and gradually enlarges without pain or much inconvenience. It is impossible, when the tumour is very small, to be sure of its nature; but when it has reached the size of a nut, its smoothness, tenseness, and clearly-defined outline may lead one to think it is a cyst. There are no means, however, by which it can be certainly known to be a hydatid cyst.

The treatment of hydatid cysts is very simple and successful. If the cyst is punctured and the hydatid sac turned out, recovery ensues. In most instances the sac escapes with the fluid when the cyst is opened; but, if it does not escape, it can generally be easily turned out. If the cyst wall is degenerated and there seems to be a strong probability that suppuration will continue for a long time, the cyst should be dissected out.

Chronic abscess.—Chronic abscess may fairly

be considered in this place on account of the similarity which it presents to the diseases which have been just described. It has many of the characters of a cyst. It is perfectly circumscribed, lies just beneath the mucous membrane, which may be perfectly movable over it, and is smooth on the surface. Fluctuation may be perceptible if the pus is not too tightly packed; and the little tumour is not usually painful or tender. Such a tumour may, therefore, easily be mistaken for a cyst; but abscess is common in the dorsum of the tongue in front of the circumvallate papillæ, while mucous cysts are found behind the papillæ; cysts are usually more prominent than abscess, and abscess is never translucent.

It is very improbable that a chronic abscess should be mistaken for a carcinoma; yet the mistake has happened, when the abscess has been of small size, rather deeply situated, and yielding no sign of fluctuation. Sir James Paget tells me that many years ago he went with two of the surgeons then most eminent in London to remove a portion of the tongue of a lady between 45 and 50 years of age. The disease was of five years' duration and consisted of a very firm lump that seemed nearly as big as a horse-bean embedded in the very substance of the tongue about half an inch from its side and its apex. It was exactly circumscribed; the mucous membrane was movable over it, and it felt as if not very closely united with the tissues of the tongue. Before the ligatures were applied for its removal, it was determined to cut into it; and when this was done a few drops of thick pus escaped. The wound soon healed and the patient was perfectly well. Sir James Paget was at that time only an on-looker, and had gone to assist the operators; but he thought the diagnosis ought to have been made. The long duration of the disease and the absence of ulceration were

strongly opposed to the theory that the tumour was a carcinoma.

A chronic abscess of the tongue never attains a large size, and is in most instances not larger than a small nut. The case which has just been quoted shows that it may exist many years without even reaching the size of an ordinary nut. Its commencement is insidious, and very seldom is there any history of inflammation preceding the appearance of the tumour. It is an uncommon disease, and is met with more often in the tongues of adults than of children. The diagnosis has already been discussed, and it only remains to add that the presence of chronic suppuration should always be suspected when there exists in the substance of the dorsal aspect of the tongue a small circumscribed smooth tumour, not very prominent, not translucent, not painful or tender, of long standing, rounded or ovoid. The diagnosis may be confirmed by an incision, and the incision serves for the cure of the disease. If the cavity fills again, the incision must be repeated, and the opening kept patent by the introduction of a tiny piece of lint or guttapercha tissue until it has healed up from the bottom.

CHAPTER XV.

CYSTS UNDER THE TONGUE, AND SALIVARY CALCULUS.

Ranula—Dermoid Cyst—Salivary Calculus.

Ranula.—A common disease, affecting men, women, and children, but adults more frequently than children. It consists of a cyst, often of considerable size, which lies under the tongue, usually on one side of the frænum, and bulges forwards between

the floor of the mouth and tongue. Sometimes, but rarely, a ranula is developed on both sides, and a swelling projects on each side of the frænum. A patient suffering from ranula is induced to seek relief chiefly on account of the sense of fulness beneath the tongue on the affected side, and, perhaps, of discomfort during mastication; there is seldom any pain or tenderness. When the mouth is opened, and the tongue turned back, the ranula is plainly visible as a smooth bulging tumour, of a deep bluish tint or tinged with pink. Large tortuous vessels often run upon its surface, and it has a translucent aspect. It feels very soft, or, may be, tense, and fluctuation can be easily detected, either with two fingers in the mouth, or with one finger in the mouth and another beneath the jaw. There is not any surrounding induration, nor is there any inflammation, unless it be accidental.

The disease is very chronic, and may have existed a long while before the patient seeks advice. If it is left to itself, it may attain the size of a large plum, but is rarely larger. An acute form of ranula has been described by S. Mackenzie, accompanied by considerable swelling of the tongue and general signs of inflammation, with fulness of the floor of the mouth, which is hard and hot and tender. Mackenzie has seen several cases of this affection. In all of them the disease subsided after a few days, apparently without active treatment. The cases are interesting, but I cannot convince myself that a ranula was present in either of them; they appear to have been rather instances of catarrhal glossitis, with more swelling than is usual of the floor of the mouth. Richet has, however, offered much stronger proof of the occurrence of ranula as an acute affection; for he relates the case of a young man, twenty-five years old, in whom acute swelling of the sublingual region,

and of the entire tongue, was caused by obstruction of Wharton's duct. The obstruction was sought for and discovered with a fine probe. It was afterwards found to be due to the presence in the orifice of the duct of a blade of grass.

The exact *nature and origin* of ranula have been, during many years, a subject for discussion. It was at one time supposed to be invariably a dilatation of the duct of the submaxillary gland, or, perhaps, of the sublingual gland. But although there can be no doubt that some ranulæ are due to this cause, there is just as little doubt that the majority of them owe their origin to disease of some other structure. The shape of the swelling is not usually that of a dilated Whartonian duct; there is no associated enlargement of the submaxillary gland, such as is frequently noticed in cases of salivary calculus, and Baker has shown that it is possible in many instances of ranula to introduce a probe into Wharton's duct, and push it onwards for more than an inch, thus clearly proving that the duct is not obstructed. Barker, referring to this observation, says that dilatation of the duct does not necessarily imply that it is obstructed, and this may be admitted; but the proof that the ranula is not a dilated submaxillary duct rests on the further facts that the probe can be passed along the duct obviously by the side of the cyst, and that the opening of the duct does not allow the fluid to escape from the cyst. The shape of the swelling and the condition of the sublingual gland equally oppose the theory that the disease is a dilated condition of one of the sublingual ducts, but the proof cannot be so clearly offered as for the submaxillary duct. The theory which is most readily accepted at the present time is that which attributes the formation of a ranula to dilatation of the acini, or ducts of mucous glands beneath the tongue. Von Recklinghausen and

Sonnenberg maintain that the gland which is diseased is the Blandin-Nuhn gland, a small mucous gland situated on the under surface of the tongue, a little to one side of the middle line. Von Recklinghausen, in the dissection of a subject in which there was a ranula, found the remains of the Blandin-Nuhn gland projecting into the cavity of the cyst at its upper and front part; and, further, that the epithelium lining the cyst resembled that of the gland. He therefore came to the conclusion that the cyst had been formed by dilatation of one or more of the acini of the gland, and that the remains of the gland which he found projecting into the upper part of the cavity had escaped the disease which had transformed part of it. Careful comparison of this case with several other cases of ranula served to convince Von Recklinghausen and Sonnenberg that they were all of the same nature, and probably of the same origin. All the cysts were situated in the same region; they all bore the same general characters; the epithelial lining was in every instance of the same kind; and the contents of the cysts were similar, and possessed the same chemical composition. From their investigations it appears not improbable that many ranulæ owe their origin to disease of this gland. It must not, however, be forgotten that the Blandin-Nuhn gland is very variable in its disposition: in some subjects it can only be discovered on one side of the under aspect of the tongue; in some subjects it cannot be discovered even by the most careful examination, and is, therefore, presumed to be absent altogether. Nevertheless, neither its irregular disposition nor its occasional absence need affect the theory that ranula is a disease of the gland when the gland is present.

The evidence, of all kinds, goes to prove as clearly as can be that a ranula may be due to more than one diseased condition, and that the commonest of the

conditions to which it may be due are dilatation of Wharton's duct and expansion of the acini of a mucous gland, probably the Blandin-Nuhn gland.

Congenital ranula has been described by Lanne-longue, who supposed, from the shape of the tumour and a careful examination of certain of the cases, that the tumour was due to a dilatation of Wharton's duct. Of more than one instance of so-called congenital ranula, I am quite sure that the disease was not a ranula, but was merely a congenital cystic hygroma, or one of the cysts belonging to such a tumour.

The *diagnosis* of ranula is, in most instances, plainly written on the face of the tumour, but errors of diagnosis have occasionally been made. It may be distinguished from sublingual nævus by the absence of true fluctuation in the nævus, by the absence of the appearance of translucency, and by the readiness with which the blood can be squeezed out of the nævus by firm and continued pressure. It may be distinguished from dermoid cyst by the more doughy feel of the latter, the absence of translucency, and the tumour which the dermoid cyst forms behind the jaw. And the diagnosis may be made from salivary calculus by the hardness around the latter, the inflammation which is so often present, and by the swelling of the salivary gland on the affected side.

The *treatment* of ranula is not so simple and satisfactory as the diagnosis. The methods which are employed are, indeed, sufficiently simple, but the success with which they are attended is often disappointing. The ordinary practice is to make a free incision in the front wall of the sac, where it projects beneath the tongue, and thus to let out the clear, glairy, viscid fluid which forms its contents. But if the treatment is limited to this, the fluid almost invariably re-collects. To prevent the refilling of the sac, it is the practice of many surgeons to cut out a

portion of the wall of the sac, and, in addition, to paint the interior with a stick of nitrate of silver. Even after these measures, recurrence of the disease is very frequent; perhaps because the caustic is so much diluted by the mucus and saliva that the full effect is not obtained.

Bryant recommends the introduction of a seton, which is to be left in for a week; and I believe this will be found the best method of treating all cases which have not been previously treated, or have been treated merely by incision. The seton should be a piece of tolerably thick ligature silk, and should be passed through the tumour with a curved needle. Unless very severe inflammation is produced, the thread may, as Bryant suggests, be left in a week; but the length of time must be determined by the effect produced. If this method fails, and it will fail in a certain number of instances, the disease may be cured by stitching back a flap of the cyst wall. The cyst is first fixed by passing a thread through it; a triangular flap is cut with a pair of sharp scissors in the anterior wall, and the apex of the flap is turned back into the interior of the sac, and fastened there by means of one or two fine silk sutures. The sac is by this means prevented from closing, and, within a short time, contracts. Sonnenberg, on the supposition that the disease is due to the dilatation of part of the Blandin-Nuhn gland, and that the remains of the gland lie at the upper and front part of the interior of the sac, recommends that the wall of the cyst should be separated from the overlying mucous membrane from the line of Wharton's duct up to the under surface of the tongue, and that this portion, which will contain the remains of the gland, should then be cut away. In his opinion, so long as a portion of the gland remains, so long will there be probability of recurrence. But neither this plan nor

that recommended by Barker, which consists in the removal of the entire cyst, appear to be necessary; and both of them are more difficult than the methods which have been described.

The fluid in the interior of a ranula, in spite of its viscosity and almost jelly-like consistence, consists very largely of water. The few parts of solid matter which it contains are in great part made up of mucin.

Dermoid cyst, described by some authors under the name of sebaceous cyst. A rare disease, but of which at least a score of cases can easily be collected from the records of surgery. Indeed, Barker, in an excellent paper in the *Clinical Transactions*, has analysed eighteen recorded cases. The disease consists of a cyst, often of considerable size, situated between the muscles on the under aspect of the tongue, and filled with the material which is found in dermoid cysts in other parts of the body. Usually only a single cyst occurs on one side of the mouth, but the existence of two cysts has been noted in the same individual, one on either side of the middle line. It might be supposed that the disease would be, in all cases, congenital, and probably the disposition to it, or the anatomical condition which will permit it, is in all cases congenital. But the cases in which the actual existence of a cyst has been noticed soon after birth are very few, and the very large majority of dermoid cysts of the mouth have been observed in adults, not uncommonly in adults at or upwards of thirty years of age. One case is described in which the patient was more than sixty years old.

A dermoid cyst forms a more or less considerable tumour in the floor of the mouth, and projects, not only like a ranula, between the tongue and floor of the mouth, but also in the neck between the chin and hyoid bone, where it frequently forms a tumour as large as an egg, and sometimes the size of a turkey's

egg, or of the closed fist. The swelling, both within and on the outside, yields a well-marked sense of fluctuation; but the fluctuation is not so soft as that of a ranula, and the feeling is often doughy rather than elastic. The surface of the mass is smooth, and its outline generally elongated or rounded. The mucous membrane is raised over it, and is traversed by small vessels like the surface of a ranula, but the translucent aspect, and the bluish tint peculiar to ranula are not observed in the dermoid cyst, which usually presents a yellowish tint. Pressure produces over some dermoid cysts distinct pitting.

Inasmuch as a dermoid cyst is often much larger than a ranula, and its contents are less yielding, its presence is productive of more inconvenience. There are, frequently, discomfort in eating and in speaking, sometimes salivation, and a constant feeling of fulness in the mouth. But the subjective symptoms are rarely more severe than this. Inflammation in connection with the sac is not at all usual.

The *pathology* of dermoid cyst is full of interest. It is thought to be due to the folding in of a portion of the integumental layer during development. In this manner is formed a cul-de-sac, lined with epithelium. In the further process of development the external opening of the cul-de-sac is closed, and a cavity closed on all sides remains. If the epidermis or epithelium lining the wall is inactive, the sac need never become distended, and its very existence is not suspected. But if the epithelium, at any period of after life, is excited, new cells are developed, and the old cells cast off into the interior of the sac distend it and form a large part of its contents. The situation of the folding in, and consequently of the cyst, is either between the genio-hyo-glossi in the middle line, or a little to one side between the genio-hyo-glossus and the mylo-hyoid; and if two cysts are developed,

they are found between the genio-glossus and the mylo-hyoid on either side. The cyst wall is almost always very tough and fibrous, and is lined internally with a more or less thick covering of epithelium, like that which covers the surface of the body. The contents are a thick material resembling sebaceous matter, in some cysts offensive, sometimes so thick and dry and hard that it is difficult to evacuate the cavity. This matter is composed of large numbers of epithelial cells, cholesterine, oil, and fatty *débris*. More rarely hairs are found; and, very rarely indeed, teeth and bone are said to have been observed. In most cases the cyst is loosely attached to the structures in the midst of which it lies, but one dermoid cyst has been described which was united to the symphysis of the lower jaw by a firm resistant fibrous cord.

Dermoid cysts are *generally recognised* without much difficulty. The only diseases with which they are likely to be confounded are ranula and salivary calculus. From the former they are distinguished by the signs which have been mentioned, the doughy feel, the yellow colour, the swelling behind the chin. From salivary calculus, by the smoothness of the tumour in the mouth, its fluctuation, the absence of inflammation, and of the hardness of the swelling in the submaxillary or sublingual region which is associated with salivary calculus. Churchill has described a case of fatty tumour in the floor of the mouth in the situation of a ranula or dermoid cyst. It was mistaken for a ranula, chiefly, perhaps, because ranula is so much more common than dermoid cyst; but the characters of the disease were much more those of dermoid cyst, and I think it would probably have been exceedingly difficult to diagnose between the two affections. In any case of doubtful character a puncture with a fine knife, or with a trocar, will permit the nature of the contents to appear.

A dermoid cyst may be *treated* by free incision through the mouth. The contents are then removed, the cavity filled with a strip of lint and made to heal up from the bottom. This method cannot, however, be recommended, partly on account of the difficulty in most cases of removing the contents of the sac, partly on account of the inflammation and œdema which usually follow the operation. Complete removal of the sac, although it appears to be a formidable procedure, is really the simplest and best method of dealing with the disease. If the tumour is small, removal may be effected through the mouth. The mucous membrane must be freely incised over the tumour, and the latter may be removed almost with the handle of the scalpel, so little is it adherent to the surrounding structures. Here and there a touch with the knife will be required. The bleeding is inconsiderable, and the cavity may be filled with lint soaked in sanitas oil, or may be drained in the ordinary way. During the operation the mouth is kept open by means of a gag, and the tongue is held on one side by a cord passed through it. The practice of opening the cyst during removal, recommended by some authors, is not necessary for the smaller cysts; but if the cyst is very large, and difficulty is experienced on this account in removing it, it may be incised, its contents removed, and the wall dissected out. The largest cysts have almost invariably been removed through an incision behind the chin, either in the middle line of the neck or over the most prominent part of the tumour. The dissection is neither very troublesome nor very dangerous, and the operation is easier than that practised in the mouth; but the objection on the ground of scarring, even when the scar is partly hidden by the jaw, cannot be overlooked. The external operation should, therefore, be employed only in those cases in which it seems

PLATE VII.

Fig. 1.—Tertiary syphilitic plaque of dorsum of tongue in a man, aged 30 years. Two gummata on right border commencing to shrink.

Fig. 2.—Degenerated nævus of the whole thickness of the tongue in a boy, 7 years old.

Fig. 3.—Carcinoma of the left border of the tongue of a man, aged 40.

Plate VI



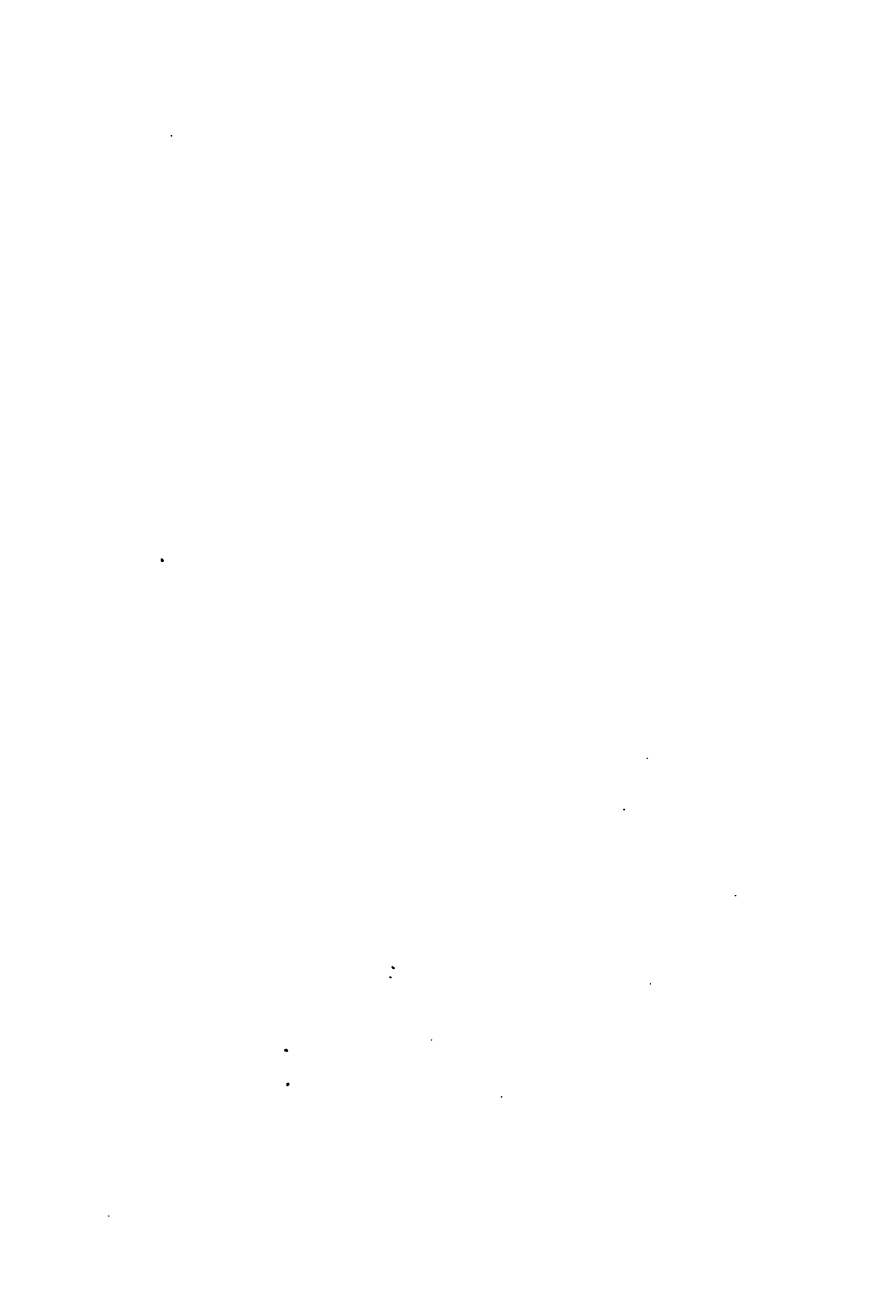
Fig. 1



Fig. 2



Fig. 3



impossible, even after evacuation of the sac, to remove it through the mouth. The operation is followed, in some instances, by severe inflammation and œdematous swelling, but these are allayed in the course of two or three days by sucking ice, by careful attention to draining of the cavity, and by removing every source of irritation. The result is satisfactory; the wound heals in a very short time, and recurrence is impossible if the sac has been completely removed.

Salivary calculus.—An elongated mass, like a fragment of slate pencil in shape and size, but consisting of animal matter and earthy matter, chiefly phosphate and carbonate of lime and phosphate of magnesia, is formed not very uncommonly in the duct of the submaxillary gland. It forms, in all probability, very slowly, and may remain for years in the duct without giving rise to any symptoms. But as it grows larger, or, from some accidental cause, inflammation ensues, the surrounding tissues become swollen and painful, partial obstruction of the duct is produced, and the submaxillary gland, whether as a result of the obstruction or of chronic inflammation spreading back along the duct, becomes enlarged. Then the patient seeks relief, and the following symptoms are observed: The tongue is usually somewhat swollen; the parts between the tongue and in the floor of the mouth on one side are much swollen, red and tender; the submaxillary gland is enlarged and hard, but seldom tender or painful. It is not always easy to discover the cause of these symptoms, even when the true cause is suspected. But if the orifice of the duct is sought for, and a probe is passed along it, a rough and gritty mass will be felt, generally near the orifice, but in some cases much farther back. The sooner the stone is removed the better for the patient. An incision should be made over it with a sharp-pointed bistoury, and it

should be taken out with a pair of forceps. Great delicacy should be observed in the removal, for the stone is usually very brittle, and if it be broken the fragments are difficult to discover and take out; yet it is necessary to remove them, as their presence in the duct is apt to excite even greater irritation than was produced by the original calculus.

It is not very unusual for a salivary calculus to be passed without an operation, and a patient will sometimes bring with him the little stone, telling how he found it underneath his tongue, and asking what it is. With the removal of the calculus the symptoms ought to subside; and their continuance is to be regarded as a sign that there are still some fragments left behind; these must be removed in the same manner as the original stone.

The diagnosis of a salivary calculus from ranula and dermoid cyst has already been discussed; it depends in great measure on the inflammation which is usually associated with the calculus, and the hardness of the swelling below the jaw. In a few instances the symptoms due to the presence of a calculus have been much more severe than those which have been just described. Stephen Mackenzie relates two cases in which severe inflammation of the floor of the mouth, with swelling from the angle of the jaw to the middle line, and considerable swelling of the tongue, occurred in the course of a few hours. And Kappeller describes the removal of a tumour, supposed to be malignant, extending from the symphysis of the jaw to the hyoid bone, but which, on examination, proved to be an inflammatory thickening in the muscles, set up, apparently, by the presence of two small chalky bodies which had been previously removed. Such occurrences are, however, to be regarded as curiosities of surgical practice rather than probable events.

CHAPTER XVI

INNOCENT TUMOURS

Lipoma (Fatty Tumour)—Fibroma (Fibrous Tumour)—Chondroma and Osteoma (Cartilage and Bone)—Papilloma (Warty Tumour)—Adenoma (Glandular Tumour)—Angioma (Vascular Tumour)—Keloid.

Lipoma (fatty tumour).—The tongue is much more rarely the seat of innocent than of malignant tumours, and the occurrence of a fatty tumour may be regarded as a rare event. The disease belongs to adult life, but several examples of congenital fatty tumour have been observed. The tumour is usually single, and is situated on the border of the organ near the tip, more rarely on the dorsal aspect, and occasionally in the position of a ranula beneath the tongue in the floor of the mouth. It probably first forms in the substance of the tongue between the muscles; but after a while, enlarging, makes its way towards the surface, and may finally project as a pedicled tumour attached by a more or less narrow stalk. In any case, the mucous membrane which covers it is almost invariably smooth, stretched and devoid of papillæ when the disease affects the dorsum. The growth may be quite uniform, or may be lobed; it is generally so soft as to fluctuate, and through the smooth rosy membrane covering it may be discerned a yellowish or golden hue, highly suggestive of the character of the tissue underneath. The rate of increase is so slow that ten, fifteen, or even more than twenty years may elapse before the tumour has attained the size of a walnut or a pigeon's egg, a strange contrast to the rapid progress of a carcinoma of the tongue. The disease, if

left to itself, produces little inconvenience, and is not dangerous; even the surface seldom ulcerates. But when it has reached the size of a large nut, more especially when it projects in the form of a polypus from the dorsal border, it becomes inconvenient, is apt to be caught between the teeth, and is unsightly if the mouth is opened widely. The patient therefore seeks to be rid of it, and as the operation is not dangerous it is removed.

The *diagnosis* seldom presents any difficulty. The situation and slow growth of the tumour, its lobulation, the sense of fluctuation or extreme softness, together with the golden or yellowish hue which has been mentioned, are sufficient to make it sure that the disease is a fatty tumour.

The only *treatment* is removal, a very simple operation, whether the growth is pedicled or whether it lies buried in the muscular substance of the tongue. The pedicled growths may be removed by cutting through the pedicle and tying the single vessel which passes through its middle. The tongue requires to be fixed during the operation, by holding it firmly in a small piece of linen, or with a pair of forceps with large flat blades, deeply ribbed. The deeper situated growths may easily be removed through a single incision, for they are encapsuled and shell out readily.

It may be mentioned here that the congenital lipomas often contain other tissues, a large proportion of fibrous tissue, for example, or even cartilage or bone.

Fibroma (fibrous or fibro-cellular tumour).—Perhaps a little more common than the fatty tumours of the tongue, to which they present many points of resemblance besides their rarity. They occur for the most part in adults, but may be noticed first in childhood, or may be congenital. They are situated on the

dorsum much more frequently than elsewhere, and may occur on any part of the dorsum, even towards the root of the tongue, but, unlike the fatty tumours, they scarcely ever affect the under aspect. There may be one or several tumours; indeed, it is not unusual to see two or three, either separated by a tolerably wide interval, or lying side by side. It is probable that the fibromas, like the lipomas, commence in the substance of the organ, but as they increase in size, they project and often assume a distinctly poly-poid form, on which account they have been not infrequently described as fibrous polypi of the tongue. They probably grow rather more quickly than the fatty tumours, but the rate of increase is very slow, and after many years a fibrous tumour may be no larger than a walnut. The fibrous polypi resemble, in every respect save one, the fatty polypi; they are composed of the softest varieties of fibrous tissue, and are rather fibro-cellular than fibrous. The mucous membrane covering them is smooth and stretched, and they are so soft as to appear to fluctuate. The important exception is that they do not present the yellowish hue peculiar to the fatty tumours, and thus the diagnosis of one of these diseases from the other is made. But the deeper-seated fibrous tumours are much more difficult to distinguish. The mucous membrane over them may be tense and thin, but it is not adherent; the tumour is generally rounded, but may be lobed; it is firm, tense, elastic, so that it may be taken for a sac filled very full of fluid. Fibromas are very seldom either painful or tender; they are quite innocent, and give rise to very little inconvenience. But after a time they are irksome in speaking or in eating, and hence there comes a desire to be rid of them.

The *diagnosis*, as has been hinted, is not in every instance free from difficulty. The tumour may be

taken for a cyst, and the error is only rectified by an incision. Even then some doubt may still remain. Sir James Paget kindly gave me the notes of a case in which, to make the diagnosis, he punctured such a tumour; some synovia-like fluid escaped, but finding that a solid mass remained behind, he cut it out and found it was a fibrous growth. No serious consequences are likely to ensue from an error in the diagnosis of a fibrous tumour.

The *treatment* is precisely similar to that recommended for fatty tumours, to cut off the polypoid growths and to enucleate those which are more deeply placed through a single incision. The appearance after removal varies; it may be that of a dense mass of fibrous tissue; or of bands of firm fibres intersecting a softer, yellower, and more succulent material; or of such loose and cedematous tissue as nasal polypi are made of.

Chondroma and osteoma (cartilaginous and osseous tumours).—Both cartilage and bone are occasionally met with in tumours of the tongue, but pure examples of either form of tissue are almost unknown. Weber describes a case which he had seen of a girl, fifteen years old, who had a rounded, slightly nodular mass about the size of a walnut growing in her tongue for eight or more years. It was composed largely of cartilage, but contained also a goodly quantity of fat and fibrous tissue. One cannot but suspect that the tumour in this case was of congenital origin; first, on account of the extreme rarity of lingual chondroma in adult or almost adult age; second, because two cases at least are described (Arnold and Bastien) of congenital tumours of the tongue which contained large quantities of fat mixed with cartilage and other connective tissues.

The diagnosis of such a growth does not materially differ from the diagnosis of a fibrous or fatty tumour,

and if a more considerable quantity of cartilage or bone is present, their presence may readily be perceived by the extreme hardness of the tissues, together with the nodular character of the surface of the tumour in which they occur.

Papilloma (warty tumour).—Warts and warty growths are among the more common of the innocent tumours which affect the tongue. They occur most frequently upon the dorsum within the papillary area, and are then doubtless due to hypertrophy of the natural papillæ; but they are not limited to the papillary area, and may even grow on the under aspect where the mucous membrane is quite smooth. They may occur at any age, and are not uncommonly congenital. I remember one remarkable case of a little boy who was a patient in St. Bartholomew's Hospital some years ago. He had a warty enlargement of all the fungiform papillæ of his tongue; there was not one of them, so far as we could judge, which was not hypertrophied and warty. Each fungiform papilla stood up on the surface of the mucous membrane as a small white papillary tuft. So, at the Hospital for Sick Children I saw and examined after removal a little warty tumour which was seated sessile on the under aspect of the tongue of an infant ten months old. It projected to the left of the *frænum* in the groove between the tongue and the floor of the mouth.

Papillary growths are almost always compound; they may be either single or multiple.

The *diagnosis* of a papilloma, in most instances, presents no difficulty. In children and young persons it can only be mistaken for a condyloma. I have more than once seen a warty syphilitic growth on the under aspect of the tongue, where it was out of reach of injury or irritation, so like a papilloma, that I doubt whether the diagnosis could have been made

unless a clear history or some other signs of syphilis had been present. On this account it is always well to examine the patient closely for syphilitic symptoms, especially if he is a young adult, and the tumour has not existed very long. The syphilitic warty growth rapidly disappears under the local application of a ten-grain solution of chromic acid; but I am not aware that the acid produces any effect on a true papillary growth. In children and young adults the only other disease for which a papilloma can be mistaken is a degenerated nævus, of which a description will be given presently.

In persons more advanced in life, especially in men, there is danger lest a papilloma should be mistaken for an epithelioma; or rather, the danger is lest the epithelioma should be mistaken for a simple papilloma, a much more serious error. The diagnosis is all the more difficult because the simple growth may be transformed into a carcinoma. As an example of the difficulty, I recollect how, several years ago, Mr. Savory removed what appeared to be a single innocent wart, about the size of a large pea, from the tip of the tongue of an old man between seventy and eighty years of age. It was a prominent sessile tumour, with a white papillary surface, and did not appear to penetrate beneath the surface of the mucous membrane. It grew near the scar of a former operation, in which Mr. Savory had removed, six years previously, what was believed to be a recurrent epithelioma; but the scar was quite sound. I examined the little tumour after removal, and discovered that its structure was of very doubtful character; the papillæ were very irregular in shape, the epithelial cells were ill-formed, and cell nests were visible in many parts. The epithelium of the adjacent cuticle, too, was affected. On these grounds I came to the belief that, although the wart could not yet

be clearly termed a squamous-celled carcinoma (epithelioma), it was nevertheless on the road to become a carcinoma. The removal was thoroughly carried out, and I hear from Mr. Savory that the patient still lives and has not since suffered any inconvenience from his tongue.

The diagnosis of innocent warty growths from warty carcinomas, and the suspicion that a simple warty tumour is being transformed into a carcinoma, will depend first and largely on the age of the patient; carcinoma is so rare before thirty years of age, and not common under forty, that a papillary tumour in a person under thirty-five or forty years is almost certainly an innocent tumour. Next to age, but not second to it in importance, is the condition of the structures at the base of the growth; beneath a simple papillary tumour they are quite soft and natural; beneath and around a carcinoma they are infiltrated, stiff, and, as the disease advances, widely indurated. The value of this subjacent induration cannot be over-estimated. Ulceration, glandular affection, the microscopic examination of a scraping of the surface will be discussed in the section devoted to carcinoma; but these are all symptoms belonging to a later period of the disease, and are of little value in deciding between a warty tumour and an epithelioma in an early stage.

Papillomas may be *destroyed or removed* in various ways. The numerous hypertrophied papillæ which are sometimes seen on the tongues of children may be destroyed by the application of nitrate of silver stick: a single application to each papilla is usually sufficient to ensure its cure. The larger pedunculated growths may easily be removed with scissors, or, to prevent bleeding, by ligaturing the pedicle with a piece of fine and strong waxed silk. The larger papillomas had better be removed with the knife or scissors, and

if there is any induration about the base, or the least suspicion that the growth is malignant, the base and a wide area of the surrounding tissues should be removed. These are the cases in which the best results are secured by operation; a free removal, which is yet but a trivial operation, prevents the occurrence of carcinoma, or removes it while it is still a manageable disease. The treatment of the larger or doubtful warts in persons over forty years of age by caustics and other similar means cannot be too strongly deprecated. So far from being serviceable to the patient, it is in the highest degree detrimental; the applications irritate and excite the tumour to more rapid growth, and if it be not already cancerous, under such treatment it is likely speedily to become so.

Inasmuch as some, if not many, of these papillary growths of the tongue in adults are really condylomata, and of syphilitic origin, they may be treated with mercury or iodide of potassium in the absence of any suspicious symptoms of carcinoma. And, in such cases, no local application is so useful as a solution of chromic acid in the proportion of ten grains of the acid to an ounce of water. It should be painted freely over the surface of the growth three or four times every day. The absence of a syphilitic history need not prevent the trial of anti-syphilitic remedies. Sir James Paget has lent me the notes of a case which I can scarcely doubt was syphilitic, and which was cured by the local and internal use of iodide of potassium, yet there was an entire absence of history of syphilis. The case is so interesting that it deserves to be quoted. The patient was a man, thirty-eight years old, whom Sir James Paget saw for the first time in 1858 for a low, oval, circumscribed, coarsely warty elevation on the mid-dorsum of the tongue, just to left of the middle line. It looked like a

condyloma, but was rather more nodular and fissured. It was about three-fifths of an inch by one-third, and was raised to the height of rather more than half a line. It felt throughout firm, and as if a thin, firm layer were at its base, embedded on or in the tongue. Not the least interesting feature of this disease was its history. Near the end of 1854, Mr. Luke had removed from the exact situation where it stood a growth of some warty kind, which had then been growing for about a year. In the course of the year following the operation a lump appeared under the scar and increased. It was an abscess, and was opened. All remained well until a year before he was seen by Sir James Paget, when the present growth appeared, which increased from that time. It quickly got well on the treatment by iodide of potassium. Then there formed an induration in the substance of the left side of the tongue, which remained better and worse up to the last time he came under observation, in January, 1862.

Adenoma (glandular tumour).—A disease so rare that no general account can be written of it. Of four cases of which I have collected notes, two occurred in adults at or about the middle period of life, the third in a girl of sixteen, the fourth in a newborn child which died sixteen hours after birth from the pressure of the growth on the larynx, near to which it originated in the base of the tongue. In one of the other cases the tumour was situated at the back of the dorsal aspect of the tongue, precisely where such a tumour ought to grow, for in that region are the submucous glands. In the case of the girl the situation of the tumour is not mentioned, but in a case recorded by Mr. Bryant it grew beneath the mucous membrane on the under aspect of the tip, perhaps in relation with the Blandin-Nuhn glands. The general appearance of the tumours seems to have

resembled that of the fatty or fibrous growths ; they were either polypoid or embedded in the substance of the organ. The microscopic structure exhibited in one case glandular tubes lined with cubical epithelium, in another case glandular follicles, ducts, and vessels, like the structure of a racemose gland. The tumour, described by Solis Cohen, in the back part of the tongue of a woman, was said by Dr. Seiler to be a "cystic adenoma," but there is not a detailed account of the examination. There do not appear to have been any peculiar signs in any of the cases which could have led to a correct diagnosis of the exact nature of the disease ; but the exact diagnosis was not important, for the tumours were innocent, and bore the general aspect of innocent tumours. It is useless to attempt to give any rules for the diagnosis and treatment of tumours of this nature. If they are met with they will probably be mistaken for fibrous or fatty tumours, and will be treated as such ; nor could they be better dealt with.

Angeioma (vascular tumour).—The vascular tumours to which the tongue is subject may be divided, as in other parts, into venous and arterial. The former are not uncommon ; the latter have only been met with in a very few instances. Venous angeiomas are generally congenital, but this is not invariable, for, if their history is to be credited, they originate occasionally in the tongues of adults. They may occur singly, or to the number of three or four or more ; and, in either case, are situated generally on the dorsum, more often in the anterior than the posterior half. There they project slightly above the surface, lifting up and thinning the mucous membrane over them, and generally showing a dull blue or livid colour through the thinned membrane. As in the integument covering many of the external *nævi*, so in the mucous membrane covering the lingual *nævi*, small

varicose vessels and vascular spots may be observed. In some instances the contents can be slowly pressed out of the tumour, but in other instances the mass feels tense and elastic, like a thin cyst tightly filled with fluid, and cannot be reduced even by firm and long-continued pressure. Nævi of the tongue are seldom very large, not reaching usually to the size of a large nut. They are usually quite painless, and give rise to no inconvenience save by their bulk; yet they may bleed, and if by misadventure they have been pricked, may bleed profusely and repeatedly.

