THE LUMLEIAN LECTURES

ON THE TONGUE AS AN INDICATION OF DISEASE.

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By W. HOWSHIP DICKINSON, M.D., F.R.C.P.,
Honorary Fellow of Caius College, Cambridge; Senior Physician to St. George's
Hospital; Consulting Physician to the Hospital for Sick Children.

LECTURE II.

CLASS 8.—*Encrusted Dry and Brown Tongue.*

THE variety about to be described is distinct enough, though it has points of contact with the two preceding classes, as a later stage of which it presents itself. The essential characteristic is the covering of the tongue with a brown dry crust, which surmounts and conceals the papillæ. It occurs as a later stage of the furred tongue, the spaces between the elongated papillæ getting filled up, as it would seem almost necessarily, and the accumulation carried up so as to level or overtop their summits. It occurs also as a later stage of the coated tongue, more particularly of that kind which has been described as plastered, the growth of the papillæ and of the epithelium in the intervals and the accumulation of parasites on the dry surface producing the result.

To the naked eye the characters of the encrusted brown and dry tongue are almost sufficiently described by these three words. It is irregularly covered with brown dry incrustation, variously broken and fissured. Sometimes the cracks are quite irregular; often the deeper are transverse, with longitudinal longer and shallower fissures, which together divide the crust into more or less rectangular scales. The surface, particularly in front, often displays, instead of incrustation, coarse elongated papillæ which are antecedent to it, while towards the back and central parts the coat covers and conceals these prominences. The colour is generally brownish, and the upper surface rough and dry, while the under part is smooth, uncoated, and only clammy. The teeth are often encrusted with brown matter.

It may be asked, Why is the encrusted tongue brown? First, because it is dry. Many animal substances dry brown, among others the white coat of the tongue. I have dried a thickly-coated white tongue at the temperature of 100°, and also at that of an ordinary room. When dry it became brown. A brown, dry, encrusted tongue, when soaked in water, became nearly white, but not quite, and brown as before when re-dried. Thus dryness appears to be the chief producer of brownness, but staining by food and medicine no doubt helps. Many coloured matters—beef-tea, wine, etc.—go into the mouth of a sick man, and cannot but discolour the tongue if the natural wash by saliva is wanting. The crusts on the teeth are probably similarly produced. They are not due to the drying of saliva on the teeth, for saliva at the heat of the body dries white.

With the microscope the chief points are the elongations of the papillæ, and their being embedded and overlaid by a heterogeneous brown mass, which will be further noticed. The incrustation differs from what has been shown to form the coat or fur, though attached to it so as to be inseparable without fracture. Traced in section from within outwards, it presents first much epithelium, more or less horizontally arranged, flattened, but usually not old enough to have lost the power of taking carmine. Through this project long papillæ, chiefly consisting of horny, un-tinting epithelium, upon the exalted summits of which rests a confused mass which constitutes the crust. While the tops of the papillæ support this material, their intervals are filled up by it. Thus there are two constituents of the covering of the encrusted tongue; first, a large growth or accumulation of epithelium, much of which is in the shape of elongated papillæ; and, secondly, a less definite structure, which lies upon this and in its interspaces. The superimposed substance is mixed and irregular; much of it can be described only as amorphous; in it can be distinguished epithelial cells disposed without regularity, fat-globules, occasionally other adventitious and accidental matters, and last, not least, a multifarious collection of organisms, chiefly vegetable. In

two cases, in one during life, in the other after death, I found lying on the tongue large detached masses of dry brown crust, one of which was not less than a quarter of an inch thick. Sections of these prepared in different ways were examined; I show a diagram representing one of these sections made from a drawing which I owe to the skilful hand of Dr. Délépine. Both masses showed a profusion of vegetable organisms, chiefly micrococci and the *oidium albicans*. I am indebted to Dr. Délépine for a minute description of these organisms, which, however, I will not read. Besides these were many strands of horny or superficial epithelium, many epithelial cells of the deeper kinds, many fat-globules, and much indeterminate matter. The dry incrustation differs from the moist coat chiefly in this; whereas the major bulk of the white coat is epithelial, a very large proportion of the dark dry crust is parasitic. In the deeper parts of the epithelial structure, more especially in the Malpighian layer, there is often much profusion of nucleation or cell growth, the corium is in many cases distinctly hypernucleated and often over-injected. More rarely leucocytes are extruded within the papillæ and elsewhere.

