

**Glossology, or, The additional means of diagnosis of disease to be derived from indications and appearances of the tongue : read before the Senior Physical Society of Guy's Hospital, 4th November, 1843 / by Benjamin Ridge.**

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GLOSSOLOGY :  
OR THE  
ADDITIONAL MEANS  
OF  
DIAGNOSIS OF DISEASE  
TO BE DERIVED FROM  
INDICATIONS AND APPEARANCES  
OF  
THE TONGUE.

READ BEFORE  
THE SENIOR PHYSICAL SOCIETY OF GUY'S HOSPITAL,  
4th November, 1843.

BY  
BENJAMIN RIDGE, M.D., M.R.C.S.L.  
&c. &c.

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# GLOSSOLOGY :

OR THE

ADDITIONAL MEANS

OF

## DIAGNOSIS OF DISEASE

BY THE EXAMINATION THEREOF

### INDICATIONS AND APPEARANCES

OF

## THE TONGUE.

BY

C. AND J. ADLARD, PRINTERS, BARTHOLOMEW CLOSE.

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BY

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## PREFACE.

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A PREFACE to the following Paper seems necessary as an apology for so small a communication on a subject so extensive. I intended to have prepared for publication a System of Glossology, but was deterred by the labour of such an undertaking, and the dread a malady most incident to publishers, which those worthy bookmen exhibit at having anything to do with an extensive work, by an unknown author, on a subject hitherto uninvestigated. On reflection, it appeared to me that reading a communication of the *heads* of my subject before this long-established society would be the better plan, leaving all details for a future day, to be given or withheld according to the reception of the scheme itself. This will account for the brevity of the Paper now submitted to the Public, who are most interested in its disclosures—to whom its doctrines are either of vital or of no importance, just as truth, if there is truth in it, as I hope there is, or delusion, which I would not knowingly practise, is established as a fact, or set aside as a fiction.

The history of the rise and progress of the Medical Profession holds out no great encouragement to the innovator—



to the author of novel doctrines. Those who, in their day, have contributed most beneficially to the art, by upsetting old prejudices with the lever of new theories, have been at first losers, though finally gainers of the name and fame they sought: whilst their opponents, however high they stood in public estimation, have sunk into oblivion; and the truths they buffeted, and would, if they could, have beaten down and trampled under foot, have become the guides of future generations of men. I am too well aware of the opposition I shall have to meet when these novel disclosures become publicly known. The voice of the present day may pronounce against me and my doctrines, and men may feel it difficult to give up their prejudices: but it is satisfactory to think that a future generation will sit in judgment between them and me.

History, the chronicler of past events, unfolds her ample pages to the inquirer; and he who studies the progress of medicine from the earliest times will be astonished by its annals. He will see, that the doctrines which were orthodox one day were heterodox in the next, the opinions of reigning men upsetting those of the dead and gone authorities; and anon, the reigning opinions succumbing once more to antiquated dogmas, when put forth by eminent men, and meeting with disciples to uphold them.

So many persons, in every community, are accustomed to follow a leader, and take for granted what he propounds, without troubling themselves to ascertain if his views are sound, that this man's doctrine—this opinion of one—in time becomes the opinion of many. Few trouble them-



selves to examine the merits of the question, but use the weapons of their chief as they find them, and as they can ; and thus a *vox populi* is established, which time and habit strengthens till it is at last listened to, and believed in, as the oracle of God. A bold man may have power to turn the tide another way, and get his train of followers through the same means, as history will show.

But what do these vacillations show? Merely that present right of argument is temporary right of power. We not only see in each age that opinions change, but that they are always changing. The sound conclusions to be drawn from these facts are,—that truth to-day must be truth to-morrow, and for ever ; but where doctrines are founded, not in truth, but on the shifting quicksands of error, then opinion shifts and changes, and is unstable as shoals of sand, or as the winds. The doctrines of one man, or the doctrines of a generation of men, are but mere opinions, if they are not founded in truth.

Students are apt to imagine that research is exhausted, and that everything is known that can be known—that the zeal and industry of man has fathomed everything. How clear appear the arguments of the professors ; how sound their doctrines ; how skilful their treatment ! Yet no age is spared by the destroying hand of Death, though so much wisdom and learning have been expended in the godlike act to save. The inspections how clear, after death ; the disease, no human power *could* stop—under it no human being *could* live. Their first aim accomplished, and their diplomas framed and glazed, the weight of



responsibility then first falls upon them. In their hands the dearest and tenderest interests are placed. Are they to leave off study because they hold these diplomas for having studied? This were unreasonable. Then the thought haunts them, on what foundation does the art of medicine rest, if it be not built on truths which cannot be overturned? Why do men differ in looking at the same fact, and see it in so many ways, yet all the while it is the same fact? If the foundation of the practice of medicine was laid on the knowledge of certain laws based on truth all would agree, but we find all are differing and disputing. I once made this remark to a keen Northern physician, whose answer was, "*There was the advantage of calling in a second opinion;*" an admirable manner of settling a doubt truly, but expensive: for I presume the public do not think it always an advantage to have to pay two doctors instead of one.