Nævi of the tongue may *increase in size*, and may demand treatment; or may undergo spontaneous cure; or may remain quiescent, neither increasing nor diminishing in the course of years; or may undergo warty degeneration. The last change is one of the most interesting; as Bryant describes it in a case he had unusual opportunities of watching, the diseased portions of the tongue lose their spongy feel and become tolerably firm, harder in some parts than others. The surface changes, and looks to be made up of vesicular warts, these vesicles being filled with clear or blood-stained serum (Plate VII., Fig. 2). Even when the surface of a nævus has undergone this change, the growth may still continue in the deeper parts, while fresh tumours bearing similar characters may form in the vicinity. Mr. Marsh transferred to my care, some time ago, a young woman, who had in the middle of the tongue a row of several of these degenerated nævi. The central and largest of the group had existed many years, but the smaller tumours had formed within a year or more. I cut them out, and the operation was attended with much venous and capillary hæmorrhage from vessels which were so numerous and minute, and so difficult to tie, that pressure was employed to stay the bleeding. It recurred

several times in the first few days after the operation, and with such severity that I was quite anxious for the patient's safety ; but the oozing was always easily arrested by pressing a pad of lint firmly on the bleeding surface for a few minutes with the finger. Finding that the hæmorrhage was produced by the movements of the tongue in swallowing, I ordered the patient to be fed exclusively by the rectum, and from this time the bleeding ceased, and she made a good recovery.

Although there is no glandular enlargement in association with lingual nævus, a curious complication is occasionally noticed, a certain degree of dilatation of the lymphatic vessels (lymphangiectasis) in the floor of the mouth and in the neck. This is evidenced by the presence of a painless, ill-defined swelling below the jaw ; and if the swelling is punctured, some thin, watery, highly albuminous fluid is obtained. Bryant describes this complication in the case already mentioned, in which the warty degeneration of the nævus was noticed.

Pathologically, the venous nævi of the tongue are of two kinds ; they are composed of numerous anastomosing vessels, or they are cavernous. The deep-seated and larger nævi belong almost invariably to the latter class.

A nævus is usually very *easily recognised*. Its situation on the dorsal aspect of the tongue, its bluish colour, its soft consistence, the ease with which it can usually be diminished in size by pressure, the rapidity with which it refills, and the appearance of vessels and vascular points upon its surface, permit no doubt to exist regarding it. I have never seen a case in which there was the slightest doubt of the nature of the tumour ; and the records of cases show that in nearly every instance the disease was recognised without difficulty.

I have, however, met with one account of a nævus in the tongue of a boy, sixteen years of age, which, on account of the absence of the characteristic bluish or livid tint, and because the tumour was much more tense and elastic than usual, and could not be emptied by pressure, was thought to be a fibro-cellular tumour or a cyst (probably hydatid). The diagnosis was not made until the tumour had been punctured. In this case it is evident that the characters of the disease were singularly masked, yet there was one feature which might have led the surgeon to suspect its true nature: the mucous membrane over the tumour showed several congested small varicose vessels and vascular spots. It appeared to be a cavernous nævus.

Unless a lingual nævus is obviously diminishing in size, and there is thus a reasonable prospect that it will undergo spontaneous cure, it should be treated, and the earlier the *treatment* is undertaken the better. Small superficial nævi may be cured by destroying them with the actual or, far better, the galvano-cautery. Even nævi as large as a small nut may be easily destroyed by two or three applications of the galvano-cautery; the point of one of the platinum instruments should be made to penetrate deeply into the substance of the growth and moved in all directions through it until it has been completely broken up. The swelling and inflammation which follow this operation are comparatively trivial, and the nævus is sometimes cured by a single application. If it shows signs of returning vitality the operation must be repeated. If a dull red heat is employed there is no hæmorrhage. Circumscribed and prominent nævi may be ligatured; but where the galvano-cautery can be procured, it is preferable to the ligature, for the after-pain and distress are much greater from the ligature. The

largest and most diffused specimens of nævi may be excised or may be removed with the thermo-cautery, and the warty degenerations of nævi may be treated in the same manner; but after the experience of the case narrated above, I should not recommend simple excision with the knife or scissors. If they are removed, it should be by the cautery of one kind or the other.

Cirsoid aneurysm, or aneurysm by anastomosis, appears only to have been recorded in one or two instances. In a case related by Bryant the tumour occupied the tip and right side of the anterior half of the tongue. These parts were congested, swollen, and covered with large full veins, while great tortuous arteries could be felt running up from the base of the tongue to supply the tumour. It could readily be emptied by pressure, but filled again the instant the pressure was removed. It was not treated. In a case related by Fayer, the tumour occupied the situation of a ranula, and at first looked not unlike a ranula; but, when closely examined, it was found to have a tortuous, lobulated configuration, and it pulsed strongly. It was as large as a small orange, had existed eight years, during which time it had on several occasions bled violently, and it was said to be steadily increasing. Fayer punctured it, and a jet of arterial blood spouted up through the opening. He then injected it with a strong solution of tannic acid; the hæmorrhage and pulsation were immediately arrested. The tumour continued to consolidate during several days, when the man, a native Indian, discharged himself from the hospital, and was not seen again by the surgeon. Both these patients were males, one of them thirty, the other forty, years of age.

A strange story was told in the *Lancet*, more than fifty years ago, of a girl, eighteen years of age, who had a congenital tumour of the tongue as large as a

strawberry, soft, compressible, purple, composed of a congeries of vessels, and pulsating. She was salivated by mistake; the tongue ulcerated all over, and the tumour disappeared, so that in four months she had completely recovered. In spite of the pulsation, it may be doubted whether this was an arterial nævus.

Keloid.—The only case of keloid with which I am acquainted is that related by Sedgwick in the Pathological Transactions for 1861. The patient was a little girl, between four and five years old, who had patches of keloid on several parts of the body. A short time before her case was brought before the Society a patch appeared on the right side of the tongue, and quickly spread along the upper margin towards the tip. It looked, when the tongue was protruded, like the contraction consequent on some surgical operation, or a severe burn, or the application of some corrosive to the part. It was very little indurated. Sedgwick regarded the disease as a good example of Addison's keloid. A case, which appeared to be somewhat similar in kind to this, was under the care of Mr. Marrant Baker, in St. Bartholomew's Hospital, in 1881. The patient was a healthy-looking man of twenty-three years old, who had on the left border of his tongue a perfectly smooth concave depression, surmounted on the dorsal aspect by a very smooth curved border raised to the extent of an eighth to a quarter of an inch, and slightly everted. The border was a little firmer than the surrounding parts, otherwise there was not any induration. The disease was said to have followed a bite of the affected portion of the tongue. Mr. Baker removed the disease, with about a quarter of an inch of the adjacent tissues, and I am not aware whether it has recurred.

CHAPTER XVII.

CANCER.

Sarcoma—Carcinoma.

Sarcoma.—Writing some time ago on the subject of sarcoma of the tongue, I said that I had found in the records of surgery only a single instance of the disease. The case was reported by Professor Jacobi, of New York, in the American "Journal of Obstetrics," for 1870. The tumour was congenital, about the size of a walnut, seated in the dorsal aspect of the tongue, quickly growing. It was elastic, rounded, deeply grooved, and ulcerated. It was removed successfully with the galvano-cautery, and after removal was found to consist partly of round, but chiefly of spindle cells. I expressed some doubt whether this was in truth a sarcoma, and suggested that it might have been composed of embryonic tissue on account of the extreme youth and immature condition of the infant. One of the reasons which led me to adopt this view was the fact that, at the period at which I wrote, there was not, so far as I was aware, another instance of sarcoma of the tongue on record in the human subject. Since that time two other instances have been related to me. One of these was that of a patient under the care of my friend, Mr. Godlee, in University College Hospital. The tumour was seated on the dorsum of the tongue, was somewhat pendulous, and recurred after it had been removed. Later there appeared several growths on the skin of different parts of the body. Barker mentions the case, and suggests, what is by no means improbable, that it was really a case of multiple

sarcomata. Of the other case I know very little. I was asked to examine a section of a tumour of the tongue of rather long duration, but I never saw the tumour, or heard the history of its growth or of its course. It presented the characters of a round-celled or lympho-sarcoma.

Even if all these cases are admitted to have been true cases of sarcoma, it is still very evident that primary sarcoma of the tongue must be regarded as an exceedingly rare form of tumour, and equally certain that it is quite useless to attempt to write an account of it which shall be useful. On the other hand, now that attention has been drawn to its extreme rarity, it is possible that some instances which have been observed, and not yet recorded, may find their way into surgical literature.

Carcinoma.—Scarcely less remarkable than the rarity of sarcoma is the fact that only one variety of carcinoma affects the tongue. Although during the past two years the statement has been made in more than one place that the tongue is occasionally attacked by hard and soft carcinoma, I cannot discover that these statements rest on any surer foundation than the hardness or softness, or the large size of particular tumours. I may therefore repeat, that the tongue appears to be subject to only one variety of carcinoma, the squamous-celled carcinoma or epithelioma. Even if, by-and-by, it is clearly proved that other varieties of carcinoma do occasionally affect the tongue, the extreme rarity of their occurrence will always remain a puzzle. For the back part of the tongue and the parts beneath the tip are rich in glands, and these parts are very vascular, and the dorsum behind the circumvallate papillæ, although it is not nearly so exposed to injury as the tip and borders, is not by any means protected from injury and irritation. A partial explanation may perhaps be found

in the fact that pre-cancerous conditions are much more frequent in the fore part of the tongue and at the borders than behind the circumvallate papillæ. Thus, ulcers and excoriations, ichthyosis, psoriasis, and all similar conditions, occur far more frequently or even exclusively on the tongue in front of the foramen cæcum. And, although every individual carcinoma of the tongue is not preceded by a clearly defined precancerous stage, there is perhaps no other part of the body in which the precancerous conditions are so well known and so frequently observed as in the tongue.

No part of the tongue is exempt from carcinoma, but the posterior half is not nearly so frequently affected as the anterior half, and the edges are more subject to it than the dorsum or the under surface. There is not any difference in the liability of the two sides to the disease. Nor is there the least reason to expect there would be any difference; for the conditions which lead to the formation of carcinoma are such as occur with equal frequency on both sides. The following table shews the relative frequency with which the different parts of the tongue were affected in eighty cases of carcinoma which I collected :

Root	1
Anterior half and tip	3
Right border	12
Left border	17
Right side	11
Left side	16
Border	1
Dorsum	15
Right underside	2
Left underside	1
Whole tongue	1
Total	80

If these numbers are compared with those given

by other authors, some differences will be discovered. But the main facts are the same. One point, however, deserves to be noticed; in these tables the left side or half of the tongue appears to be far more liable to carcinoma than the right, but if von Winiwarter's or Barker's statistics are consulted, the greater number of cases will be found to have occurred on the right side or border. Again, it must be understood that in many descriptions the "side" of the tongue is intended to mean the border and not one half of the dorsum. A closer analysis would, I have no doubt, show that the anterior half of the border is much more liable to be affected than the posterior half, but the materials within my reach do not permit me to exhibit this in sufficiently large numbers.

In relation to seat, one thing must not be forgotten; two carcinomas may be developed on the same tongue at the same time. The condition is undoubtedly extremely rare, but at least two cases of it are on record. On the other hand, I know of no instance in which the tongue was the seat of more than two carcinomas at one time. A greater number of cases might be collected in which, after the removal of carcinoma, the disease reappeared in a different part of the tongue.

The *causes* of carcinoma may be divided into predisposing and exciting, and these terms are far more applicable here than in many other cases in which they are employed. Among the general predisposing causes, age and sex stand in the first rank.

Youth appears to be absolutely exempt from carcinoma of the tongue; and the disease is so rare before the age of thirty years that the same statement might almost be made with regard to young adult life. In the eighty cases to which allusion has been made (and which will be found tabulated in my book on "Sarcoma and Carcinoma"), only two instances are

recorded in which the patients were less than thirty years of age, and both of these were twenty-nine. One of the patients mentioned by Barker, and indeed operated on by him, was twenty-six; and in a table of ages which he has collected from the statistics of different authors, eight of 290 patients were between twenty and thirty years of age; but their exact age is not stated, so that it is not improbable that they were only just under the age of thirty. After thirty years of age no person seems to be safe from the disease; but by far the largest number of cases will be found in persons between the ages of forty and sixty; and although the highest proportion of all will be found in persons between forty-five and fifty, and again between fifty and fifty-five, the cases are, after all, very evenly distributed over the whole period of life from forty to sixty years. One, if not the chief, reason of the smaller number of cases of the disease after the age of sixty is probably the much smaller proportion of persons who survive the age of sixty years, the much smaller number of persons, therefore, remaining to be attacked. There are, doubtless, many reasons why the disease should be more frequent in adults than in children; smoking, spirit drinking, syphilis of the tongue, the eating of very hot and highly-spiced foods, injuries and irritation of carious and rough teeth, all of them causes in greater or less degree of carcinoma, are vastly greater in adults than in children. But it is not easy to understand, when all this has been admitted, why the disease never appears in children, and so very seldom in young adults. It is probable that, to all other causes, there must be added a predisposition of the epithelium to undergo or to accept the carcinomatous transformation after a certain time of life. So intimately must this condition or capacity of the epithelium depend on the age of the individual, that it

appears to be absolutely impossible to induce it at an early age, although it is not improbable that it is occasionally induced in younger individuals than those to whom it properly pertains, and thus may be accounted for the few cases in which the disease has attacked persons under thirty years of age. This assumed condition of the epithelium may be compared, in its relation to age, to atheroma of the arteries, and to other more decidedly degenerative changes.

The relation of the disease to *sex* is as striking as to age. It is incomparably more frequent in males than females, so much so that my own tables show a preponderance of nearly six males to one female. Barker, examining the statistical tables of several different authors, finds that there were only 46 females in 293 cases, so that the disproportion is even greater than among the cases collected by myself. Many of the causes to which carcinoma of the tongue is justly attributed are certainly more common in men than women, but I have always found it difficult to believe that the irritative effects of various bad habits are six times more frequent in men than women. On the whole, however, after a careful consideration of all the facts bearing on the question, I am much more disposed now than I was two years or more ago to believe that the difference in the habits of men and women, and in the consequences of certain habits, is the essential and most reasonable explanation of the great difference in the liability of the two sexes to lingual carcinoma. Smoking, drinking spirits, the effects of syphilis on the tongue, are all much more common in men than women; and, whether as a result of these and similar habits, or owing to some totally different cause, the conditions of the surface of the tongue, known under the names leucoma, leukoplakia, psoriasis, etc. (now recognised as precancerous conditions), are much more common in males than females.

Stallard has drawn attention within the last few weeks to the increase of the death rate from cancer of certain parts of the body among the population of San Francisco, and attributes the increase in a large measure to the habits of dram-drinking, smoking, and rough eating which prevail there. He finds that the increase is much greater among the males of his city than among the females, and points out how this may be accounted for by the vast difference in the habits of the two sexes. It is quite possible, as the editor of the *Western Lancet* suggests, that Stallard has exaggerated the disproportion of deaths in the sexes, not intentionally, but from not sufficiently taking into his account the large number of cancer cases (especially in males) which are attracted to the city from distant places, for treatment; but it is improbable that he has so much exaggerated it that his conclusions should be altogether cast aside; and the conclusions themselves are so thoroughly in accordance with those which have been put forward, particularly by Virchow, but by many other authors as well as Virchow, that one is inclined to accept them, even if they were not supported by evidence as strong as that which Dr. Stallard furnishes.

Of other predisposing causes of lingual carcinoma, mention has already been made more than once of the effects of spirit-drinking, of smoking, of rough eating, and it may fairly be maintained that these things, and not the male sex, predispose to the disease. That they do so directly I strongly doubt, but I feel equally sure that they exercise a very potent indirect effect on the occurrence of carcinoma. They and, with them, syphilis tend to produce the so-called psoriasis or ichthyosis or *leucoma* of the tongue, a condition of chronic inflammation of the superficial layers of the mucous membrane, which frequently precedes and is a predisposing cause of

carcinoma. They may therefore be said to prepare the soil for the occurrence of carcinoma. This condition, which has already been described, is, I feel sure, a more frequent precursor of carcinoma than is even now imagined. A very large majority of the later cases of lingual carcinoma which have come under my notice have been preceded by an abnormal condition of the surface of the tongue; but if I had not looked carefully for it I should assuredly have passed it by, believing that the imperfection, the smoothness, the slight bluish-white or pearly appearance of the organ in the vicinity of the cancerous ulcer was a mere accidental complication of the carcinoma not worthy of special notice. The patients, as a rule, are not sufficiently annoyed by the lesser conditions of leucoma (under which name all these conditions are understood) to complain of them, and may be wholly unaware of their existence. Very recently a man has been attending the out-patient room with psoriasis of the extremities, and with a pearly and quite smooth tongue, a typical condition of leucoma; but he was quite ignorant that there was anything the matter with his tongue, and could give no information of the duration of the abnormal condition, or of how it had been brought about. Among my own series of eighty cases, the disease is known to have been preceded by leucoma sixteen times;* but I am quite sure if I were to collect another series of the same number of cases, and were to take them from cases under my own observation, or reported by surgeons whose attention had been thoroughly directed to this matter, I should find that the proportion of cases in which the disease

* If a reference is made to these tables, the term leucoma will not be found, but it must be understood to be replaced by "chronic glossitis," "chronic superficial glossitis," "psoriasis," "ichthyosis."

had been preceded by leucoma was vastly greater than in my present table.

The *influence of syphilis* is not limited to the power it possesses of producing superficial inflammation of the tongue. It is prone to leave scars along the borders of the tongue, and these, when they are irritated, may at a later period become cancerous ulcers. Even the fissures and scars left by the breaking of deep-seated gummata may afterwards become the seat of carcinoma. Such cases are probably very rare, but an excellent proof of the possibility of their occurrence was presented during a recent session of the London Pathological Society by Mr. Marrant Baker. A man who had been ten years previously under his care in the out-patient department of St. Bartholomew's Hospital, suffering from gummatus ulcer of the tongue, so characteristic of tertiary syphilis that a water-colour drawing of his tongue had at that time been made as a study and preserved, returned this year with unmistakable carcinoma in the scar of the former disease, and with secondary enlargement of the lymphatic glands. The smaller, more superficial, and apparently less important scars left by syphilis on the borders of the tongue are more liable to become carcinomatous than the deeper and more striking scars on the dorsum, owing to the much greater irritation to which they are exposed.

Fissures and ulcers in persons who have never suffered from syphilis may also become cancerous, and they are especially prone to do so when they are situated on the borders of the tongue, and are produced by the rubbing or scratching of a carious tooth, which is permitted to remain and aggravate the sore of which it was the cause.

The question is sometimes raised whether syphilis can be regarded as a cause of carcinoma. So far as

the tongue is concerned, the answer is, I believe, plain. In so far as syphilis is capable of producing ulcers and scars of the tongue, so far it is capable of predisposing the tongue to the occurrence of carcinoma. But the ulcers and scars produced by syphilis are not more prone to become cancerous than the ulcers and scars which are due to any other cause. Nor is the psoriasis (leucoma) or chronic superficial inflammation produced by syphilis more apt to become cancerous than a psoriasis or chronic superficial glossitis which has had no connection with syphilis.

The question of the *liability of smokers* to carcinoma of the tongue is one to which attention has been especially directed of late years, and it deserves a little more space than has been accorded to it. There is no evidence with which I am acquainted which will prove that carcinoma is really much more common among adult males who smoke than among adult males who do not smoke; yet I think it is not improbable that smoking does to a certain extent predispose to the disease. Probably the same answer may be given to this question, as to the question regarding the relation between syphilis and carcinoma. If smoking causes sores or plaques (leucoma), or chronic superficial glossitis, it predisposes the individual tongue in which these conditions are produced to carcinoma; but if smoking produces no appreciable effect upon the tongue, it cannot be said to predispose to carcinoma. The relation of smoking to leucoma and chronic superficial glossitis is discussed at greater length in the chapter on these diseases.

Of *inheritance* as a predisposing cause of carcinoma generally, I believe too much has been made. Sufficient allowance has not been made for the effects of the same locality and other conditions on parent and offspring; and it has rather too hastily been assumed that if carcinoma is present in two generations of the

same family, a predisposition to it must have been inherited, either in the blood or in some special weakness of certain tissues. Only an exceedingly small proportion of patients with carcinoma of the tongue are conscious of the occurrence of carcinoma in other members of their family; and if the theory of the inheritance of cancer rested on the family histories of persons with carcinoma of the tongue, it would soon cease to be accepted.

Some of the predisposing causes of lingual carcinoma are also *exciting causes*, ulcers and fissures for example. A tolerably acute ulcer may pass in a comparatively short time into carcinoma. But, as a rule, carcinoma is not engrafted on acute ulcers. It is the chronic and indolent ulcers which, irritated by rough and carious teeth, by smoking, spirit-drinking, and other causes, become carcinomatous. The actual exciting causes of the disease are bad teeth, ill-fitting plates of teeth, coarse, hot, and highly-spiced food, the scratching or rubbing of the stem of a tobacco-pipe, chewing tobacco, and probably more often and more certainly than most of these, the application of caustics to sores upon the tongue. An injury such as a bite or a burn or scald may be the determining cause of carcinoma, but only in a few instances. It is very probable that the effects of such injuries would never become carcinomatous if they were not kept open and irritated by various causes, either designed or accidental. Some of the more obvious causes of carcinoma may be avoided or remedied, and, by their timely removal, the disease may be averted. But there is one cause which it is for the most part out of the power of the patient to remove or to prevent, for it is applied by the practitioner, viz. caustic. *If there be one thing more harmful than another in the treatment of simple indolent sores of the tongue in persons over thirty years of age, it is the application*

of a strong caustic. Yet the practice of applying it finds favour in the eyes of a large number of practitioners, and unfortunately secures the approval of their patients, who feel that something is being done for them, and who place great faith in caustics. The practice is one which cannot be too strongly protested against. The result of strong solutions or of solid nitrate of silver on some of the indolent sores remaining on the tongues of children after aphthous ulceration is admirable; and the same remedy may be employed with good effect in the treatment of some of the indolent sores and fissures resulting from tertiary syphilis in comparatively young persons. But the use of caustics should be absolutely avoided in the treatment of sores of whatever kind on the tongues of people after thirty years of age. Caustics are not necessary, and the good which they may do is as nothing compared to the cruel harm which they have done to many tongues. So far as affections of the tongue are concerned, I should not be sorry if caustics were never again employed in the treatment of any of them.

It is not often that *chewing tobacco* can be credited with producing a carcinoma; but there has been quite recently admitted into St. Bartholomew's Hospital a man with a carcinoma of the particular part of the tongue on which his quid of tobacco habitually rested. In this case it is probable that a sore was first formed accidentally, or an excoriation from the constant contact of the quid, and that the ulcer, or excoriation, developed into a carcinoma owing to the irritation produced by the continued use of tobacco.

The *first appearance* of a carcinoma may vary within very wide limits. It may commence as a blister, as an excoriation, an ulcer, a fissure, a pimple or tiny tubercle, a wart or warty growth, or a lump

or nodule in the substance of the tongue. The great variety of aspects in which the disease may possibly present itself depends not on the tendency of cancer, like syphilis, to assume very various appearances in the same part of the body, or to imitate other diseases, but on the fact that all these different conditions are capable of being, so to speak, inoculated with carcinoma. There is ample evidence to prove that many of the forms of disease in which cancer first appears are in the first instance, and even for a long time after their first appearance, simple non-cancerous affections. The excoriation, or ulcer, due to a burn or bite, for example, is certainly not in the first instance cancerous. And the sores which are due to the rubbing and scraping of carious teeth are as certainly not cancerous at the onset. The warty growths, too, in which carcinoma not uncommonly develops on the dorsum of the tongue are at first innocent. It is not, therefore, so important to remember the number of instances in which carcinoma has first appeared in each one of these forms as it is to bear in mind that each one of these forms of disease is capable of becoming carcinomatous. But the great interest in relation to them is to study carefully the manner in which each of them becomes carcinomatous, and, above all, to strive to arrive by the most careful study at the signs by which the actual development of carcinoma in each of them may be perceived.

A blister usually breaks and leaves an excoriation or an ulcer, and a pimple does the same thing, so that, for all practical purposes, blisters, pimples, excoriations, ulcers, and fissures may be considered in the same category. Indeed, were it not for the history given by the patient, the first commencement in a blister or a pimple would scarcely be admitted by a medical man, so rarely does he see this very early

stage. The sore place, no matter what is its origin, is at first generally indolent, or having been more or less acute, becomes indolent, and bears all the signs of a chronic sore, discharging little, paining not much, changing little or not at all. If, as is not unusual, it is seated on the border of the tongue, it often stands out on a slightly raised base, or, if it is a fissure, makes its place known by a slight prominence of that part of the border. Either from ignorance on the patient's part, or from ill-advised treatment, it is irritated, and then slowly enlarges. The surface of the open sore becomes uneven, the fissure becomes deeper and ragged; the surrounding area may become inflamed, but more often is only a little angry. But, and this is one of the most important features in the change, the surrounding area and the base become slowly and almost imperceptibly harder, or being from the first indurated, become more and more hard. It is probable that at this time the lesion has already become carcinomatous, for the disease now presents some important characters of carcinoma, of which induration is certainly one of the most important; and from this time it may rapidly increase, and may unfold one by one such signs of carcinoma as cannot be mistaken. But there is no particular moment, at least clinically, at which it can be said that the change from a simple lesion to a carcinoma has taken place. Occasionally, even at this stage of the disease, the changes in the sore are accompanied by enlargement of one of the glands beneath the jaw; but, although this renders the prognosis of the sore more grave, it does not necessarily mean that the gland is cancerous.

The gradual steps by which a tubercle or warty growth is transformed into a carcinoma may best be studied on the dorsum of the tongue. Lately, I have had two cases under my care, one of a simple warty

growth on the dorsum near the middle line, the other of a larger warty growth in a corresponding situation which had actually become cancerous. Both tongues were the seat of leucoma of many years' standing, but so little troublesome that it had scarce been noticed. Owing probably to some greater irritation than usual, a warty growth had formed in the midst of the diseased area. In the first case the growth measured about five-eighths of an inch in its long diameter (which was parallel with the long diameter of the tongue), by one-third of an inch (Plate VIII., Fig. 1). It stood forth from the surface like a small bean set upon it, but with a slightly papillary or warty contour; it was firm, but elastic, painless, and without induration around its base. There was no ulceration or even excoriation of the surface, although, from its situation, it must have been exposed to frequent injury and irritation. In the second case the growth measured nearly an inch by more than half an inch, and its long diameter was, as in the other case, parallel with that of the tongue. It had probably been, not a very long while previously, exactly like the smaller growth; but now it had an ulcerated surface, it was firmer, and its base was indurated for a short distance in the substance of the tongue (Plate V., Fig. 3). Naturally I did not wait and watch the smaller growth develop into a carcinoma; but, had I done so, I doubt not it would have slowly been transformed into such a growth as was the second. But, seeing that it was increasing, and that the probability was very strong that it would become carcinomatous, I cut it out with a galvano-cautery loop, removing with it an area of the surrounding healthy tissues. In all cases of the transformation of warty into cancerous growths, the increase of size, the ulceration, greater firmness of the tumour itself, and the growing induration of its base, are the principal characters by which the change is announced.

PLATE VIII.

- Fig. 1.—Warty cancerous growth of the tongue of an old man, which had been leucomatous for many years. The warty growth had not been noticed longer than a few weeks.
- Fig. 2.—Protuberant carcinoma of the tongue of a man, with a slough of the central part.
- Fig. 3.—Ulcerated and fissured carcinoma in a man, aged 52, under the care of Mr. T. Smith. The tongue lies within the opened mouth, and cannot be protruded.

Plaque VIII.



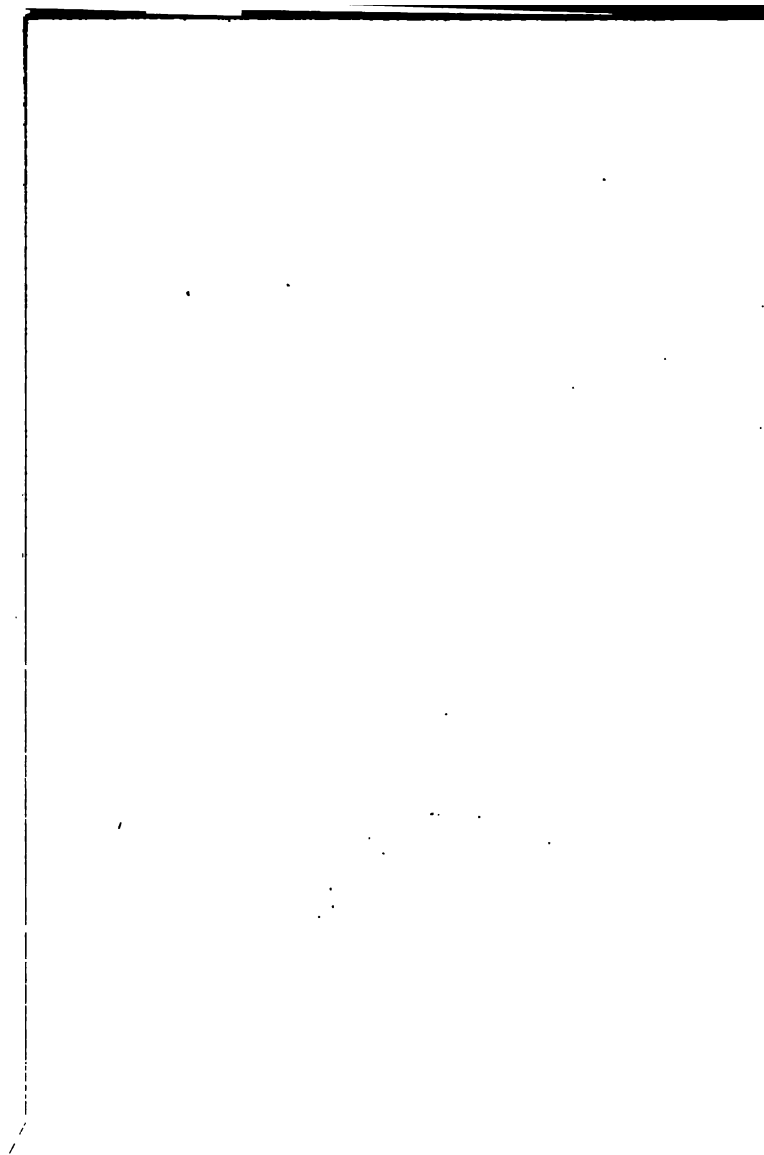
Fig. 1.



Fig. 2.



Fig. 3.



The least frequent commencement of carcinoma of the tongue is that in which it begins as lump or nodule in the substance of the organ, or, to speak more correctly, in the tissues beneath the surface; for although the lump often appears to be situated deeply in the substance of the tongue, and only projects slightly on the surface, there are good reasons for believing that it has originated in changes in the deeper layers of the cuticle. Such a lump or nodule is probably, in many cases, if not in all, carcinomatous from the commencement, and does not become, like the ulcers and warts, inoculated or impregnated with carcinoma. It may, indeed, be said to correspond with the thickening and induration around the base of the ulcer or wart, which has been pointed out as a very significant and reliable sign of the transformation of a simple affection into a carcinoma. And it is due to the same condition, the in-growing of cylinders of epithelium from the cuticle into the subjacent tissues. But, whatever may be the actual pathology of the lump, the manner of its growth and the characters which it develops are in almost every case the same. It slowly enlarges in the substance of the tongue, is very firm, then projects rather more upon the surface, and finally breaks. When the breaking is accomplished, there is not necessarily a discharge, and the formation of a deep and foul excavated ulcer, although this may occur; but a fungous mass may protrude, or the edges of the sore may enlarge, become nodular or tuberoso, and everted.

The frequency with which *ulceration* occurs, and the early stage at which it commences, may be imagined from what has been said. Ulceration is indeed so frequent that it may be regarded almost as a necessary condition of lingual carcinoma. I believe the only cases in which ulceration is absent for some long time after the disease is thoroughly developed, are those in

which it commences in a warty growth. When this is very papillary and rather dry and hard, it may remain long unbroken, and the carcinoma may develop in the substance of the tongue. The lump or nodule underneath the surface is also not ulcerated at first, and may develop to a considerable size before it breaks down, but it seldom remains unbroken for more than a few weeks. And it has been pointed out in the preceding paragraph that this is the least common form of development of lingual carcinoma. In the diagnosis of the disease, the frequency and great importance of ulceration will be again adverted to.

The *objective characters* of the fully-developed disease are very striking, as a rule very unmistakable, and yet widely different in different cases. I have before me, at the present moment, four coloured sketches of lingual carcinoma, made under my direction by Mr. Godart, from cases in St. Bartholomew's Hospital. One of them is of the carcinoma which developed from a warty growth; it has already been described and needs no further mention. The second is taken from a case under the care of Mr. Smith, to whom I am indebted for permission to use it. On the left border of the tongue is a large prominent mass composed of several red raw tubers growing from a constricted base, and in a central depression is a dark greenish grey slough (Plate VIII., Fig. 2). The impression of the whole is of the unfolding of some hideous flower, with its red and fleshy petals turned back, and a horrible mass of corruption hiding its pistil and stamens. Nor is the impression falsified by the foul odour which proceeds from the loathsome weed. For the third I am also indebted to Mr. Smith. The tongue lies at the bottom of the mouth and cannot be protruded, but through the open mouth the whole of the left half of the organ is seen transformed into

a raised, warty, and granular mass of irregular form, covered here and there with sloughs or clotted pus, and broken by deep irregular fissures, furrowing it up in various directions (Plate VIII., Fig. 3). In front the disease is limited by the middle line, but not far from the tip it bulges over on to the right half of the tongue. In the last case the dorsum, except where it was actually invaded by the disease, was natural and thickly furred; but in this case the remainder of the dorsum is perfectly smooth and equally void of fur and of papillæ. The fourth patient was under my own care, and I removed his tongue for what is represented in the picture as a disease chiefly of the left border. It is an oval ulcer without any granulations, but with a smooth glazed surface, which dips in at the centre to form a long and narrow chink. It looks as if the centre were drawn in by some force placed deep beneath the floor of the ulcer. The whole sore is set upon a raised base, over the sides of which the mucous membrane passes to the margin of the ulcer, where it is abruptly limited (Plate VII., Fig. 3). Along the border in front of the disease is a linear superficial ulcer, with irregular notched edges, a simple, indolent ulcer; and the whole of the dorsum is smooth and pearly or opaque white, without fur, and set here and there with raised warty growths, any one of which might by-and-by become cancerous. Other cases, widely differing from these, yet equally typical of carcinoma, are engraved in my memory. About two years ago I operated on a man, whose tongue was scarcely more than excoriated at any part, nor was it enlarged. Indeed, it appeared to be smaller than natural, as if shrunken by the disease like a scirrhus breast. It was smooth and glazed and irregularly furrowed, and almost the whole of the front part was transformed into a hard inelastic substance, almost as hard as

wood and almost as unyielding. So, too, about the same time there was a patient in the hospital under the care of Mr. Willett with a very warty epithelioma of the dorsum of his tongue. The surface was dry and hard, and was at no part ulcerated. The disease might well have been a simple papillary growth had it not been for its indurated base extending into the muscular substance. This patient suffered from the most typical ichthyosis of the tongue, and the inside of the lips and cheeks, that I have ever seen, for the surface of all the affected parts was not merely thickened and harder than natural, but decidedly papillary. Another not uncommon form of carcinoma is that in which a deep and foul ulcer is excavated in the substance of the organ. Its edges are usually raised and everted, and nodular or tuberoso; the interior is occupied by slough and discharge and decomposing food; and the surrounding tissues are infiltrated and indurated.

The description of the fully-developed disease is not exhausted in the account of these cases, but they comprise the conditions which are most frequently observed, and some of those which are more rare. To the symptoms I might have added, in some if not all the cases, *enlargement of the lymphatic glands* beneath the jaw, a very usual accompaniment of the disease in stages so advanced as these. The glands may be so large as to be plainly visible, but more often they have to be sought, and are easily felt on the side corresponding to the affected portion of the tongue.

In the earlier stages of carcinoma the most distressing *subjective symptoms* are usually pain and salivation. The former may be present from the first, may be very sharp or aching or gnawing, and may radiate into the surrounding structures as far as the ear of the same side. Aching pain in the ear is a frequent effect of carcinomas situated far back on the

border or side of the tongue. Salivation is not usually distressing until the disease is more advanced, but in the later stages often greatly aggravates the sufferings of the patient. Neither of these symptoms can be regarded as in any way essential to the presence of a carcinoma; nor, on the other hand, are they proper only to carcinoma; they are even more common in connection with tuberculous ulcers, and are usually produced by these much earlier than by carcinoma. It is surprising how very painless and free from salivation some carcinomatous ulcers are, even when they are so situated that they are constantly irritated or injured. It is, however, very unusual for a carcinoma to run its course without producing both pain and salivation in its later stages.

Although this volume is intended to be devoted to the clinical aspect of diseases of the tongue, it would not be right to pass without notice the *histological* and *pathological* features of such a disease as carcinoma. It has been already stated that the only form of carcinoma which has been found as a primary disease of the tongue is squamous-celled carcinoma or epithelioma, but no reasonable explanation can be offered for the exclusive right which this variety may be said to have established to affect the tongue. There are many reasons why it should be more frequently met with in the tissues of the tongue than any other variety, but there are no apparent reasons why the other varieties never attack the tongue. The minute structure of the disease resembles the minute structure of epithelioma in other similar parts of the body. Columns of epithelial cells, resembling those of the deeper layers of the epidermis of the tongue, and directly continuous with them, grow down into the fibrous tissue of the mucous membrane, and through the fibrous tissue into the muscles. Some of the columns grow perpendicularly downwards for a

considerable distance, although they seldom maintain the same thickness and uniformity throughout; but, as a rule, they diverge, branch, anastomose with one another, and form networks in the deeper structures of the tongue. The columns, or processes, which form these networks are for the most part slender, distinctly composed of altered epithelial cells, and lined as it were with a single layer of the same kind of cell placed vertically to the tissues which surround the column, like the deepest layer of the epidermis, but not nearly so regular or even. The cells of which the columns and various processes of the growing tumour are composed are easily recognised as epithelial, yet they differ in many important respects from the cells which form the normal epidermis of the tongue. They vary considerably in size, and are generally smaller than the cells of the more superficial layers of the epidermis. They vary as much in shape, but are seldom distinctly spindle or caudate. Many of them are frayed out at the borders (*riff-zellen*). Most of them are furnished with nuclei, which are very large in proportion to the size of the cells, and many of them contain two or more nuclei, nucleolated, or are mother cells, filled with two or more secondary cells. The larger columns frequently contain cell-nests or epidermic globes; rounded bodies consisting of one, two, or more altered central cells surrounded by layers of flattened scale-like cells arranged like the scales of a tulip or crocus bulb. Smaller cell-nests may also be seen in the more slender columns, which they sometimes cause to bulge unequally. The columns, or processes, of epithelium are not enclosed in any visible membrane, yet they are almost always clearly separated from the surrounding fibrous or muscular tissues, which are infiltrated with such small round cells as are invariably found in the tissues bordering on a malignant tumour. The general aspect of the

network calls to mind the disposition of the lymphatics, and it is not improbable that it is due to the fact that the development of the columns takes place within, or at least follows the route of the lingual lymphatics. The comparatively early period at which the glands are affected lends colour to such a view.