To sum up the evidence afforded by the morbid anatomy of the encrusted dry tongue, we see first the results of the absence of friction and irrigation, most conspicuously in the accumulation which forms the crust. It is probable, also, that the elongation of the papillæ may be partly attributed to this cause. But there are also signs of increased cell formation and nutrient activity, so that we witness here a double process, over-production conjoined in larger measure with deficient removal. It is obvious that the dryness which helps to define this tongue has played an important part in it, both by want of scour and also by induration.

Coming to clinical considerations, much that has been said about the furred tongue applies also here. It will be convenient to take together two classes which, though I have separated them for some of the purposes of the inquiry, are not to be distinguished save as the earlier and later stages of the same state. I shall for clinical purposes fuse together the tongue which is completely encrusted and that which is in the process of shedding its crust in the way to become denuded. So various are the conditions under which the encrusted tongue is seen that it is not easy to discern what the link of association may be, except the somewhat loose one of severe illness, and that of some standing. The instinctive sense of the physician carries him thus far. His looks are ominous, he talks of the "typhoid state," and he orders stimulants.

Analysing the details in the two tables before us (Nos. 8 and 9), comprising together thirty-four cases, pneumonia takes the first place in frequency with six cases; then come pyæmia with four and continued fever with three. Acute rheumatism with hyperpyrexia occurred in one instance, and erysipelas in one. In short, there is scarcely any protracted and depressing febrile disorder in which, if I may supplement the scanty records before us with unrecorded experience, this tongue is not apt to be developed. It is often characteristic of typhus by means of the black colour it then presents—possibly due to hæmorrhage into the coat (but of this I cannot speak from observation). The encrusted tongue is so commonly looked for in advanced typhoid that it is often spoken of as the "typhoid tongue," though by no means the only variety displayed in this disease. But the association with fever does not contain the whole story, nor is the febrile condition essential. This tongue may concur with its complete absence. The abstract shows that of the thirty-four cases in question, fifteen displayed a temperature above 102°, eight a temperature under 99°, in three of which it was sub-normal. The low temperature was manifested with abdominal cancer, advanced phthisis, albuminuria, syphilitic mania, diarrhoea, alcoholism, and prostration from an unknown cause. Thus, pyrexia, though often present with the encrusted tongue, and no doubt, by the evaporation which it entails, helpful to its production, is by no means necessary to it. The average temperature is lower than with the plastered tongue. It is scarcely needful to inquire, after what has been said, whether this tongue is to be generally attributed to openness of the mouth during sleep or coma. The dry encrusted or furred tongue—for the two have similar clinical relations—is an especial property of coma or insensibility. I have not recorded any case in which well-marked coma persisted for more than twenty-four hours without one or the other being developed. The records are scanty, but a larger experience supports the general rule that with coma or long unconsciousness the tongue becomes as described. Many reasons are

obvious—dryness and disuse the chief. But why the dryness? It is manifest that coma, if it involve habitual openness of the mouth, must tend to dry the tongue; but if health is good in general respects, it does not appear that the mere passage of air over the tongue in respiration can produce anything like the degree of desiccation in question. I have noticed how little dryness has resulted in a person otherwise well whose nostrils have been surgically plugged, and we must take another point of view. Coma, however it acts, is connected with only a minority of cases in which the tongue becomes dry and encrusted. Putting aside all states of coma and unconsciousness, all in which the mouth has been habitually open from other causes, and all states of pyrexia, there remain many conditions, and these most various, in which the tongue has presented itself. Advanced phthisis, intra-thoracic or abdominal cancer, idiopathic anæmia, and diarrhoea have been mentioned; all were attended with much depression or prostration, and, indeed, it appears that, whatever else be present, a condition of much illness or lowered vitality runs through all and supplies the common factor. It has been shown that a similar condition of prostration often attends the furred tongue. I should have preferred to have been more explicit, but it is not easy to narrow the statement within a more strict definition. To most of the conditions the term "sinking" would be applied as indicating what is present or threatened. There is not necessarily any loss of consciousness nor any obvious failure of the nervous system. Sense and senses may be alike unimpaired. There is, as a rule, failure of circulation, of muscular strength, and of nutrition. Perhaps the term "asthenia" best implies this state. Any disturbance may be superadded, but none other is generally essential. I say *generally*, for direct dehydration will cause the state of tongue in question. This is seen in the effects of dry diet, and perhaps less simply in the effects of diarrhoea. It is to be observed that exhaustion by suppuration, as will be seen, causes other changes in the tongue than this.