Knowledge is only to be found by diligently seeking after it. If we would find gold in the ore in its native mines and sands, we must dig for it, or wash the sands with which it is commingled. If we would fish up pearls from the bottom of the sea, we must dive for them. I trust that I have not been idle and undiligent in my vocation. I have sought for and found an immense array of facts; but medical facts are, not unfrequently, so unphilosophical, that they seem no facts at all. On what, then, are these effects or facts founded, if they cannot be referred to the causes which produced them? I wandered through reams of paper recording effects, but nowhere could I



find any record of causes. I had been taught to study diagnosis, to hear the sick tale, to examine secretions and excretions, to stethoscopize and auscultate, to feel the pulse and look at the tongue; from some or all of which means an inkling of the nature of the disease was to be derived. What were the latent or proximate causes of the effects seen I was still uninformed upon: mere exciting causes were easy enough told, or, if not, easily imagined.

The various treatment of different medical men was perplexing in the extreme. One had found this medicine a remedy in a certain disease, and another that, but on what principle they acted none could tell. I almost regretted that I was so inquisitive as to ask questions sure to be unsatisfactorily answered. One thing always struck me as curious—that the tongue should be looked at for information on the state of the system, and, when seen, little or no information derived from it. If it gave information not to be relied on, where was the use of looking at it? Who commenced the practice of looking at the tongue as an indicator of disease? and why have not the followers of that practice reduced its appearances to a system? On mentioning to intelligent non-professional men the probability that some parts of the tongue were more connected with certain organs than with others, and that I believed in such connexions, and even pointed them out, I was always met by the observation that they did not consider this new, and they seemed to wonder at my simplicity in thinking it a discovery: for they remarked, that surely the Faculty generally has such a



guide, *as they always looked at the tongue*; and why did they consult it but for this purpose? If I said the facts were not known, there arose a suspicion in their minds of my want of knowledge of what seemed so feasible a circumstance. I mentioned my discovery to several medical friends, but it met with little or no encouragement. One said it was ingenious; another that he would consider of it; a third would hear nothing at all about it; a fourth listened, and to him I unfolded the practice I had formed on these indications of the tongue, and I thought I had gained a disciple; but, meeting him soon after at a consultation, he seriously, and I believe sincerely, advised me to give up my new-fangled notions, as they were erroneous and speculative, without a shadow of truth or usefulness in them; and that, in fact, he had even heard it hinted that some of my friends “doubted my sanity.” I thanked him and them, and resolved henceforth not to make any more private communications to medical friends. One physician, as learned as he is liberal, to whom I made known my researches, said candidly, “If you can prove the connexion between the parts mapped on the tongue, and the organs to which they are apportioned, there can be no doubt of its being a brilliant discovery; but I cannot judge of it until you give it to the public: if there be any truth in it, it will be acknowledged, for all are not prejudiced; and, if it be false, the sooner you are informed of it the better, that you may no longer waste your time in pursuing a Will o’ the wisp.”

I coincide with his opinion: I desire no more than is



due to me for the discovery, should it be one, and for the truth itself than the value of it.

Being new, however, and somewhat in opposition to established doctrines, it has its way to make. I only deprecate hasty opinions of its truth or falsehood. It is hard to resign a fixed prejudice; but it is harder still to retract an adverse judgment. A new doctrine, gradually introduced, has time for maturing, as step by step it comes on the attention; but a novelty launched all at once is a startling affair.

That I shall have opponents of the scheme, I have experienced enough to know—that I shall soon get disciples I do not doubt, from the anatomical proofs I have brought forward of the feasibility of this discovery. I cannot, however, expect partisans to step out from the ranks of the veteran battalion of the profession, to array themselves under my banner, particularly if they have fought for and taught another faith. If the doctrine makes not immediate way in the world, I shall still have the satisfaction of drawing enough attention to it to insure its being considered, if it be of any value. Such an inquiry can do no harm, and it may effect some good.

If the subject of this Paper meets with fair and candid consideration, I have a second founded on it, which I shall publish, and on some future occasion fill up the details of both.