The process of development of a squamous carcinoma from an inflamed or irritated area has been described by Eve, and it is important to note that there is as great difficulty in deciding histologically the exact moment at which the change is effected as there is clinically. There is no absolute line of demarkation between the two conditions. The one passes imperceptibly into the other. Speaking in general terms, it may be said that as long as the overgrowth of epithelium is limited to the region of the epidermis and the immediately subjacent tissue, the disease cannot be said to be an epithelioma, but when the overgrowth encroaches on the deeper layers of the cutis of the mucous membrane, and, above all, when it extends into the muscles, the disease is clearly epithelioma. The presence of cell-nests, although greatly increasing the probability that the disease is carcinomatous, cannot be regarded as an infallible proof that it is so, for cell-nests, as large and complex as those of epithelioma, may be frequently observed in sections of the healthy mucous membrane. It may, however, be mentioned in relation to this circumstance that the microscopic test in diagnosis is not likely to be rendered useless or deceptive by the discovery of cell-nests in scrapings of simple ulcers, or of the healthy portions of the tongue, for in the scrapings of more than a hundred tongues, healthy and diseased in various ways, but not carcinomatous, I never once saw anything which resembled a cell-nest. The epithelial cells, too, which are scraped in large numbers from the surface of an epithelioma,

are so widely different from those which proceed from other ulcers, and from healthy tongues, that there is no reasonable fear that a single cell-nest, if it should be found, would lead to the belief that the sore from which it came was carcinomatous.

The reason why the inflammatory conditions of the tongue so frequently become cancerous, or leave conditions which, although they are reparatory or actually repaired, become cancerous, and why old ulcers and sores, which have long been scarred over, develop carcinomas from their scars, is, I believe, because they have not the same advantages for complete recovery as similar conditions have in most other parts of the body. They are not allowed to repose and settle steadily down into the tough scar-tissue which is formed in other parts. They are continually irritated by undue movement, by too great heat and cold, by the passage over them of hard or rough or irritating substances. Fresh inflammations are lighted up at frequent intervals, scars are again and again broken, and sore places are re-formed. If sections of the affected areas of such a tongue are examined, even when they are apparently most healthy, the epithelium is found to be unequal in size, irregular in shape, containing vacuoles and larger nuclei than natural, often, indeed, two nuclei in a single cell. The fibrous tissue beneath the epithelium is much more vascular than natural, and is infiltrated to a greater or less degree with small round cells like leucocytes. Everything tells of the continuance of irritation, and the epidermis, more than any other tissue, shows the effects of the continued irritation.

The *course* pursued by an untreated carcinoma depends largely on its situation on the tongue. If it commences on the dorsum it extends into the muscular substance, and probably infiltrates a large part of the tongue before it reaches the adjacent structures, or it

may never reach them. If it is situated on the border, especially just beneath the border, it infiltrates the tongue, and at the same time makes its way along the floor of the mouth to the gum and jaw. The tongue becomes fixed, and can no longer be protruded or even moved much in the interior of the mouth. The bone itself is invaded, grows softer and carious and crumbling, and by-and-by the teeth become loosened and drop out. When the disease commences farther back, it spreads into the root of the tongue, gradually makes its way to the epiglottis, and through it to the larynx; or, and this is perhaps more usual, it grows into the half-arches of the palate and the tonsil, and may even spread up on to the palate itself, or, burrowing deeply, open the tonsillar artery, or the internal carotid, and so prove fatal. Whatever be the course of the disease within the mouth, if it is left untreated *the glands* will almost certainly be diseased. In every case which I have seen or read of in which no operation was performed, the glands were affected. The group of glands depends on the part of the tongue in which the primary disease occurs, but this relation is not in every instance exactly preserved. Nay, it may apparently be departed from so far that a carcinoma of one half of the tongue may be complicated with enlargement of the glands on both sides of the neck. But I believe that the departure from the general rule is only apparent. The disease is not really limited to the parts which are first and most markedly affected, but has spread, perhaps very deep down, through the adjacent parts without altering them to such a degree that the alteration can be discerned by sight or superficial touch. The affected glands are at first small and hard, and freely movable, but as they increase in size grow softer and are less movable, until at length they may distinctly fluctuate, and are quite immovable. Sometimes they form an enormous

mass on one or both sides of the neck ; and I have known them suppurate, and, still more strange, after remaining for a while open and discharging, heal up and shrink, but never entirely subside.

It would be a great advantage if it could be shown that the glands are never affected during a certain definite period after the first appearance of the disease within the mouth ; if, for example, it could be laid down as a law of carcinoma of the tongue that affection of the glands never occurs within six months after its first appearance. Unfortunately, this cannot be done. In some reported cases the glands are said to have been enlarged at the time the disease was first noticed in the mouth, and although it is in the highest degree improbable that carcinoma was developed in the tongue and the lymphatic glands simultaneously, there can be doubt that affection of the glands does sometimes occur extremely early, so early, indeed, that the disease is only recognised as carcinomatous by the enlargement of the glands which is associated with it. It is probable that in the most rapidly progressive cases the glands may be affected within two or three months after the disease in the mouth has become actually carcinomatous. On the other hand, there is quite as good reason to believe that carcinoma of the tongue may exist for six, nine, or even more months before the glands are involved. Again, it cannot be assumed, pathologically, that every enlargement of glands in connection with the early stages of carcinoma is carcinomatous, although, clinically, it is far safer to treat them as if they were so.

As the disease advances, speech and swallowing become more and more embarrassed. When the tongue is bound down to the floor of the mouth, and there is profuse salivation, it is extremely difficult to understand what the patient says. The acts of swallowing after the food has made its way to the back of the

mouth are usually accomplished without difficulty, but the collection of the food from the sides of the mouth and the massing of it into a bolus, are impossible, on account of the immobility of the tongue. Fluids and such soft and coherent solids as jellies are, therefore, more easily disposed of than solids which are masticated. The later stages of the disease are not infrequently complicated by hæmorrhage from vessels opened by the progress of the ulceration; the hæmorrhage may be arterial or venous, and even capillary bleedings may be frequent and troublesome. But death from hæmorrhage, in cases which are not treated by operation, is not by any means the most frequent *termination*. The large majority of patients die through slow exhaustion, increased in some cases, no doubt, by repeated small bleedings. The exhaustion is due to several causes; to pain, to profuse salivation, inability to take sufficient food, sleeplessness, suppuration, and, in some instances, sloughing of the cancer. And when the patient is in a state of extreme exhaustion, the final blow is sometimes administered by a low form of pneumonia which is much more commonly observed in those who die after removal of the disease. It is to be lamented that hæmorrhage is not a more frequent cause of death than is actually found to be the case, for the sufferings of those who die of cancer of the tongue, whether without operation or with recurrence after operation, are in most instances severe.

Patients who are not operated on usually die within a year or eighteen months after the first appearance of the disease; or, if an ulcer has existed for years upon the tongue and has become cancerous, within a year or eighteen months from the time at which the alteration in its characters was observed. The shortest duration of life of which I have any record was in an old and feeble woman of seventy-eight

years, who died five months after the first appearance of disease within her mouth. The large majority of the unoperated die within twelve months.

Dissemination in connection with carcinoma of the tongue is a somewhat rare event. Whether it be that patients die too early for the occurrence of dissemination (a very improbable suggestion, when the rapidity of the dissemination of some sarcomas of bone and of some carcinomas of the breast is remembered), or whether the channels through which dissemination can occur are not easily available (a suggestion not more acceptable than the first, when the situation of the disease and the great vascularity of the tongue are considered), or whether squamous-celled carcinoma originating in the tongue has very little tendency to strike root and grow in any other organs than the tongue and glands, the fact remains that dissemination of the disease rarely takes place. Yet it is possible that it may occur more frequently than is now supposed, for the number of post-mortem examinations of persons who have died from the disease, either unoperated or after recurrence, is small, so that very large conclusions must not yet be drawn upon the subject. It might be thought that the lungs would be more frequently affected than any other organ, on account of the relation which they bear to the part primarily affected. Material may be carried into them by the inspired air or through the medium of the blood. But experience, that is, the experience which we possess at present, shows that the liver is affected as frequently as the lungs, in some cases with the lungs, in some cases alone. If this rule proves, after more extended investigations, to be correct, it can only be supposed that the tissue of the liver affords a more suitable soil for the planting and development of the disease than the tissue of the lungs.

But however this may be, I think we may accept for the present, at least, that carcinoma of the tongue is essentially a *local disease*, certainly not limited to the part in which it takes its origin, but yet surely to that part, and the immediately adjacent parts, and to the neighbouring lymphatic glands. It may cover a wide area, yet it is so far local that in the large majority of instances, if these parts to which it spreads either directly or through the medium of the lymphatics were completely removed, a cure of the disease might confidently be expected. The more limited the area involved in the disease, the more easy and the less dangerous is it to fulfil these conditions; the more widely spread the disease, the more difficult, the more dangerous the operation, until complete removal becomes incompatible with the recovery of the patient. Under these circumstances, the importance of an early diagnosis cannot be over-estimated. If an operation is to present a good chance of complete success, it ought to be performed before the disease has extended far back in the mouth, and certainly before the glands have become enlarged. For, although cases are recorded in which complete recovery has followed operations on very extensive lingual carcinomas, such cases are very rare. And still more rare are those in which complete recovery can be claimed after removal of the primary disease and associated glands. Assuredly no cases so advanced as these can be said to offer a good prospect of complete recovery.

The diseases most *likely to be mistaken* for carcinoma are syphilitic lumps and sores, tuberculous ulcers, simple warty tumours, and simple ulcers and fissures. The resemblance which each one of these diseases at times bears to carcinoma is so great that the difficulty of deciding on the exact nature of the affection is extreme. And it is increased especially

by the fact that certain of these diseases are transformed into carcinoma, and the transition is very gradual and by almost imperceptible gradations.

Secondary syphilitic affections are scarcely ever mistaken for carcinoma, but primary and tertiary affections may both closely simulate it. A primary sore upon the tongue is so rare that the question between it and carcinoma will very seldom arise. It is more likely to occur in younger subjects; it may occur as frequently in women as in men; and it occurs usually at or near the tip of the tongue, while carcinoma occurs almost always farther back along the border. The glands are enlarged from the first, or very early; and, at a period of the disease at which few persons would be inclined to operate, secondary symptoms not uncommonly appear. The conditions of tertiary syphilis require to be distinguished from carcinoma, the unbroken gumma, and, far more frequently, the ulcer left by the breaking of the gumma. The only form of carcinoma for which the unbroken gumma can be mistaken is that in which the disease commences as a lump or nodule in the parts beneath the mucous membrane. Both conditions occur for the most part on the dorsum; in both cases the lump is at first ill-defined, firm, and intimately associated with the tissues of the tongue; in both the progress of the disease is at first slow, and there is no affection of the lymphatic glands; both affections occur more often in men than women, and more often in adults over thirty years than younger. The points of resemblance between the two diseases are many and striking; indeed, I believe it is sometimes impossible to distinguish between them. But the following points in which they do or may differ should be borne in mind. It is not unusual to observe two or more gummata in the same tongue, while it is extremely rare to observe a second carcinoma. There are not

infrequently old scars of syphilis upon the tongue, and associated signs of syphilis in other parts of the body, and there may be a clear history of syphilis. The cancerous lump is not uncommonly associated with a diseased condition of the surface of the tongue, with leucoma or chronic superficial glossitis. On the other hand, it must be remembered that these conditions may be the result of syphilis, and that carcinoma may occur in old syphilitic tongues. It is almost certain, in such doubtful cases, that the effect of treatment will be tried. Iodide of potassium will be administered, and if the dose is large enough, and is borne by the patient, the gummatous lump will speedily shrink and disappear. The question of diagnosis between a carcinoma and a gummatous ulcer is far more often raised on account of the great frequency with which carcinomas ulcerate, and although the resemblance of one disease to the other is often very close, I do not think there ought to be nearly so great difficulty in distinguishing them. Gummatous ulcers are often met with in the central parts of the tongue, cancerous ulcers chiefly at the borders; the edges of gummatous ulcers are usually undermined, those of cancerous ulcers are raised, nodular, and hard; gummatous ulcers are much more often multiple than cancers; gummatous ulcers are rarely so deeply or so widely indurated as cancers; and the lymphatic glands are scarcely ever affected in tertiary syphilis, whereas they are almost invariably enlarged in connection with cancerous ulcers which have existed long. I have purposely mentioned this condition last, and have entirely omitted any statement of the results of anti-syphilitic treatment, because I am firmly convinced that the diagnosis ought to be made in all but the rarest cases long before the glands have become affected, and because I am just as strongly of opinion that the test of treatment

ought never to be applied in any but the earliest stages of the disease. In all cases in which there is actual ulceration, and the question is raised whether the ulcer is carcinomatous, the *microscopic test* should be applied and a scraping of the ulcer should be carefully examined. I believe this method was recommended first by Schuh, for I have found no earlier mention of it than that contained in the "Pseudoplasmen," but it had either never attracted the attention it deserved, or had fallen into disuse until I attempted to revive it a few years ago. Since that time it has been frequently employed by myself and others at St. Bartholomew's Hospital, and generally with admirable results. It has also been employed at one or more of the provincial hospitals successfully, but not nearly so frequently or so widely as I could wish.

If the scraping from the surface of tuberculous or syphilitic, or a simple ulcer, is placed in a tiny drop of water on a glass slide and examined, first with a low, and then with a higher power (a three-quarter inch and a quarter inch, or a four and seven Hartnack will do well), pus and blood corpuscles are observed, with *débris* of food, schistomycetes, and a few normal, or almost normal, epithelial scales. There is nothing peculiar to the disease in either case, nothing by which either of these diseases can be distinguished from the other. In another chapter the question is discussed of the possibility of discovering the tubercle bacillus in scrapings of tuberculous ulcers; but, even if this is possible, the scrapings will require a special preparation. If, now, the scrapings from a carcinomatous ulcer are substituted for those of the tuberculous, syphilitic, or simple ulcers, highly characteristic appearances are observed. Pus and blood corpuscles, *débris* of food and schistomycetes, are still present, but, in addition, or, to speak more correctly, holding the most prominent

place, both in numbers and importance, are many epithelial scales, no longer normal, but differing widely from the normal epithelium of the tongue and the adjacent parts in almost all respects. The cells vary greatly in size and shape; some of them are flattened scales; others are rounded, or oval; others are elongated with truncated or long tapering ends; others, again, bulge at one end and are caudate at the other end. The contents vary as much as the size and shape; the protoplasm is generally granular, often coarsely so. There may be two or three, or more, nuclei, and the nuclei, whether there be one or many, are much larger than those of the normal epithelium of the tongue. The nucleoli are often as large as the natural nuclei. Mother cells are often present, and, not uncommonly, the cell-nests, which are so characteristic of squamous-celled carcinoma.

I have no wish that this method of examination should take the place of a careful examination of the general characters of the disease in any individual instance of carcinoma, nor do I claim for it infallibility. It is quite possible to over-estimate its value, and quite possible to be mistaken in cases in which the appearances are not decided.

But I regard it as a very valuable aid to diagnosis in difficult cases, and not only I, but others of my colleagues, have been able to pronounce with certainty on the nature of more than one case in which there were grave differences of opinion at our Thursday consultations at St. Bartholomew's Hospital. Of course the microscopic test requires some knowledge of microscopy, but a very slight knowledge may suffice, for there are no complicated processes, and a comparison of the appearances observed in scrapings of different ulcers may very readily be made. If the first scraping does not afford results which can be regarded as decisive, a second and a third scraping should be

examined, and the examination should be repeated at the end of a week or ten days. It is scarcely necessary to suggest that the surface of the ulcer should be carefully cleansed before the test is applied. The actual scraping may be made with a blunt knife, and the knife need penetrate no deeper than the surface, or immediately beneath it. As a rule, only the most trivial pain is produced. This method of examination may be employed in all cases in which there is ulceration, but it is useless in carcinomas which are not ulcerated, such, for instance, as the hard warty growths, and the submucous lumps in which carcinoma sometimes first appears. The reason which has led me to speak so strongly in favour of the microscopic test is that I have seen several cases within the past two or three years in which carcinomatous ulcers have been treated as syphilitic ulcers by some of the best clinical surgeons in London, not because they felt sure that the disease was syphilitic, but because they could not feel sure whether it was cancerous or syphilitic. Weeks were allowed to elapse in this manner, until the ulcer had clearly shown that it was not in the least affected by anti-syphilitic treatment, and perhaps had implicated the lymphatic glands. The period at which it should have been removed was allowed to pass, and the operation was undertaken when the prospect of ultimate success was exceedingly small, and when the patient was weakened by the use of large doses of iodide of potassium, and, in one case, by mercurial salivation.

The diagnosis between tubercle and carcinoma is, in many cases, not less difficult than between syphilis and carcinoma, but the more widely-spread knowledge of tuberculous ulcers which prevails now than formerly has rendered the number of mistakes in diagnosis fewer. Primary tuberculous ulcers of the tongue are rare, and the associated signs of tubercle in secondary ulcers ought to suggest the gravest doubts of carcinoma,

even when the symptoms are in other respects suggestive of it. In the section on tuberculous ulcer the diagnosis of carcinoma and primary tuberculous ulcer is discussed, and it is there mentioned that all the primary tuberculous ulcers described and examined by Nedopil had been cut out, under the impression that they were cancerous. To this I may add that the manner of dealing with them thus summarily was the best that could be devised, both for tubercle and cancer, and if the same decisive method were adopted in the case of all doubtful ulcers of the tongue, there would be a striking diminution in the number of deaths from lingual carcinoma.

The difficulty of distinguishing a carcinomatous from a simple warty growth is greatly increased by the fact that the latter usually passes slowly into the former. The disease begins as a simple warty growth and the warty growth after a time becomes almost imperceptibly a carcinoma. It has been already pointed out that the softer growths almost invariably ulcerate, and that both the softer and the harder warts become more fixed upon the tongue, while the base and the surrounding parts become indurated. And I know no surer signs than these conditions of ulceration, fixation, and induration, of the malignant change which the innocent disease is undergoing. The microscopic test is less applicable to warty epitheliomas than to any others, except those which commence as submucous lumps. It cannot be employed at all, unless the surface is ulcerated; for the scraping of an unbroken warty epithelioma is in no way different, in the large majority of instances, from that of a non-carcinomatous warty growth.

The same difficulty which attends the diagnosis of a warty growth is met with in distinguishing between a simple ulcer and a carcinoma, for the former passes slowly into the latter, and the exact period at which

the transformation is accomplished is not marked by any certain and clearly discernible sign. The age at which the ulcer occurs, the extent and intensity of the surrounding induration, and especially the increase of induration, may do much to make the diagnosis plain. And the fact that the ulcer remains stationary, or actually increases after the cause which produced it has been removed, is another important sign. But, with all care, it not infrequently happens that a simple or traumatic ulcer has already for a long time been carcinomatous before the fact is appreciated; and it is only when the lymphatic glands are decidedly enlarged that the suspicion of the change is turned into certainty. It is in cases of this doubtful character that I believe the microscopic test will prove of great value. It should be employed from time to time, say at intervals of a week, and the results should be carefully compared. If the scraping is mounted in a weak solution of carbolic acid, and the covering glass is surrounded with a layer of oil or brunswick black, or one of the common mounting materials, the slide may be easily kept for several weeks.

With regard to the general subject of the early diagnosis of carcinoma of the tongue, I am glad to believe that the attention of the profession and of the public is much more keenly directed to the importance of it than was the case even a few years ago. Until the last few years the practice was almost universal in the profession to regard a carcinomatous ulcer as probably, then possibly, an ulcer of some other kind until it was very clearly proved to be a carcinoma by unmistakable signs, such, for instance, as the implication of adjacent structures, the adhesion of the tongue to the floor of the mouth, and the enlargement of lymphatic glands. I do not mean to say that all the cases which were seen by surgeons of large experience attached to hospitals were treated in this fashion;

yet even among them there was a fatal tendency to do what is commonly termed, "give the patient a chance," by treating the disease on the assumption that it was syphilitic or simple. Gradually medical men are coming round to the belief that to "give the patient a chance" means, under such circumstances, to "give the carcinoma a chance" of obtaining a firm and irresistible hold, and to take all chance of complete recovery from the patient. Without doubt the tendency which now prevails among surgeons to operate early, and even in doubtful cases, depends in large measure on the greater knowledge which we have of good and safe methods of removing the whole or a part of the tongue. The operation, especially when only a segment of the organ is removed, is no longer regarded as a very difficult or very dangerous operation. Owing partly to this circumstance, partly to the fact that practitioners of all kinds are beginning to recognise the extreme danger of delay in doubtful cases, I have observed of late a disposition to recommend the removal of what would formerly have been regarded as insignificant warts and lumps and sores. In my own practice, and in that of my hospital colleagues, several cases of this kind have occurred within the last year or two. An almost trivial operation has been practised, and the fear, nay, sometimes almost certainty, of a horrible death from lingual cancer has been averted.

There is only one *prognosis* in all instances of unoperated lingual carcinoma, death; and I am sorry to say that the prognosis is the same for a large proportion of cases treated by operation when the characters of the disease are unmistakable. The manner of death, and the duration of the disease, in unoperated cases, have already been discussed, and it now remains to consider the value of operation as a means of saving or prolonging life, or of saving pain.

First, does complete recovery ever take place after an operation for an undoubted carcinoma of the tongue? Before this question can be thoroughly answered, it is necessary to state that recovery is assumed to be complete if the patient is quite well and free from all signs of disease a full year after operation. Whether this definition of complete recovery is accepted or not, there is no doubt that the answer to the general question must be in the affirmative, for there are records of the good health of patients who were relieved of undoubted carcinomas by operation many years after the performance of the operation. But the number of cases of complete cure depends largely on the period of sound health which is insisted on as evidence of complete cure. In the discussion of this question I prefer to use my own tables to those of other authors, for they are, I believe, the only tables in which the character of the disease was in every instance proved by a microscopical examination of the tumour. Of the eighty cases which the tables contain, seventy were treated by operation, and there are records of the good health of seven of the patients more than a year after the performance of the operation. An eighth case may be claimed as a case cured, for the patient died four years after the operation, of a disease quite unconnected with the disease of the tongue, and her tongue was quite well at the time of her death. Since the tables were published, I have heard of the death of one of the "cured" patients, a man on whom Mr. Rushton Parker performed a very extensive operation for the removal of a very extensive disease. This man was well eighteen months after the disease was removed, but shortly afterwards it reappeared, and he was dead or dying when the last report was received. To make up for this loss I am in possession of intelligence of the good health of two of the

patients who could not at that time be classed as cured (Nos. 5 and 8 in the tables), for the operation had been performed only six months previously in the first, and the further history of the second was not recorded. Both patients were treated by Mr. Christopher Heath, and when he last heard of them or saw them, they were quite well, one eleven years after the operation, the other at least five years after operation. There are thus nine persons of whom the records tell that they were free from disease at least a year after operation. The periods during which they were respectively observed were seventeen months, twenty-one months, two years, three to four years (2 cases), four years (patient died of another disease), five years, six years, and eleven years. Of one of the patients, who was observed between three and four years after the operation, and of whom the last record was made in 1880, there is certain information that he is still alive, although I cannot say whether his health is good and he is free from carcinoma. Nine cases in seventy gives a percentage of nearly thirteen; but I am inclined to doubt whether a larger number of cases would afford so good a percentage of recoveries. Barker, who does not appear to be acquainted with my tables, found seventeen recoveries in 170 cases, a percentage of ten, but the cases were not all certified by a microscopical examination. Nevertheless, it may be taken for granted that a saving of ten lives in the hundred may fairly be claimed for operation in cases of lingual carcinoma. And the operations were not all performed in the most favourable cases, or under particularly favourable conditions. In the case of the last patient of whom I have spoken, the disease commenced as a lump in the middle of the dorsum, and was of large size when all the anterior portion of the tongue was removed; in another case the disease was so extensive that a portion of the lower jaw was

obliged to be taken away; and in more than one case the glands were already enlarged, and were removed at the time of the operation. At the first sight a percentage of ten or twelve appears to be very small, but when the situation of the disease is considered, its rapid growth, the speedy implication of the neighbouring structures, and the early affection of the lymphatic glands, a percentage even so small as this must be accepted as a triumph of surgery. But how much larger might be the percentage of complete recoveries if the operations were performed at a much earlier date! And in the presence of a growing knowledge of the early stages of the disease, and of the steps through which simple affections pass to become carcinomatous, how much better a result may be expected in the future than that to which we now can point!

Secondly, is life prolonged, and is the patient spared pain and distress by operations which do not result in complete recovery? If the disease recurs in the tongue, and cannot be removed by a second operation, the life of the patient is perhaps prolonged; but this can scarcely be counted as a gain, for it is only prolonged in order that he may endure all the pain and distress which he would have had to suffer if no operation had been performed, and the interval of ease is in such cases too short to compensate for the pain and fear of the operation. But if the disease does not recur within the mouth, and the patient dies from the effects of secondary affection of the lymphatic glands, there can be scarcely any reasonable doubt that the manner of death is less painful and hideous, and that, in the large majority of cases, life is prolonged for several months. The gain of life by operation is variously estimated by different authors at from five to eight months.

In all these and similar considerations it must not be forgotten that the operation itself is not devoid of

danger. Eight of the seventy persons in my table died from causes directly connected with the operation, a mortality of more than ten per cent. And when a larger number of cases is analysed the percentage of deaths may be found to be much larger, a circumstance which may be accounted for by the fact that most of the larger tables contain cases dating back many more years, to a period when removal of the tongue was not so safe or so successful as it is at present. It is found, for example, that the results of operations for removal of the whole or half of the tongue are much better for the cases of the last ten years than for those of the previous ten years. Barker shows that the improvement in this respect is manifest even for the last five years over the five years preceding it. Yet I suspect that the operations which are performed are much more extensive now than they used to be, and that the operations of the last five or ten years include many more operations for the removal of lymphatic glands than formerly.

The subject of *treatment* may very well be divided into two parts: the first, the treatment of the pre-cancerous conditions which threaten to become cancer; the second, the treatment of undoubted cancer.

The treatment of the various pre-cancerous conditions which have been alluded to will be found in the chapters in which these conditions are described at length, but the general principles of treatment which should be adhered to in every instance in which one or other of them threatens more emphatically to become cancerous may be considered here. For all indolent sores which have existed for some time, especially for those which have indurated bases, and which occur on the borders of the tongue; for all indolent sores which form in areas of leucoma or chronic superficial inflammation; for all warty growths

which develop on the dorsum of the tongue in the midst of similar diseased areas, the rules of treatment must be imperative. Every source of irritation must be carefully sought for and, if possible, removed. Every application must be as soothing as possible. The application of caustics must be avoided. And the disease must be removed if it does not speedily improve under treatment. It need scarcely be said that every care should be redoubled if the patient is a male, but that the precautions are not so needful in persons under five-and-twenty years of age.

To take each one of these matters in turn. The most common sources of irritation are rough and carious teeth, and stumps of teeth, and ill-fitting plates of teeth. It is absolutely essential that every error connected with any of these conditions should be as speedily as possible corrected. In the large majority of cases the result which follows on the correction more than justifies what has been done. Rather more than a year ago, a housekeeper, forty-seven years of age, was sent to me from Shropshire by Mr. Tredinnick for the treatment of an ulcer of the tongue, which he suspected was already cancerous. It had been noticed only a few weeks, was produced by the grating of the stump of a tooth, and was associated with a pain in the ear of the corresponding side. She had rubbed the sharp edge of the tooth down with a thimble, but the sore would not heal, although the pain had been less since the tooth had been filed down, and since Mr. Tredinnick had given her a soothing lotion. On the right border of the tongue, opposite a prominent second lower molar and the stump of the third molar, was a smooth, indolent ulcer, oval, superficial, with very few or no granulations, placed on a slightly raised base, which was a little indurated for the third of an inch around the ulcer. One of the submaxillary lymphatic glands was enlarged. The ulcer was just in that

doubtful stage in which one is not sure whether it is solely due to the rubbing of a rough stump, or whether it has already been transformed into a carcinoma. I scraped the surface of the sore, and examined the scraping carefully with the microscope, but found nothing which could lead me to believe that carcinoma was yet developed. I therefore ordered that not only the stump, but the prominent second molar, should be removed, and gave the patient a solution of chromic acid (ten grains to the ounce of water) to paint on the surface of the ulcer three or four times every day with a soft camel-hair brush. The treatment was religiously carried out, with the result that in a week the sore was well, the induration had disappeared, and the enlarged lymphatic gland had nearly regained its normal size.

Again, quite lately I have seen an old man in the wards of one of my colleagues at St. Bartholomew's Hospital with a tiny ulcer rather far back on the left border of his tongue. It was not larger than a small split pea, was quite indolent, and rested on a raised hard base, which was very well defined. It had been there a few weeks, and was evidently due to the rubbing of a tooth. It was not examined by the microscopic test, but its general characters were such as to lead to the belief that it was already carcinomatous. Yet within a few days after the removal of the offending tooth the ulcer had healed, and its hard base had nearly disappeared. Chewing tobacco and smoking must be forbidden, and if the patient will persist in smoking, the cigar or pipe must be held on the side opposite that on which the disease is, and the mildest tobacco should be smoked through a pipe with a long stem, or the cigar or cigarette should be smoked through a holder. Strong wines and spirits must not be drunk, unless they are greatly diluted, or unless they are drunk through a tube which prevents them

from coming in contact with the affected part of the tongue. If it is possible to dispense with them they should not be taken. The food which is eaten must be neither very hot nor icy cold, neither very sour nor very sweet, neither very sharp nor highly spiced. Minced meats, not highly flavoured; beef tea, mutton broth and chicken broth, meat and light wine jellies, sopped bread, milk, cocoa, weak tea and coffee, are the solids and liquids which are fittest for these doubtful cases, especially where there is much chronic superficial inflammation of the tongue. It may seem absurd to keep a patient on such diet, and under such stringent regulations as these for what appears to be a trivial affection. But the practitioner must always bear in mind the horrible fate which may befall his patient if the trivial affection becomes carcinomatous, and must, without unduly alarming the patient, make him sensible of the danger which he runs, and of the extreme importance of preventing an evil so difficult and dangerous to cure.

The applications to the wart or sore must be as unirritating as possible; such, for example, as honey and borax, solutions of chlorate of potash, pastilles of guimauve, and the like. These may appear to be very mild measures to employ for the cure of obstinate sores, but the majority of the sores, however obstinate they may have been, will get well with the mildest application when the source of irritation has been removed. For those sores which are still slow in healing, even when the induration or other alarming symptoms have disappeared, weak astringent lotions may be used, alum, tannic acid, sulphate of zinc, and, one of the best of all, chromic acid, applied as it was in the case of the housekeeper of whom I spoke above.

Avoid caustics; and again I say, *avoid caustics*. If there is one means more certain than another to transform a simple into a cancerous sore it is the use

of caustic. Hutchinson has traced, on more than one occasion, the gradual formation of a cancer from a simple wart or sore, and has shown how large a part caustics play in the "breeding" of such cancers. Nine times out of ten the surgeon who asks what has been the treatment in the early stages of a case of cancer of the tongue receives for answer, either from the patient or his medical attendant, "caustic." The complete destruction of a wart or sore by the actual cautery, or the galvano-cautery, may undoubtedly be good treatment, but the application of caustic, such as solid nitrate of silver, to the surface of a wart or sore is absolutely indefensible. The disease is not destroyed by the caustic ; it is merely irritated.

Last, a warty growth or sore which does not speedily give way to a simple treatment after the removal of every visible source of irritation, should be itself removed without delay. A fortnight is quite long enough, in the very large majority of instances, to observe the effect of the removal of irritation, and of simple soothing treatment. At the end of that time, if there is no improvement, or if the more suspicious symptoms remain unaltered, the disease should be removed. The operation in almost all such cases is quite trivial, for it suffices to remove the disease with a very narrow margin of the surrounding tissues. The removal of an enlarged gland in cases in which the whole duration of disease is not more than a very few weeks is seldom necessary ; it is almost surely enlarged by irritation, not by the entrance into it of the cancerous germs.

I am not so sanguine as to believe that carcinoma of the tongue can be in every case absolutely prevented by timely attention to doubtful warts and sores, and by the careful employment of such means as those which have been indicated ; but I am quite sure that many persons might be saved from lingual

carcinoma by the careful management of these pre-cancerous conditions, and by the timely removal of those of them which do not quickly mend. The hope of surgery in regard to lingual cancer in the future lies, I am certain, more in prevention than in cure. However skilful we become in operating on the tongue, however carefully and successfully we dress and treat our wounds, complete cures of thoroughly-developed carcinomas of the tongue will be comparatively few. But there is no part of the body in which at present the pre-cancerous conditions are so well marked as in the tongue, no part of the body, therefore, in which the chances of attacking the disease before it has ripened into cancer are so favourable. As these conditions become more widely understood, and are more easily recognised, especially by men in general practice ; and as the best methods of dealing with them, and the importance of removing them at a very early date, if they do not yield to treatment, are generally appreciated, so we may expect to see a diminution in the number of cases of lingual carcinoma, and in the mortality from the disease.

The treatment of undoubted cancer by operation, the various operations for the removal of the tongue, the after-treatment, the removal of lymphatic glands, operations for recurrent disease, and the treatment of those cases in which no operation is practised, or in which there is recurrence of the disease which cannot be attacked by operation, will be considered in the following chapters.

CHAPTER XVIII.

TREATMENT OF CANCER OF THE TONGUE BY
OPERATION.

Heath's method of arresting hæmorrhage—The removal of Warts and Sores—Removal of the Tip—General Measures and Instruments necessary for Operations on the Tongue—Removal of Anterior Half of Tongue—Removal of the whole Tongue—Removal of Disease extending into floor of mouth and jaw—Removal of Lymphatic Glands—Table of Operations.

BEFORE the various operations for the removal of a part or the whole of the tongue are described, it may be well to draw attention to the very excellent suggestion of Mr. Christopher Heath for drawing forward and controlling the bleeding stump. It is that the stump can be brought forward by hooking the finger round the base of the tongue in the pharynx. The value of this suggestion has been proved in many cases of sudden and sharp hæmorrhage from the lingual artery after the removal of one half or the whole of the tongue. Within the last few days I have seen it put in practice by one of my colleagues, when a ligature which had been applied on the lingual artery far back in the mouth slipped. The mouth instantly filled with blood, and blood poured out on the table. But the hæmorrhage was instantly and almost entirely arrested by pressing the root of the tongue forwards by two fingers passed down behind it into the pharynx, and the vessel was easily seen and secured.

I have mentioned this manœuvre first in order to give it the prominence which I think it merits. It ensures a command of a bleeding stump which may

be of the greatest value to every operator, but above all to young operators who have not yet attained to the coolness and steadiness so admirable in such emergencies.

The removal of wart and sores which are not certainly carcinomatous.—Since so much weight has been laid on the importance of the early removal of those affections which, although they are not yet certainly cancerous, threaten speedily to become so, it is desirable to devote a few lines to considering the method of removing them. These minor operations may easily be practised by most medical men, and do not render it necessary that the patient should be placed under the care of an operating surgeon, unless, indeed, the disease is situated very far back upon the tongue.

For small warts seated on the dorsum, it suffices to seize the wart firmly at the base, and to snip it off with a pair of curved scissors. It is not needful to remove more than a very narrow area of the surrounding tissues. The hæmorrhage is very trivial, for the main artery runs very deep down below the surface, and there are no vessels near the surface from which serious bleeding can take place. It must, however, be borne in mind that congenital warty growths, if they are derived from altered nævi, are exceedingly vascular. A case of this kind, in which removal with the scissors was followed by severe and repeated hæmorrhage, has been mentioned in a previous chapter. Warts which take their origin in a congenital defect must therefore be dealt with much more cautiously than those which develop late in adult life. The slight hæmorrhage which follows the removal of a small wart may be arrested by the application of ice, or the use of very cold water, or by the pressure of a small lint pad held for a short time on the wound with the finger.

Warts and tiny sores seated on the borders may be treated in a similar manner, and there is no greater fear of bleeding from them than from those on the dorsum.

The removal of rather larger warts or warty growths, whether they are seated on the dorsum or the borders, may be accomplished in the same way with scissors; but greater precautions should be taken, and greater care must be exercised, for, speaking in general terms, the larger the growth, the greater the danger of its being carcinomatous. It is therefore desirable to remove rather a wider area of the surrounding tissues. The bleeding will be much more abundant than for the tiny warts, but there is never very severe hæmorrhage or hæmorrhage which cannot be arrested by such means as those which have been indicated, for the wound will not be near the lingual artery even if more than a third of the thickness of the tongue is cut. Nevertheless, it is well to administer chloroform and to have the mouth kept widely open during the performance of the operation by a strong gag, and to draw the tongue out by means of a ligature passed through the tip. The operation can then be deliberately and very thoroughly performed, and the tiny vessels which are seen bleeding can be secured with catgut ligatures. I have lately removed two warts from two men's tongues with the galvanocautic loop. The warts were each about the size of a horse bean, and seated on the fore part of the dorsum. The battery which I use in the department for diseases of the larynx, for touching granulations, and removing nasal polypi, was employed. The removal was very thoroughly performed, and there was no bleeding, although a little oozing took place from one of the wounds a few days after the operation. The hot wire loop possesses the twofold advantage that there is no bleeding during the operation, and

that it destroys the tissues for a short distance around the base of the disease. If there is any difficulty in retaining the tumour within the loop a curved needle passed through the tissues beneath it will ensure complete removal. The heat employed should not be more than a dull red heat; a white heat will often cause hæmorrhage.

Sores, especially those seated on the borders, may be removed in the same way, either with the scissors or with the galvano-cautery, the tongue being drawn forward out of the mouth, and the mouth being kept open with a gag.

Removal of part or the whole of the tip.—By the tip that part of the tongue is understood which is in front of the reflection of the mucous membrane on to the floor of the mouth. Practically there is a great difference in the difficulty and danger of removing the tip, and in removing the parts situated farther back, for, in the former case, the reflection of the mucous membrane is not divided, and the larger vessels and extrinsic muscles are not interfered with. But in the removal of the tip it is very desirable, if it is not absolutely necessary, to make the same preparations for the operation, and to carry out many of the methods which are employed when parts of the tongue farther back are removed. These will, therefore, be described in this section, and will not again be described in detail in the description of other operations.