It has been shown that the essential local change is dryness, and that this, as a rule, is not due to direct dehydration or to increased evaporation from pyrexia or patency of the mouth. That it is due to deficient secretion of saliva is a necessary conclusion, warranted by the obvious deficiency of liquid in the mouth, by the difficulty or impossibility of spitting, and by the usually fruitless result of catheterisation of the parotid, notwithstanding that acetic acid may be applied to the tongue as a stimulant to this gland. I shall revert to this point, but am not wrong so far in assuming the dryness to be, as a rule, due to suppression of this secretion. Associating this with the asthenia which accompanies it, we cannot but regard the local as the result of the constitutional state, and probably may accept it as a sign that the prostration is telling upon the functions of at least some of the organs. The bowels, kidneys, and skin do not obviously participate in the failure; but how about the gastric and other digestive juices? Observations here are difficult or impossible, but it may be conjectured that the salivary failure does not stand alone, and we may accept the state of tongue before us as an index not only of asthenia, but of a failure of certain vital functions connected with nutrition.

8. Encrusted, dry, and brown.

Pericarditis, hydrothorax, tapping often	...	1
Pneumonia	...	2
Phthisis	...	1
Cancer of lung	...	1
Block in rectum and hepatic ascites	...	1
Choleraic diarrhoea	...	1
Gravular kidney and uræmia	...	1
Uræmic coma	...	1
Diabetic coma	...	1
Obstructive jaundice...	...	1
Cancer of pancreas, etc.	...	1
Acute rheumatism	...	1
Idiopathic anæmia	...	1
Typhoid	...	1
Typhus	...	1
Erysipelas	...	1
Pyæmia	...	3
Rapid emaciation, cause uncertain	...	1
Alcoholism	...	1
Total	...	22

Observations as to the above cases.

Pyrexia (temp. 102° to 104°)	...	8
Hyperpyrexia	...	1
No observations as to temperature	...	1
Average temperature of 21 cases	...	100.3°
Much prostration	...	12
Prostration not severe	...	0
Chiefly on liquid diet...	...	13
Strictly limited to liquid diet...	...	4
Dry diet	...	0
Saliva abnormally deficient!	...	8

Died, 14; recovered, 7; relieved, 1.

CLASS 9.—The Process by which the Coated, Furred, or Encrusted Tongue becomes Red, Smooth, and Dry.

The cleaning of convalescence requires no further notice; the shelving off of the coat at the tip and edges has been described. In less favourable circumstances the process of making bare occurs in this wise. The incrustation is very dry and correspondingly brittle, and the epithelium beneath it, in connection probably with the same want of moisture, does not grow properly. The coat or crust now wears off more or less at the tip and edges, in a gradual manner, and displays not the normal surface, but a red and dry one, usually covered with a delicate membrane, so thin as possibly to escape notice, but discernible to a careful eye. Under the microscope it is evident enough. After, or more or less together with, the exposure of the fore part of the tongue, the central part loses its covering along a broad stripe which reaches from this point not quite to the back. This may be an inch or rather more in width, and is the part of the tongue most exposed to the breath, and consequently the driest. The clearing is often effected by a very obvious cracking and breaking away of the crust, which may be so rapid that I have seen a much encrusted tongue become nearly naked in a day. The exposed surface may look raw, but is seldom absolutely so, for it is skinned over with the dry translucent membrane which has been described. This stretches straight along the surface, like the arachnoid of the brain, not dipping between the papillæ, the outlines of which it obscures. The bare and polished stripe is often fringed with white fur or coating as a line down each side, outside which is the nearly normal lateral margin. After a time the whole upper surface becomes nearly equally red, dry, and bare, the surface being intersected with fine or deeper lines or cracks, some longitudinal, the deeper transverse. The coating is retained longest at the root. A resumption of moisture is a sign of constitutional improvement, and precedes a gradual reclothing—too seldom observed—which restores the tongue to its normal state.