It is said—and to our shame it is said—that the art of medicine has not progressed in the same ratio as other arts and sciences of less vital value and importance. The



art of medicine, as it affects the well-being of the community at large, should hold a high place and dignified position in human affairs; but never, unfortunately, was charlatanism more rampant than in this day, both at home and abroad. For myself, I would willingly hold any doctrine, and follow it out, which promises to benefit my fellow-creatures, if it be founded on truth, and upheld by philosophy; but where this is not the case, I will not be guided by the general clamour in its favour, but will follow after truth in my own way.

Many remarks have been made to me from which I have derived encouragement. One said he had had pointed out to him that, when the edges of the anterior part of the tongue were marked by the lower teeth, they indicated a dyspeptic state of the stomach. A second said, a friend had noticed to himself a costive condition of the bowels to be indicated by clusters of papillæ on the tip of the tongue. A third, and, by the way, a non-medical man, said he always found when he had headach that the edges of his tongue were serrated or rugous. These observations, professional and non-professional, strengthened my views, and led me to count on those who made them as Glossologists without knowing it, who might soon become so upon principle. I shall be greatly pleased if this sort of single observation runs through all the tests and trials of the doctrine. To those who have never observed these appearances, they will, of course, be strange, and hard to understand; and to those who do not wish to understand them harder still. To those who doubt the value of a



well-defined system of Glossology I would say—let them account for the different appearances of the tongue in scarlet-fever and measles: why in the former it is red, and in the latter limaceous, or white; and why, as an eruption on the skin appears in both, they are of different characters: that of scarlet-fever, as its name implies, being scarlet-coloured, and rough when the hand is passed over the skin; and in measles, brownish red, or livid, and the skin slightly prominent? And let them at the same time account for the variety of treatment,—scarlet-fever requiring refrigerants, cool apartments, and cold spongings with vinegar and water, to lessen the fever; whilst measles require warmth and seclusion from the air, to keep the eruption out. Every one is aware that, if measles are driven inwards, the greatest danger ensues from congestion and inflammation of the lungs; and that scarlet-fever leaves a decortication of the skin, and measles a discoloration of that organ alone. As these diseases, and every feature of them, appear so different, I do not expect to be told, in answer to my queries, that the treatment usually adopted by rules of art does good, or that such and such remedies have been found to do good: I expect a fair, philosophical reason given as to the *cause* of difference of each disease, and the *cause* of difference in the remedies—not the *effects* of medicines on the complaints, but the *causes* for these *effects*. We know well that both diseases are effects of certain causes, and we know that certain medicines have certain effects upon them; but the philosophy of the present age is not satisfied with doing



what has always been found to do good. The question why it does good must be satisfactorily answered, or we must remain content to be called EMPIRICS, and a body of men practising under the system of "*Quot homines tot sententiæ.*" Whilst the art continues in this state, and the Faculty are satisfied to practise in this manner, the young men from memory of what they have read in books or learned orally from teachers, I am persuaded that legislation cannot benefit them. Our non-medical law-makers may summon to their councils men from every grade of their profession, and talk of medical reform; but their consultations will be unsatisfactory, and their results nothing. They will have from these *patres conscripti* of the art as many opinions as men, or as many as they would give in obscure medical cases.

The Profession must first become unanimous and philosophical in themselves, and in what they profess; and then, and not till then, can the senate form a code of laws for *their* protection and that of the public. It is to these ends that I would, first, place all on an equality who practise our noble art, as far as thorough knowledge of *cause* and *effect* can accomplish this by the best and surest means of diagnosis of disease; and, secondly, that all shall know the broad general principles of the treatment required. The most diligent will always insure the most patronage; the young practitioner will, in that case, have as fair a chance of succeeding as his seniors; whilst those who have most experience will keep their standing, if they go with the times, and follow on the heels of what the



times as they travel discover, not turn their faces from the light; for, if they are bigoted, and cling to bygone opinions, they must not be surprised if they find the younger members have gained a march upon them.

Knowledge is confined to no sex or age; it is open to all: our elders may boast their experience, but science is advanced by the vigour of middle life, and nourished and upheld by the glowing warmth and ardour of youth. I am sanguine enough to hope that the art of medicine will, in these days, take rapid strides; and that a few more years will entirely do away with much that passes now as current coin, but which the assayer of metals would pronounce not worth remelting. Whatever is retained will then have its value tried and tested; and whatever philosophy cannot fairly reason on will be thrown aside as worthless.

My sincere wish is to see Unity in Diagnosis, Unity in Treatment, and Unity amongst the Brotherhood.