The anæsthetic most suitable for operations on the tongue is chloroform, since it can be administered without a face-piece, and anæsthesia can be kept up by means of the mouth tube and air ball recommended by Mills. Bichloride of methylene would perhaps answer as well if administered in the same manner, but I have had very little experience of it, and therefore prefer chloroform. The patient should lie on a

table the height of an ordinary operating table or a little lower, and with the head well thrown back by means of a pillow placed beneath the neck, so that, with the light shining directly into his mouth, there may be as thorough a view of the interior of the mouth as possible. The mouth must be kept open

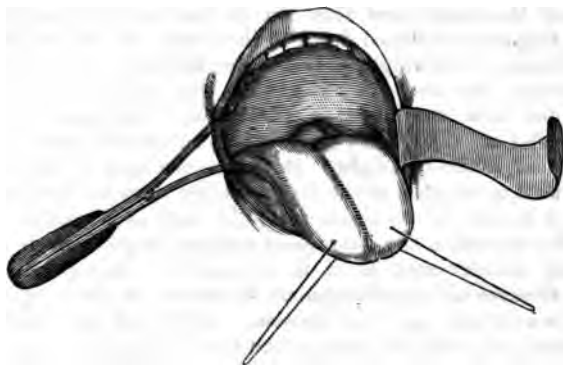


Fig. 1.—The Mouth widely opened by Coleman's Gag and a Copper Retractor, and the Tongue drawn out by two Cords passed through the Tip.

with a gag, and of all gags for the purpose, Coleman's is, I think, the best; but it should be made much stronger than it is generally made, or it will yield to the pressure of a strong pair of jaws. The teeth should be protected from injury by the metal of the gag by covering the parts which support the teeth with pieces of indiarubber tubing drawn over them. If more room is desired than the one gag gives, and if the cheek is not split or the operation done from the outside, the other corner of the mouth may be held back with an ordinary copper retractor. In order to ensure complete quietude of the patient during the operation, the hands should be kept down by a bandage

passed round each wrist and joined beneath the body (not beneath the operating table), and a strap should be fastened round the table and the thighs immediately above the knees. The reason for fastening the hands together beneath the body rather than the table is to allow the patient to be turned over as far as is necessary on one side to allow blood to run out of the mouth, and this can be done even when the thighs are fastened down to the table. If the binding down of the thighs prevents the turning over of the body, the use of a strap, with the buckle upwards, and near the operator, allows him in a moment to relax it. Day-light, when it is good and can be easily used, is the best light. But when the light is as bad as it is on some of the foggy winter days in London, it is safer to use an electric light, such as is sold now by several of the instrument makers, or gas-light if it is concentrated as it is in most of the operating theatres of large hospitals. If neither of these lights is available, and it is necessary to perform the operation on a dull day or at a bad time of day, a very good light may be obtained by reflecting into the mouth the light of a good duplex paraffin lamp, by means of a laryngeal mirror fixed on the forehead of the operator. For all the more extensive operations at least three assistants are necessary, a chloroformist, a person to hold the gag and steady the head, and some one well accustomed to operations to assist the operator. It is well to have an extra hand to look after the instruments and offer aid if it is suddenly required.

Of course, all these precautions are not essential in removing the tip of the tongue, nor is it necessary to employ so many assistants for so small an operation. I have described all the machinery required for a large operation; but I would venture to advise that too many, rather than too few, precautions should be taken in any operation of the tongue. If all goes

well, it can only be said that more care was exercised than was necessary ; but if an accident happens and there is hæmorrhage, the extra precautions or the extra hand may make all the difference to the patient's life.

The instruments required for the operation through the mouth, when no incisions are made in the external parts, are :

A curved needle on a handle, sharp ;
 A long, probe-pointed bistoury ;
 Blunt-pointed scissors, straight and curved ;
 Artery forceps, short and long ;
 Two or three pairs of clamp-forceps ;
 An écraseur, or two écraseurs, mounted with thick cord ;
 Silk or catgut ligatures ;
 Stout silk or whipcord ;
 Coleman's, or some other, gag (*see* Fig. 1) ;
 A large copper retractor.

When the cheek is split, there are required, in addition

Two hair-lip pins ;
 Silver wire, or horsehair, for sutures.

If the lingual artery is tied in the neck, or the glands are removed,

A scalpel,
 Dissecting forceps,
 Small retractors,
 A blunt aneurism needle,
 Small vulsellum forceps.

If the jaw is divided, or a portion of it is removed,

A keyhole saw,
 A Hey's saw,
 Strong bone forceps,
 A drill for bone,
 Very stout silver wire.

If the disease is situated very far back on the tongue,

and there is likely to be difficulty in keeping the écraseur well behind it,

Two or three curved blunt needles, either with or without handles.

If the floor of the mouth is implicated, and the bone slightly affected, or there is likely to be much oozing,

The thermo-cautery, or the actual cautery ;
A bone-gouge.

If tracheotomy is performed before the operation, or in case it should be required during the operation on account of hæmorrhage, etc.,

Tracheotomy hooks, blunt and sharp ;
Durham's tube with Trendelenburg's tampon.

The tip may be removed, in whole or part, with the scissors or the knife ; the écraseur is not necessary. The patient having been placed under the influence of chloroform, and the mouth opened with the gag, the tongue is drawn forwards out of the mouth and kept out by means of a pair of artery forceps, or, better still, by passing a stout silk ligature threaded on a sharp needle set on a handle through the front part of the tongue on one side of the middle line. A second similar ligature is passed through the other half of the tip. The ends of each ligature are fastened together.* Stout silk is used because it is not likely to cut through the substance of the tongue when strong tension is put upon it. The tip of the tongue is now drawn forward by the operator and his assistant, each holding one of the silk ligatures. The tongue is split in the middle line by incising the mucous membrane on the dorsum and under aspect, then tearing through the muscular tissue by separating the two halves with the fingers as far back as is

* See Fig. 1, page 307.

necessary. Each half of the tip is cut off separately with the scissors or knife, and one or two tiny vessels in each half are usually ligatured. The vessels of the first half should be ligatured before the second half is cut, and the cutting of the second half may be so slowly done that the vessels may be ligatured before the piece comes away with its silk ligature; it should be cut from the centre towards the border. The cleavage, or splitting of the middle of the tongue, produces no troublesome hæmorrhage even when it is carried back to the root.

Removal of the anterior half of the tongue.—This may be done with ease from the mouth without splitting the cheek, or in any other way enlarging the orifice of the mouth. I will describe what I believe to be the three best methods of performing it.

Removal with the scissors by Whitehead's method is described by himself in the following words. "The operation is conducted after the following simple manner:

"1. The mouth is opened to the full extent with Mason's or any other suitable gag, the duty of attending to this important part of the operation being entrusted to one of the two assistants required.

"2. The tongue is drawn out of the mouth by a double ligature passed through its substance an inch from the tip. This ligature is given in charge of the second assistant, with instructions to maintain throughout the operation a steady traction outwards and upwards.

"3. The operator commences by dividing all the attachments of the tongue to the jaw, and to the pillars of the fauces, after the manner suggested by Sir James Paget, with an ordinary pair of straight scissors.

"4. The muscles attached to the base of the tongue are then cut across by a series of successive

short snips of the scissors, until the entire tongue is separated on the plane of the inferior border of the lower jaw, and as far back as the safety of the epiglottis will permit.

"5. The lingual, or any other arteries requiring torsion, are twisted as divided. It is generally found that a moment's pressure with a small piece of sponge, held in sponge forceps, suffices temporarily, if not permanently, to arrest any bleeding; it is, however, regarded as desirable to twist, either immediately, or after the tongue is removed, every bleeding vessel.

"6. A single loop of silk is passed by a long needle through the remains of the glosso-epiglottidean fold of mucous membrane, as a means of drawing forwards the floor of the mouth should secondary hæmorrhage take place. This ligature may with safety be removed the day after the operation, and, as it is invariably a source of annoyance to the patient, it is always desirable to adopt this rule.

"The after treatment consists in feeding the patient for the first three days absolutely and solely by nutritive enemata; satisfying thirst by occasionally washing out the mouth with a weak iced solution of permanganate of potash; forbidding any attempt at speaking, and requiring that all the wishes of the patient shall be expressed in writing, or by signs. The difficulties and dangers of the operation are few, and more imaginary than real. Hæmorrhage, the *bête noire* of most surgeons who contemplate removing the tongue, is in reality easily controllable, and frequently trifling. I have twice removed the entire tongue without having to secure a single vessel, and more than once have only had to twist one lingual artery."

Removal with the *écraseur* by Marrant Baker's method is described by the author in the *British Medical Journal* (1883, ii., 765) thus: "A gag

having been introduced, and any jagged teeth likely to be in the way of the operator having been extracted, two threads are passed through the tongue, about an inch behind the tip, and half an inch on each side of the middle line. One of these looped threads is now given to an assistant to hold tightly; and the operator, holding the other, scores the dorsum of the tongue with a blunt-pointed scalpel, exactly in the middle line, extending the 'cut' well through the mucous membrane into the surface of the muscular substance, and dividing the tip freely down to and through the middle line of the frænum. The cut may be extended back as far as the operator deems necessary, say, for an inch beyond the level of the posterior edge of the cancer. He then takes both threads, one in each hand, and, using the forefingers much in the same way that he would for tightening a ligature on a deep vessel, he splits the tongue into two halves. At this stage of the operation the hæmorrhage is usually very trifling if the operator has taken care to cut along the middle line; and, even if he is a little to one side or the other, the divided vessels are small and easily ligatured. The thread which tethers the diseased half of the tongue is now pulled quite taut, either by the operator or his assistant; while the former, with blunt-pointed scissors, snips, as far as he considers necessary, the mucous membrane and muscular fibres which connect the tongue with the anterior part of the lower jaw behind the symphysis, after the manner suggested many years since by Sir James Paget. He then 'runs' the scissors along the floor of the mouth, immediately beneath the mucous membrane, keeping close to the ramus of the jaw, until he has cut, if possible, to a point beyond the level of the posterior edge of the cancer. Then, with his forefinger and occasional snips with the scissors, he frees the tongue as completely as may be requisite from its attachments

in front and at the sides, and in the floor of the mouth. The chief point aimed at, of course, at this stage of the operation, is to free the diseased half of tongue in such a manner that it may be surrounded by the loop of the *écraseur* at some distance behind the disease, and without danger of the cord slipping forward so as to embrace the neighbourhood of the cancer, and much less the cancer itself.

“This is by far the most important part of the operation ; and should the surgeon be in doubt about his having sufficiently freed the tongue with his finger, he should again introduce the scissors, and cautiously divide any muscle or other structure which prevents the due loosening of the tongue. Having now freed the tongue sufficiently, one, and sometimes two, blunt curved needles are now made to perforate it at some distance, an inch, or more if possible, behind the cancerous mass ; and the loop of the *écraseur* is now slipped over the diseased half of the tongue, and adjusted behind the needles. With the screwing-up of the *écraseur* this part of the operation is now completed, with the exception that, very commonly, at least when whipcord is employed, the main vessel and some other tissue, perhaps nerve fibres, are pulled through the end of the *écraseur* after the softer substance of the tongue has been crushed through. Under these circumstances a double ligature should be passed with an aneurysm needle, and the strand of vessels and nerves divided between the two knots, when the *écraseur* will, of course, at once come away, and the main vessels will be left on the face of the stump securely ligatured.

“In the event of both sides of the tongue requiring removal, an *écraseur* should now be slipped over the other half after it has been sufficiently freed from its attachments, and the diseased part guarded by a blunt-pointed needle. This part of the operation, on

account of the space gained by the removal of half the organ, can be performed with comparative ease and rapidity. . . . With regard to the *écraseur*, the choice of instrument is a matter of secondary importance; at the same time, it is not unimportant altogether. The instrument which I have been in the habit of using of late is of very moderate length and weight, and is somewhat curved on the flat near the end. The pattern is almost identical with that which my colleague, Mr. Harrison Cripps, has recommended for removal of the lower end of the rectum; but I prefer working both limbs of the looped cord at the same time, and therefore have a double instead of a single hook, and have no perforations at the shoulder of the instrument. The material of the cord, which I much prefer to any other, is a thick kind of whipcord. It is more easily manageable than any kind of wire, and very much more than the linked chain. For some years past I have not met with any case in which the cord has broken under the strain of cutting through the tongue; nor have I ever had, so far as I can remember, any case of recurrent hæmorrhage after the operation. This last advantage I am inclined to attribute partly to the fact that a whipcord or wire loop, and more especially whipcord, will usually, after the tongue has been crushed through, drag through the end of the *écraseur* a small strand of tissue containing the chief vessels, to which a ligature can be applied before the removal of the *écraseur*. The being able to tie the main vessel at the end of the operation enables the operator to screw up the *écraseur* more rapidly than he would have otherwise ventured to do. I think it is a good plan to apply a ligature to the main vessel, if it can be seen on the face of the stump, if it has not been tied before the removal of the *écraseur*."

Removal with the galvano-cautery has been practised by many surgeons, but the galvano-cautery has,

I think, been more directly associated with the name of Mr. Bryant in this country than with that of any other surgeon. In the *Lancet* for 1874 he published several lectures on the performance of operations with the galvano-cautery, and one of these lectures was devoted almost entirely to operations on the tongue (vol. i, p. 291). He was at that time in the habit of using the instruments of Middeldorpf and a Bunsen's battery. He describes the operation thus :

“For the removal of a cancerous nodule of the tongue, or of a cancerous tongue wholly or in part, the first thing a surgeon has to do is to isolate the part to be removed ; and this can usually be effected by the introduction of long pins, ivory pegs, or curved needles in handles beneath the base of the growth, in the way I have illustrated in my work on the “Practice of Surgery,” p. 262 ; and in doing this the surgeon had better go wide of the disease. Having isolated the growth by this means, fixed the mouth open by a gag, and had the tongue drawn forward as far as possible, either by means of tongue forceps, or, what is far better, a whipcord ligature passed through the tip of the organ, the loop of the galvanic *écraseur* is to be passed round the base of the disease, behind the pins, and gradually tightened ; the connection between the poles of the battery being made as soon as the wire loop has been adjusted, but not before. The process of tightening and cauterising may then be carried out ; and, when performed successfully, the part to be removed will quickly fall off, without the loss of a drop of blood. In this process of tightening and cauterising much care is called for. In the first place, the wire that is employed should be thick or twisted. I believe the twisted platinum wire is better than the thick. This wire should not be heated beyond a red heat, and the redness ought to be of a dull kind. But, above all, the process of tightening should be very slowly

performed, the wire of the *écraseur* being screwed home only as it becomes loose by cutting through the tissues; any force may break it, and thus give rise to difficulties, or cut through the tissues too rapidly, and give rise to bleeding. Whenever bleeding follows the operation that has been described, it is from one of two things: the wire cautery has been used at too great a temperature, or has been screwed up too rapidly. The surgeon had better take a few minutes longer at his operation than fail in obtaining its good effects."

To Mr. Bryant's account it is merely necessary to add that the last ten years have been productive of great improvements in galvano-cautery batteries, although no better instruments than those of Middel-dorpf, with a few slight modifications, have been invented. Instead of Bunsen's battery a bichromate battery may be used. I use such a battery in the department for disease of the larynx, but it is scarcely powerful enough to heat the thick wire or strain of wire which Bryant recommends for the tongue. My friend, Dr. Steavenson, has, in his electrical department, a much better battery for the purpose. It is a bichromate battery of four cells, each composed of five pairs of zinc and carbon plates, which dip into two troughs. It rapidly heats the thickest wire, and the degree of heat can be very easily arranged, as in my own battery, by lowering the box lid and so bringing the fluid in the troughs higher up on the plates.

Removal of half or the whole of the tongue may be accomplished with precisely the same instruments and by the same methods as have just been described for the removal of only the anterior half; but most surgeons prefer to adopt some modifications of these operations, in order to enable them to get very far back, and to deal more easily with hæmorrhage if it

should occur. The simplest and the easiest of these modifications is the splitting of the cheek,* which is sometimes attributed to Furneaux Jordan, but which, I believe, is properly due to Gant in this country, although it had been practised many years previously on the Continent by Jaeger.

The cheek is split by making an incision through all its structures, from the angle of the mouth as far back as the edge of the masseter muscle. A blunt-pointed straight bistoury is the best instrument for the purpose, and while it is being used, an assistant holds firmly between the finger and thumb of each hand the whole thickness of the cheek above and below the line of the incision, or clamps may be applied to arrest the hæmorrhage, which is otherwise very free. A sponge should be so placed as to prevent the blood passing into the mouth, and the vessels should be taken up and tied before the operation on the tongue is commenced. I have performed this operation on several occasions myself, and have more often assisted my colleagues to perform it, especially my friend and colleague, Mr. Baker. Of the immense advantage which it gives in the performance of a difficult operation within the mouth, I have no doubt; far more room is obtained, better light, and a command over the stump of the tongue, which can hardly be over-estimated. The general risks of removing the tongue are little, if at all, increased by the making of the cheek wound, which may be brought together with hare-lip pins and silver or horsehair sutures; it heals almost invariably along the greater part of its length by the first intention.

Lately a submaxillary incision has been recommended and performed by Kocher, who describes his operation in the "*Deut. Zeitschrift für Chirurgie*" for 1880 (xiii., 146). It is a much more extensive

* See Fig. 2.

operation than any of those described in the preceding pages, since it includes a preliminary tracheotomy and the ligature of the lingual artery on one or both sides, as well as the facial artery.

Tracheotomy is performed and an ordinary canula

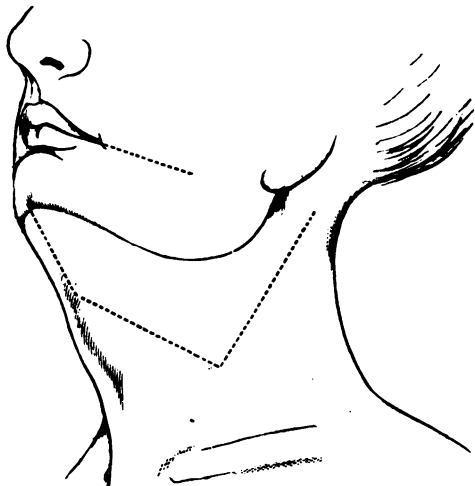


Fig. 2.—Removal of the Tongue.—The Dotted Line in the Face shows where the Cheek should be split. The Dotted Line in the Neck shows the Line of Kocher's Incision.

is employed, Trendelenburg's canula, which sometimes produces serious dyspnoea when it is inflated, not being necessary, on account of other precautions which are taken during and after the operation. The pharynx is completely filled by a sponge soaked in carbolic acid and attached to a string, by means of which it can be easily removed when necessary. The first incision is made along the anterior border of the sterno-mastoid muscle, commencing a little below the tip of the ear.

From the first, a second incision is made from the middle of the sterno-mastoid muscle to the hyoid bone, and along the anterior border of the digastric to the jaw. The flap is turned up on the cheek, and the facial artery and vein and the lingual artery are tied. The submaxillary fossa is then completely cleared out, commencing from behind; the lymphatic glands are all removed, and even the submaxillary and sublingual salivary glands, if the disease appears to lie so near as to affect them. The mucous membrane is now divided along the lower jaw, and as much as is necessary of the mylo-hyoid muscle is separated from the bone. The tongue is drawn down through the opening, is exposed with great ease, and is removed either in part or whole with scissors or the galvano-cautery. The galvano-cautery is preferred by Kocher on account of the less liability of oozing after it has been employed. If the whole tongue is removed, the lingual artery of the side opposite to the operation must be ligatured through a separate incision.

Kocher lays great stress on the after-treatment, and on the treatment of the wound within the mouth. If the operation is extensive, the external wound is not to be closed with sutures. The two great dangers of general sepsis and pneumonia from swallowing various matters are to be avoided by the following measures. The tracheotomy canula is left in and allowed to lie loose in the trachea as usual after tracheotomy. In order that the wound shall not in the slightest measure be infiltrated by the discharges, the skin flaps are fixed back with sutures, and the entire cavity, from the entrance of the wound right back into the mouth and pharynx, is plugged with a tampon of sponge or gauze soaked in a solution of carbolic acid, five per cent. But before so strong a solution of carbolic acid is applied directly to the mucous membrane of the mouth, the tampon is just

washed over with water. The sponge, or gauze, lies immediately on the epiglottis and root of the tongue, and fills the bottom of the wound as far as it is covered with mucous membrane. The naso-pharynx is treated in the same way as part of the general

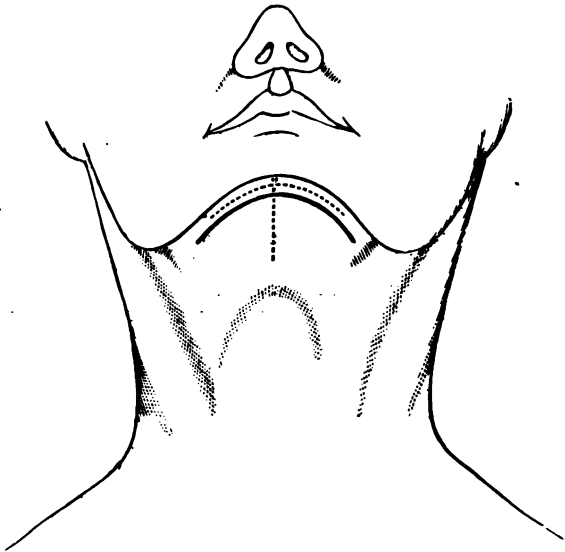


Fig. 3.—The Dotted Line shows the Lines of Egnoli's Incision.
The Black Line shows the Line of Billroth's Incision.

wound, only taking care to protect the mucous membrane from the acid as in the mouth. The whole operation is performed under the carbolic spray. The patient may be fed partly by the rectum, but the feeding is accomplished chiefly when the dressings are changed. This is done twice a day under the spray; and before the fresh dressing is applied, nourishment

is given through a tube introduced for the purpose into the stomach.

If all the directions given by Kocher are strictly followed the wound is treated antiseptically from the beginning to the end, and it is certain that neither discharge nor food can make its way into the air passages.

The removal of the tongue through the floor of the mouth by what is called the submental incision was first practised by Regnoli of Pisa, who described the proceeding in the "*Bulletino delle Scienze med. di Bologna*," in August and September, 1838. It has since that time been modified in several particulars, but I prefer to give it as nearly as possible in the manner of the original operation. The disease for which it was performed does not appear to have been cancer, or indeed any of the common forms of tumour of the tongue, and the patient was a young girl fourteen years of age. She was seated in a chair or stool, opposite the window, with the head leant back against the breast of an assistant standing behind her. Regnoli then made, with a curved bistoury, an incision in the skin of the neck, from the middle of the symphysis of the jaw to the middle of the hyoid bone. He then made two other incisions, one on the right, the other on the left, beginning at the chin end of the first and running outwards in the line of the base of the lower jaw as far as the anterior border of the masseter, so that the facial artery was not wounded. These three incisions formed a T, and the two flaps, which included skin, cellular tissue, and the platysma myoides, were dissected up, so that the muscular layer was exposed. A straight bistoury was now thrust from below upwards behind the symphysis of the jaw, so as to divide the insertions of the genio-hyoid and genio-hyo-glossal muscles and the mucous membrane, so that its point appeared in the mouth

behind the incisor teeth. Through the same incision a blunt-pointed bistoury was passed from below upwards, and turned first to the right, then to the left, so as to divide the anterior insertions of the digastrics, the mylo-hyoids, and the mucous membrane of the mouth as far as the anterior pillars of the palate; three or four vessels were tied. The tip of the tongue was seized with a pair of forceps and drawn down through the opening so that the whole tongue lay in the front of the neck. Regnoli seized it with his fingers, drew it as far down as possible, and surrounded the base with many threads so as to guard against bleeding from the main arteries of the tongue. After he had completely encircled the tongue and the disease with threads, he cut off with small scissors all the parts beyond the threads. The cutting was very cautiously performed in order to guard against hæmorrhage, and the surface of the stump was touched with the hot iron in order to arrest the oozing. The stump was then returned into the mouth. Not a drop of blood had passed into the larynx. The external wound was not completely closed, in order to allow free drainage from the mouth, but was partly brought together with strapping and bandage. The patient made a good recovery.

Some of the measures which were taken appear absurd, until the period at which the operation was performed is taken into account. It is scarcely necessary to suggest that no person who performed the operation at the present time would pass threads through the tongue, and bind it tightly up before proceeding to remove it; the *écraseur*, or galvano-cautery, or the scissors would naturally be employed. In other respects the steps of the operation might be followed exactly as they were performed by Professor Regnoli himself.

A very greatly modified operation through the

middle of the floor of the mouth has been recommended by Nunneley of Leeds, but was previously practised by Chassaignac. It is an *écraseur* operation, and is thus performed: The tongue is drawn forwards out of the mouth as far as possible, and is transfixed behind the disease by two strong curved needles passed through it from below the chin. A stout, bladed needle, to which the noose of an *écraseur* has been attached by a ligature, is then made to penetrate in the middle line of the floor of the mouth about midway between the jaw and the hyoid bone, so that its point emerges in the mouth close to the *frænum* of the tongue, which has been withdrawn during the passing of the needle. The loop of the *écraseur* is drawn up through the tiny opening, the needle is withdrawn, and the loop of the *écraseur* is widened out so as to permit the tongue to be once more drawn forward through it until it lies behind the curved needles which were first introduced. The *écraseur* is tightened, and the part included in the ligature is cut through.

This method of applying the *écraseur* is ingenious, but after all the operation is only of use for removing the anterior portion of the tongue, which can be thoroughly done by any of the methods which have been described in the previous pages.

Removal of the tongue by dividing the symphysis of the lower jaw was first practised in Great Britain by Professor Syme in 1857 and 1858. The account of his cases is published in the *Lancet* for 1858 (vol. i., 46, and ii., 168). Both the patients on whom he operated at that time died; but his operation was performed successfully a short time afterwards by Fiddes, and his description in the *Edinburgh Medical Journal* (iv., 1092, 1858-9) is so much more complete than the description of Syme that I have thought it better to follow it. He says:

“The patient was seated in an armchair, and the body secured to it by a sheet passed around. Chloroform having been administered, one of the lower central incisor teeth was extracted, and the lip divided in the mesial line to the lower margin of the chin; here several small vessels spouted from the cut surfaces, requiring ligatures, and by the time they were all secured, the effect of the chloroform had passed away. It was therefore re-administered; and as soon as she was brought fully under its influence, the jaw was sawn through at its symphysis, and the two halves held asunder by two assistants. Then grasping the tongue firmly with a vulsellum, it was held and stretched forwards and upwards by a third assistant, while I introduced two fingers of the left hand beneath it, and dissected it away from the floor of the mouth by a strong, blunt-pointed and slightly curved scissors, leaning the instrument on the fingers as I proceeded, and feeling with them what way was made in the separation of the parts. The line of dissection was carried a little obliquely, so that I divided the left lingual artery before cutting the right; and as soon as these vessels were tied, the dissection of the organ was proceeded with as far as its attachment to the hyoid bone. Then taking a straight, sharp-pointed bistoury, I pushed its point through the firm fibro-cellular texture constituting the root or osseous connection of the organ, at the same time feeling for and meeting the point of the instrument with the end of the left forefinger, which had been passed over the upper surface of the tongue, and placed within the concavity of the os hyoides, in front of the epiglottis. Through the perforation thus made I then passed a straight, blunt-pointed knife, and keeping the blade closely applied to the bone, and guiding it with the left forefinger, I separated the parts completely from their osseous insertion, and finally divided the two

lateral folds of mucous membrane connecting the tongue to the palate. As soon as the detachment was effected, two small vessels, lying in close proximity to the hyoid bone, bled and required tying; but there was no further hæmorrhage from any part of the mouth."

Fiddes brought the two halves of the divided bone together with silver wire passed between the teeth. At first attempts were made to feed the patient through a tube passed into the stomach, as had been done in the cases operated on by Syme; but the irritation produced by the attempts was so great that they were abandoned, and the patient was allowed to take nourishment through the spout of a teapot.

Neither Syme nor Fiddes appear to have taken any special precautions to prevent the falling back of the stump, which occasionally occurs when the organ has been removed far back, and its attachments to the jaw have been divided. In order to prevent this, and the consequent danger of suffocation, it is advisable in this and similar operations to fasten the stump of the tongue to the mucous membrane at the side of the mouth, along the line of incision, by means of two or three sutures.

Removal of disease extending into the floor of the mouth, and perhaps to the jaw.—If the disease is well in front, this may be accomplished by Syme's method of dividing the chin and lower jaw; and the operation is especially applicable when the disease has extended so deeply into the substance of the jaw that it is deemed needful to remove a portion of the bone. In place of merely dividing the bone, the affected portion is completely removed. When the resected fragment of bone is of large size, it is, of course, impossible to bring the two halves together with a suture; but when only a narrow fragment has been taken out, there is no reason why this should not be done.

When the bone is only very superficially affected, when, indeed, it appears that the disease has not penetrated actually into the tissue of the bone, but has so far affected the periosteum as to bare the bone and perhaps render its surface slightly carious or rough, it may be sufficient to remove the soft parts over it, and to scrape the surface of the bone and apply the actual cautery, or the thermo- or galvano-cautery. Such a proceeding is much less severe than the removal or even the division of the bone; the scraped surface, especially after it has been burned, dies and is by-and-by cast off, and there is far less probability of recurrence in the bone beneath than in the soft parts in the tongue and floor of the mouth.

If the disease is very extensive and well at the side of the tongue and mouth, it may be removed by Kocher's submaxillary operation, and through the incision a portion of the bone may be removed, or it may be treated from the wound and from the mouth in the manner just described.

If the disease affects the tongue and floor of the mouth, but does not affect the bone, and if there is no apparent affection of the glands, it may be removed through the mouth by any one of the methods which have been described, modified so as to meet the particular requirements of the case. In order to gain more room, and to obtain a better light, the cheek may with advantage be split; but it is impossible to lay down rules for the performance of every operation on all the irregular conditions which may occur in connection with a carcinoma of the tongue. In most cases of this kind, if the floor of the mouth is deeply diseased, and particularly if there is the least suspicion that the glands are affected, it is far better to perform a much more extensive operation, such as Kocher's, than to make an ineffectual attempt to remove the disease through the mouth.

Cases in which the disease has been from its commencement under the tongue, and has thence extended into the floor of the mouth, require, almost invariably, the removal of half of the tongue, and sometimes of the entire tongue, in addition to all the parts of the floor or of the mouth which are affected.

Removal of lymphatic glands.—If the glands are removed at the same time as the tongue, they may be taken out through an incision over them, either before or after the removal of the tongue. The tongue may be removed through the mouth by one of the ordinary methods, and the operation for the removal of the glands is quite separate. Or, the whole operation may be performed through a submental or submaxillary incision, Regnoli's or Kocher's, which offers the further advantage that hæmorrhage is provided against at an early stage of the proceeding by ligature of the lingual artery, and one incision suffices for the removal of the tongue and glands and the ligature of the vessel.

The removal of the lymphatic glands may be made a distinct operation, and may be practised a few days before or after the removal of the tongue; or it may be required at a later period in the history of the case, when affection of the glands has appeared some time after the removal of the tongue. In all these cases the removal is effected by cutting down upon the diseased glands in the neck without reference to the operation which has been practised on the tongue.

In this chapter I have not attempted to describe all the operations, or modifications of operations, which have been recommended or practised on the tongue. I have thought it better to give as complete an account as possible of the manner of performing those operations which are the best, or which have been most frequently employed either in this country or abroad. But, for the convenience of those who are

interested in the growth of the surgery of the tongue, and who desire to study its various phases, I append a copy of a table by Barker, who, in his turn, has taken his information from the table and text of the historical account in Woelfler's excellent paper in the archives already mentioned. I should have quoted the table directly from Woelfler, but Barker has arranged the material in a more convenient form, and has made the actual table fuller from the text which accompanies Woelfler's table, and by the addition of two or three statements referring to the operations of English surgeons.

The proceedings are divided into two groups: (1) The earliest irregular operations; (2) the definitely designed operations.

EARLIEST IRREGULAR OPERATIONS.

1. Pimpernelle, died 1658.—Was probably the first to excise the tongue with success.
2. Marchetti . . . 1664.—Extirpated a cancer of the tongue by actual cautery; probably the first recorded extirpation for this disease. ("Phil. ac. Med. Observ.," s. 62.)
3. Val. Hoffmann 1692.—Removed a tongue affected with macroglossia.
4. Ruysch . . . 1737. { Excised with a knife and cauterised with a hot iron. ("Oper. om." Amstelodami, p. 70.)
5. Memonista . . . 1737. }
6. Heister . . . 1743.—Gave the first methodical description of operative treatment of cancer of the tongue. ("Chirurgie," Nurnberg, 1763.)
7. Buxdorf . . . 1754.—Excised a true cancer of the tongue with the knife. ("In Actis Helvet.," vii., 116, Basil, 1772.)
8. Guthrie . . . 1756.—Was probably the first English surgeon to excise a cancer of the tongue, using the knife, followed by cauterisation of the cut surface.

9. Louis . . . 1759.—Ligated a "fungus" of the tongue, and later (1774) spoke at length and clearly in favour of total excision for cancer. ("Mém. Acad. R. Chir.," 1774.)

DEFINITELY DESIGNED OPERATIONS.

Ligature.

10. Inglis . . . 1803.—Introduced ligature of the tongue from the mouth for cancer, the cords being drawn with needles through the tongue and round the tumour. ("Edin. Med. and Surg. Journ.," 1805, p. 34.)
11. Major . . . 1827.—Split the organ down centre to apply the ligature to the diseased half from the mouth.
12. Cloquet . . . 1827.—Also split the organ, but introduced the ligature by a supra-hyoid incision, and strangled the diseased half. ("Arch. gén.," xii., 511.)

Wedge-shaped excision.

13. C. J. Langenbeck, 1819.—Introduced wedge-shaped excision of diseased part of tongue, with careful suture of resulting flaps. ("Biblioth. f. Chir. u. Augenh.," 2 Bd., s. 487.)

Preliminary ligature of lingual artery.

14. Mirault . . . 1833.—Introduced preliminary ligature of lingual artery to give a clear bloodless field for extensive incisions. He was followed by Roux, and later by Roser. ("Archiv. gén.," vi. 5, 636.)

Écrasement.

15. Chaisaignac . . . 1854.—Introduced the écraseur, employing Cloquet's supra-hyoid method, and defining it more exactly, *i.e.* using puncture instead of incision. ("Traité de l'écrasem. lin.," p. 31.)

16. Middeldorpf . . . 1854.—Introduced the galvanic *écraseur*. ("Schmidt's Jahrb.," Bd. 107, 260.)
17. Nunneley . . . 1856.—Introduced the suprahyoid use of the *écraseur* into England, adopting Chaisaignac's modification. (*Medical Times and Gazette*, 1862.)
18. Girouard . . . 1857.—Employed circumpuncture with rods of caustic. ("Arch. gén.," 1857, p. 100.)

Division of the Cheek.

19. Jaeger . . . 1831.—Was the first to divide the cheek for free access to the tongue. ("De Extirp. Ling.," 1831.)
20. Maisonneuve . . . 1858.—Divided both cheeks from angle of mouth for same purpose. ("Compt. rend. Acad. Sci.," T. 57, 831, 1863.)
21. Collis . . . 1867.—Reintroduced Jaeger's operation, using the *écraseur*. ("Dub. Quart. J.," xliii. 3, 1867.)

Division of the Lower Jaw.

22. Roux, died . . . 1836.—Was the first to divide the lower jaw and lip in mid-line, in order to gain free access to the floor of the mouth and tongue. ("Maisonneuve's Thèse," p. 146.)
23. Sédillot . . . 1844.—Improved this method by dividing the bone by a serrated cut. ("Gaz. des Hôp.," 1844, 83.)
24. Syme . . . 1857.—Divided the jaw in mid-line, and excised with the knife. (*Lancet*, 1858, i. and ii.)
25. Billroth . . . 1862.—Divided the jaw and soft parts at the side in two places, and turned down the flap of skin and bone so formed, replacing and wiring the bone afterwards. ("Arch. f. Klin. Chi.," 1862, 681.)

26. B. v. Langenbeck, 1875.—Divided the jaw and soft parts opposite the first molar tooth on one side, in order to gain access to side of the mouth for removal of the tongue, glands, and part of the palatal arch and tonsil. (Benary's "Inaug. Dissert.," 1876.)

Inframaxillary Operations.

27. Regnoli . . . 1838.—Opened the floor of the mouth from below by an incision from middle of hyoid bone to chin, ending in another semi-lunar incision along the border of the jaw. The tongue was drawn through the opening and excised. ("Bull. Sci. méd. Bologna," 1838.)
28. Czerny . . . 1870.—Modified Regnoli's procedure, forming lateral flaps.
29. Billroth . . . 1871-6.—Modified it still further, extending both ends of the curved incision much farther backwards, and omitting the incision in mid-line. (Langenbeck's "Archiv.," Bd. 16, Hft. 2.)
30. Kocher . . . 1880.—Introduced a method of opening the mouth from behind and below the angle of the jaw to reach the base of the tongue, and remove it with all the lymphatic glands situated there. ("Deutsche Zeitscht. f. Chir.," xiii., 146, 1880.)

CHAPTER XIX.

THE CAUSES OF DEATH AFTER REMOVAL OF THE
TONGUE.

BEFORE considering the after treatment of wounds made in the removal of part or the whole of the tongue, it is desirable to discuss shortly the causes of death after the operation.

In five of the eight fatal cases recorded in my tables (already alluded to), the cause of death was pneumonia, either alone or associated with general blood-poisoning. The sixth patient died of tetanus, the seventh of cellulitis, and the eighth of hæmorrhage.

If a very much larger collection of fatal cases is examined, the proportion of deaths from lung affections and general blood-poisoning will correspond very nearly with that in my own tables, but the cause of death in the remaining cases will be found to vary considerably. The case of tetanus may be regarded almost as an accident; tetanus certainly is not a danger peculiar to operations on the tongue. A few cases of cellulitis, of collapse and of hæmorrhage, will be found in every large series of fatal cases.