I will now bring the microscope to bear upon the process which has been described. I pass over the gradual change of convalescence to consider the modes by which the morbidly dirty tongue becomes morbidly clean. Starting with the elongated papillæ of the furred tongue, these, together with all the superficial epithelium, are often swept off accurately down to the Malpighian layer, which retains its place, and still uniformly clothes the corium. In time, or almost simultaneously, this may become covered afresh with epithelium of the horny sort, not at first as in health, but in the shape of the thin membrane of which I have spoken. Supposing the denuding process to continue, the Malpighian layer itself is removed and the corium exposed, making a surface which is uneven microscopically, though to the naked eye smooth, and necessarily red and raw. This process is attended with vascular injection, hypernucleation, and often the extrusion of leucocytes. Much of the injection and hypernucleation may be the consequence of the loss of the protective epithelium, with exposure and irritation of parts which should be covered. But in some cases it is apparent that a general inflammatory infiltration of the superficial parts precedes the denudation, and helps to produce it by a destructive process. This is most marked with scarlatina, where the infiltration is often most abundant. This may be due to the especial effect of the disease, which the tongue appears to share with the skin and throat. I have now traced the flaying operation down to the true skin. All that is special to the tongue has gone, at least in places; but more often, as I have said, the process stops on reaching the Malpighian layer, and here begins a process of repair to which I have alluded, but to which I must revert. The tongue is now red, level, and polished. To the hasty eye it looks

¹ The extreme illness of many of these patients made it difficult to estimate the absence of saliva by attempts to spit or by catheterisation of the duct. The number therefore appears small. It is probable that saliva was wanting in nearly all, so far as the state of the mouth could be taken as an index.

like raw beef, a similitude often used; but the beef is wrapped in silver paper. A continuous layer of horny epithelium, of extreme tenuity, presents itself, and resting on the more elevated remnants of what were papillæ, stretches from one to another without dipping into the hollows, like the roadway of a bridge. The hollows, however, are not empty, but contain epithelium of the deeper sort. The somewhat gradual process which I have described is sometimes replaced by one into which violence more obviously enters. This relates especially to the encrusted tongue. The felted mass of crust breaks through its deeper part, the fracture passing through the bases of the papillæ, leaving their broken stumps standing. These quickly become levelled down, and the Malpighian layer soon presents itself with a delicate membrane, as described. In this breaking away of the crust accident cannot be excluded, but more is probably due to the rising up of new epithelium from beneath, by which the brittle and mostly effete mass above is pushed from its stool. Probably something of this sort happens when scarlet fever patients and snakes shed their skin.

9. *Furred or encrusted, becoming denuded; generally dry.*

Tetanus	1	Cancer of pancreas, etc. ...	1
Syphilitic mania	1	Peritonitis, faecal extravasa-	
Valvular disease	1	tions	1
Pneumonia	4	Typhoid	1
Cirrhosis	1	Pyæmia	1
Dysentery, abscess of liver...	1		

Total 13

Observations relating to preceding cases.

Pyrexia (temperature 102° to 104°) ...	5
Hyperpyrexia (over 104°) ...	1
No observations as to temperature ...	3
Average temperature in 10 cases ...	100.8°
Much prostration ...	7
Prostration not severe ...	0
Chiefly on liquid diet ...	9
Strictly limited to liquid diet... ..	2
No food by mouth (fed by rectum) ...	0
Dry diet	0
Saliva observed as deficient ² ...	2 (?)
Died, 10; recovered, 1; relieved, 1; not relieved, 1.	

CLASSES 10 and 11.—*Bare, Red, and Dry Tongue.*

In the description of the process of denudation I have anticipated much that applies to the bare tongue. The completely bare tongue, red, raw, and dry—for this state, does not seem to be attained except with dryness—is comparatively rare. The term *completely* bare or denuded relates to the completeness of the loss of the epithelium in certain places, not to its spread over the whole tongue. This change is more limited in extent than the more shallow divestures which have been described. I have already traced the process down to the Malpighian layer, which has become covered anew with a straight membrane instead of the normal serrated one. Should the repair be exceptionally wanting, this membrane is not formed, but the Malpighian layer is left to break away and lay bare the corium beneath. Occasionally it would seem that the destruction occurs after the formation of this membrane, which it involves, for the broken ends are often seen overhanging a tract of excoriation. The exposure is effected not quite abruptly; the neighbouring epithelial structures shelve off until the patch of complete exposure is reached. Here no epithelium of any kind remains: the corium is laid bare to the cavity of the mouth, and is even sometimes itself encroached upon. I have not seen this process descend quite to, though sometimes it has approached, the muscular fibres. The exposed corium sometimes shows little change of structure, more often it is infiltrated with leucocytes, sometimes to such an extent that the surface appears to be entirely composed of them. There is also injection of the blood-vessels. The infiltration is probably generally due to irritation by the unaccustomed contact of the contents of the mouth, and is subsequent, not antecedent, to the loss of covering. Even in scarlatina, where the inflammatory exudation may possibly be a part of the eruption, the enucleation is greater in the exposed parts than elsewhere.