BENJAMIN RIDGE, M.D.

*Putney, November, 1843.*





## GLOSSOLOGY.

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### DESCRIPTION OF THE TONGUE.

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GENTLEMEN,

THE Tongue, though it has the appearance of a single organ, has been considered by anatomists to be a double organ furnished with a central raphé, which divides it into two symmetrical halves, each half being supplied with separate sets of muscles, nerves, and vessels. These halves, being in a great degree independent of each other, may be separately affected, as is the case in Hemiplegia. It is, however, a three times double organ, independent of its structure.

It may with propriety be called an internal as well as an external organ: internal from its situation in the cavity of the mouth, subject to all the laws of an internal organ, contributing largely to the performance of the first duties of the *primæ viæ*; and as an external organ it is capable of being protruded and examined—a circumstance peculiar to itself, no other internal organ possessing the like double properties. It is also an organ possessing the two very powerful senses of taste and touch. It is an organ of speech, and the direct means of communication from mind



to mind: for no sooner does the brain conceive than the tongue performs its double action of modulating the voice and conveying ideas.

These are the four double properties that present themselves at the first view of this complicated organ; but when we turn to its importance as an organ of diagnosis of disease, it will be seen that it possesses numerous other qualities. It is to this point that I beg most earnestly to call your attention; and at the same time I implore you to lay aside any prepossessions or prejudices you may have formed in schools and closets, which are ever ready to become adversaries of new truths, and though they end perhaps in accepting them as truths, begin by opposing them as fallacies. And I implore you, too, to think with me—that no real benefit, no lasting good can accrue to the profession of which we are members, or to the public who look up to it, except through the wholesome study of facts founded on scientific research and philosophic reasoning.

I take Man, with all his wonderful properties, and the laws of his nature, as far as I have been enabled to understand them, as the basis of my inquiry. I come not before you with vague theories, or, like a charlatan, with nostrums, but as one of your own body, with a simple graft on such knowledge as I have acquired from the professors of that body; and if, from what I have learned, I have derived bolder or broader views than others, I ascribe it, first, to the spirit of inquiry which characterizes the present age, and which influences every class of men to benefit their fellow-creatures; and next, to the example I had set before me when I was a student here in this admirable hospital.

The various appearances of the Tongue have, from the



earliest periods of the practice of medicine, been said to indicate the state of the body: in addition to these indications, the pulse, the aspect of the patient, his sick tale, and other symptoms, have led the physician to judge by a combined process, called Diagnosis, what was the true nature of the disease; and I need scarcely mention that a correct diagnosis of disease is of the first importance.

To be able to distinguish diseases, which are merely effects, to classify them, and to trace them up to causes, to ascertain how exciting causes act upon proximate or latent causes, and so to apply relief to human suffering, is the result of cultivated reason, the noblest gift of Providence to man. Whatever, therefore, aids the powers of diagnosis aids the good the physician aspires to do. In skilful hands, time saved in discovering disease saves suffering, and even life: whilst time lost in diagnosis of disease is never regained. It is to aid and assist in this happy work that I now come before you. Even supposing that which I have to communicate should not at first appear conclusive, still if it can be shown that certain appearances in parts of the tongue indicate the presence of certain diseases, and that these parts correspond with certain organs of the body, the fact is surely not unworthy of investigation.

It seems to me a most imperative duty to point these indications out to you; and it is your duty, Gentlemen, to ascertain how far they correspond with truth. If novel terms are used in the course of this communication, I trust that they express my meaning intelligibly. The subject itself, rather than the manner in which it is conveyed, will I hope be looked at as of the only real importance. My tongue must now assist my voice in conveying to you the spirit of this Paper—a conveyance of my thoughts, or mental conceptions, by direct communication through the



instrumentality of the tongue. Can you deny, then, that the tongue is in direct connexion with the organs that constitute the voice; the lungs that generate the air which stimulates the vocal chords; and the mind that forms the matter for the tongue to put in shape and utterance? If, then, the tongue is in such close spiritual connexion with the lungs and brain, it must have a more palpable material union with those parts. If you acknowledge that, as it is situated at the commencement of a track for the passage of everything we take internally to sustain life, it must have connexion also with the continuous parts, equally engaged with itself in the appropriation and conveyance of aliment, this connexion must be kept up by the communication of nerves and vessels. For if the smell of grateful viands to the hungry man increases his desire for food, animates his countenance, and fills his mouth with the ready-acting saliva, how much more will the first mouthful stimulate the expectant organs to which such viands are being conveyed! If you admit this, you cannot but admit that the tongue in return will be influenced by these distant organs, if the aliment taken is not well digested, but morbidly remains about or along the track through which it should have passed. Certain annoyances, therefore, taking place below, certain effects are shown upon the tongue, by this reversed sympathetic action. The mucous coverings at a distance, which are the more immediate seats of irritation from morbid causes, will by sympathy affect the mucous track above, and the tongue will consequently indicate these morbid symptoms: *ergo*, the tongue shows the state of the system. If this were not previously admitted, the question would arise, why the tongue is examined at all? Admitting, for the sake of following our subject closely, that the tongue is in direct