When the vascularity of the tongue and the methods of removing it are taken into account, it seems surprising that the number of deaths directly attributable to hæmorrhage is so small. There is, not uncommonly, severe hæmorrhage during the operation; and if the removal is accomplished without bleeding by means of the *écraseur*, whether hot or cold, the lingual artery is in many instances not directly secured by a ligature. Yet the deaths from

recurrent or secondary hæmorrhage are really very few. The only instance in my table occurred in the case of a man whose tongue was removed with a strong wire *écraseur*, which cut through the tissue of the tongue like a knife, much more quickly and cleanly than had been intended. There was some smart hæmorrhage at the time, and it was not easy to get the man out of the operating theatre alive. The artery was not thoroughly secured, the bleeding recurred, and the patient sank and died a few hours later. But, although hæmorrhage cannot be made directly responsible for many deaths, it exercises a very large indirect influence on the results of operations. The blood lost at the time of the operation may be very little, and there may be no actual loss of blood after the operation, no more, indeed, than the oozing which naturally follows in the first few hours after the making of a wound. But the small quantity of blood which is lost, is, in part at least, swallowed, and in part passes down into the trachea and bronchi. It is liable to undergo decomposition, and is probably a very important factor in the production of the earlier deaths from affection of the lungs and septic poisoning.

In the consideration of the relative value of the different operations for the removal of the tongue, the question of the arrest of hæmorrhage, and particularly of the protection of the air passages against the effused blood, will be discussed.

Septicæmia or pyæmia without affection of the lungs is comparatively rare as a cause of death, but the same diseases with affection of the lungs are not uncommonly fatal. The uncomplicated blood poisonings commence about the same period after the operation, and run much the same course as they do after operations on other parts of the body. They therefore require no special description. They depend,

without doubt, on the decomposition of the wound, so hard to prevent in most cases of removal of the tongue; but the debilitated condition of the patients does much to predispose them to absorb the nocuous material.

The most common cause of death, and that to which attention cannot be too persistently directed, is affection of the lungs. I say affection of the lungs, because the anatomy of the morbid condition varies considerably. In some cases there is actual gangrene of a portion of the lung; in others there are small abscesses containing stinking pus; in others pneumonic consolidation, but usually either threatening to become gangrenous, or actually gangrenous in parts; and in others the condition is described as broncho-pneumonia. The broncho-pneumonia and the pneumonia, whether gangrenous or not, are due, in the large majority of instances, to the inhalation of foul gases from the decomposing wound, and to discharges passing down the trachea and bronchi into the lungs. I do not think there is sufficient evidence to show that the morbid conditions which are due to the first of these accidents can be distinguished from those which are due to the second. Even when the fluids in the mouth are not very abundant, those which are there rapidly decompose in cases in which there is great fœtor, and very small quantities of such fluids introduced into the bronchi are quite sufficient to light up the intensest inflammation of the lung. The condition in which numerous and stinking abscesses are discovered in the lungs may be due to direct contact of septic material derived from the wound, or may be a part-manifestation of general blood poisoning, for such abscesses are among the most usual of the post-mortem appearances after death from pyæmia.

The symptoms of pneumonia or broncho-pneumonia usually appear within a week after the operation, and

may be observed within forty-eight hours after it has been performed. In the intervening period the patient may have been progressing favourably, or from the first his condition has been such as to excite alarm. Sometimes the pulmonary symptoms are preceded by a very abundant secretion of mucus and saliva, which may persist during two or three days, and cause the patient much annoyance; owing to the difficulty he experiences in getting rid of the secreted stuff. These fluids, hanging constantly about the mouth, speedily undergo decomposition, and it is probable that some of them are drawn down or run down into the trachea and bronchi. In other cases the large secretion is not observed; but in either case the mouth is horribly fœtid, and it is exceedingly difficult to keep it free from fœtor, no matter what dressings are employed. As a rule the attack of pneumonia is not ushered in by a rigor, but the temperature rises, the pulse quickens, the breathing becomes more rapid, and the patient begins to cough. In some cases he is jaundiced; and in most cases he becomes dusky. The progress of the inflammation is usually very rapid; the breathing increases in rapidity, and is more and more difficult, the complexion grows more and more dusky, the pulse still quickens, and is weaker until death takes place, often in forty-eight hours, or even less, after the onset of the pneumonia. During the whole course of the inflammation, whether it lasts two or four or five or more days, the mouth is dreadfully offensive, and it is almost impossible to correct the stench. This, no doubt, is one of the most powerful reasons why the pulmonary inflammation is so fierce and so speedily fatal. The patient is poisoned by the hideous exhalations which proceed from his own mouth; he is often feeble at the time of the operation, and the difficulty of supporting him during the early days is much greater than after

many capital operations, on account of the condition of the mouth. To the lung affection there is, in many instances, added general blood-poisoning, which hastens the progress of the pneumonia, and diminishes in a large degree the chances of recovery.

CHAPTER XX.

THE AFTER-TREATMENT OF OPERATIONS.

The Method ordinarily Employed—Objects of After-treatment—
Whitehead's Method—Morrant Baker's Method—Kocher's
Method—Billroth and Woelfler's Methods.

UNTIL a comparatively late period, the after-treatment of patients who had suffered amputation of the whole or a part of the tongue was little studied, but during the last few years it has received much more attention. For, during the last few years the most frequent causes of death after the operation, and the relation which they severally bear to the methods of removing the tongue, and to the condition of the mouth and neighbouring parts after the operation, have been much more carefully considered. It has gradually come to be believed that some, if not all, of these causes are preventable, and that the operation of removal of the tongue ought not to be nearly so fatal in the future as it has been in the past. Every surgeon who has seen many cases of amputation of the tongue, whether complete or partial, knows that during the first few days the mouth is, in some of them, very foul, and the fœtor of the breath is horrible; and every surgeon who has attempted by syringing with Condy's fluid, and other antiseptic solutions, to correct the foulness and fœtor, will bear witness how impotent the attempt has been in some,

if not in all, cases. The apparent difficulty of dealing successfully with these conditions has undoubtedly been the chief reason why wounds of the tongue have been suffered, in these days of antiseptic surgery, to poison a large percentage of patients either directly by septicæmia, or indirectly by inducing pneumonia and other pulmonary affections. Maccormac and Watson Cheyne, in their works on antiseptic surgery, make no mention of the tongue; and, so far as I am aware, Kocher is the only surgeon who has attempted to carry out the Listerian method rigidly for operations on the tongue. His paper was published in 1880, and has not hitherto attracted a very large share of notice in this country, partly because it was written in German, partly, perhaps, because the operation he proposed is of so sweeping a character that few surgeons would, at the first sight, be inclined to perform it. But, as I shall presently show, Kocher's results are exceedingly good, and when the severity of the operation is taken into consideration, and the difficulty of thoroughly carrying out the after-treatment, it must be admitted that they are admirable. Before, however, they are analysed, it will be well to describe briefly the usual after-treatment of a case of removal of the tongue.

When the patient is put back in bed, it is not unusual, if there has been much hæmorrhage, or much oozing, to leave the cord used for drawing the tongue forward still in that half of the tongue which has not been removed, or in the stump if the entire tongue has been removed far back. During the first three or four hours, unless the patient is much exhausted, it is not customary to do more than watch him to see that, in his excited or half-conscious state, he does not do himself an injury, or attempt to pull the ligature out, the end of which is probably fastened to his cheek by a narrow strip of strapping. If, on

the other hand, he is much exhausted, an enema of beef-tea and brandy is probably administered. During the first few days after the operation the patient commonly sucks ice, or drinks cold liquids, in order to allay the inflammation and diminish the consequent swelling of the tongue. The further object of preventing or arresting oozing of blood is served by the cold. If the patient can take food by the mouth, he is generally fed with milk, beef-tea, and essence of beef, with wine or brandy if his condition seems to demand stimulant. But, if food cannot be taken by the mouth, the strength is maintained by enemata or nutrient suppositories, or food is introduced into the stomach through a tube. Usually it is found difficult to keep the mouth sweet, and for that purpose Condy's fluid, or weak carbolic acid, or some other disinfectants, are frequently used with a syringe, or are given as gargles, if gargles can be used. Some cases do well from the first; there is never much fœtor, and the wound heals quickly without marked inflammation or other troubles which are common to open wounds. But other cases do badly from the first; the wound soon stinks, and every attempt to correct the fœtor is vain. In a few days, or even in a few hours, symptoms of sepsis, with pulmonary trouble, appear, and in many instances death ensues within a week of the amputation. When the symptoms of pulmonary affection have appeared, whether they are accompanied by marked general sepsis or not, it is very unusual for a patient to recover; and it is still more unusual for him to recover if he is attacked by the symptoms of septicæmia or pyæmia. The hope of the surgeon lies in the chance of his patient steering clear of these diseases, for there is little hope of curing them when once they are established.

In discussing different methods of after-treatment

it is desirable continually to bear in mind the principal objects which the treatment ought to have in view, and to consider how far these objects are fulfilled by the measures which are recommended. The principal objects are three :

Free drainage of the wound ;
Prevention of decomposition ;
Proper and sufficient feeding.

The first two are such objects as are kept constantly in view in the treatment of wounds of all parts of the body ; the last belongs particularly to this operation. It may be said that there is a fourth object peculiar to operations on the tongue, the prevention of the passage of discharges which are nocuous into the air passages. But if the first two conditions are fulfilled, this need not be considered.

Whitehead's after-treatment has been described in his own words in the pages devoted to his operation. It consists in feeding for the first few days exclusively by the rectum, washing the wound occasionally with a weak solution of permanganate of potash, and forbidding speech. The first object on our list is considered as sufficiently provided for by natural means ; there is no danger of tension, and the discharges can escape from the mouth as soon as they are formed. The permanganate of potash is intended to prevent decomposition, and the food is not administered by the mouth.

Mr. Marrant Baker tells me that he is in the habit of using a solution of Condy's fluid, or some similar antiseptic, for washing out the mouth, but that lately he has been using iodoform, which he applies by means of a spatula over the wounded surface, or merely dusts over it from time to time. Instead of allowing his patients, as formerly, to take nourishment by the mouth through a feeder or with a spoon, he now feeds through

a soft indiarubber catheter, which is passed as often as is necessary about half way down the œsophagus. A funnel is attached to the end of the catheter, and the liquid is allowed to run gently through the tube into the stomach. Like Mr. Whitehead, Mr. Baker does not deem it needful to take any special steps for the drainage of the wound, although by keeping the patient for the most part on his side, and encouraging him not to swallow the discharges, he succeeds in keeping the mouth tolerably free from discharge during the first few days, when there is great danger to be apprehended from the entrance of the discharges into the trachea and bronchi.

The German surgeons have taken more pains than the English, or, so far as I am aware, than the surgeons of any other nation, in attempting to fulfil the conditions which are most to be desired in the after-treatment of amputation wounds of the tongue, and their efforts have certainly been attended with success.

Kocher's antiseptic method has already been described in the account of his operation. If the description is referred to it will be seen that he does not take any especial measures to procure a thorough drainage of the discharges; but the wound is so covered with antiseptic dressing and is so frequently dressed (twice a day) that the quantity of discharge is probably never large, and the discharge which is present is as innocuous as it can possibly be. Further precautions are taken, by the performance of tracheotomy, that the patient shall not draw air in over the wound, and thus the probability of septic pneumonia is reduced to a minimum. The feeding is carried on through an œsophageal tube on the two occasions in the day when the wound is dressed, which, that the antiseptic method may be as thorough as possible, is always done under the spray. It may be supposed that the patient receives a supplement of food by the

rectum, for the two feedings a day, unless they are much more copious than the stomach is likely to be able to receive, are very small allowance for persons who have just undergone a severe operation. As the result of this method of removing the tongue and treating the patient after the operation, Kocher is able to announce thirteen recoveries out of fourteen cases; and further, and this is of extreme importance, to boast that not one of his patients suffered from sepsis, or pulmonary affection of the kind so frequently observed after operations on the tongue.

Billroth appears to have been taking great pains during the past few years to improve the after-treatment of amputation wounds of the tongue, and with a success which deserves the most careful attention. Woelfler, in the paper from which several of the statements in the foregoing chapters have been taken, gives a detailed account of the manner in which the wounds have been treated in Billroth's klinik. His description, liberally translated, is as follows :

In our cases, immediately after the extirpation, two circumstances have demanded attention, the preparation of an exact drainage, and the cauterisation of the whole surface of the wound with permanganate of potash (kalihpermanganicum). If a preliminary ligature of the lingual artery had not been performed, we generally, in cases in which the extirpation had been performed through the mouth, thrust a trocar through the floor of the mouth, and drew through the opening a drainage tube the size of the finger; but if the artery had been ligatured and the glands removed, the mucous membrane of the mouth, if it had not been freely removed, was torn through, and a drainage tube as thick as a man's thumb was passed through the opening, so that not merely the secretions of the wound, but also the masses of tough mucus, might be removed. The drainage tube had at

the end turned towards the hollow of the mouth two or three holes, and was, above all things, very carefully placed; it was expected to reach with its upper end into the posterior part of the cavity of the mouth in the region of the stump of the tongue, or if there was no stump, in the middle line of the bottom of the mouth, where usually the cavity of the mouth is deepest. The opening of the tube did not look towards the pharynx, because it could not then be used for syringing. The tube was apt to shift easily in the first twenty-four hours, unless, what ought always to be done, it was sewn externally to the lower border of the ligature wound; otherwise the soft parts of the floor of the mouth or the stump of the tongue came to lie on the opening, and its action was quite illusory. It is therefore good to prevent the sinking down of the end which is situated in the mouth by means of a safety stitch, and, besides, to try several times in the day the position and complete perviousness of the tube. The remaining portion of the ligature wound was closed and drained by means of a medium-sized tube; over the wound was placed a piece of antiseptic gauze and a bandage, and the end of the tube projected free through the bandage.

Whether simple excision, partial or complete amputation, was performed, in most cases, *on the same day the entire wound surface was covered with permanganate of potash*, powdered, or in a saturated watery solution (half a coffee-spoon of powdered permanganate of potash to about two coffee-spoonfuls of water). In using this material the following rules were observed:

1. The pain which is produced by cauterisation with the permanganate is not so great that it cannot be endured without narcosis; it appears, in any case, to be less than that produced by cauterisation with caustic potash or fuming sulphuric acid. Nevertheless,

it is desirable, after a large operation for the removal of the tongue, to maintain a slight narcosis during the arrest of the lesser hæmorrhage, and to proceed to the cauterisation about ten to fifteen minutes after the operation ; this is desirable, less on account of the pain, than because during the narcosis, and with the help of the assistants, who are still present, the whole of the soft parts can properly be brought into view, and surety is thus obtained that no part is left untouched. If, on the other hand, the wound is small, perhaps three to four centimetres long, and about an equal breadth, the cauterisation may be performed without narcosis.

2. If the cauterising material is strewn on in the form of powder, it is well to protect the lips and to spare all the sound portions of the mucous membrane, otherwise, first scabs, afterwards painful excoriations are produced. If the material does light on the lips, the scab may be easily washed off with a ten per cent. solution of oxalic acid.

3. The bleeding must be quite arrested before the material, in whatever form, is applied, if it is to produce its full effect. The permanganate does not act as a hæmostatic, nor does it eat into the walls of the vessels ; it does not penetrate deeply, but transforms the whole of the superficial tissues into a very dry scab, which clings more firmly than the chloride of zinc scab, and, easily as the permanganate is dissolved in water, yet the scab composed of it adheres, under favourable conditions, from two to four days.

4. Those places which on the first day have perhaps been overlooked, or on which the cauterisation scab has perchance not adhered, should be painted on the next day again with a concentrated solution. All paintings which are made on the following days, even with the most concentrated solutions, are quite painless.

5. The cauterisation produces no re-active inflammation in the neighbourhood of the scab, nevertheless the cauterisation should not be overdone on that account. If the floor of the mouth is infiltrated and painful on the first or second days, the cauterising material is certainly not to blame ; if the course of the wound is favourable not the least pain is produced by very firm pressure with the finger externally over the floor of the mouth, even after the most extensive cauterisation.

6. It is neither necessary nor desirable to strew the entire surface of the wound with the powdered material more than once after the operation.

7. However extensive the cauterisations, one spot should be treated with peculiar respect, and very little touched, that, namely, which borders immediately on the epiglottis and aryepiglottic ligaments, because it appears that in one instance there was a direct connection between an acute pharyngitis and laryngitis and a cauterisation carried out two days in succession. On the other hand, it is well, in the cauterisation of the floor of the mouth, to penetrate as deeply into the tissues as can be done by pressing a wooden spatula into them.

8. In not a single instance were there any symptoms of poisoning from the use of the permanganate.

By means of the cauterisation and the arrangement of a proper drainage not merely all that is usually necessary for a favourable progress of the wound was accomplished, but so much was gained that the further treatment was for the most part quite simple. The hourly syringings, indeed drenchings, with permanganate of potash, which are generally employed, were unnecessary, and were substituted by two or three paintings of a moderately concentrated solution. The patients were less disturbed and enjoyed their rest at night. Only from time to time was the bandage

changed and the mouth syringed with a one per cent. solution of carbolic acid, in order to bring the collected mucus more readily through the tube. It need scarcely be mentioned that in syringing the head was always lowered, so that no fluid might pass into the larynx. *In all the cases in which thorough drainage and cauterisation simultaneously were employed, there were no phlegmons in the cellular tissue of the neck, no diphtheria of the mouth, no capillary broncho-pneumonia.* In all such cases in which the course of the progress of the wound was favourable, the patients recovered exceedingly quickly from the operation, and had little to complain of as regards pain; indeed, we could not but wonder at the strikingly good state of health which the patients enjoyed during the whole course of the case, particularly when we remembered how heavily in former times our patients suffered after similar operations. The temperature remained either quite normal, or rose in the first three or four days to 38° to 39.5° C. (100° to 103° F.), and fell regularly on the fourth day. If the first four days were happily over-passed, as a rule there was nothing to be feared. Later complications in the second and third weeks were very exceptional. The thick drainage tubes were removed in from five to seven days. Up to that time, and even later, the feeding was performed through an œsophageal tube, until the drainage openings were nearly closed. The ligature wound healed (as has been mentioned), as a rule, without any reaction; the drainage tube of the ligature wound was removed on the third to the fifth day.

I have thought it desirable to describe this treatment in detail, and partly in the words of Woelfler, because, although I have never used it, or indeed seen it used, and although I believe the treatment presently to be described is preferable, it nevertheless fulfils all the objects which were to be kept in view at the

commencement of this chapter, and the results which have been obtained by it exhibit a great advance on those which were obtained by the old methods formerly adopted in Billroth's wards. In another section, Woelfler gives tables to show the results of the after-treatment. Eighteen patients were treated in the manner which has been described, and two died. Thirteen patients were treated without either drainage or cauterisation, and two died. Nine were treated by drainage without cauterisation, and two died. Six were treated with cauterisation and without drainage, and two died. It was, however, in the causes of death that the chief difference lay. The two patients who died after thorough drainage and cauterisation, died, one of collapse after a very large operation (he had been a great drinker), the other of an unknown cause in the third week after the operation. His body was examined, but the cause of death was not ascertained; it was thought to have been exhaustion; in any case, it was not pyæmia or pulmonary affection. On the other hand, all the six patients who died in the other table died of septic poisoning of one kind or another. Not only, therefore, was the mortality far greater, but it was from causes which we should consider to a large extent preventable in wounds of other parts of the body; or, if we cannot go so far as this, we may at least say that a mortality of six deaths from blood poisoning out of twenty-eight operations would be regarded as most lamentable if the operations had been performed on another part of the body.

In the twenty-seventh volume of Langenbeck's Archives, the volume for 1882 (p. 419), Woelfler has published a second paper on the treatment of wounds in the mouth, in which he gives the results obtained by a much simpler treatment which has been employed by Billroth since the previous paper was published. After admitting that the cauterisation recommended

in his previous paper is painful, and that, to be complete, it ought to be carried out when the patient is under the influence of anæsthetic, he says that, in consequence of the reputation which iodoform has recently gained as an application to wounds, it occurred to those in charge of Billroth's wards to try the effect of iodoform on wounds in the mouth. The results of the trial were that all the patients whose wounds were treated in the manner presently to be described with iodoform recovered from the operations. They numbered seventeen, and included all the cases treated by Billroth between the writing of the two papers. And not only did they all recover, but the course of the healing was in all the cases most satisfactory. The slight pulmonary troubles which the cauterisation had been successful in so far modifying that they were rarely fatal, were completely absent in every case. There were no cases of phlegmon, and no cases of blood poisoning. The wounds were from the first absolutely free from decomposition and offensive odour. Yet the operations were quite as extensive as those which had been performed in the series which was previously published; the floor of the mouth was opened in many of them, and the glands were removed.

The manner in which the dressing was applied was as follows: Six metres of gauze, thoroughly cleansed of fatty matters, are soaked in a mixture of glycerine and colophony dissolved in alcohol (60 grms. glycerine and 100 grms. colophony dissolved in 1,200 grms. 94 per cent. alcohol) then squeezed and powdered in the half-dry condition with about 50 grms. of iodoform powder. If the iodoform powder is used in ordinary gauze, it easily falls out. From this strips are cut about the width of two or three fingers, and are placed in the cavity in the mouth with a pair of forceps; all the angles of the wound are filled with it

without exercising any undue pressure, but so as to cover the whole surface of the wound. The strips of iodoform gauze interlace with the surface of the wound, and in the next few days cannot be separated from the wound without the occurrence of bleeding. If the strips are properly placed, there is nothing more to be done to the surface of the wound, for they may remain there six or eight days until they fall out : only the superficial layers, which become sodden with the saliva and the food, need be removed from day to day. If in the meantime the finger is put into the mouth of the patient, it smells very much of iodoform, and never of foul discharge. Woelfler proceeds to say, that if the difficulty is remembered which formerly existed in keeping the cavity of the mouth sweet, and how uncertain the result of all our care was, the value of iodoform as a dressing for wounds in the mouth cannot be over-estimated. In so far as the discharges are no longer foul and are very small in quantity, it does not appear necessary to take the same precautions as formerly in maintaining a perfect system of drainage, and certainly is not needful to make a special opening in the floor of the mouth for the insertion of a drainage tube. And even when the lingual artery has been tied in the neck, it is not needful to make a communication between the internal and the external wounds for the sake of drainage ; the two wounds had better be treated separately, the internal wound with iodoform, the external wound with cleansing and drainage with a medium-sized tube. If, during the course of the operation, a communication is made between the two wounds, the drainage tube may, for the sake of greater safety, be passed up through the external wound into the mouth, and after a few days removed. Even this precaution was not taken in the later cases, yet a good result was obtained. In truth, it appears well to avoid any special drainage, unless it

is absolutely necessary, on account of the hindrances it offers to the independent feeding of the patient.

In another part of his paper, and in the account of the individual cases, Woelfler particularly draws attention to the fact that the patients were able to take fluid food without difficulty after the operation, without the introduction of an œsophageal tube, and he regards this as another advantage which may be attributed to the dressing with iodoform gauze.

If this method of dressing the wound is analysed, it will appear that the only point on which stress is laid is the purifying of the discharges, and, I think it may be added, the protection of the surface of the wound by means of a layer of gauze impregnated with iodoform in such a manner that the protecting material adheres to the surface of the wound for about a week. At the end of that time it may be replaced by another similar dressing, or if the wound has a healthy granulating surface, it may be dispensed with, and a little iodoform or borax may be powdered over, or a simple or astringent lotion may be employed. The nourishing of the patient does not require any special attention, nor is it necessary to take any peculiar measures to prevent the discharges which proceed from the surface of the wound from passing down into the air passages: if they do pass into the air passages they are supposed to be innocuous. In order further to prove the effect of iodoform in cleansing the discharges and rendering them innocuous, Woelfler, in conjunction with Paneth, made a number of experiments, and found that it is possible, on the one hand, to induce in animals the septic pneumonia which is common in man after operations on the tongue, by injecting certain decomposing fluids into the trachea; and, on the other hand, to prevent the evil effects of the injection by mixing iodoform with the decomposing material.

So brilliant is the success in these last seventeen

cases that one is almost tempted to ask whether patients are ever again to die after the removal of the tongue, even when the operation is not limited to the mere removal of the tongue, but is extended to the preliminary ligature of the lingual artery on one or both sides, to removal of diseased lymphatic glands, of portions of the floor of the mouth, and to the resection of a portion of the lower jaw. For the cases quoted include all these procedures. The success is not, moreover, a chance succession of fortunate cases after a succession of mischances, but is the legitimate success obtained by long-continued efforts, assisted by experiments on animals, having for their sole object the improvement of the treatment of wounds in the interior of the mouth. It is not, of course, in the nature of things that such an operation as a complicated removal of the tongue should be undertaken in a large number of instances without the occurrence of a death, and this series must be accepted as a very happy series of successful cases, the number of which may be equalled and perhaps exceeded in the same wards or in other wards, but which will always be regarded as a full measure of success, whatever improvements may in the future be effected in the management of wounds of the interior of the mouth. So far as I am aware, English surgery cannot yet exhibit returns so good,* and I have no doubt that the reason is that in the United Kingdom there is still too great a disposition to rely more upon the manner in which the operation is performed than on the manner in which the wound is dressed and the patient is treated after the operation. The gauze and iodoform application recommended by Woelfler has not, I believe, been adopted here for operation wounds of the tongue, but iodoform has been used in a modified fashion by a large number of

* For English statistics see chapter xxi., on "The Choice of an Operation."

surgeons. Barker says that Heath has used it with the best results at University Hospital, and at St. Bartholomew's Hospital it has been used by my colleague, Mr. Baker, and myself. But it has been used merely in the form of powder, sprinkled or spread over the surface of the wound. I certainly am quite ready to attribute to it a marvellous power of arresting decomposition, even when employed in the manner described, for I have seen more than one case in which the discharge from the wound was decomposing and the breath was horribly offensive, and the patient was beginning to show signs of blood-poisoning, and in which the change of the washes which had been previously employed for iodoform was followed by complete cleansing of the mouth, an absence of fœtor of the breath, and a speedy subsidence of all the symptoms of sepsis. But I do not think that the mere powdering of the wound with iodoform secures all the advantages which may be gained by the application of properly prepared gauze. The protection afforded by the powder cannot be so great as that afforded by the gauze, which actually adheres to the wound and becomes, so to speak, a part of the wound during the first and most important days. The feeding of the patient without an œsophageal tube will probably be more readily accomplished if the wound is neatly packed with gauze than if it is merely strewn with powder; and although one knows that the difficulty of feeding through a tube is over-estimated by those who have never attempted it, nevertheless, there are few surgeons who would not prefer to dispense with the tube if it could be done with safety.

Since writing the preceding paragraphs I have tried the iodoform gauze dressing recommended by Woelfler, and the result was very interesting, but at the same time very unsatisfactory. The mouth

appeared to be thoroughly antiseptic, and the patient died on the eighth day, of septic pneumonia. The case is, on this account, sufficiently instructive to be recorded. The man was about fifty years of age, in bad condition, and suffering severely from the presence in the fore-part of his tongue of a rapidly destructive carcinoma, which had eaten deeply into the substance of the organ. I removed the tongue by Whitehead's method. Mr. Cripps assisted me at the operation, which passed off well and without any serious bleeding. The removal was effected through the mouth without enlarging the buccal orifice. The glands were not removed, because they were not known to be enlarged at the time of the operation. The cavity of the mouth was very carefully packed with iodoform gauze in strips, and the packing was evidently successful, for the gauze remained firmly fixed in the wound for several days, moving only with the floor of the mouth and the stump of the tongue. The patient was well the day after the operation, and was much relieved by the removal of the cancer. He was soon able to take nourishment by the mouth, and everything which had been foretold by Woelfler appeared to be proceeding in admirable order; there was no smell except the smell of the iodoform. But, within two or three days after the operation, the temperature, which had begun to subside, rose again, and the pulse and respiration quickened. He coughed at intervals, and spat up a very small quantity of rusty sputa. Even now he seemed so much better than before the operation that I could not believe it possible that he was suffering from septic pneumonia. I was the less inclined to suspect it on account of the perfectly sweet condition of the interior of the mouth. On the eighth day, without any sudden increase in the severity of the symptoms, he died. The autopsy shewed consolidation of a large part of both lungs, and,

in the interior of the consolidated tissues, many small abscesses and gangrenous areas. There was also recent pleurisy of the pleura covering the affected portions of the lungs. The appearances allowed no doubt to exist respecting the septic character of the disease.

I must confess that I was greatly disappointed at the result in this instance. That the patient should have been lung-poisoned by the discharges proceeding from a perfectly sweet wound, which appeared to be progressing favourably up to the time of his death, was not certainly what might have been expected. If he had died, as I believed he was dying, of a simple aseptic pneumonia, I should have regarded that as a mischance. But his death from septic pneumonia I looked upon as a very great misfortune. However, one must not be too ready to judge from the result in a single case. The poisoning may have been caused by the decomposition of the small quantity of blood which probably passed into the lungs at the time of the operation, or even by the foul discharges of the cancerous cavity before it was removed. I look forward to my next cases with extreme interest.

CHAPTER XXI.

THE CHOICE OF AN OPERATION.

IN a previous chapter several different methods of removing the tongue are described, but no opinion is expressed as to which of these methods should be adopted, except in so far as they are described under certain headings which denote that one or other of them is especially adapted for the treatment of an uncomplicated or a complicated affection of the tongue. Here I propose to advise, so far as it is possible to do

so, which operation shall be practised in the majority of instances, and what modifications of the operation, or what other operation is better suited for the rarer and more complicated conditions.

To begin with, I think it may be admitted that there are very few carcinomas of the tongue which cannot be removed through the mouth, supposing them to be within the reach of an operation; and, on the other hand, I think the converse of this proposition is true; namely, that it is not possible to gain any very important advantage over the buccal operation by any of the other methods, so far as extensive removal of intrabuccal disease is concerned, unless the disease within the mouth is complicated with such affection of the jaw or of the floor of the mouth and glands that it is necessary to remove all these structures. As Woelfler puts it, there are at present no statistics to prove that operations for the removal of cancer of the tongue and floor of the mouth performed from the outside are followed by better results so far as complete cure is concerned, than operations performed within the mouth. It may of course be said, in reply to this statement, that the operations from without are performed generally in more extensive conditions of disease than the operations from within.

Surgeons who have been in the habit of operating more or less frequently for removal of the tongue, and of employing one particular method, are not likely to be influenced in their selection of an operation by this chapter, unless it can be clearly shown that the new operation is far more easy to perform and far less dangerous to life than that which they have been accustomed to perform. But, in truth, there is little or no evidence to prove the great superiority of any one operation over all the others; although, on the other hand, there are distinct reasons for not performing more than one of the operations which have

been described unless there are some peculiar conditions which seem to demand it.

If the statistics of the results of some of the operations are studied, they will be found not very different in relative mortality, and the differences which do occur are such as may probably be easily explained. Baker prints a table of thirty-five cases, all treated by himself in his own peculiar method, and five of the thirty-five patients died within a short time after the operation. Four of the deaths were certainly due to the operation, but the fifth, which was from diphtheria setting in about the eleventh day, cannot be certainly ascribed to the wound, although it is possible it may have been due to it. Whitehead tabulates twenty-eight cases in which the entire tongue was removed by his method, but by different operators, and four of the patients died from the effects of the operation. The relative mortality of the two operations may therefore be said to be equal. Or if, by excluding the fifth death in Baker's table, his statistics are more favourable than those of Whitehead, it may be said for Whitehead's statistics that the entire tongue was removed in every one of his twenty-eight cases, while the thirty-five cases in Baker's table contain many instances of partial removal of the tongue.

Kocher claims to have operated on fourteen patients by his submaxillary method, with only one death, a brilliant result; but the number of cases is so much smaller than those in the English tables that it is scarcely fair to compare the results. It would be much more just to compare them with the first fourteen cases recorded by Whitehead, in which there was only one death. Indeed, if the first twenty-four cases in Whitehead's table are taken, they contain only one case in which death was the result of the operation, and as all the cases in the table are in chronological

order, this cannot but be admitted to be a very remarkable series. Of the last four cases, however, three died.

I have not at hand any large statistics of the results of operations performed with the galvanocautery, nor have I any tables of Regnoli's submental method.

Of division of the lower jaw, either with or without resection of a portion of the bone, I may say that the operation in the hands of Syme, who first performed it in Great Britain, was most fatal, so much so, indeed, that he speedily abandoned it. It has been performed since that time by several surgeons, but never, so far as I am aware, in many instances. Woelfler mentions six cases in which the jaw was divided or partially resected by Billroth, and only one of the patients died from broncho-pneumonia, an exceedingly good result when the severity of the operation is taken into account.

From what has preceded it may be judged that there are no very special reasons for preferring one operation to every other which has been performed for the removal of the tongue. I shall presently attempt to show, and, I think, with success, that the method of operating exercises infinitely less influence on the result than the after treatment of the case.

I should suggest to any person who was about to operate for the first time, or who is in doubt as to the operation which is best suited to the majority of cases, the following operations :

In uncomplicated cases, in which there is no disease of the glands,

Baker's method, or
Whitehead's method,

carefully carried out according to the description in the preceding chapter ; and if the disease is far back

and is not limited to the tongue, but affects the neighbouring soft structures,

split the cheek.

Of the two operations I personally prefer that of Baker, chiefly, perhaps, because I have not seen Whitehead's operation frequently performed. The sole advantage which can be claimed for the operation with the scissors over that with the *écraseur* is that the *écraseur* bruises the tissues through which it cuts, and the bruising is probably not confined to the line of incision, but extends slightly into the subjacent tissues, so that sloughing of the surface of the section must ensue. I am decidedly opposed to the use of the galvanocautery as an instrument for cutting off the tongue. It necessarily produces sloughing of the surface of the wound, so that several days elapse before the cut surface is clean and granulating; it produces more local inflammation than the scissors or the *écraseur*, and the absence of bleeding which is expected at the time of the operation is not always experienced, while the danger of secondary hæmorrhage must be far greater than in the cases in which a ligature is placed on the lingual artery, or torsion is employed, and this is done in Baker's and Whitehead's operations. With regard to different methods of removing the tongue through the mouth, the following quotation from a recent paper by Mr. Bryant may be given here: "As to the best means for the removal of a tongue wholly or in part, surgeons are found to differ, one advocating strongly the removal by the knife or scissors, whilst others as strongly urge the use of the *écraseur*, employed either as a crushing or burning force. The chain or wire instrument is used in the former case, and the platinum wire heated by means of a galvanic battery in the latter. For many years I employed the galvanic

écraseur, and found no fault with it; of late I have again resorted to the chain or wire instrument, but have had no reason to be better satisfied with my results. I altered my practice in deference to a strong opinion that has been given by some surgeons as to the dangers of the galvanic and greater safety of the simple écraseur, but this opinion does not find support from facts" (Guy's Hosp. Rep., xli, 124). In speaking, as I have done, against the employment of the galvano-cautery, I felt that it was only fair to Mr. Bryant to quote this statement; but, if I might venture to criticise the work of so excellent a surgeon, I should say that the use of the cord écraseur and the ligature of the vessel string which is drawn through the loop is far superior to the chain or wire écraseur, and affords a security which cannot be obtained with them. Mr. Bryant does not appear to have used the scissors in many instances, and, in this respect, his practice accords with that of most of the London surgeons. It is not improbable, if no other very superior method of operation is introduced, that the operation with the scissors will be practised much more frequently during the next ten years, for there appears to be a growing feeling in favour of giving it a more extended trial.

A preliminary tracheotomy, or preliminary ligature of the lingual artery, is not required in any of these operations, for the hæmorrhage at the time of the operation is, in the large majority of instances, very small.

In cases which are complicated with affection of the glands, or in which there is any doubt of the condition of the glands,

Kocher's method, or

Removal of the glands through a separate incision, through which the lingual artery may, at the same time, be ligatured, or

Regnoli's method if the glands are chiefly in the middle line.*

Hitherto the removal of diseased glands in connection with disease of the tongue has not been practised nearly so frequently or so methodically as in some parts of the Continent, notably in Germany. Operations are often denied to patients whose glands are obviously affected, and doubtful affection of the glands is very often left untreated, in the hope that the affection is not cancerous, or in the fallacious belief that the glands can be dealt with better when they are larger and more obviously diseased. The inclination, which is fast becoming a law, in the operative surgery of the breast, to examine the axilla in every case in which there is doubt of the condition of the glands, must be extended to the operative surgery of the tongue. There is a feeling which almost amounts to a prejudice, against the making of a wound in the neck at the same time as the tongue is removed; but the facts which can be brought to bear on this matter may go far to dispel this feeling. Let the sub-maxillary or submental region be examined through a sufficient incision; let the affected or suspicious glands be removed, and let the lingual artery be ligatured through the same incision *before* the removal of the tongue is commenced, and the difficulty of the operation within the mouth will be largely diminished, while the mortality of the whole proceeding will not be seriously increased. Thus, Woelfler tells us that Billroth performed four operations by Regnoli's operation, and all four patients recovered. And, further, that of forty cases in which the removal of the tongue was effected through the mouth, twenty were *without*

* Billroth's modification is, perhaps, preferable. The longitudinal incision is omitted, and the ends of the curved incision are carried farther back on each side, so that the lingual arteries can be ligatured before the removal of the tongue. (See Fig. 3, page 321.)

previous preliminary ligature of the lingual artery, with five deaths, while the other twenty were performed *with* preliminary ligature of one or both lingual arteries, with two deaths. I would not venture to draw too many inferences from this list of cases, but it is impossible to be blind to the fact that there is certainly nothing in them which can make one believe that the danger of the operation is in the smallest degree increased by the preliminary ligature of the lingual, or by the wound which is made for the purpose.

With regard to Kocher's method, it is probable that the preliminary tracheotomy may be dispensed with by the use of a different dressing of the wound. On the only occasion on which I performed it, Mr. Baker, who was present, thought that it was not possible to remove the tongue farther back through the submaxillary opening than it is through the mouth when the cheek is split. I quite admit the truth of this remark ; but when the opening in the neck has been made, and the glands have been removed, and the lingual artery tied, it is not worth while to split the cheek for the complete removal of the tongue when that can be performed easily and thoroughly through the submaxillary incision. Barker has strongly recommended a preliminary tracheotomy in the more severe operations for removal of the tongue, partly for the purpose of allowing the operation to be conducted with greater comfort and safety without the fear of blood descending the trachea, partly to prevent the patient inspiring foul air, and sucking down decomposing discharges after the operation has been performed. But Barker's later experience of the means of arresting hæmorrhage during the operation, either with or without ligature of the lingual artery from the neck, and the improved methods of dressing the wound to which he has alluded and which we shall presently discuss, will probably modify his views on this subject. Without daring to

speak dogmatically on the subject, I am strongly of opinion that a preliminary tracheotomy is very seldom necessary, and that it adds, if only a little, to the dangers of the amputation of the tongue.

I have only to add that through the courtesy of Mr. Whitehead and Mr. Baker, I am able to give their statistics of removal of the tongue up to a recent date.