For clinical purposes I shall place together two classes that cannot be always distinguished except with the microscope, and give a common consideration to the red denuded tongue, whether

absolutely bare, or protected only by the thin membrane which has been described.

The qualities of redness, smoothness, and dryness are nearly related. If the tongue be uncovered with the opaque superficial epithelium it will necessarily display the vascularity of the deeper parts; and this is usually increased because the tongue is irritated by exposure. The denuded tongue is dry partly because the loss of epithelial protection allows of increased evaporation from its surface, but chiefly from want of saliva. Want of saliva may encrust the tongue; it may also make it bare: of this more anon. This variety of tongue is that on which aphthous growths are most apt to occur. It presents itself in diverse circumstances, generally of exhaustion. The most prominent fact is its occurrence as the result of exhaustive discharges, especially of pus, and it is linked with the constitutional state described as hectic. The table shows that of thirty cases seven were connected with an ostensible escape of pus, including one case of lumbar abscess, one of empyema, two of discharge of pus with the urine, one dysentery with open hepatic abscess, and two of advanced phthisis with much expectoration and diarrhoea. Besides these, in which loss of pus was obvious, there was one instance of profuse dysenteric flux in which an abscess had formed in the liver but not found exit; two cases of lardaceous disease with the customary discharges, and five of advanced diabetes, brought to fifteen, of thirty, the number of instances in which this state of tongue was associated with exhausting discharges. The frequency of diarrhoea deserves remark. It has not been shown so far that simple diarrhoea causes it, but diarrhoea was prominent with other morbid conditions, notably dysentery and phthisis. The most striking tongue of this kind which I ever saw (it was as red and almost as smooth as sealing-wax) was in the case already referred to of acute dysentery, with unopened hepatic abscess. I have to thank Sir Joseph Fayrer for giving me some of his Indian experience, with regard more especially to tropical diarrhoea. In advanced cases of this, the tongue, he says, is shrunken, red, polished, and smooth; the papillæ have disappeared, and the epithelium is stripped off in patches. The gums, lips, and buccal mucous membrane are often aphthous. The tongue is very tender; alcohol or salt causes great pain in passing over it. As significant signs of convalescence, Sir Joseph notices a softening of the tongue, a change of the red to pink, loss of tenderness, and the reappearance of the papillæ.

There remain cases in which the red, dry, smooth tongue has presented itself without any obvious association with discharge. Among them were five of pneumonia, all with much depression; one was double, and attended with maniacal delirium; one was complicated with delirium tremens; another was in a drunkard; two were attended with great prostration (not explained). There were two cases of typhoid, of which one was characterised by sleeplessness and nervous agitation; one of tubercular peritonitis, one of biliary colic, and one of a dangerous gorge of grapes,—all these conditions being attended with much depression. Advanced tubercular disease presents itself as a not infrequent associate of this tongue; there were five cases of this sort in the thirty. Pyrexia is not needful to the production of this tongue, though often present. A temperature not above normal was found with it in cases of lumbar abscess, pyelitis, lardaceous disease, several of diabetes, and some under dry diet. As compared with the encrusted tongue, there is no great difference in the frequency of pyrexia; both may occur without it; the average temperature of the bare tongue is somewhat lower than that of the encrusted.

To sum up the circumstances of the red, smooth, dry tongue, they are usually more chronic than those of the encrusted. This must be so, since the one is often a later stage of the other. Exhaustion by discharge is frequent with the smooth tongue; or, if this be absent, there are generally especial circumstances of prostration or depression, which are often connected with the abdominal organs. This tongue implies failing nutrition. The clinical evidence accords with the indications of pathology in this respect. The saliva is, I believe, always deficient, though I think it is not usually so completely absent as with the encrusted tongue. It will presently appear that in certain circumstances want of saliva prevents the growth of epithelium; though this failure of growth may also have its connection with a more general impairment of the nutritive process. Increased moisture of the tongue is a sign of the best omen; this is usually followed by re-covering, and possibly by recovery.

The prognosis with this tongue is bad: of the thirty cases in

² Mouth invariably dry, but special observations on saliva not generally made, or practicable.

which it was recorded, sixteen ended fatally. The mind commonly remains clear, though the patient may be weak unto death.