Mr. Whitehead wrote on the 16th of October, 1884, "I have removed the *entire* tongue fifty-eight times. Forty-eight cases have been excised by scissors. I have had nine deaths. The oldest male patient was seventy-six, and the youngest thirty-eight. The oldest female was sixty-four, and the youngest two years.

I have excised the tongues of eight females, and they all recovered.

I have never had any serious difficulty in controlling hæmorrhage, and I cannot remember any patient having died from the immediate effects of losing blood. I must remark that a very large proportion of the cases I have operated upon have been patients in a very advanced stage of the disease where the operation has been undertaken more as a means of relieving pain than with any sanguine prospect of prolonging life."

In reply to a letter of mine asking what the causes of death had been, Mr. Whitehead wrote on the 18th of October: "As for the cause of death in my nine cases, I find that five died from septic pneumonia, one from thrombosis, one from fatty degeneration of the heart, one from an abscess bursting into the bronchial tubes, and one registered as death from exhaustion."

Mr. Baker has given me notes of five cases in which he has removed half or the whole of the tongue since his last table of statistics was published. These five cases, added to the former thirty-five, bring the total.

number up to forty. None of the last five cases was fatal, although in one of them the right tonsil and a part of the soft palate, and in another a portion of the whole thickness of the lower jaw, and part of the floor of the mouth, were removed, as well as the entire tongue. If, therefore, the death from diphtheria, which occurred in one of his earlier cases, is not attributed to the operation, Mr. Baker may claim to have removed the tongue forty times, with four deaths, a very excellent result. Three of the four deaths were due to septicæmia or septic pneumonia; the fourth occurred from syncope on the day after the operation in a very feeble, gouty man.

CHAPTER XXII.

LATER OPERATIONS ON THE LYMPHATIC GLANDS— LATER OPERATIONS FOR RECURRENT DISEASE— PALLIATIVE TREATMENT.

[Ligature of the Lingual Artery.]

WHEN a cancerous tongue has been removed, and the lymphatic glands appear to be healthy at the time of the operation, it nevertheless happens not unfrequently, that at a later period, usually within three or four months, the glands begin to enlarge. The enlargement may be quite independent of reappearance of the disease within the mouth, or it may be accompanied by reappearance of the affection of the tongue, or of the floor of the mouth. It has been already pointed out that when the glands thus become enlarged after removal of disease of the tongue, and when the enlargement is not accompanied or preceded by recurrence within the mouth, there is every reason to believe that the glands were really affected at the time of the removal of the lingual cancer, but that the affection

had as yet produced so little enlargement of them that it could not be distinguished through the structures forming the floor of the mouth. In order not to overlook even the slightest enlargement, it is very desirable that a very thorough examination should be made of the floor of the mouth at the time of the operation on the tongue when the patient is under the influence of chloroform, and the parts can be examined by careful pressure and searching between the two forefingers, one in the mouth, the other below the jaw. If there is the least suspicion of their condition, the glands should be exposed and removed; for it is of great advantage to the patient to be rid of the whole disease at one operation; and it has been shown that the increased risk to life of an opening in the neck need scarcely be taken into consideration.

In spite, however, of every precaution it occasionally happens that the glands begin to enlarge shortly after the operation in the mouth, and then the question arises whether they should be left or removed by operation. The answer is in most instances clear. If there is no recurrence within the mouth, if the enlarged glands are easily movable, and if the patient's health is good enough to bear an operation, they should be at once removed. And not only should the glands which are obviously diseased be taken away, but all the glands which can be discovered in the neighbourhood of the affected glands should also be removed. If they are not now obviously affected, there is strong probability that they will soon be affected. Such an operation for the removal of affected glands is not, as a rule, nearly so severe or so dangerous to life as the operation within the mouth.

If, on the other hand, the glands feel fixed, or are only partially movable, even if they are so placed that they can probably safely be removed, there is small hope of benefit from an operation. I have removed

such glands and have seen them removed by others, but with little or no benefit. Indeed, even if the fixed gland is removed, the disease almost certainly remains behind unless a very wide area of the surrounding tissues is cut out or destroyed at the same time. The important structures in the immediate vicinity of the disease, and the uncertainty as to how much of the surrounding tissues it would be necessary to remove to secure an absolute cure, make one hesitate to do as much as might be done without gravely endangering the patient's life. But, however this may be, it is a fact that operations practised on glands which are fixed or nearly fixed are, as a rule, unsuccessful. The disease reappears almost before the wound has healed.

Hitherto nothing has been said in regard to the possible necessity and desirability of operations for recurrence of the disease of the tongue and floor of the mouth. Nor need much be said. It suffices to point out that the disease returns within the mouth in a large proportion of the patients who are operated on, and that, provided the patient's health is not seriously impaired, and the recurrent disease is not quite out of reach, there is just as good reason for removing the recurrent disease as there was for removing the original disease. Operations for recurrence are not usually so successful or so easy to perform as primary operations, for the disease is often far back in the mouth, and still more often involves the floor of the mouth and neighbouring parts, and is usually far more fixed and difficult to define than the original disease. For one or other, or all, of these several reasons, operations for recurrence are very rare in comparison with the number of instances in which the disease recurs.

In connection with this subject it may not be amiss to point out that it may be justifiable, nay, desirable, to remove a part only of a cancerous disease and to

leave a part behind, well knowing that it will certainly advance, and ultimately prove fatal. Thus, it may be a great relief to the patient to have a carcinoma of the tongue removed when the lymphatic glands are already so extensively affected that their removal cannot be undertaken. The operation may fairly be recommended to patients who suffer much from pain and salivation, and who find it very difficult to take nourishment in any form. Life may even be prolonged by such an operation, and although this may seem scarcely desirable in the case of a disease so hideous and distressing, yet the longer term of life which is granted may be much easier than was the life before the removal of the cancer, and the gain is thus twofold. The gradual death from exhaustion which is produced by affection of the lymphatic glands is usually far less distressing than the death from carcinoma of the tongue.

On the other hand, I do not approve of operations which are undertaken for the removal of a part of the disease actually within the mouth. I have heard the opinion expressed that the removal of a part of the disease in this fashion will probably afford some relief to the patient, but I cannot conceive that the relief afforded by such an operation can compensate for the distress of mind and the pain due to the performance of the operation.

Last of all is the important question of the **palliative** treatment of those cases in which it is found impossible to remove the disease, or in which the patient refuses operation, or in which the disease recurs after removal. After all that has been or can be done by operative treatment, this question, for the present and probably for many years to come, will more frequently require consideration than any other. Whether the carcinoma is untreated, or whether it recurs after operation, both

the patient and the doctor will want to know the best way of allaying the pain, of diminishing the salivation, of correcting the fœtor, of assuaging the hunger, and of arresting the hæmorrhage, which are associated with the steady advance of the disease. Fortunately, we are not so helpless in these matters as our fathers were, and, although we cannot promise that a patient shall suffer no distress from an advancing and fatal cancer of the tongue, we can do much to alleviate the distress which, without treatment, would be intolerable. Take each of these troubles separately, and consider what means will best relieve it.

Pain is not in all instances an equally prominent symptom. Some patients suffer very little pain even up to the period of death. But in other cases pain is excessive and almost constant; it is aggravated by every movement, or attempt at movement, of the tongue; it is increased by the taking of food, however soft and well prepared; and it is even heightened by the contact of the washes which are used for the purpose of cleansing the mouth and correcting the fœtor. It may be much soothed, and even completely relieved by various means. Insufflation, such as I have recommended in the treatment of painful tuberculous ulcers of the tongue, and such as has long been practised with the best result in various affections of the larynx, will often afford great relief. A powder composed of three or four grains of borax, one grain of iodoform, and from one-sixth to one-half grain of morphia, is blown directly on the surface of the ulcer. The precise spot where the pain is most acute should be chosen, and, before the powder is applied, the surface of the sore should be dried as far as it is practicable to dry it by very lightly touching it with a fragment of absorbent wool, or a tiny roll of blotting-paper. The powder may be blown through a plain glass tube, with a diameter of about one-third of an inch, or through

one of the nasal or laryngeal insufflators kept by most instrument makers. The quantity of morphia in each powder must be determined by the amount of suffering of the patient, and by the effect of morphia upon him. The insufflation may be repeated several times in the day, if necessary, for it can easily be performed by a non-professional person, and does not need special skill or knowledge. The relief afforded by insufflation is so great in many instances, that it can scarcely be over estimated.

There is another local treatment which can scarcely be recommended, but which must not be passed over in silence, the application of the actual cautery to the surface of the ulcerated cancer. It has been employed with marked relief in one or two cases of tuberculous ulcer, and may perhaps prove useful in certain cases of carcinoma where the disease is so situated that it cannot be thoroughly removed, and where one point appears to be, above all others, the seat of the pain. It should be employed at a dull red heat so as not to burn too quickly through the tissues, and so produce hæmorrhage, and should be very carefully and thoroughly applied to the painful and tender parts of the surface of the sore.

Division of the lingual nerve is described in the chapter on neuralgia of the tongue; but inasmuch as lingual neuralgia is rare and lingual cancer is common, division of the lingual nerve is likely to be much more frequently required for cancer than for neuralgia. It has been practised now for many years past for the relief of the pain of cancer, and yet it has not, I think, been practised nearly so often as it might have been with advantage to the patients. Hilton and Moore both speak of it in high terms, and I have seen very good results from it during the past few years at St. Bartholomew's Hospital, where it has been performed by some of my

colleagues. It not only promises relief from pain, but diminishes and may completely arrest the salivation, which is, in most instances, exceedingly distressing. The effect is instantaneous, the pain and salivation cease the instant a complete section of the nerve has been made. Unfortunately the divided nerve re-unites, and when the continuity is again established, the symptoms recur. Usually a month or more elapses before there is any recurrence of pain and salivation, and about another month before the distress is as acute as it was before the operation. But a month of complete release from suffering has been purchased by a very trivial operation, and there is no good reason why the operation should not be repeated at the end of every month or two, as long as may be necessary. However, it is probable only a few patients will be found to suffer so acutely as to require the division of the nerve, for most of them are sufficiently relieved by insufflation and the internal administration of morphia. It may be suggested that a portion of the nerve should be resected to prevent the two ends again uniting, but the operation of resection is much more difficult and tedious than the operation of division, and the disease is so situated in many instances as to interfere seriously with the performance of so tedious an operation. In the chapter on neuralgia both Hilton's and Moore's methods of dividing the nerve are described. Moore's is preferable to Hilton's when the mere division of the nerve is intended, for it implies little more than a single incision. But Hilton's may with advantage be employed if resection of a portion of the nerve is contemplated. The dissection necessary to expose the nerve may be made under chloroform, and a portion about half an inch in length may be removed.

Division of the nerve may be practised in all cases in which the nerve can be reached, and in which

the pain and salivation are not relieved by insufflation. Chloroform may be administered, but Moore's operation really does not necessitate chloroform, unless the patient suffers so much from the disease that he cannot bear the slightest touch upon the tongue, and perhaps cannot bear to open the mouth widely enough to allow the division to be made. If chloroform is necessary, I think it is wiser completely to expose the nerve by Hilton's method, and so make quite sure of dividing it, or of resecting a portion of it.

Lastly, the administration of opium and morphia play a large part in the later treatment of most fatal cases of carcinoma of the tongue. No special directions are needed in such cases other than those which should be observed in the administration of the same drugs in other painful diseases. As a rule, it will be found easier to administer the medicine as an injection than by the mouth, but preparations of opium may be given with advantage to the majority of patients by the mouth. Two rules may, I think, be observed with benefit to the patient in most cases of cancer of the tongue; first, never to give narcotics until they are absolutely necessary; second, when narcotics are used, to use them freely enough to keep the patient relieved by them. The first rule is of importance, for the distress produced by the disease is frequently increased by the depression which opium and morphia produce. The second rule is also very important, for it is not unusual for practitioners to administer narcotics in small doses, yet to refuse to increase the dose as the symptoms become more acute, and as the patient becomes habituated to the drug. It should be always borne in mind that, in such cases, the measure of the amount given must be, not the exact quantity, but the effect which is produced.

Salivation.—The means which have been discussed in the preceding paragraphs are useful against

salivation as well as against pain. The insufflation of iodoform particularly has been successfully employed to diminish the salivation. If the quantity of iodoform in the powders (of which the prescription is given above) is not sufficient, there is no objection to increasing it, or the iodoform may be made to take the place of a part of the borax, so as not to render the powder too bulky. As the odour of iodoform is disagreeable to most persons, especially when it is used in a very concentrated form, it may not be amiss to say that the addition of a drop of attar of roses to each dram of iodoform suffices almost entirely to conceal it. This suggestion appeared in a number of the *British Medical Journal* in 1884, and I have found it useful in several cases in which persons who were advised to employ iodoform as an external application objected to the drug on account of the pungent odour.

In the remarks on the effect of division of the lingual nerve, it was stated that the profuse salivation, as well as the pain of lingual cancer, are relieved by it. Not only is the patient less annoyed by the salivation, but the secretion of saliva is considerably diminished. And the improvement is maintained as long as the relief from pain, in fact until the nerve unites again.

The vapour of creasote, which will be alluded to in the next paragraph, appears to have the effect of diminishing the quantity of saliva, but it is probably inferior to iodoform in this respect.

Fætor.—Again, the powder of iodoform will be found one of the most powerful agents in correcting the stench which is so horrible a feature of advanced lingual carcinoma. As in the case of an offensive operation wound in the mouth, so in the case of an ulcerated carcinoma, the application of iodoform will often completely remove the fætor. There is not,

however, the same certainty of correcting the foster of an ulcerated carcinoma, for the ulceration is more difficult to reach in all its windings and its fissures, and the effluvia depends partly on the naturally offensive discharge exuded by the foul disease, partly on sloughing of portions of its surface, and partly on the sinking of food into its depths, where it decomposes. It is well, therefore, to order the mouth to be thoroughly washed out with a solution of Condry's fluid, or weak carbolic acid, or some similar disinfecting fluid before the powdered iodoform is applied. The formula which has been mentioned may be employed with a greater or less proportion of morphia according to the pain which is complained of, and a greater or less proportion of iodoform according to the intensity of the offensive odour.

Various other applications have been recommended to destroy the stench of lingual cancer, but I believe that none is so efficacious as iodoform. Condry's fluid, carbolic lotion in different strengths, chlorate of potash gargle, myrrh and borax, have all been used for this purpose. The vapour of creasote is preferable to most of these, inhaled through an ordinary inhaler, into which is placed a pint of water, two-thirds boiling, with a teaspoonful of the following mixture: creasote, 80 minims; light carbonate of magnesia, 30 grains; water, 1 ounce. The inhalation may be made at frequent intervals during the day.

There is another remedy which may be used in the form of powder, which possesses strong antiseptic properties, salicylic acid. It has been used with admirable effect in ulcerated cancers of other parts of the body, and there seems no reason why it should not be used also for cancer of the interior of the mouth. It may be combined with borax, and if necessary with morphia also, and may be blown in

upon the ulcer like the iodoform powder. A very small quantity of the acid suffices, a proportion of about 3 to 10 grains to the 100 grains of borax. If this proportion is found insufficient, a larger quantity may be employed without fear of producing constitutional effects. Salicylic acid possesses one advantage over iodoform; it is quite free from odour. At present, however, an opinion cannot be so certainly expressed on its merits as a deodoriser, for it has not been nearly so frequently employed, at least for wounds and sores within the mouth.

Hunger.—In by far the larger number of cases of lingual cancer the patient is able to take nourishment by the mouth without any other assistance than is afforded by the careful preparation of the food. In advanced cases none but liquid food can be taken, and, as a rule, cold or lukewarm liquids are preferred. The food should be free from pepper, spices, and irritating substances; and, if solid food is taken, it should be soft meat and jelly, or very carefully mashed or sopped material. If stimulants are taken, they generally require to be largely diluted, on account of the smarting which they excite when taken in a pure or nearly pure condition.

In those cases in which the taking of food by the mouth is the cause of great distress, either on account of the smarting produced by the direct contact of the food with the surface of the sore, or because the taking of food necessitates or excites movement, or attempt of movement, of the tongue, and every attempt at movement is fraught with anguish, the patient may be fed partly by the mouth, chiefly to allay the thirst, and partly by the rectum. For the latter purpose, Slinger's suppositories are highly to be recommended. They are prepared of various nutritive materials, so mixed as to form a conical mass less than half the size of a racquet ball. One of these masses introduced every

four or six hours suffices to maintain the patient's strength, and I have known them borne without serious trouble by the rectum for as many as two or three weeks, or even longer. As a nutrient enema, either of those described in the foot-note* can be strongly recommended. I have fed a patient solely with one of them for as long as four weeks, and during the whole of that period the enema has been borne without producing the slightest distress.

* The following recipes for nutrient enemata have been given me by Mr. Berry, to whose ingenuity they are in great part due, and who used them in cases under my care in the wards of St. Bartholomew's Hospital during the time that he was house-surgeon to the hospital.

The first is :

Milk	half-a-pint.
Beef-essence	half-a-pint.
Eggs	three.
Sodæ bicarb.	60 grains.

Mix, boil thoroughly, then rub through a fine hair sieve.

Two ounces of the mixture are to be administered with half-a-dram of Benger's liquor pancreaticus, one dram of brandy and tincture of opium if it is deemed necessary.

The second is :

Milk	half-a-pint.
Beef-essence	half-a-pint.
Eggs	three.
Sodæ bicarb.	60 grains.
Liquor pancreat.	six drachms.

Mix thoroughly and digest at a temperature under 140° (Fahr.) until the mixture begins to taste slightly bitter (this usually takes about an hour). Then boil the whole for a minute or two to stop further digestion. Add brandy and tincture of opium afterwards if necessary.

The third is much the easiest to make :

Milk	one ounce.
Beef-essence	one ounce.
Sodæ bicarb.	five grains.
Liq. pancreat.	half-a-drachm.

Mr. Berry, in his comments on these three enemata, says that the chief difficulty in making the first is the rubbing of the material through a sieve, but this is necessary to allow it to pass

In a certain number of cases it may be more agreeable to the patient to be fed through a tube introduced into the œsophagus, and passed either into the stomach or a part of the way only. Fluids can be easily run through the tube from a funnel attached to it. The tubes best adapted for the purpose are the vulcanised indiarubber catheters, which are so soft that they produce the least possible irritation, and which can nevertheless be passed without difficulty down the œsophagus. The operation is so unirritating and so easily performed that it may be repeated as often as is necessary; or, if the patient has a great objection to the actual passing of the tube, it may be left in the œsophagus with the end projecting from the mouth, as is done in cases of advanced œsophageal cancer with obstruction.

Hæmorrhage.—Although death from hæmorrhage is not a frequent termination of lingual carcinoma, slight, and sometimes severe, hæmorrhages are by no means infrequent, especially in the later stages of the disease, and, without proving directly fatal, are certainly indirectly instrumental in causing death earlier than it might otherwise occur. Death from hæmorrhage at a tolerably early period of the disease, in cases in which it is not possible to remove the disease, and in which, therefore, the only prospect is of death, cannot be deplored, for the patient is spared by such a sudden accident from weeks, or perhaps months, of suffering, which may indeed be softened by treatment, but which must always be hard to bear even under the best-directed treatment. More than once I confess I have felt a wish not to interfere, but to allow the

through an ordinary enema tube. In making the second, care must be taken lest the digestion be carried too far and the material be thus spoilt. . . . On account of the care which is necessary to prevent this catastrophe, this is the most difficult of the three to prepare, but it is certainly the best when it has been successfully made.

hæmorrhage to take its course in the fervent hope that it would speedily prove fatal.

The bleeding is usually venous or capillary, and the fluid oozes slowly away, sometimes altogether ceasing, and again commencing to run more quickly. In such cases the question of an operation does not arise. All that is necessary can be done by means of styptics or pressure. If the blood runs from a single point on the surface of the ulcer, or from the bottom of a fissure, it may usually easily be arrested by the pressure of a piece of lint beneath the finger, and the continuance of the pressure for a few minutes, or it may be half-an-hour suffices. The pledget of lint may be soaked in the tincture of the perchloride of iron, or in the solution (liquor) of the subsulphate of iron, or may be powdered with matico. When the blood oozes from the whole or a large part of the surface of the ulcer it may be treated in the same way by the pressure of medicated lint; but it is much more difficult to apply the pressure. It will be found better in such cases to use a strong styptic solution, such, for example, as an ounce of water containing 360 grains of tannic acid and 120 grains of gallic acid. These large quantities of the acids are not soluble in so small a quantity of water, but they form a thick sediment which is diffused through the water when the mixture is shaken thoroughly. The blood should be as far as practicable cleared off the surface of the sore, and a teaspoonful of the mixture should be slowly sipped, so that it may lie long on the ulcer as it passes over it. Tincture of hamamelis may be used, either diluted with an equal quantity of water, or pure; it acts for the most part more certainly and quickly when a piece of lint or soft rag is thoroughly soaked in it and applied to the bleeding surface. If a small quantity of these applications is swallowed no harm is likely to ensue.

In one instance in which repeated hæmorrhages threatened to speedily destroy the patient, a solution of ergotine was injected into the arm. From four to six minims of the *injectio ergotinæ hypodermica* was thrown into the muscle by our house-surgeon, Mr. Square, with the apparent result of arresting the bleeding, for it ceased, and did not recur after the second or third injection, although it had previously been both frequent and abundant. I have not used it in any other case, nor have I seen it used by any of my colleagues; and I do not, therefore, care to speak strongly of it on so small an experience. The bleeding in the case in question appeared to proceed from some small artery or arteries; the blood was bright and flowed vigorously, and with imperfect jetting.

When the hæmorrhage is distinctly arterial, and proceeds from one of the larger branches of the lingual, or from the lingual artery itself, the advisability of applying a ligature at the usual seat will arise. The operation is, however, very seldom performed. The occasion for it rarely occurs, and when there is so severe a bleeding as to require it, the rapidity with which the blood is lost, and the weakened condition of the patient, usually quickly end in death. Still, there are cases in which time is afforded for the performance of even so tedious and difficult an operation as ligature of the lingual artery, and in which the patient and the friends urgently desire that life shall be prolonged, even if it be only for a few days. Under these circumstances the artery must be tied with as much expedition as is possible.

It will not be amiss to describe the operation here, for probably no other more fitting place will be found for the description.

The artery may be tied through several different incisions, but two of them are much more frequently employed than the others, and only these two need be

described. In either case, the patient is so placed that the head is thrown well back and the chin is turned towards the side opposite to that on which the artery is to be tied; the operator stands behind the patient's head.

By the first method a slightly curved incision, from one and a half to two inches in length, is made from the lesser cornu of the hyoid bone upwards and outwards along the upper border of the greater cornu. The skin, the platysma muscle, and the cervical fascia are divided, and the lower border of the submaxillary gland is exposed; this is turned up until the hypoglossal nerve is seen and the point where the tendon of the digastric muscle is fastened to the hyoid bone. In the triangle formed by the nerve above, and the two tendons of the muscle, one on either side, below, lies the lingual artery, but beneath the hyoglossus muscle. The lingual vein usually lies on the outer surface of the muscle and must be drawn aside. The fibres of the muscle are then cut through and the artery is exposed.

By the second method, a longer and more curved incision, with the convexity, as in the last case, downwards, is made from a little below the symphysis of the jaw to the anterior border of the sterno-mastoid muscle below the mastoid process, in such a manner that the lowest part of the convexity is just above the middle of the greater cornu of the hyoid bone. A larger flap is thus raised, and, pursuing the dissection in the same manner as in the last case, a more complete exposure of the parts overlying the artery is obtained.

It must be borne in mind that the course of the artery is liable to variation, and the variations, which have been well described, some of them for the first time, by Zuckerkandl, are as follows:

1. The artery may arise at a higher level than

usual from the external carotid, and therefore may lie a little higher above the cornu of the hyoid bone; but this does not affect the operation in the hypoglossal triangle. Or it may arise at a lower level, and from the posterior aspect of the carotid, and may be covered for some distance above its origin by the facial artery, which may be mistaken for it and ligatured.

2. The artery may pass between the mylo-hyoid and the anterior belly of the digastric, perforate the mylo-hyoid and penetrate the substance of the tongue between the genio-hyoid and the hyo-glossus. Or, it may accompany the hypoglossal nerve in the place of the inferior hypoglossal vein. Neither of these conditions is likely to affect the operation seriously, as they would almost certainly be noticed sufficiently early in the operation to prevent an error.

3. One of the lingual arteries may completely fail, and the entire tongue may be supplied with blood by the other artery.

These abnormalities are all uncommon, and most of them, the last especially, are extremely rare: it is necessary to mention them, but it need not be feared that the occurrence of one of them will render the operation of ligature of the lingual artery more difficult. Unfortunately, the least complicated operation for ligature of the lingual is far from easy, and the fear of abnormalities in the origin and course of the artery is not the cause which makes men unwilling to attempt it unless they are almost driven to it. The large size and thin coats of the lingual vein, and the difficulty of drawing it thoroughly to one side or well above the line of the artery; the network of veins which sometimes lies immediately in front of the triangle; the difficulty which is in some cases experienced in clearly discovering the boundaries of the triangle; the oozing when the fibres of the hyo-glossal muscle are divided and when it is most desired to obtain a clear view,

are only some among the many conditions which render ligature of the lingual artery one of the most difficult of operation for ligature in the human subject. Even on the dead body it is not easy; how much less so on the living subject, with all the accompanying circumstances which render every operation for the arrest of actual hæmorrhage difficult and anxious!

CHAPTER XXIII.

PARASITIC AFFECTIONS OF THE TONGUE.

Dracunculus, or, Guinea-Worm—*Trichina Spiralis*—Thrush—Fur.

I. ANIMAL PARASITES.

ANIMAL parasites, of whatever kind, are exceedingly uncommon in the tongue. The echinococcus, the most frequently observed, and the cysticercus, are described in the chapter on cysts of the tongue. It only remains to say a few words regarding the *dracunculus* (guinea-worm) and the *trichina spiralis*, both of which have been observed in the human tongue.

Dracunculus (*filaria medinensis*; guinea-worm) I have only found the record of one case of guinea-worm in the tongue; and, as that case is quoted in every treatise on diseases of the tongue in which the guinea-worm is mentioned, I am inclined to believe it is the only case on record. It is related by Davaine, who says the patient was a young man under the care of Clot-Bey, and was treated in the hospital at Abou-Zabel, in 1825. He had a painful swelling at the tip of the tongue, near the frænum, was much salivated, with swollen and bleeding gums, and could not take any solid nourishment. The little tumour fluctuated; it was therefore punctured, and serous pus escaped.

In the efforts which the patient made to spit, a portion of a guinea-worm was expelled. The worm was afterwards extracted by the method of unrolling which is usually practised for its removal.

If the theory be correct that the young filariæ obtain entrance to the body through a sudoriparous duct or hair follicle, it may be suggested in this instance that the worm effected a lodgment beneath the tongue by entering one of the salivary ducts or, possibly, the duct of the Blandin-Nuhn gland.

Trichina spiralis.—As I have found only one record of the occurrence of guinea-worm in the tongue, so I have found only one record of the occurrence of trichina. Not that trichina does not occur in the muscles of the tongue as in those of other parts of the body; but there is only one record, so far as I have discovered, of trichina producing a definite tumour in the tongue, and apparently occurring there and in no other part. It is related in the Transactions of the Pathological Society of London, in 1849, by Dr. Miller, that a woman, forty-nine years old, had a circular, cupped, dense and painful tumour, about the size of a shilling, springing from the left border of the tongue not far from the root. The neighbouring parts were slightly indurated, and there was pain in the cheek, pharynx, and ear of the affected side. It is not distinctly stated at what time the tumour first was noticed, but the patient, who had been quite well until two years before the case came under the observation of Dr. Miller, was cachectic and ill.

No very strong opinion appears to have been expressed as to its exact nature; but it was regarded as suspicious, and was accordingly removed with ligatures. The examination was made by Mr. Dalrymple, who found that it was composed of trichinæ spirales, imbedded in (?) non-striated muscular fibre. The further history of the case is not recorded, nor is there an

express statement that the patient was not elsewhere trichinous, but the character of the account leads one to infer that she was not so.

II. VEGETABLE PARASITES.

Vegetable parasites are exceedingly common on the surface of the tongue; probably no tongue is ever completely free from them. But there is only one disease, so far as I am aware, directly due to the presence of a vegetable parasite. The description of thrush which depends on the development of *oidium albicans* ought, for some reasons, to be placed under the general heading of plaques and patches; but it will be better, in view of its decided parasitic nature, to describe it here, and merely to refer to it in the other chapter. Fur, which is at all times chiefly made up of vegetable parasites, will be also described in this chapter. It cannot truly be regarded as a disease, for it is almost invariably present on the tongue, but it is so mixed up with diseased conditions that it is entitled to a place in this volume.

Thrush (soor; mehlmund; stomatitis aphtho-phyta; muguet; schwämmchen).—A membranous disease, not only of the tongue, but of the inside of the mouth generally, which depends on the presence of a fungus (*oidium albicans*), and which occurs almost invariably in children. It is not infrequently confounded with aphthous stomatitis, with which it has in truth little in common.

Children who are brought up by hand are the usual subjects of thrush. The disease commences with slight indisposition, which may be of several days' duration or may last only a few hours. If the mouth is examined at this time, the mucous membrane, especially that covering the tongue, is observed to be of a much deeper red than usual; the redness is not in patches, but is uniform, and the surface of the

tongue is sticky and has an acid reaction. In the course of a few hours tiny white patches, like bits of curd, appear on the tongue, especially near the tip and edges, on the inner aspect of the lips, on the inside of the cheeks, especially near the angles of the mouth, and in smaller number and less frequently on the gums. They are at first circular, and as they increase in size, still, for few days, retain their circular outline. But if the disease continues to advance, they coalesce and form a continuous layer which may extend over the whole tongue (except, perhaps, the centre of the dorsum), the inner surface of the lips, cheeks, soft palate, uvula and tonsils, so that all these parts are covered by a thick layer of membrane which has rather a creamy than a dead-white hue. The disease may even extend to the pharynx and œsophagus, but it does not attack the larynx and trachea, being fortunately, as Vogel has pointed out, limited in its occurrence to those parts of the mucous membrane which are lined with squamous epithelium. The patches at first adhere closely to the mucous membrane, and although the surrounding membrane is not congested in a definite area as in aphthous ulceration, they can only be detached with difficulty, and with the leaving behind of deep red areas which often bleed slightly. In the course of some days they become yellower and drier, and may then fall off spontaneously, or may easily be detached, the more easily if they are still of small size and have not coalesced to form a continuous layer. After they have existed for some time they may assume a brown colour, particularly if they have been roughly handled and have been made to bleed.

During the whole period of the formation and extension of the patches the child is more or less ill; partly on this account, and partly because the mouth is sore, it does not care to suck. The bowels are usually

relaxed, and in many instances there is troublesome diarrhœa, with the passage of green and sour-smelling stools. The child becomes in the worst cases torpid and drowsy, and if the diarrhœa continues, the anus and buttock are irritated, and become red and actually sore. In some cases patches resembling those in the mouth have been noticed on the buttocks, and this, no doubt, together with the occurrence and persistency of the diarrhœa, has given rise to the popular belief that the thrush passes completely through the child.

The *course* which the disease runs depends in large measure on the conditions in which the child is placed. It is a matter of common observation that patients who are attacked by thrush in private practice almost invariably recover, while children who are attacked by thrush in large foundling establishments are much more ill, and much more liable to die. In fact, in the French foundling hospitals the mortality from thrush was at one time enormous. The difference might, perhaps, have been attributed to the less healthy condition of the patients at the time they were attacked by the disease; but experience has shown that the observance of strict cleanliness is more effectual in preventing and in curing the disease than any other means. Children who are well managed and carefully treated usually recover without any grave symptoms in the course of a few days. Children who are not managed and treated well are very subject to enteritis; they become exceedingly emaciated, are unable to take food, are weakened by continual diarrhœa, and at length die exhausted. The thrush of adults is even more fatal than that of children, or, to speak more correctly, is followed by a greater mortality than the thrush of children; for the disease is not itself a cause of death in adults. It occurs almost only in adults who are the subjects of slowly progressive and fatal diseases, phthisis and cancer, for example.

Children *who die of thrush* present, on section, the white membrane in the mouth, and, perhaps, down the œsophagus as far as the cardia, but not in any other part of the intestinal tract. The most constant occurrence, in addition to the membranes, is that of inflammation of the follicles of the small intestine. West states that twenty-one of twenty-six bodies of children who have died of thrush present these appearances in the small intestines. The presence at death of the white membranes in the mouths of children who have been suffering from thrush for a considerable period is explained by the circumstance that the membranes re-form after they have been detached, and the re-formation may take place frequently in the time between the first appearance of the disease and death.

If the white membranes of thrush are examined *with the microscope*, they are found to be composed almost entirely of a fungus consisting of threads and spores embedded in a finely granular mass. The spores are round or oval bodies, very much larger than the spores of micrococcus, with which, therefore, there is no possibility of confounding them. The threads are said by Vogel to be of two kinds, broad double-contoured rods, with many transverse marks; smaller and slenderer rods, slightly granular, with scarcely any cross lines, and less clear contours. The former are probably the proper threads of *oidium albicans*, and are formed by elongation of the spores. The latter are more abundant on the free surface of the membranes, the former deep down in proximity with the epithelium. The disease appears to originate in the development of the fungus in the superficial epithelial cells. The fungus is altogether so large and easy of recognition that it cannot be confounded with any of the fungi which are found in the natural fur. There can be little doubt that the *oidium albicans* is identical with the *oidium lactis*, as was suggested by Hallier. The

oidium lactis is the ferment fungus of the acid fermentation of milk, and the development of oidium albicans depends on the continued acidity of the mouth, when once the parasite has been introduced. The oidium lactis and oidium albicans resemble each other in size and characters.

Vogel suggests that the almost complete immunity from thrush which children who are suckled enjoy is due to the mechanism of sucking, if not wholly, at least in part. They not only draw in the mother's milk, but they also draw forth what little saliva they secrete, and the saliva, being alkaline, neutralises to a great extent the acidity of the fluid which is naturally present in the mouths of young children. When the infants are fed with a spoon, the excitor is absent, and the secretions of the mouth are almost wholly acid. It seems much more probable that suckling children seldom suffer from thrush because they are not exposed to the action of the parasite. They are not, if one may use the expression, inoculated with the oidium. The nipple is soon cleaned of the last milk which rested on it after suckling; and even if the child retains for awhile some milk within its mouth, the milk is not there long enough to be inoculated with the spores of oidium, or is not accessible to the spores. Even if a suckled child is residing in a hospital where thrush is very prevalent, the chances of the spores obtaining access to the interior of its mouth are not great. In lying-in and foundling establishments, where great care is not taken to observe the strictest cleanliness, the conditions are extremely favourable to the spread of thrush. Milk is very largely used; the drinking vessels are not kept clean, the same vessels are used for different children, and if one child develops thrush, the probability is that the disease will speedily spread through the establishment. Nor, in these uncleanly places, has the child a reasonable chance of

recovering; the same conditions which favoured the outbreak of the thrush favour its continuance. The spores are produced and reproduced; the membranes are detached, and immediately re-form. The affection of the mouth is complicated with enteritis, and the children die.

Thrush is sometimes mistaken, as has been already stated, for aphthous ulceration; but if the distinction between the two diseases is admitted, there ought not to be any confusion. Thrush is essentially parasitic, aphthous disease is not parasitic. The same curd-like patches are present in both diseases, but the patches in aphthæ are not so round and regular as those of thrush, and are surrounded each by a bright red areola. The children attacked by aphthous ulceration are generally much older than those with thrush. The membranes of thrush are distinguished from those of croup and diphtheria by their whiter colour, by their situation, by the absence of the fœtor of the breath, of fever, and of laryngeal symptoms. In all cases a microscopical examination will decide the matter, for only the membranes of thrush are composed of the spores and threads of oidium.

The treatment of thrush in private practice is, in the large majority of cases, very simple and effectual. The strictest cleanliness must be enjoined; the spoons and other vessels which are used to keep the milk in and to feed the child must be washed and thoroughly cleansed as soon as they have been used. The milk must be as fresh as possible, and between the deliveries must be kept in a cold and clean place, and the nurse must be very clean in her own person and dress. These precautions will naturally be the order of the day in a well-managed house, and in such a house thrush ought never to occur; for it may be said with truth, that if the milk is sweet and the nurse clean, the children will not have the thrush. The occurrence of

thrush, on the other hand, may be regarded as a clear proof that the milk is not always sweet, and the nursery is not clean. The local treatment is to remove very gently, with a piece of soft rag, dipped in a warm solution of carbolic acid or Condy's fluid (in either case very weak), the patches of membrane as they form. The patches farther back in the mouth may be removed in the same way, or, better still, with a soft camel-hair brush, which must be thoroughly cleansed by removing the membrane from it after it has been used, and keeping it in a solution of carbolic acid. West recommends the use of a solution of half a dram of borax and one dram of glycerine in an ounce of water, and in more severe cases, a solution of two grains of nitrate of silver in an ounce of distilled water twice a day, the borax solution to be still used on all other occasions of cleansing. Borax and honey should not be used; for although the borax is good, the honey, as Vogel has very properly pointed out, is bad, the sweetness tending to increase the acidity of the mouth, and to favour the development of the fungus.

In establishments in which thrush is very prevalent, it is quite clear that the management is at fault; and the sooner this is altered, the sooner will the disease disappear.

When thrush is complicated with enteritis the only treatment which is likely to avail is to put the child to the breast of a sound nurse. Even when the child seems sure to die, this treatment will frequently be successful; it takes the breast, as a rule, well, and recovery is often rapid.

Fur.—Some years ago I drew attention to the fact that the fur on the dorsum of the tongue, whether in health or disease, is not composed chiefly of epithelial scales and the débris of food, but of minute living organisms (schistomycetes). The grounds on which that assertion was based were laid before the Royal

Society, and were published in a separate paper in the St. Bartholomew's Hospital Reports (1879). It is not necessary that I should give them here in full. But as the views I held at that time, and still hold, on the subject, have only, so far as I am aware, been publicly adopted by Mr. Hutchinson (College Lectures, 1883, and *Medical Press and Circular*, 1883, ii., 2), it may be well to repeat them shortly. I believe they would be more generally adopted if they were more widely known.