10 and 11. *Bare, Smooth, Dry, Red (Membrane or None Evident).*

Pneumonia	5	Surfeit	1
Broncho-pneumonia (also after recovery)	1	Diabetes, advanced	5
Phthisis or general tuberculosis, or of peritoneum	4	Typhoid	2
Hepatic ascites and dry diet	2	Pyæmia	1
Attack of gall-stones	1	Lumbar abscess, discharging	1
Lardaceous disease, ascites, etc.	2	Pus in urine (abdominal tumour)	1
Dysentery and abscess of liver	2	Tubercular pyelitis, pus in urine	1
		Empyema, discharging	1
Total	30		

Observations relating to the above Cases.

Pyrexia (temperature, 102° to 104°)	11
Hyperpyrexia (temperature over 104°)	2
No observations as to temperature	1
Average temperature in 29 cases	99.6°
Much prostration	21
Prostration not severe	2
Chiefly on liquid diet	11
Strictly limited to liquid diet	6
Dry diet	2
Saliva abnormally deficient	15
Died, 16; recovered, 6; relieved, 7; not relieved, 1.	

CLASS 12.—Cyanosis or Venous Congestion of the Tongue.

This tongue is characterised mainly by a superabundance of recent or deep epithelium, which occurs in circumstances indicative of excessive production, not deficient removal. It especially belongs to heart disease or cyanosis from some other cause. To the naked eye there is a bluish or purple colour, and a smooth, wet, slippery surface like that of an eel, upon which the papillæ are almost indistinguishable, as if fused together, or in some other way deprived of their separating intervals. Upon this substratum may be overlaid more or less of one of the grades of coat which has been ascribed to the partial obscuring of the deeper characters. Microscopically, the most noticeable peculiarities are superabundance of the recent epithelium, vascular injection, and hypernucleation. The deep epithelium is amassed thickly over the surface, sometimes rising to the tops of the papillæ, but leaving these exposed, sometimes overlaying them completely, so that the whole papillary structure is embedded. The Malpighian layer shares in the overgrowth. The horny epithelium is usually deficient, as also are superficial vegetations, so that the surface is often abnormally clean and smooth. The corium and deeper parts are enormously over-injected and over-nucleated, and the fibrous tissue of the corium is often coarse and hypertrophied. The appearances presented suggest the means by which they are produced. In the excess of deep epithelium and of nucleation we see evidence of increased growth, while the generally clean surface shows that wear is not wanting. The essential factor is a hypertrophic process connected with mechanical congestion. The thick covering of the tongue with epithelium of the deep character is not confined to heart disease or cyanosis. My classification was based on what can be surely recognised with the naked eye. Had microscopic examination been the criterion, a separate class must have been made characterised by excess of epithelium of this sort. But this peculiarity is not obvious. The horny or superficial epithelium when wet is white and conspicuous; the deep epithelium is neither. Its presence in excess may be inferred from the appearance of cyanosis, and guessed at from some degree of paleness and fulness. Such a tongue may be thickly covered with superficial epithelium, by which the deeper characters may be hidden. Taking as the standard great excess of deep epithelium as displayed after death by the microscope, I find that of nineteen cases four were connected with cyanosis (cardiac or pulmonary), six with chronic albuminuria, two with acute tuberculosis, two with pyæmia, and one each of the following—pneumonia, diphtheria, perityphilitis, lumbar abscess, and leucocythæmia. Thus we see this form of epithelial hypertrophy in circumstances of three kinds—venous congestion, albuminuria, and diseases attended with pyrexia. To take the last first, no details of temperature are needed when once the disorders have been named. The overgrowth was no doubt a direct result of the increase of body heat on principles which have been stated. No further reference need be made to the congestion of cyanosis; but

I must halt for a moment upon the question of albuminuria. I have sections of eight tongues from cases of chronic renal disease, mostly the granular kidney; in six there was such accumulation as has been described; in two there was less, but enough to show the tendency. Why in these cases should the epithelium grow in such profusion? Not from pyrexia, for there usually was none; not from venous congestion, of which there was generally no sign. Was the hypertrophic process due to the increased arterial tension so constant in the circumstances? If this be so, we should find hypertrophy of epithelium elsewhere. The reason may admit of doubt; but I think none need apply to the observation that in chronic albuminuria certain parts of the lingual epithelium are remarkably increased.

I have now concluded the separate consideration of each variety of tongue. I shall proceed to make a few observations relating to some general conditions which belong to it or affect it, and while I do so I must ask the College to tolerate a certain amount of repetition which it will not be possible to avoid.

Having regard to the importance of dryness as necessary to some of the most significant alterations of the tongue and its value *per se* as a clinical indication, I shall take this quality into consideration, abstracted, as far as may be, from others. Before doing so I shall venture to delay the College with a few observations upon the saliva.

On the Saliva.

I am satisfied that of all the immediate causes which make the tongue dry, or tend to do so, arrest in the secretion of saliva is the most important. In advanced conditions of dryness, not only is saliva obviously absent from the tongue and mouth, but the patient cannot spit. When the dryness is less complete, he will sometimes produce with difficulty a little spittle, which is often tenacious or bloodstained. Frequently, in the absence of saliva, such patients will, on the request to produce it, hawk up a little mucus from the throat, which is clearly a different thing. I have made many experiments upon the salivary ducts—or rather, I should say, upon those of the parotid, which lend themselves most readily to the purpose. A tube passed into one of these channels in health could generally be made to drip saliva somewhat abundantly by the application of acetic acid to the tongue, or the secretion could be seen working its way out by the side of the tube. When the tongue was dry it was usually impossible to obtain any by such means. With advanced and complete dryness I have never been able to get a drop; with lesser degrees often a little. These observations show the dryness to be, as a rule, due to deficient secretion of saliva, not to its drying on the tongue, as has been supposed by some. This failure of secretion appears to be of much significance. It is not possible thus to gauge any other of the secretions which are concerned in the digestive process; but it is, at least, probable that the gastric and others may be similarly affected. It is a matter of immemorial experience that the dry tongue, more particularly that which is also encrusted, is incompatible with the digestion of solid food; the physician orders liquids and stimulants. This ancient practice has been arrived at not by reasoning, but by a less unsafe though a longer road—experience. We may be sure that there is natural truth at its foundation, though we may not know what that truth is. Provisionally we may assume that a deficiency of saliva, if it depend on other than local causes, goes with a deficiency of other juices concerned in digestion. At the same time it would seem that other secretions—those, for example, of the bowel, the intestines, and the skin—do not take part in any failure of secretion which may be supposed to exist. Putting aside cases where an excess of some secretion, as with diarrhoea or diabetes, has been contributory to the dryness, there are many of daily experience where, together with a dry tongue, the urine is fairly abundant, the bowels free, and the secretion of the skin not wanting or even excessive. If, therefore, it be presumed that the failure of the salivary secretion is associated with a similar failure elsewhere, it is clear that the arrest is limited, not common to all the glands of the body.

I may add a few words upon the action of saliva upon the coat of the tongue; we have seen that, as a general rule, as the tongue becomes more and more coated, especially with acute disease, it gets drier and drier. This association of want of saliva with increasing coat suggests the question whether the secretion has any solvent action on the coat, so that this thickens from the absence of normal solution. This must be answered in the negative. I have taken coated tongues and kept similar pieces of them, one in saliva and one in water, for periods ranging up to sixty-eight

hours. Then, making sections of each in the usual way, I have satisfied myself that there was no greater loss of epithelium in saliva than in water, and the same result has been given when the experiment was conducted at a temperature of 100° F. as at the ordinary temperature of a room. Whatever effect, therefore, is to be attributed to want of saliva, it is not by loss of any solvent action.

Other causes have been shown to conspire to make the tongue coated, but it would seem that want of saliva by itself will do this. A boy was brought under the care of my colleague, Mr. Rouse, with, as was believed, a fracture of the base of the skull. He had left facial paralysis, and an injury apparently of the chorda tympani on this side. The tongue was normally protruded, but the left half, sharply defined by the median line, was dry and presented a milky appearance. The suppression of saliva was probably the cause of the coat, though other effects of nerve injury could not in this case be absolutely excluded.³ I will take a simpler case reported by Mr. St. Clair Buxton. A lady had mumps, after which her mouth became quite dry. The tongue, gums, cheeks, palate, and pharynx presented a "fearfully dried up state." The tongue was thickly coated with a tough, brown fur, which was horn-like and so hard that it sounded under a blow like the cover of a book. After ineffectual treatment by other means, the salivary ducts were probed, the glands galvanised, and the secretion restored. In the course of the following day, Mr. Buxton tells me, in a letter for which I have to thank him, the fur became soft and spongy, though it had previously been as hard and dry as wood; in a week all had cleared off, and in a fortnight or three weeks the tongue was perfectly normal. The fur stripped off in patches, leaving a rather raw surface underneath, which gradually assumed a natural appearance. It has been shown how closely the conditions of furring and encrustation are associated with deficiency of saliva, and inferred that these are largely the physical results of the ensuing dryness; the normally wet surface is soft and liable to wear; deprive it of moisture, and it becomes horny and resistant of it; besides which, with no saliva solid food is unacceptable. So that while induration is created attrition is reduced; and in general terms, and up to a certain point, it holds good that the less saliva the more coat.