The examination of the fur scraped off the tongues of a large number of persons showed that in every instance masses of micrococci were present, and with these were mingled in greater and less proportion the spores and threads of bacillus subtilis. Other micro-organisms were frequently observed, sarcina ventriculi, spirochæta plicatilis, a form of vibrio and (?) bacterium termo. But whereas the latter organisms might be looked on as in some sort accidental, the two first (micrococcus and bacillus subtilis) appeared to be the constant and essential elements of the fur. I found it easy to cultivate micrococcus from tiny fragments of fur placed on a warm stage, but very difficult to cultivate the bacillus, apparently because its development would not take place under artificial conditions when other micro-organisms were rapidly developing. The masses of micrococcus appeared to form the bulk of the fur, and were attached usually very firmly to the hair-like processes of the filiform papillæ. Sections of the tongue examined under the microscope showed that the micro-organisms were attached always to the filiform papillæ, and were seldom to be seen in the depressions between the papillæ. They were very seldom present on the fungiform or circumvallate papillæ. Epithelium was, of course, always present in the fur scraped from the surface of the tongue, and the harder and deeper the

scraping, the greater was the quantity of epithelium. But in those cases in which there was a very thick fur, and the fur could be removed without much force, the quantity of epithelium was exceedingly small; it was, indeed, almost limited to a few hair-like processes of the filiform papillæ which came away covered with enormous masses of micrococcus spores. The quantity of food débris depended, as might naturally be expected, on the period which had elapsed since the last meal, and on the kind of food which had been taken; but it never formed a large part of the coating of the tongue. There were not any other components of fur discovered, unless of a purely accidental kind.

Perceiving that the food débris was a wholly unimportant element of fur, the question of the essential element of fur resolved itself into the question whether epithelium or micro-organisms were to be regarded as the essential element. Nor was the question difficult to solve. Repeated examination clearly proved that the quantity of microzymes bore a direct relation to the thickness of the fur, and that the quantity of epithelium was in almost inverse relation to the thickness of the fur; for the thinner the fur and the harder the scraping required to remove it, the greater was the proportion of epithelium; the thicker the fur and the more easily it was removed, the less was the proportion of epithelium.

While these microscopical examinations, and the cultivation experiments connected with them, were being carried out, I examined the tongues of a very large number of individuals, both healthy and diseased, to discover, as far as possible, under what conditions fur existed, and on what parts of the tongue it lay. From these observations it appeared that fur is so constantly present that even the most healthy persons are not free from it; nay, a thick

coating of fur, especially on the dorsum in front of the circumvallate papillæ, is not incompatible with the soundest health. The only tongues which were quite free from fur, so far as the naked eye could see, were two or three which were as nearly smooth as possible, whether naturally or from disease. The fur was in every instance limited to those portions of the dorsum which were covered with filiform papillæ, and was thickest where the filiform papillæ were close together and long. When the tongue was lightly coated, so that the fur did not form a continuous layer, it was plainly discernible that the fur was adherent to the filiform papillæ, and did not lie in the depressions between them. In these cases the fungiform papillæ were small, clean, and apparently sunken below the level of the surface of the fur, but easily perceived. When the fur was so thick as to form a continuous layer, the separate filiform papillæ could no longer be distinguished, and the fungiform papillæ were sometimes hidden by the fur; but this was by no means invariably the case, for they could often be distinguished in breaks in the continuity of the coating. This was especially the case when they happened to be congested (for example, in scarlet fever); in such cases they stood prominently forth like the tiny berries of a strawberry or raspberry in the midst of a thick layer of white or whitish-yellow fur. The circumvallate papillæ, like the fungiform papillæ, were very seldom covered with fur, and the dorsum behind the circumvallate papillæ had no fur upon it, for it was destitute of papillæ.

From all these facts, general and microscopical, which I observed, it was impossible to resist the conclusion that the fur on the tongue, whether in health or in disease, is essentially a growth of fungus, chiefly of micrococcus and bacillus subtilis; and that it consists so largely of these fungi that epithelium and

food débris are unimportant, and, as it were, accidental constituents.

The various organisms which are found in fur may enter the mouth with the inspired air or with solid or liquid food, but the food is probably the principal medium by which they are conveyed. They are caught on and between the fine hair-like processes of the filiform papillæ, which are, indeed, so rough and jagged that it is difficult for them to escape them. They are now placed in conditions favourable to quick development. They are kept in a warm and moist soil, the varying reaction is rarely sufficient to destroy them. They are, as it were, nourished by decomposing food, and are exposed to sufficiently free access of air. The micrococcus glœa adheres firmly to the papillary processes, so firmly that it is difficult to detach it. The tongues of very young infants, which are possessed of small and insignificant filiform papillæ, are naturally almost or quite without fur; the fungiform papillæ, which are earlier developed than the filiform, and are comparatively large and prominent, are smooth, so that the glœa does not collect upon them. In adults in health, fur forms during the night, to a greater or less extent according as the conditions are favourable to its development. In the morning almost every person has a very thin layer of fur over the papillary surface of the dorsum. During the day, the greater part of this layer is cleaned off by the taking of food, the movements of the tongue, the rubbing of the tongue against the roof of the mouth and teeth, and the actual washing of the mouth and teeth. The area most difficult to cleanse by these means is the area immediately in front of the circumvallate V, for this area cannot be pressed against the roof of the mouth and teeth, and is less moved than any other part of the dorsum on which the fur collects. This area, therefore, is scarcely ever

free from fur, unless the filiform papillæ are deficient naturally, or have been removed or destroyed by disease. From this area the fur extends during the night, or when the tongue is not kept thoroughly cleansed. Free mobility is essential to the thorough cleansing of the tongue. Stiff and unyielding tongues are scarcely ever clean.

In considering the furring of the tongue, these two conditions should be always borne in mind; that the dorsum of the tongue presents a rough surface on which minute organisms constantly collect and develop, that the fur is kept down by the cleansing of the tongue. If the surface of the tongue is very smooth, organisms will not collect upon it. If the tongue is not kept clean the fur will become thick and abundant. Many of the impressions which prevail with regard to furring are entirely erroneous; some of them are true in part, but only in part; they may be said to be founded on fact. There is a general impression that the most trivial disorder of the stomach and bowels is invariably associated with a furred tongue. In many acute and chronic disorders of the alimentary canal the tongue is, indeed, thickly coated, but in some cases of diarrhœa the surface of the tongue is quite smooth and free from fur, especially when the diarrhœa is long standing and the patient much exhausted. It is a popular belief that a man who eats and drinks more than is good for him at dinner or supper, goes to bed with a perfectly clean tongue, and wakes the next morning with a thick coating of fur upon it. The truth is that the tongue was not examined before the man went to bed, so a comparison cannot be made between the condition of the fur then and in the morning. After a debauch or even after too heavy a meal, so heavy that it produces a feeling of malaise on the following morning, the mouth is often kept open during a great part or

the whole of the night, it feels dry in the morning, the muscles are indolent, and the tongue is not properly cleansed. If there was a thin layer of fur on the previous night, it is now thicker; if there was only a little fur about the middle of the dorsum, it has now extended over the entire papillary surface. But the discomfort and dryness which are experienced are not due solely to the formation of fur upon the tongue; they are only a part of the general malaise from which the patient suffers, and are felt in other parts of the mouth as well as in the tongue. In order to discover the rapidity with which the fur may increase, I examined, some years ago, the tongues of persons who had met with more or less severe accidents, and in consequence had been subjected to a complete change of diet and habits. The amount and condition of the fur was noted at the time of their admission into the hospital, and again at intervals of twenty-four and forty-eight hours. In the interval a very thin fur would become moderately thin, a thin moderately thick, or a moderately thin fur almost thick; but I never saw a case in which a sudden change had occurred from a thin fur to a very thick fur, nor anything which could lead me to believe that the fur could, under any conditions in this climate, increase so rapidly.

Another impression which largely prevails is, that particular varieties of fur are associated with particular diseases; that the tongue of typhoid fever differs essentially from the tongue of acute rheumatism, that the tongue of peritonitis is different from either of the other two, and that the tongue of scarlet fever is peculiar to that disease, and found only in association with it. These impressions are not wholly wrong, but they are far removed from being wholly right. The typical typhoid tongue may be seen in persons suffering from quite different diseases, for the conditions which

usually produce the typhoid tongue may be met with in many different diseases. In the early days of typhoid fever the whole of the papillary surface of the tongue is usually covered with a thick, or moderately thick, layer of dirty-white or yellowish-white fur, for at this period the patient is suffering from a general malaise, and is unable to take much food or to keep the tongue clean. As the disease advances, especially in severe cases, the tongue lies far back in the mouth, shrunken, fissured, brown, and destitute of fur, for at this stage the mouth is kept almost always open, and its cavity is hot and dry. The central part and the edges are the first to dry, because they are less directly supplied with blood, and the central part is not so easily reached by the saliva ; on this account the median line and the borders are often brown and without fur, while there remains a thin line of fur on each side of the median line. But inasmuch as the mouth may be kept continually open in many serious diseases, the typhoid tongue may occur in any of these diseases. The essential conditions are the extreme debility, the open mouth, and the taking only of liquid food.

In acute rheumatism the tongue is usually large, moist, and thickly coated with a dirty yellow, or yellowish-white fur, covering completely its papillary surface. The tongue, like the skin, is moist ; and as the mouth is not habitually kept open, the moisture is retained. The patient is fed on liquids, and is not inclined, if he is able, to make the slight exertion necessary to clean the tongue. Indeed, the operation of the cleansing of the tongue is seldom undertaken of set purpose ; the tongue is cleaned for the most part involuntarily and unconsciously in the performance of numerous acts during the day ; and if these acts are left unperformed, the cleansing of the tongue is incomplete. The conditions of rheumatism are peculiarly

favourable to the development of fur ; heat, moisture, a sufficiency of air, a diet of liquid food.

In scarlet fever the aspect of the tongue is very characteristic, especially in children. The surface is covered with a thick white or yellowish-white fur, in the midst of which the fungiform papillæ stand out red and prominent, producing the well-known strawberry tongue. In scarlet fever, the surface of the tongue, like the surface of the body generally, is usually intensely congested. All the papillæ are prominent and swollen, but while this favours the development of fur upon the filiform papillæ, it only serves to render the fungiform papillæ (which in children are of large size in proportion to the filiform papillæ) more smooth and round and visible. They are not more fitted than at ordinary times for the attachment of the micrococcus glæa, and therefore stand out red and bare in the midst of the sea of fur around them.

Cases of unilateral furring have often been explained by assuming a nerve influence on one side or the other of the tongue. Affection of the gustatory nerve on one side has produced or prevented the occurrence or maintenance of the conditions which are necessary to the development of fur. But, in truth, I believe that nerve influence has little directly to do with the development of fur. Unilateral furring depends on the existence of some condition which prevents the efficient cleansing of the tongue on one side, but does not affect it on the other. A painful ulcer on one side of the tongue, a carious and very tender tooth on one side, the removal of one upper jaw, these and similar troubles prevent the thorough cleansing of the tongue on the affected side. Hemiplegia, too, interferes with the thorough cleansing of the paralysed half of the tongue, not because the nerve influence on that side of the tongue is impaired, but because the affected side

cannot be so freely moved as is needful for the proper cleansing of that half of the tongue. It must not be supposed that the presence of a carious tooth on one side necessarily induces unilateral furring. The presence of a carious tooth need not affect in any way the movements of the tongue ; but if the margin of the tooth is sharp and jagged, so that the tongue is liable to be wounded by it, then unilateral furring will almost certainly be noted.

There are some conditions of the dorsum of the tongue in which fur never develops. Some of them are transitory, as when, for instance, areas of the surface are deprived of the long processes belonging to their filiform papillæ by a process analogous to desquamation of the skin. This may follow or occur in the course of a slow and exhausting disease, or it may happen on a much smaller scale and over a smaller area in persons apparently in good general health. Others are permanent or almost permanent, the smooth tongues of superficial glossitis or of leucoma. In certain of the most characteristic instances of these affections not a particle of fur is visible, for not a single filiform papilla is present ; but in many of them tiny patches of fur are visible here and there where the natural covering of the tongue has not been quite destroyed.

The different colours which the fur assumes may be explained by the differences which are observed in the appearance of the micrococcus glœa. Many of the masses present a pale, or even dark-brown, tint, while some of them are light-yellow, and others are almost colourless. According as one or the other of these tints prevails, so may the colour of the fur vary from brown to yellow and yellow to white. The colour of the micrococcus masses may be due to accidental causes, to the kind of food which is taken, to the action of various staining materials ; or it may be

due to colour-producing properties of the organisms. The blackness of "black tongue" may, perhaps, be due to a power the organisms have acquired of producing a dark-brown or black tint.

Furring of the tongue, as a rule, requires no treatment; the fur is got rid of by natural means, which are much more effectual than any artificial means which can be devised. But sometimes a sick person is very much annoyed by the thickness of the coating on his tongue, and he may suffer more distress from this cause than from any other symptom of his malady. In such cases I have ordered the tongue to be very frequently, and at the same time very gently, cleansed with a piece of soft rag wetted with a weak carbohc lotion (not more than two per cent.), or with weak Condyl's fluid, or, better still, with boracic acid in a three per cent. solution. The effect of these remedies and of various gargles is not so powerful as might, perhaps, have been expected. However frequently they are employed, it is very difficult thoroughly to cleanse the tongue with them. In spite of assiduous care the fur collects and again collects, slowly, it is true, but constantly, and it is at all times very difficult to detach; facts which show how admirable are the unconscious methods by which the tongue is cleansed in health. Even after the thorough cleansing of the tongue from fur, the relief afforded to most patients is not complete.

The disordered sensations, due partly to the general condition of the patient, partly to the very process of artificial cleansing, produce a sense of discomfort. Nevertheless, the partial relief which is afforded by the artificial cleansing is, in most instances, quite worth the trouble which is taken to procure it.

CHAPTER XXIV.

NERVOUS AFFECTIONS.

Affections of Motion : Spasm or Cramp, Paralysis or Glossoplegia
 —Affections of Sensation : Pain (Division of the Lingual
 Nerve, Excision and Nerve-stretching), Absence of Feeling in
 the Tongue—Affections of Taste.

AFFECTIONS OF MOTION.

Spasm or cramp.—According to the authors who treat of nervous affections, hypoglossal cramp is not very uncommon as a part symptom of various central lesions, and in connection with various general nervous disorders. Thus, it may occur in hysteria, chorea, epilepsy, and eclampsia; in stuttering-cramp and trismus; in meningitis, progressive muscular atrophy, and bulbar paralysis. It may be a part symptom of convulsive tic douloureux, particularly when the third division of the fifth nerve is chiefly affected. But all authors are agreed that isolated hypoglossal cramp is an extremely rare affection. In spite of its rarity, several varieties are described; by some persons it is divided into articulatory and masticatory; by other persons into tonic and clonic. None of these terms appear to be quite applicable to the chief types of spasm or cramp, unless it be the term articulatory; and, on the other hand, these terms do not cover all the principal varieties of spasm of the tongue. I prefer, therefore, not to limit myself to them, or, indeed, to any special terms, but rather to describe and discuss the conditions of cramp or spasm which have been observed.

One of the most usual forms of hypoglossal cramp is that in which *the tongue is protruded involuntarily,*

and in spite of the earnest desire of the patient to prevent it. The protrusions take place after longer or shorter intervals. The spasm is, for the most part, independent of the acts of speaking and masticating and swallowing; it is neither produced by them, nor does it prevent them from being performed, unless at the moment when the spasm is most powerful. In some instances, however, the spasm is induced or exceedingly aggravated by these acts. Between the actual attacks the patient may be quite well, but there is often a feeling of fatigue after the attack is over, and sometimes the patient is altogether indisposed. The attack may consist of a mere protrusion of the tongue, which is kept out for a short period, and perhaps turned a little upwards, or the tongue may be rapidly protruded and withdrawn many times in succession. The latter condition has been observed more often than the former. There is usually no pain in the tongue, either during or between the attacks, nor is there any swelling or other physical abnormality. The affection has been noticed more frequently in women than in men, but as often in women of fifty years of age or older as in young persons. In one or two instances the attack has been preceded by premonitory sensations, and after these sensations have lasted for about a minute, the actual spasm has commenced. The attacks occur during the night as well as in the daytime, and are so violent that the patient is awakened out of sound sleep.

As an example of the form of spasm in which the tongue is kept protruded during the whole of the attack, I cannot do better than quote a case recorded by Dochmann. The patient was a girl, nine years old, under the care of Professor Winogradow. She appeared to be a healthy child, and did not suffer from headache or from carious teeth, or any trouble

about the tongue or mouth ; but during the last five months she had been much distressed by involuntary protrusions of the tongue. The tongue was thrust out at tolerably regular intervals of eight to ten minutes, and remained protruded from eight to fifteen seconds. During the protrusion it was quite still, and was at first quite straight, but towards the end of the attack the tip was a little turned up. The attacks were more regular and troublesome during the day, but she was not exempt from them at night, when they often awakened her from sleep. They were not preceded by any premonitory symptoms, nor was there any abnormal condition during the intervals between them. The child said that she was suddenly seized with a great desire to protrude the tongue, and she could not prevent herself from doing it. If she kept her mouth closed with the hope of retaining the tongue within it, the tongue was thrust hard against the teeth so that she suffered pain, but when it was permitted to protrude from the mouth there was no pain, only a feeling of weariness, which ceased as soon as the spasm had passed off. Speech and mastication were affected only during the persistence of the spasm. In this case there was no history of neuroses, nor was there a family history of neuroses. The attacks appeared to be under the control of the patient only so far, that she could induce an attack of spasm by keeping the tongue out for a long time, and then suddenly withdrawing it ; and the attacks of spasm were certainly more frequent when the child was excited. So far as I am aware, Doehmann has not supplied the further history of this case, and we are not informed whether the patient recovered.

One of the most carefully recorded cases of rapid protrusion and withdrawal of the tongue is that described by Berger. In March, 1878, he saw the daughter of one of his colleagues, who was brought to

him for advice. She was twenty-eight years old, delicately made and anæmic, but had never suffered from hysteria in any form. As an infant she had suffered from eclamptic attacks when teething, but they had ceased as soon as the teething had been accomplished. She had menstruated at 14, and had always been regular. In 1875 her right leg had been swollen and oedematous after a severe cold. These were the only ailments which could be remembered, and there was no family history of neuroses. On the 21st of October, 1877, without any perceptible cause, and whilst in good health, she had an attack of spasm of the tongue, which was repeated four times during the same day. She remained free from any further symptom for eight days, and then had two attacks during the day and three in the night, which woke her. For several months she was treated with quinine, and the attacks were very slight and infrequent, but she was not exempt from them. On the 15th of March, 1878, they occurred with great intensity both by day and night, and on that account she was brought to consult Berger. The attacks were of this kind: Without any pain in the head, and in the midst of the best health, she suddenly felt a peculiar, disagreeable, yet not painful, sensation of tension above the larynx, beneath the chin, then a feeling as if the tongue was swollen and filled the entire mouth, a wavering in the tongue, the sensation as of "a wave-like movement running from behind forwards." These peculiar sensations, which may be described as an aura, lasted from a minute to a minute and a half, then the tongue was involuntarily and unconsciously thrust out and withdrawn with great force and in rhythmic spasms, numbering some fifty or sixty in a minute. It projected in a straight line between the teeth, but it was not thrust out to its full extent. The attack lasted from one to two

minutes, when the tongue ceased to be actually protruded, but the movements were continued for a few minutes within the mouth. If an attempt was made to prevent the protrusion by keeping the teeth firmly set, the tongue struck against them with an audible sound, and the spasm took place within the mouth. After the attack the patient felt weak, but no other abnormal condition was observed. Between the attacks the mobility and sensibility of the tongue were perfect, and no disease was discovered in any part of the mouth. Improvement followed the administration of iron, quinine, and belladonna, but the patient was not cured until she had taken the baths at Landeck, and had drunk the iron waters. From that time to the date of the publication of Berger's paper (1882) there had not been a return of the spasm.

A condition differing in some respects from the foregoing is described by Remak. The spasm was not confined to the muscles of the tongue, but the affection of the tongue was by far the gravest part of the patient's trouble, and the case may fairly be considered here. A man, thirty-three years old, who had never had syphilis or been the subject of any neuropathic trouble, was attacked, without known cause, by a peculiar sensation in the left half of the tip of the tongue, as if it had been scalded or had gone to sleep. There was no affection of taste and common sensation, nor was there any disturbance of motion. In about two weeks the peculiar sensation extended over the middle of the tongue, and was noticed in the inside of the left lower lip, and the left gum. At the same time painless spasms of the tongue commenced, which gradually increased, were never quite absent, and distressed him in speaking and, still worse, in eating. At the end of four weeks his condition was as follows: There was slight

paresis of the portion of the facial nerve which supplies the muscles round the mouth, but with this exception, none of the cranial nerves except the hypoglossal was affected. When the mouth was opened a rhythmical play was observed of the movements of the tongue, which, still lying at the bottom of the mouth, was pushed forward and withdrawn forty or fifty times a minute. With every complete spasm there was diminution and flattening of its surface, and there were corresponding rhythmical contractions of the muscles attached to the lower jaw and hyoid bone, particularly the genio-hyoid muscles. The tongue was not thrust so far forward as to touch the teeth, so the spasm was not so violent as in some of the other cases; but it was worse when the tongue was held down with a spatula, and when it was protruded. It was not made worse by speaking, but the speech was a little thick and slow. *It was decidedly increased by drinking, and still more by eating; so bad was it when he chewed, that he had frequently bitten the left side of his tongue, and was not seldom obliged to spit out his food. At times the spasms increased in intensity, and extended to the muscles of the lower part of the face on the left side. When the attack was at its climax he felt faint, and could neither eat nor speak.*

A very careful examination was made of the interior of the mouth and neighbouring parts, but, with the exception of chronic pharyngeal catarrh, there was nothing abnormal. The teeth were fairly good. No facts of importance were revealed by an electrical examination.

Iodide and bromide of potassium were administered, and the constant current was used every day in the inframaxillary region, the left side, and back of the neck. The attacks speedily diminished, and in eight days had ceased. Gradually the peculiar

sensations vanished, and in three weeks the patient was quite well with one slight exception, the paresis of the orbicular portion of the facial persisted.

Remak regards this as a good example of masticatory hypoglossus cramp.

In the cases thus far related, the cramp or spasm was either constant or occurred at regular or frequent intervals; it was, in two of the cases, certainly, capable of being excited or exaggerated by certain acts, in one instance, especially, by the act of chewing and of swallowing, but it did not depend on any action or attempted action. There is, however, a variety of cramp, differing widely from that which has been described, in which *the muscles are thrown into convulsive movement only by a certain action, or by the attempt to perform a certain action.* No better example of this can be adduced than that which is recorded by Vallin. An intelligent boy, between six and seven years of age, was greatly frightened during a performance at a travelling booth or circus, so greatly, indeed, that he was unconscious for a short time. On the following day he could not speak. Whenever he tried to do so there was a feeling of constriction, a tonic convulsion in the throat and the entire hyoid region, and his tongue was tightly applied to the roof of his mouth. He made strenuous efforts to overcome the spasm by which his tongue was fixed; his face reddened and his lips moved spasmodically, but the effort was in vain. He could swallow without the slightest difficulty, and every other act in which the tongue takes part was performed with ease and smoothly. The child's intelligence remained unaffected, and his health was as good after as before the alarm which had deprived him of speech. There was no family history of neuroses. One fact is worthy of notice; the tonsils had been enlarged for a considerable period, and had been cauterised at intervals. The possible importance of

this fact will be referred to presently. The child slowly recovered without any special treatment at first; and when the power of speech had in some degree returned, he was made to recite every day until he was quite well.

This variety of cramp is not so infrequent as the other varieties; it is recognised under the term "articulatory hypoglossus cramp." It is also termed *aphthongie* (*alalie par trouble de la motilité de la langue*).

In these cases will be found the types of all spasmodic affections of the tongue. Individual examples may present slighter or more marked deviations from them, but it is not necessary to enter into all these deviations. It may be seen that, although these cases are regarded as examples of pure isolated hypoglossal cramp, the cramp or spasm was not always strictly limited to the muscles supplied by the hypoglossal nerve. Nevertheless, the muscles of the tongue, especially those supplied by the hypoglossal nerve, were so much more affected than any others that the term "hypoglossal cramp" is quite justifiable. In considering the nature, the pathology, and treatment of these affections, it is desirable to separate, as far as possible, the variety of cramp which is produced by attempts at speech from that which is independent of every act of the patient, or so nearly independent that it cannot be solely or chiefly associated with any act.

The independent cramp may, as has been already stated, and as has been illustrated by the examples which have been given, assume different forms. But the essential features were the same in each form; the tongue was protruded and withdrawn without any definite object and without performing any useful or reasonable purpose, and without any attempt to do so. All the ordinary acts in which the tongue takes part were performed smoothly and without a special

effort, provided there was not any actual spasm present at the time they were attempted ; except in one instance, in which the acts of chewing and swallowing were attended with great difficulty, and were at times impossible. But in that instance the tongue appears never to have been quite quiet ; the paroxysms of spasm were induced by taking food, but they were not wholly dependent on the taking of food. In the other cases the spasms or cramp were involuntary, and were, for the most part, absolutely beyond the control of the patient, who was neither able to prevent nor to induce them.

It is impossible, at the first sight, to resist the impression that the affection is hysterical, and that the convulsive movements of the tongue might be prevented by a strong determination on the part of the patient. Jolly has drawn attention to the muscular contractions which affect the tongue in hysterical persons, sometimes twisting and distorting it, at other times suddenly protruding it, or suddenly withdrawing it when the patient makes an attempt to keep it out, and at other times preventing or impairing the power of speech and swallowing. The absurdity of the gesture or grimace produced by the spasm, and the similarity which it bears to those made by children or rude persons, almost prevents one from taking a serious view of the affection. But a dispassionate analysis of the published cases proves, I think, that although there may be, and probably are, hysterical cases of spasm of the tongue, resembling in most respects those which are dependent on disease, there are also spasmodic affections of the tongue which are as certainly dependent on disease. Thus, though most of the patients were women, the affection is not unknown among men. One of the cases I have quoted was the case of a man, and Berger has related the case of a merchant, forty-two years old, strong and healthy-

looking, without any appearance denoting nervousness of any kind, who had been for two and a half years troubled, at longer and shorter intervals, by involuntary protrusions of the tongue, which happened not infrequently at night and woke him out of sleep. The very fact of the occurrence of the contractions during sleep is opposed to a hysterical origin. Of the female patients, some were children or old persons, neither of whom are nearly so liable to hysterical affections as young and middle-aged persons. Children of eight and ten years certainly are not exempt from liability to hysteria, but they are not often the subjects of hysterical affections. Further, similar convulsive movements to those of pure hypoglossal cramp occasionally occur as part symptoms of grave affections of the central organs of the nervous system.

It is probable that the *seat of the disease* may be either peripheral or central. Very few of the cases which have been published of pure, or almost pure, hypoglossal cramp occur in English medical literature, but one of the few appears to be an example of cramp depending on a peripheral cause. It is as old as 1813, and is recorded in the Transactions of the Medico-Chirurgical Society, by Mitchell. The patient was a woman, fifty years of age, and the spasms affected the tongue, the jaw, and mouth. They were thought to be due to the condition of her teeth and gums: the two incisors on the left side and the canine were broken off, the two bicuspid and three molars were carious, the gums were inflamed and irritable, and there was a discharge of fœtid matter from the parts about the decayed fangs. The muscular contractions were chiefly on the side on which the teeth and gums were diseased. The carious teeth and stumps were removed, the gums were scarified, and from that time she began speedily to recover. The theory of a central origin is difficult to prove, for, so far as I am aware, it does not rest on

any post-mortem examination. But Remak has suggested that the disease may be a form of partial cortical epilepsy. He points out that Hitzig has produced spasms of the tongue and of the muscles surrounding the mouth by irritating the crossed cortical region (right side) in the lower segment of the anterior central convolution, and that Munk has produced complete paralysis of the same groups of muscles by removal of the same limited portion of the cortex. In confirmation of Remak's theory, it must be mentioned that there was a distinct aura in one instance, and that another of the patients was conscious of an intense desire, which may be regarded as in some sort an aura, to protrude the tongue. Against the epileptic theory it must be admitted that recovery from the disease has occurred in almost all the cases which have been watched for a sufficiently long period, and that the cure was not the effect of any of the usual remedies for epilepsy. An absolute judgment on this point must be suspended until the matter has been proved by a post-mortem examination, and it may be long before such an opportunity presents itself. It is not difficult to understand that an irritation which affects the hypoglossal centre, whether at the cortex or more deeply, may produce such convulsions of the tongue as those described.

The *prognosis* of independent spasms of the tongue is undoubtedly good, but the cure may require a long time and the exercise of much care and judgment. The tongue itself, and all the structures in the interior of the mouth, as well as the adjacent cavities, must be carefully examined to see if there is any disease which can produce reflex irritation of the hypoglossal. Stumps of teeth must be removed, and carious teeth stopped, if possible, or removed; and ulcers of the mouth and other neighbouring parts must be cured as speedily as possible. But in the greater number of

cases it is probable that no reflex cause will be discovered, and the treatment will be general rather than local. The question of hysteria may be raised in any case, whether there is a reflex source of irritation or not, but it will be raised especially in cases in which no irritative source is apparent, and in which the patient is a female and young. The diagnosis of the real disease will depend on the absence of associated symptoms of hysteria, and by observing that the muscular contractions are much more regular and orderly than those which usually occur in hysteria. In hysteria the spasms are seldom so restricted to certain muscles, or groups of muscles, as in disease, and it is more common to find that the spasms are associated with hindrances to speech and chewing and swallowing. In most cases it will be well to have the patient very carefully watched, that the difference, if there is any, in the spasms at different times of the day, and under various circumstances, may be known.

In treatment the means which have been most successful are such medicines as are likely to produce a soothing effect upon the nervous system or to improve the general health, with change of air or scene. Thus, quinine and iron, and belladonna and bromide of potassium should be given, according as one or other of them seems to be indicated by the general condition of the patient. In most cases rest is very desirable, with removal of the patient, as far as possible, from observation of those who are not necessary to the cure or comfort. In one instance, electricity was employed in the form of the constant current daily in the infra-maxillary region, the side and back of the neck. Whether as the result of this, or whether owing to the previously short duration of the affection (four weeks) and the administration of iodide and bromide of potassium, the spasms at once became less frequent, and in eight days ceased. It does not appear that a

strong current was employed, so that one is inclined to doubt whether the galvanism exercised much influence on the course of the disease ; but inasmuch as no harm is likely to arise from its use, and some good may be done by it, I should be disposed to use it in any case of hypoglossal cramp which comes under my care, unless there is a decided contra-indication. It is not needful, in the large majority of cases of the kind we have been considering, to forbid speech, or to take special precautions in eating or in swallowing. But, as eating is exceedingly difficult in a few instances, and as the taking of food by the mouth certainly induces or aggravates the spasms, fluid food or very soft substances should be given, and the question may be entertained whether it would not be desirable that the patient should be fed, chiefly or wholly, by the rectum. However, Remak's patient, who suffered from spasm during eating, more than any other of the patients whose cases I have studied, recovered remarkably quickly, although all his food was taken by the mouth.

The form of cramp which is associated with attempts to speak (articulatory cramp) differs widely from the independent cramp. In typical conditions of this affection the only act which is impaired is the act of speech. Chewing, swallowing, and all other acts in which the tongue takes part are performed easily and smoothly. . There are no troubles of motion or sensation, or of taste. The patients are not deficient in mental or physical power. But as soon as an attempt is made to speak, the muscles refuse to act in harmony ; the tongue is "glued" to the roof of the mouth, and speech is impossible. The patient struggles to overcome the obstacle ; his lips move spasmodically, his face is reddened, and sometimes there are convulsive movements of the muscles of the face and neck. But the effort is unavailing, and is soon abandoned.

Articulatory cramp may last for a few weeks or months, and may be completely recovered from, or it may exist in a greater or lesser degree for many years, and, in such cases, is rather a form of stammering. Ganghofner mentions the case of a young man nineteen years of age, who had from childhood suffered from spasmodic contractions of the muscles of the tongue as soon as he began to speak. He also had spasms of the muscles of the lower part of the face on the left side, and occasionally of the muscles of the right lower limb. He was anæmic, but otherwise sound, and nothing abnormal was noticed until he tried to speak. His condition was not nearly so bad as that of the boy whose case is related on a preceding page, for he could speak, although with difficulty. His cramp, too, did not affect him when he sang, or spoke very quickly, or declaimed pieces he had learnt by heart.

Articulatory cramp is essentially an *affection of co-ordination*; the muscles of the tongue are put in action, but their action is no longer harmonious. Their several movements and the correlation of their movements are not evenly maintained and balanced. The condition may be compared with ordinary stammering, with aphonia spastica (in which speech is seriously impaired by the loss of co-ordination of the muscles of respiration and the muscles of the larynx), with writer's cramp and other similar affections. There is no evidence of central or peripheral disease: the patient may be, in every other respect, quite well. But it is only fair to add that in some of the recorded cases there has been defective health, either permanent or only temporary; thus, one of the patients was epileptic; in two instances the tonsils were enlarged. These conditions may have been merely accidental complications or associations of the cramp, and may have borne no direct relation to it. But it has been

suggested that they not improbably indirectly influenced the strength and duration of the affection.

The *treatment* of articulatory cramp consists in correcting all obvious defects, whether local or general; treating or removing enlarged tonsils, ulcers of the tongue and neighbouring parts; relieving anæmia; treating epilepsy, etc. In the treatment of older patients, I believe the best means of attacking the affection itself is to forbid any attempt at speech for a period of from one to two months. It need scarcely be said that it is not easy to enforce silence for so long a time; but in the cases of male patients, this has been done by sending the patient for a long sea voyage (a good thing in itself, if the man is not in robust health), and providing that all conversation shall be carried on during the voyage through the medium of signs and writing. So long and complete a rest may be sufficient alone to effect a cure; but it is desirable that when use of the voice is permitted, it should at first be restricted to regular exercises, recitation, reading aloud, and such means as were employed successfully in the case already alluded to as recorded by Vallin. In the treatment of younger patients, it is of course useless to attempt to enforce silence. If the patient can possibly speak, however difficult speech may be, it is probable he will at times attempt it. It is better to try and restore the harmony of the various muscles employed in speech by causing the patient to recite and read aloud, especially easy pieces, and pieces which he already knows very thoroughly.

The suggestions for treatment which are made here must be accepted merely as suggestions for general lines of treatment. It is more than probable that each case of articulatory cramp will require some modification of the general plan; but the number of recorded cases of successfully treated cramp of this kind, or even of articulatory hypoglossal cramp,

whether treated or not, is so small that it is quite impossible to lay down any very definite method of treating the affection.

Paralysis (glossoplegia).—Paralysis of the muscles of the tongue may be unilateral or bilateral. When one side only is affected, the symptoms of paralysis are so ill marked that it is not always easy to be sure that there is truly complete loss of power in the muscles of the affected side. The tongue is protruded towards the paralysed side, owing to the unopposed action of the muscles on the sound side. Sometimes the deviation of the tip is so slight that it can only be affirmed after the tongue has been repeatedly thrust out. When the tongue is at rest, or is merely moved within the interior of the mouth, no abnormality can be discerned.

When both sides are completely paralysed, the tongue lies at the bottom of the mouth as an inert mass of flesh, or sometimes seems to shiver or tremble owing to fibrillar muscular contractions. In the latter case, its surface is often wrinkled; and in both cases the entire tongue by-and-by becomes smaller, undergoing the atrophy which invariably follows complete muscular inaction. As might naturally be expected, speech and mastication are seriously impaired. Speech is, in fact, quite unintelligible (articulatory glossoplegia); and mastication is imperfect, not on account of impaired action of the jaws, but because the food cannot be moved about in the mouth or kept between the teeth. Even swallowing cannot be properly accomplished without some assistance; unless the bolus of food is thrust into the pharynx with the finger, it is apt to remain on the back of the tongue, and perhaps regurgitate into the front part of the mouth (masticatory glossoplegia). When both sides of the tongue are affected but the paralysis is not complete, the terms articulatory and masticatory glossoplegia appear to be

much more justified than when the paralysis is complete; for in some partial paralysees speech suffers most, in others, mastication is chiefly impaired. In partial articulatory glossoplegia speech is intelligible, but many of the sounds are indistinct, the following letters and combinations of letters being especially difficult to express with clearness, s, sch, l, e, i, alsh, g, r, u, w.

The *cause* of hypoglossal paralysis may be peripheral or central, but peripheral paralysis is exceedingly rare. Of the various peripheral conditions, injuries in the neck and the pressure of tumours are those which more often than any others produce paralysis. Central causes are far more numerous, hæmorrhages, emboli, bulbar paralysis, progressive muscular atrophy, dorsal tabes, etc. And if the cord is injured in its highest part, hypoglossal paralysis may be a result of the wound.

The *diagnosis* of unilateral paralysis may be difficult; not so much on account of the possibility of mistaking it for another disease, as on account of the probability of entirely overlooking it. Complete bilateral paralysis can scarcely be overlooked or mistaken for any other affection of the tongue. It is very seldom isolated unless it is peripheral, and peripheral paralysis is extremely rare. It is certainly possible to mistake organic for hysterical glossoplegia, but a careful study of the case, and the associated symptoms of organic disease or hysteria, ought to leave no doubt in the mind of the observer of the real nature of the affection. The discovery of the exact cause of the paralysis, and the determination of the seat and nature of a central cause, may be very difficult; but we are not concerned with the diagnosis of central diseases of the nervous system; the only interest which the matter has here is in the fact that a partial or complete paralysis of the tongue must

always be regarded with suspicion as a possible symptom of more or less grave disease of the central nervous system.

The *prognosis* of glossoplegia is, in most instances, grave, but depends almost wholly on the seat and nature of its cause. The same remark applies to *treatment*. The mere galvanisation or faradisation of the hypoglossal nerve is absolutely useless if the cause is central and progressive. If, on the other hand, the cause is stationary or undergoing resolution, or if it is such a cause as the division of a hypoglossal nerve, and the paralysis remains with little or no improvement, faradisation of the hypoglossal nerve may be employed with some hope of benefit. In all cases in which the cause of the paralysis admits of treatment, the treatment should be directed to this end.

AFFECTIONS OF SENSATION.

Of common sensation. — *Pain*. It would scarcely be in accordance with the scope of this work to include in this section all the conditions of neuralgia in which there is pain in the tongue. I propose, therefore, to consider only those conditions in which the tongue is the chief or only seat of neuralgia.

Cases of neuralgia limited to the lingual branch of the inferior maxillary division of the fifth nerve are very rare. But the cases of pure lingual neuralgia, when they do occur, are so severe and difficult to cure that they are worthy of all the attention which can be given them.

The *cause* of lingual neuralgia is often very difficult to ascertain. Sometimes it is simply referred (due to such a cause as a carious tooth), and is analogous to the pain experienced in the face in similar circumstances. But isolated lingual neuralgia is seldom due to this cause. It has been known to

follow a trivial operation, such as the opening of an abscess in the mouth; exposure to cold from riding in the train; and to be associated with the presence of a small excrescence at the back of the tongue. In other instances no cause has been appreciable.

The *pain* may occur in paroxysms, with intervals of complete ease; but it is more commonly persistent, although it is apt to be aggravated by every movement of the tongue, whether in eating or in speaking, and to be increased by examination of the painful part and even by opening the mouth. This may, perhaps, be explained by the lowering of temperature produced by opening the mouth and exposing the tongue. The character of the pain is described by some persons as sharp and lancinating, by others as grinding or aching. The seat of pain is not always limited, as might have been expected, to the distribution of the lingual nerve, or to that of the glosso-pharyngeal nerve. One patient pointed out the border of the left half of the tongue beside and behind the anterior half-arches of the palate as the chief seat of suffering. Another person had pain in the region between the last molar tooth behind and the point of junction of the anterior with the two posterior thirds of the tongue in front. But, in the majority of cases, the pain extended over half the tongue from the last molar tooth behind to the tip of the tongue in front.

Usually there is *no swelling or obvious physical alteration* in the appearance of the tongue; nor are there any sores, aphthæ, or other similar disorders with which the pain can be connected. But Albert, in an interesting article on diseases of the tongue, stated that he had met with several patients, during the course of the year which preceded that in which his paper was written, all of whom suffered with burning, pricking, and true neuralgic pains in one half of the tongue, and in all of whom there was found at

the border of the tongue, close to where the tongue joins the arches, a small excrescence. The excrescence was very tender, and appeared to be the seat of origin of the neuralgia. It resembled a condyloma in shape, but did not appear to have been due to syphilis. Albert speaks as if he had seen many cases of this affection; for he says, "with the exception of two men, it occurred only in women;" but I have never seen a case of the kind, nor have I met with an account of any similar cases in medical literature.

There can be little doubt that the tongue may be the seat of *rheumatic pain*, for Chomel has recorded an unequivocal instance of rheumatism of the tongue. The affection is so very rare that this appears to be one of the few cases on record. The pain was seated in the tongue, but was prolonged into the pharynx. It was very sharp, increased by every movement of the tongue, and very much augmented by deglutition. There was not any swelling of the painful parts, and the symptoms passed off in the course of four-and-twenty hours. The evidence of the rheumatic nature of the pain rested on the fact that the woman (thirty-two years old) had suffered badly from rheumatism since her first confinement, that she was suffering from articular rheumatism at the time of the affection of the tongue, and that the temporo-maxillary articulation was attacked two days before the tongue. The sudden onset and disappearance of the pain also pointed to its rheumatic character.

The only case of isolated lingual neuralgia which I have ever seen was brought to me a few days ago by Dr. Sawtell, of Stroud Green. It is worthy to be recorded, because it is typical in its kind. The patient was a lady, sixty-seven years of age, who for the most part enjoyed good health, but was of a somewhat irritable disposition and apt to "worry." She had, too, been rather out of health of late, but without

exhibiting any decided signs of illness. About three months before I saw her, a pimple had formed on the tip of the tongue, not more on one side than the other, so far as could be ascertained. It was very tender and lasted several days, much longer, in the opinion of the patient, than such pimples usually last. After its disappearance the tongue began to swell, or appeared to the lady to be swollen, for I could not discover that she or any other person had ever perceived any actual enlargement. The swelling lasted for a short period, then subsided. The sensation of enlargement only affected the right side of the tongue, and was not accompanied by pain or any other strange feeling. But since that time there had been many attacks of apparent swelling of the right side of the tongue, and with the feeling of swelling there had been pain and a feeling of stiffness. The attacks occurred at very irregular intervals, and lasted a very variable time, sometimes passing off in less than an hour, sometimes lasting for many hours, or even for a day or two. The pain was either aching or shooting, and was occasionally very severe, so much so that, if the attack occurred at night or lasted through the night, she was quite deprived of sleep. There were no premonitory symptoms of the attacks, nor did she know of any circumstance which was likely to induce an attack; and she had not discovered anything which would shorten the duration or diminish the severity of the pain. She pointed to the right border of the tongue from about the level of the last molar tooth, nearly as far forward as the tip, as the seat of the pain, and was quite sure that she had not experienced pain in any of the surrounding parts or in the cheek. The attack was not associated with any movement of the tongue. Between the attacks she complained of a slight feeling of discomfort in the right side of the tongue, but there was no tenderness or actual pain.

I examined her mouth with the utmost care, but could not discover any physical alteration in the tongue; nor could I discover any abnormality in any of the parts supplied by the fifth nerve. There was no pain at the time I saw her, and she seemed in tolerably good health, but her friends said that during the attacks she looked very pale and ill, and could not take her food. The inability to eat appeared to be due to general distress occasioned by the pain, not to tenderness of the tongue.

We regarded the case as one of uncomplicated neuralgia of the lingual nerve, perhaps due to some alteration which had its origin in the pimple which had preceded the symptoms. Quinine internally, and menthol on the surface of the affected part, were prescribed; but, if relief is not speedily obtained, either faradisation or an operation on the nerve will probably be performed.*

The *treatment* of lingual neuralgia may extend over many months before relief is afforded; but the records show that even the most inveterate cases may be cured. It is of the first importance to discover, if possible, the cause on which the pain depends. If the neuralgia is rheumatic, no local treatment is likely to avail; the general treatment which is applicable to rheumatism will be most useful for the special pain. If such an excrescence as that described by Albert is discovered, it should be excised or destroyed with the galvano-cautery, or, in the absence of the galvano-cautery, with the actual cautery. Whichever cautery is used, it is desirable that the destruction should be very complete. It is scarcely necessary to advise that in every case functional disturbance should be carefully corrected, and the general health

* While these pages were passing through the press, I heard from Dr. Sawtell that his patient had completely recovered from her trouble under the simple measures which we adopted.

should be improved, if necessary, with tonics and good food. But it will generally be found that, after every attention has been paid to the general health, and every functional disturbance has been corrected, the pain continues, often without the slightest diminution. Then the question will arise of local measures, and one after another of these will be adopted until relief has been afforded.

Demarquay states that he cured one patient, a strong man, by injecting morphia into the substance of his tongue on the affected side. The dose injected was very small, but symptoms of morphia intoxication were produced. Demarquay does not give any details of this case, so that we do not know how long the case was under treatment, or what quantity of morphia, or how often it was injected. I do not know of any other case which has been cured by this means, but it deserves to be tried on account of the ease with which it can be carried out, and of the benefit which occasionally follows the injection of morphia in cases of sciatica and other neuralgias. The injection can, of course, be made with an ordinary morphia syringe, and the quantity had better be, for the first injections, one-sixth of a grain of the acetate of morphia (2 minims of the pharmacopœial solution). The fluid should be squirted into the substance of the affected half of the tongue, as near as possible to the spot from which the pain appears to radiate, in most cases as near the level of the last molar tooth as may be. One-sixth of a grain may be repeated later in the day, and if the patient, as is not very unusual, complains that the pain persists during the night, an injection may be administered at bed-time. The effect of the morphia should be very carefully watched; for although Demarquay's patient may have been peculiarly susceptible to morphia, it must not be forgotten that he

was very quickly influenced by a very small injection, and that he is said to have been a strong man. It may be that the great vascularity of the tongue is exceedingly favourable to a rapid and very complete action of the drug. If the effect produced by one-sixth of a grain is not sufficient, a larger dose may be administered, one-fourth or one-third of a grain.

If, in the course of a few days, the pain is not relieved by morphia injections, combined with such general means as seem desirable in each individual case, electricity should be tried. De Neffe has recorded the case of a man thirty years old, whose neuralgia was cured by faradisation along the course of the chorda tympani. Four sittings, each of twenty minutes, in the course of two days was sufficient. Bärwinkel, reporting this case in Schmidt's "Jahrbücher," says that the faradisation of the chorda tympani was quite irrational, and that the effect which was produced must be attributed to the influence of the faradic current on the sensory nerves. The criticism appears to be just. Certainly, if electricity is employed, an attempt should be made to apply it along the lingual nerve. For faradisation, a small battery, such as Grenet's, may be used; for galvanism a Stöhrer's or Leclanché's battery of thirty or fewer cells will suffice. Both faradisation and galvanism should be tried in a case of obstinate neuralgia. The positive pole may be placed on the neck or behind the ear, the negative pole on the side of the tongue or over the line of the gustatory nerve as it lies against the jaw. Or, if the polar method is adopted, the positive pole may be placed upon the specially painful points, and held stationary there, whilst the negative pole rests against the back of the neck, or on any other indifferent part of the body. One sitting should take place every day, and should last for about ten or fifteen minutes. The current,

whether faradic or galvanic, should not be very strong, but should, on the other hand, be sufficiently strong to produce decided sensations.

In an obstinate case of lingual neuralgia the question of an operation on the tongue, or one of the nerves, will certainly arise. Indeed, the results achieved by nerve-stretching during the last five years render it probable that an operation will be called for or recommended at an early period of the case, if the pain is very severe and is not at all relieved by general treatment. Vanzetti relates an instance of severe lingual neuralgia in which he made an incision along the affected side of the tongue. The patient experienced relief for a few days, and then the pain returned as severely as before. It is difficult to understand the principle which actuated this treatment; so far from being surprised at the return of the pain, one can only be surprised that it was relieved even for a few days. Direct treatment of the nerve by operation is a very different proceeding, and is based on good grounds. Three distinct operations may be practised, simple division, resection of a portion of the nerve, and stretching.

Hilton was, I believe, the first surgeon to put in practice the operation of division of the lingual nerve; but the division was made to relieve the distressing pain of a cancer of the tongue, not for simple neuralgia. The operation was perfectly successful for a period of a month, and partially successful for two months; but at the end of that time the pain and all the other symptoms (salivation, etc.) returned as severely as before the division of the nerve. And this is the general history of similar cases. The relief is complete, but it is only temporary. As soon as the divided ends of the nerve have reunited, and its function has been restored, the pains have returned. Nor could any other result be expected in cases of

cancer, for the course of the disease is not materially affected by the operation; the ulceration progresses, and as soon as conduction is restored, the pain produced by the ulcer is perceived. A different effect may perhaps be experienced in a case of simple neuralgia, but the operation of division of the nerve is scarcely likely to find favour in the present day of nerve-stretching. Hilton performed his operation in the following manner. The patient was placed in the recumbent posture, with the head a little raised, opposite a good light. The tongue was drawn upwards, forwards, and towards the opposite side. The mucous membrane and submucous tissue were then divided vertically with a small knife opposite the molar teeth. The incision, which was about three-quarters of an inch long, was over the hyoglossus muscle across the position of the upper margin of the sublingual gland; it was continued deeply by the side of the tongue, through the upper edge of the sublingual gland, and thus exposed the lingual nerve. The nerve was seized with a pair of forceps and divided with the scissors. Moore's method is easier to perform than Hilton's. It consists in making an incision with a curved bistoury through the mucous membrane in a line from the last molar tooth to the angle of the jaw. When the finger is passed into the mouth within and beyond the last molar tooth, the bulging alveolar ridge can be felt, narrowing as it ascends into the thin coronoid process. Behind, below, and parallel with the ridge, is the nerve. A line drawn inside the lower jaw from the crown of the tooth to the angle of the jaw, crosses the nerve about half an inch from the tooth. An incision, therefore, in the direction of this line, three-quarters of an inch in length, and carried through the mucous membrane to the inner surface of the bone, must divide the nerve. A curved bistoury is used because the alveolar ridge

shields the nerve, and the point of a straight knife cannot be made satisfactorily to reach it.

Both Roser and Vanzetti have published cases in which lingual neuralgia was cured by excision of a portion of the lingual nerve, and the cure, in each case, was so far permanent that the patient was well and quite free from pain more than a year after the operation. Although these cannot be claimed as permanent cures in the present state of our knowledge of the relief afforded by operations on nerves, the operation may, in both cases, be said to have been thoroughly justified by the result. One of the patients had suffered from lingual neuralgia for many months; the other for about five months; and in both cases numerous remedies, some of them very painful, had been employed without success. Roser cut out from two to three lines of the nerve, Vanzetti, two centimetres. The method recommended by Roser is hardly likely to be adopted, for it consisted in splitting the cheek back to the ascending ramus of the jaw, exposing the nerve, and removing as much as was deemed necessary. Roser seemed, indeed, to consider this the only certain method of discovering the nerve; he recommended that the cheek should be split and the incision continued back to the side of the base of the tongue. Roser published his method of excising a portion of the nerve four years after Hilton had published his method of dividing it, but he does not appear to have been aware of the English operation. Since the nerve is exposed in Hilton's method, and is actually seized with the forceps, it is as easy to excise a portion as to divide it. With regard to the relative advantage of division and excision, I think there can be no doubt that the latter is far more likely to effect a permanent cure of the neuralgia. If a sufficient portion of the length of the nerve is removed, there is no possibility of the two

ends becoming united, and only a remote probability of a return of sensation, and possibly of the pain, by the establishment of conduction through the glosso-pharyngeal nerve by means of the anastomosis which possibly exists between its fibres and those of the lingual nerve. In cases in which the neuralgia is of peripheral and not of central origin, this operation may be practised with the expectation of a good result. The very large majority of cases of pure lingual neuralgia are of peripheral origin; the central cases are almost invariably complicated with pain in some of the neighbouring parts, or with other symptoms of nerve lesion, and very many of them are cases of progressive disease.

So far as I am aware, the lingual nerve has not yet been stretched for the relief of neuralgia of the tongue. But it is not improbable that the operation will be practised in one of the first cases for which an operation is deemed advisable. The nerve can easily be reached by such a method as that pursued by Hilton, and stretching is more easily carried out than excision of a portion of the nerve. It may also be exposed by making the incision proposed by Moore for its division, but a little in advance of the line from the last molar tooth to the angle of the jaw. The incision should be carried from the alveolar ridge, across the line of the nerve, through the mucous membrane into, but not deeply through, the submucous tissue. If the edges of the wound are separated widely, the nerve will be perceived as a white cord, and may be seized and stretched by drawing it inwards towards the tongue with a blunt aneurism needle. The chief difficulty during the operation is to keep the wound sufficiently cleansed from blood to allow the various structures to be made out. The operation should be performed under chloroform, the mouth kept open with a strong gag, the best possible

light used, and the tongue should be well drawn out of the mouth and towards the opposite side. The relief which has been afforded in cases of neuralgia of other nerves leads one to hope that similar good results may be obtained by stretching the lingual nerve, but until the operation has been performed, it is useless to discuss its merits or to compare it with neurectomy. The object in preferring stretching to excision will probably be that the loss of sensation and of the special sense of taste, which are the result of neurectomy, will be avoided if the nerve is stretched. However, the loss of common and of special sense produced by excision of the lingual nerve is not felt as a serious trouble by the patient, nor can I discover any instance in which the operation has been followed by serious trophic disturbance.

The expectation which I expressed in the preceding paragraph has since been fulfilled, for I learn from the *British Medical Journal* (November 15th, 1884), that Mr. Clement Lucas stretched the lingual or gustatory nerve at Guy's Hospital on the 11th of November on account of extreme neuralgia. I have not heard any details of the case, and, of course, it is yet far too soon to form an opinion regarding the result of the operation; since, even if the pain has been relieved, the relief may be only temporary. Mr. Lucas, however, pointed out one circumstance which is not without practical value; that, if the "tongue be seized at the tip and drawn forcibly out of the mouth and to one side, the lingual nerve of the opposite side is made to stand out as a firm band beneath the mucous membrane on the side of the tongue, where it can be readily felt and secured." The operation was performed in the following way: "A suture was placed through the tongue to the right of the septum, by means of which the organ was drawn forcibly out, and to the left side. A sharp pointed hook was then passed

under the nerve to fix it. The mucous membrane was next divided over the nerve for about half an inch, so that it could be readily seen, and an aneurysm-needle having been passed immediately under the nerve, the sharp hook was withdrawn. The nerve was, in this way, easily reached and stretched" (p. 975).

Absence of feeling in the tongue.—The mere loss of sensibility to ordinary stimuli is scarcely ever complained of. When loss of common sensation occurs, there is at the same time, in almost every case, if not in every case, a simultaneous loss of the special sense of taste in the parts of the tongue supplied by the lingual nerve. Loss of common sensation, too, is very rare, unless there is at the same time anæsthesia of parts supplied by other branches of the inferior division of the fifth nerve. For these reasons, and for the further reason that the symptom, when it is observed, is not sufficiently distressing to call for treatment, it is not necessary to consider it at length.

Of special sensation.—*Taste.* Affections of the special nerves of taste so seldom come under the notice of the surgeon that I freely confess that all my information on this subject is derived from the works of authors on medicine and, especially, on nervous diseases. I am the less ashamed to do so because I find that the information given even by these authors is at present very imperfect, owing to the fact that affections of taste have not thus far received so large a share of attention, or in any case have not been studied so successfully, as affections of motion and of common sensation. The best account of the present state of information on the subject, and of the difficulties by which the study is attended, is to be found in Ziemssen's "Handbuch" by Erb.

In the first place, it must be acknowledged that the exact anatomy and physiology of the nerves of taste has not yet been satisfactorily settled. So far

as it is settled, it appears that the posterior portion of the tongue, the palate, and the wall of the throat receive their taste-fibres from the glosso-pharyngeal nerve. The anterior two-thirds of the tongue and the tip receive their taste-fibres from the lingual nerve (gustatory). But the taste-fibres which are contained in the lingual nerve pass over in chief part into the chorda tympani, then run in the course of the facial nerve as far as the geniculate bodies, and finally pass over, by paths not yet known in the human subject, again into the trigeminal nerve and run, in the trunk of the trigeminal, to the brain.

The faculty of taste is powerful in the tip and borders, but, above all, in the root of the tongue.

Erb recommends that the examination of the faculty of taste should be made as follows: "The patient's mouth should be wide open, the tongue out, and the eyes shut. The parts to be investigated should be touched with a glass rod or brush containing the material to be tested in the smallest possible quantity and in a sufficiently concentrated solution. The patient, before drawing in his tongue, must give a sign with his head or hand to show that he has tasted, then say what the taste was like. It is of the utmost importance to localise the material which is used for testing, and to guard against diffusion. After each experiment the tongue must be prepared afresh by thorough cleansing with water. For bitter tastes, quinine, quassia and picric acid may be used. For sweet tastes, sugar, syrup, and honey. For sour tastes, vinegar, thin acids, and wine. For salt tastes, common salt, bromide or iodide of potassium, and bicarbonate of soda.

The faculty of taste may also be thoroughly tested, and with even greater accuracy, by means of electricity. Neumann's method, as described by Erb, is as follows: Two fine wires provided with small knobbed ends,

and carefully isolated from one another by means of sealing wax, are to be attached, at a distance of a few millimetres from each other, to a non-conducting handle, such as a glass rod or an elastic catheter; these wires, which form the electrodes, are then connected with the poles of one or several galvanic elements. If these are placed upon the tongue, a slight burning sensation is felt with a distinct sensation of taste, which is described as being sourish, saline, metallic, coppery, etc., and which is somewhat stronger at the anode (positive pole) than at the cathode (negative pole). By this means a very exact localisation of the galvanic gustatory stimulus is obtained, and it is possible to determine to a hair's-breadth, by moving the small pair of electrodes over the surface of the tongue and palate, the limits of the gustatory and non-gustatory area, as well as to form an accurate conclusion in regard to the intensity of the sense of taste in symmetrically situated parts.

A formal classification of affections of taste has three divisions: gustatory hyperæsthesia; gustatory paræsthesia; gustatory anæsthesia. The two first may be dismissed in a few words.

Gustatory hyperæsthesia is of very rare occurrence, and has been noticed hitherto almost solely in hysterical patients.

Gustatory paræsthesia refers chiefly to subjective sensations of taste which are spontaneously perceived on the anterior half of the tongue in many cases of rheumatic facial paralysis, and to the sensations of taste produced by the taking of certain medicines. As an example of this condition, Erb mentions the bitter taste which endures after the taking of santonin, which is so marked that even water tastes bitter in drinking.

Gustatory anæsthesia (often spoken of as ageustis, but according to Erb, properly ageusis). May be

complete or incomplete ; may be rather of quality than of quantity, and may affect only certain regions of the tongue.

Gustatory anæsthesia may be due to *central* causes, but at the present time very little is certainly known of the central causes which produce it, or of their exact seat.

Again, the loss of taste may be due to *peripheral* causes, such, for example, as cold and heat, great dryness of the surface of the tongue, thick fur, and other conditions which prevent the materials which are taken into the mouth from acting on the nerves of taste.

The loss of taste may be due to failure of *conduction* in the nerves of taste ; and this class includes by far the most important cases. The failure may take place in the glosso-pharyngeal, the gustatory, the trigeminal, the chorda tympani, or the facial nerves.

So far as the glosso-pharyngeal is concerned, no case of isolated paralysis of this nerve, with the answering disturbance of taste, had been recorded in medical literature at the time at which Erb wrote his article, nor, so far as I am aware, has any case of the kind been published since.

In affections of the gustatory, the trigeminal, the chorda tympani and certain segments of the facial, the loss of taste occurs in the anterior half of the tongue, the borders, and the tip.

Division of the gustatory nerve has been repeatedly proved to be a cause of loss of taste.

Disease within the skull affecting the trigeminal nerve has also been found in many instances destructive to the sense of taste ; but loss of taste from disease of individual branches of the trigeminal nerve is not satisfactorily proved.

As regards the chorda tympani, loss of taste is frequently recorded in cases in which the conduction

through the nerve is interfered with in diseases of the middle ear, and caries of the petrous portion of the temporal bone; the loss of taste is not always noticed in the patient, but those who are interested in the matter should always test the condition of taste in cases in which there is paralysis of conduction through the chorda tympani of such a kind.

Paralyses of the facial nerve from various causes are frequently accompanied by loss of taste. In almost all these cases the cause of the paralysis is situated within the aquæductus fallopii and below the geniculate bodies. In those cases in which the loss of taste has resulted from affections of the facial external to the stylo-mastoid foramen, the occurrence must be explained by assuming that the recurrent fibres of the chorda tympani are involved, those fibres which proceed to the brain through the auriculo-temporal nerve. Damage to the facial nerve at the base of the skull is not certainly known to produce loss of taste, and probably does not do so.

Erb considers that in the present state of our knowledge the diagnosis of the exact cause of loss of taste in any individual instance, or even of the nerves affected, is very difficult, nay, almost impossible. For the same reason it is not possible, in the majority of cases, to offer a prognosis which is likely to be correct, for the prognosis must depend largely on the cause of the affection and on the part diseased.

The treatment is in most cases purely causal. Against the mere loss of taste it is well to try the effect of faradisation and galvanism.

Fortunately, the mere loss of taste is seldom complained of as a serious inconvenience, for it rarely affects more than a segment of the area of taste, and, on this account, may be quite overlooked by the patient. The loss of taste is, in the large majority of cases in which it is noticed, chiefly important

as a possible indication of some central mischief, and on this account must not be treated lightly.

Further, it must always be borne in mind that when patients complain of the loss of taste, the cause of the defect may lie, not in the mouth or in the brain, or in the course of any of the nerves which have been mentioned, but may depend on conditions of the neighbouring nasal cavities, or on the circumstance that the communication between the nose and the mouth is cut off.

Complete loss of taste does not appear to be produced by the most complete loss of the sense of smell, but the faculty of taste is impaired in a manner which is more marked to the patient than a complete loss of taste over a limited area of the gustatory region would be. For, as Morell-Mackenzie has well pointed out, the savour of meat, the flavour of fruit, and the bouquet of wine are no longer appreciated by the patient. Their appreciation depends on the perfection of the sense of smell. The recognition of bitter, salt, acid, and sweet substances can still be made, but the parts of taste which confer the chief pleasure on the individual are lost. Careful testing by the methods which have been described will enable the distinction to be made without difficulty between this partial loss of taste and the complete loss of the faculty of taste over a part or the whole of the gustatory region.

APPENDIX.

LIST OF WORKS AND PAPERS REFERRING TO THE SUBJECTS TREATED OF IN THIS BOOK.

ACCIDENTS.

- Taylor: "On Poisons in relation to Medical Jurisprudence and Medicine." Third ed., 1875.
 Wickham Legg: "Treatise on Hæmophilia." 1872.
 Legouest: "Traité de Chir. d'Armée." Second ed., 1872.
 Carl Seiler: Archives of Laryngology, vol. i., p. 276.
 Bertrand: *Gazette des Hôpit.*, p. 119. 1868.
 Bérenger-Féraud: *Gazette des Hôpit.*, p. 211. 1870.

CONGENITAL DEFECTS.

- Jussieu: "Hist. de l'Acad. R. des Sciences." 1718.
 Aurran: "Elinguis Femine Loquela." 4to. Argent., 1766.
 De Belebat: "Aglossostomographie." 12mo. Samur, 1630.
 Weber: "Pitha and Billroth," Einb., 6, p. 314. 1866-73.
 Kölliker: "Entwicklungs-geschichte," 2te. Aufl., 1876.
 Ahlfeld: "Missbildungen des Menschen." 1882.

TONGUE-SWALLOWING.

- Petit: "Mém. Acad. Roy. des Sciences," p. 247 1742.
 Fairbairn: *Medical Times*, vol. xii., p. 392. 1845.
 Hennig: Jahrb. d. Kinderhkd., N.F., vol. xi., p. 299. 1877.
 Fletcher Ingals: Arch. of Laryngol., vol. ii., p. 134.
 Fairlie Clarke: "Diseases of the Tongue." 1873.

DISCOLORATIONS.

- Wickham Legg : St. Bartholomew's Hos. Rep., vol. x., p. 244. 1874.
 Greenhow : Path. Trans., vol. xxiv., p. 94. 1878.
 Froriep : "De Lingua anatomica." 1828.
 Stoker : Path. Trans., vol. xxxv., p. 157. 1884.
 Raynaud : *Gazette Hebdomadaire*, p. 221, Avril 2. 1869.
 Hutchinsonson : *Med. Press and Circ.*, vol. ii., p. 20. 1883.
 Bertrand : "Compt. Rend. Acad. Scien.," vol. xli., p. 932. 1855.
 Dessois : *Gazette des Hôpitaux*, p. 217. 1879.
 Sell : Hosp. Tidend, R. 2., Bd. 8, p. 977.
 Lancereaux : Bull. gén. de Thérap., vol. xcii., p. 36. 1877.
 Vallin : Bull. gén. de Thérap., vol. xcii., p. 424. 1877.
 A. R. Barnes : *British Medical Journal*, vol. i., p. 995. 1884.
 Brydon : *British Medical Journal*, vol. i., p. 761. 1884.
 Broach : *British Medical Journal*, vol. i., p. 761. 1884.
 Rigal : "Dict. de Méd. et de Chir. prat." (Art. "Langue"). 1875.

ACUTE INFLAMMATION.

- Weber : *Loc. cit.*
 Stephen Mackenzie : Practitioner, vol. ii., p. 271. 1881.
 Fairlie Clarke : *Loc. cit.*
 Williamson : *Lancet*, vol. i., p. 136. 1881.
 Barker : "Holmes' System of Surgery," vol. ii., p. 568. Third. ed.
 Sidlo : Algem. Wien. Med. Zeit., p. 61, 73, 79. 1877.
 Stromeyer : "Chir. Krankh. d. Kopfes," p. 152. 1868.
 Bierbaum : *Journ. f. Kinderkr.*, vol. L., p. 65. 1868.
 Hjelt : "Canstatt," vol. ii., p. 175. 1881.
 Vaughan : *Lancet*, vol. i., p. 844. 1869.
 Bryant : Guy's Hosp. Reports, vol. xli., p. 108. 1883.
 Stuver : *Med. News*, vol. xl., p. 11. 1882.

HEMIGLOSSITIS :

- Graves : "Clin. Med.," vol. ii., p. 196. Second ed.
 Guenneau de Mussy : Arch. gén. de Méd. Séries 3, vol. viii., p. 385. 1879.

ACUTE INFLAMMATION (*continued*).HEMIGLOSSITIS (*continued*):

Dyce Duckworth: *Liverpool Med.-Chir. Journ.*, p. 195.
July, 1883.

INFLAMMATION AT THE ROOT OF THE TONGUE:

Craigie: *Edin. Med. and Surg. Journ.*, vol. xlii., p. 19.
1834.

Fleming: *Dublin Quart. Journ.*, vol. x., p. 87. 1850.

Fergusson: "System of Surg.," p. 516. Fifth ed.,
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MERCURIAL GLOSSITIS:

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Hyde Salter: "Encycl. Anat. and Phys." (Art.
"Tongue").

SEPTIC GLOSSITIS:

Heyfelder: *Med. Vereinszeitung* 1834.

Demarquay: "Dict. de Méd. et de Chir. prat." (Art.
"Langue"). 1875.

ERUPTIONS.

Willan: "Cutaneous Diseases," vol. i., p. 527. 1808.

Fairlie Clarke: *Loc. cit.*

Stephen Mackenzie: *Practitioner*, vol. ii., p. 271. 1831.

Rigal: *Loc. cit.* ("Discolorations").

INDENTATIONS, EXCORIATIONS, FURROWS, FIS-
SURES.

EXCORIATIONS:

Hack: *Monatht. f. pract. Dermat.*, vol. i., p. 2. 1882.

FURROWS:

Demarquay: "Dict. de Méd. et de Chir. prat."
(Langue). 1875.

FISSURES:

Fournier: "Des Glossites Tertiaires." 1877.

ULCERS.

SIMPLE ULCERS:

Paget: *Med. Times and Gasette*, vol. i., p. 500. 1858.

Weber: *Loc. cit.*

ULCERS (*continued*).SIMPLE ULCERS (*continued*):

- H. Salter: "Encyclop. Anat. and Phys." (Art. "Tongue").
 Bryant: *Loc. cit.*

APHTHOUS:

- West: "Diseases of Children."
 Paget, Salter, Bryant, as above.

TRAUMATIC:

- Demarquay: *Loc. cit.*

ULCERS IN HOOPING COUGH:

- Delthil: Bull. de l'Acad. Méd., vol. vi., p. 174. 1877.
 Rigal: *Loc. cit.* (*See* "Discolorations.")

MERCURIAL ULCERS:

- Weber: *Loc. cit.*
 F. Clarke: *Loc. cit.*

TUBERCULOUS ULCERS:

- Nedopil: Langenbeck's Archiv., vol. xx., p. 365. 1877.
 Duplay: *Progrès Méd.*, p. 225. 1876.
 Paget: *Loc. cit.*
 Trélat: Archiv. gén. de Méd. Sixth series, tome xv., p. 35. 1870.
 Féréol: *Union Méd.* Third series, vol. xiv., p. 717. 1872.
 Bosworth: Archiv. of Laryngol., vol. ii., p. 329.
 Browne and Grant: Archiv. of Laryngol., vol. ii., p. 7.
 Paulicki: Berlin. klin. Wochsft., p. 424. 1867.
 Wagner: Arch. für Heilkunde., vol. vi., p. 470. 1865.
 Bryant: *Loc. cit.*
 Weber: *Loc. cit.*
 Korte: D. Zeitsft. für Chir., vol. vi., p. 447. 1876.

LUPUS ULCERS:

- Weber: *Loc. cit.*
 F. Clarke: Path. Trans., vol. xxvii., p. 148.

SYPHILITIC ULCERS:

- Demarquay: *Loc. cit.*
 Clarke: *Loc. cit.*
 Fournier: *Loc. cit.*
 (*See* works referred to under "Gummata" and "Mucous Patches.")

PATCHES AND PLAQUES.

LEUCOMA, ETC. :

- Hutchinson : *Med. Press and Circ.*, vol. ii. 1883.
 Schwimmer : *Vierteljahrst. f. Derm. und Syph.*, p. 511. 1877.
 Hulke : *Clinical Society Trans.*, vol. ii., p. 1.
 Barker : *Loc. cit.*
 Morris : *Med. Soc. Proceed.*, vol. vi., p. 194.
 Debove : "Le Psoriasis buccal." Paris, 1873.
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 Weir : *New York Med. Journ.*, vol. xxi., p. 240. 1875.
 Morris : *British Medical Journal*, vol. i., p. 231. 1874.
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 Mauriac : *L'Union Médicale*. Mai, 1874.

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- Fairlie Clarke : *Loc. cit.*
 Butlin : *Med.-Chir. Trans.*, vol. lxi., p. 51. 1878.

WANDERING RASH, ETC. :

- Bridou : "Une Affection innommée de la Muqueuse linguale" (*Inaug. Diss.*). 1872.
 Gubler : "Dict. Encyclop. Scien. méd." (Bouche).
 Caspary : *Vierteljahrst. f. Derm. und Syph.*, N.F., vol. vii., p. 183. 1880.
 Barker : *Loc. cit.*
 Unna : *Vierteljahrst. f. Derm. und Syph.*, N.F., vol. viii., p. 295. 1881.
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 Vanlair : *Revue mens. de Méd. et de Chir.*, vol. iv., p. 53. 1880.
 Collocot Fox : *Lancet*, vol. i., p. 842. 1884.

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PATCHES AND PLAQUES (*continued*).

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LEPROSY:

- Vandyke Carter: "Leprosy," p. 55.
- Campana: *Med. Rec.*, p. 214. 1884.

NODES AND NODULES.

TUBERCULOUS:

- See Ulcers, Tuberculous.

GUMMATA:

- Fournier: *Loc. cit.*
- Zeissl: *Loc. cit.*
- Bumstead and Taylor: *Loc. cit.*
- Bryant: *Loc. cit.*
- Barlow: *Path. Trans.*, vol. xxxi., p. 101. 1880.
- Fairlie Clarke: *Loc. cit.*

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- Chapman: *Archives of Laryngology*, vol. iv., p. 66.
- Ballet: *Archiv. de Neurologie*, vol. vii., p. 191. 1884.
- Browne and Jessop: *St. Bartholomew's Hos. Reports*, vol. xviii., p. 271.

HYPERTROPHY.

MACROGLOSSIA:

- Teale: *Trans. Med.-Chir. Soc.*, vol. xxxvi., p. 133. 1853.
- Hodgson: *Trans. Med.-Chir. Soc.*, vol. xxxvi., p. 129. 1853.
- Humphry: *Trans. Med.-Chir. Soc.*, vol. xxxvi., p. 113. 1853.
- C. O. Weber: *Virchow's Arch.*, vol. vii., p. 115. 1854.
- Virchow: *Virchow's Arch.*, vol. vii., p. 126. 1854.
- Chalk: *Path. Trans.*, vol. viii., p. 305. 1857.
- Vernon: *St. Bartholomew's Hos. Reports*, vol. i., p. 62. 1865.
- O. Weber: *Loc. cit.*
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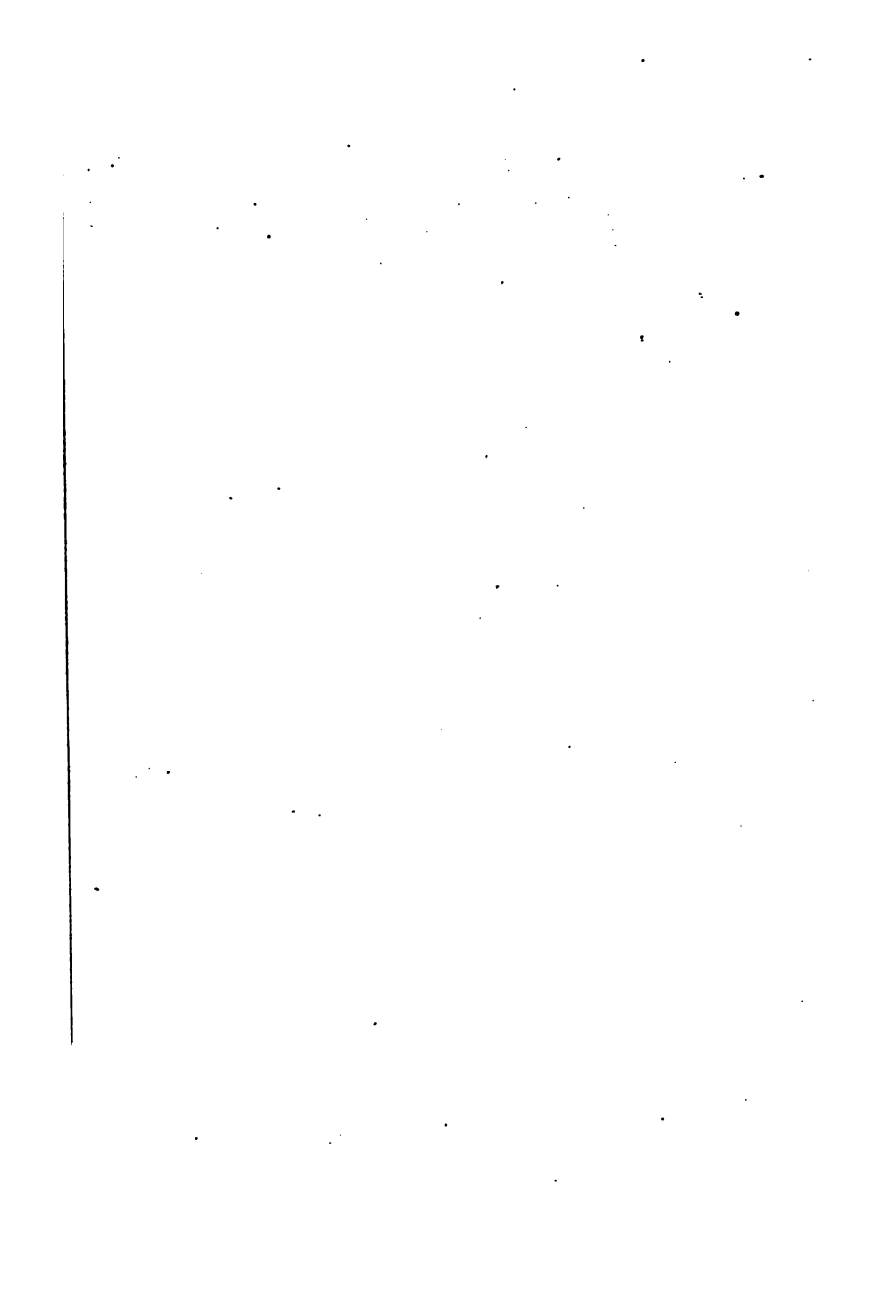
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