But there is another relation between the secretion and the covering, and that of an opposite kind. An interesting case of lasting suppression of saliva was published by Mr. Rowlands, of Great Crosby,⁴ and I have to thank him for further particulars by letter. Ten years before the date of the report, a lady, aged 60, underwent sudden and complete suppression of the saliva, after a nervous shock. Since this the mouth and tongue have been perfectly dry. The tongue now presents the appearance of a piece of dry raw beef; it is perfectly clean, and intercepted with superficial fissures; no papillæ are to be seen with the naked eye, though to be made out with a lens. Here is a typical red, dry, smooth tongue, sequent, and probably consequent, upon simple deficiency of saliva. It is scarcely necessary to revert to the red smooth tongue of disease, of which deficiency of saliva has been shown to be a constant, if not a necessary, attendant. These experiences, showing coating and denudation from the same cause, are not so contrary as at first sight appears, for many smooth tongues were formerly rough. The difference is largely one of time: furring and encrustation are early results of want of saliva, denudation a late result. It has been shown that with the bare tongue of constitutional disease two agents are commonly present; want of saliva, and failure of general nutrition; but that want of saliva by itself is able to cause bareness is shown by such cases as that reported by Mr. Rowlands. Of the *modus operandi* I was long in doubt. The epithelium is fed by the blood, not by the saliva. Why does it waste in the absence of the non-nutritive fluid? Conversation with my colleague Mr. Bennett has, I think, given the clue. The epithelium, though not nourished by the saliva, needs to be kept moist by it, otherwise it cannot assimilate what is provided by the blood. Be this as it may, a general law may be formulated; the tongue tends to become smooth whenever for a long time it is kept dry from deficiency of saliva, or possibly from other causes.

³ For this observation I have to thank Mr. Peel Davies, then house-surgeon.

⁴ The *Lancet*, vol. 1, 1888.

MRS. FLORA SCHLAMM, of New York, aged 102, is said to have about 130 descendants. Her great-grandfather lived to be 120.

THE PATHOLOGY OF ABORTION IN RELATION TO TREATMENT.¹

By MURDOCH CAMERON, M.D.,

Physician Accoucheur to the Glasgow Western Infirmary; Assistant to the Professor of Midwifery, Glasgow University.

It is not my intention to enter fully into the wide and complicated field of study as found in pathology relative to abortion, but simply to bring before your notice three specimens, which may interest as well as show the importance of a careful examination of the discharged clots in every case of abortion. I am afraid it is too much the custom to take the patient's description of the nature of the discharge, which is generally summed up as "a bleeding," or a "something that has come away."

Now, looking at the first two specimens, we see at a glance that there is a great difference in their appearance, and it is in being able to appreciate the reason for this that the accoucheur can carry out the proper treatment, and be alive to the dangers which may attend the one case rather than the other. Of course, in the early stage of abortion, say at the first month, there is the absence of the usual signs of pregnancy to guide us, and women them-

Fig. 2.—Embryo, sixth week. A. villi of chorion; B. umbilical vesicle with portion of amnion to the left.

selves frequently look upon the discharge simply as a period. If the ovum be discovered, it is found to be very small. In the second month, however, the absence of the last period, as well as the character of the pains, generally makes the patient suspect pregnancy.

If the discharged clots are carefully examined, the embryo will usually be found surrounded by its membranes, the amnion and chorion with its villi, some of which are found penetrating the decidua reflexa. This is well seen in Specimen I, in which a separation has been effected at the circular zone, marking the junction of the membranes of the ovum with those of the uterus, which, instead of following the ovum in its passage, remain attached to the uterus. You see the appearance of the discharged ovum is that of an ovoid mass, the surface smooth and rose-coloured, unless where the villi are exposed. These in the specimen are seen floating in the fluid. An incision in the wall has

¹ Read in the Section of Obstetrics at the Annual Meeting of the British Medical Association held at Dublin in August, 1887.