connexion, either by means of nerves or blood-vessels, with the brain, the lungs, and the digestive apparatus—as we infer it must be—is it probable that Nature would be confused in her arrangements, and mix these connexions in an unwise manner? We, who are the more immediate inquirers into her laws, know sufficient of her care to answer—“Certainly not.”

A portion of the tongue, which is in some wonderful manner connected with the brain, cannot at the same time be connected so closely with the stomach, though a deranged state of the stomach influences the brain, and the brain the appearances on the tongue.

Another portion of the tongue, which is in immediate connexion with the stomach, cannot be influenced by the brain so much as that other part which is more allied to it, though the brain influences the stomach, and the stomach the tongue.

The lungs supply the wind to cause vibration of the *chordæ vocales*; and a sound is produced which the tongue regulates and forms into voice, conveying meaning, sense, and language. Can you deny this great connexion between the lungs and tongue? The tongue must, therefore, possess a part more under the influence of the lungs, to uphold the integrity of their union. If the lungs are in any manner affected, can we arbitrarily set aside this union?

That portion of the tongue which is more under the influence of the lungs would indicate any anormal condition of those organs.

My inquiry has been directed to these different connexions, in order to give each organ, or union of organs for one end, their appropriate situation on the tongue, so that certain appearances — colorations or discolorations



call them—might become our certain guide to certain organs, and teach us to know the condition of those organs as diagnosed by the state of the corresponding parts on the tongue.

There is a difference of opinion in the Profession as to how far the tongue is diagnostic of disease. Some say it is no guide at all: I have heard a learned Professor say to his class, "Gentlemen, the tongue is fallacious: you must not be guided by the tongue." Influenced by this, and not knowing better, I once held the same opinion; but I can do so no longer. I found the tongue was looked at as an organ of diagnosis, and I looked at it too: but the amount of information I gained from it was trifling; and very little more did I gather from books, or from personal instruction. I still thought there must be something more substantial to be learned from it, or otherwise it seemed a waste of time to look at it at all. Dissatisfaction on the point led me gradually to reflect on its diversified appearances. As disease came before me, so different observations obtruded themselves, until, after carrying these in my mind for years without being able to arrange them or adopt any regular system, I was led at last to draw the rough form of a tongue, and map out its compartments. I had no sooner accomplished this than I perceived that the divisions corresponded very closely with its anatomy. It was not, therefore, the anatomy of the organ that first gave me the idea, but practical observations on the variety of its appearances, coupled with the diseases I was called upon to treat.

The first observations I made were in 1836-7, during the prevalence of the epidemic influenza. The cases which came before me were numerous; but my own observations differed so widely from those of the writers



on that epidemic, that I hesitated in obtruding them. I noticed three distinct stages of this disease—affecting, first, the stomach; then the lungs; and lastly the brain; and that three distinct characteristics of the tongue presented themselves: but, at this early stage of my discoveries, my drawing attention to these facts appeared useless, as I could give no reasons for such changes. As I could not satisfy myself on the point, I judged that I should give no satisfaction to a profession admitted on all hands to be rather more jealous than pleased at any novelty.

The tongue has offices and duties to perform of no mean importance. Its mobility, flexibility, powers of contraction and expansibility, its numerous forms and appearances, warrant it to be held in a different light to that in which it has hitherto been. I will, therefore, lay before you the divisions I have adopted, and which you will find in accordance with its anatomical structure, without straining any point to meet theoretical views, and without servile speculation to bring Nature to succumb to hypothesis.





## MATHEMATICAL DIVISION OF THE TONGUE.

---

*Fig. 1.* IN order to get the shape of a cone, the centre slice of which may be said to form a resemblance to the human tongue, draw a transverse line from A to D, and divide it into three equal parts, B C. From the centre of the line E draw a longitudinal line to F, four times the length of the line A D.

From the points A B C D draw lines verging to the point F. Divide the line E F into three equal parts by two transverse lines, G H. The upper division between A D and H will give the space for the formation of the cone. Divide this space into four equal parts by three transverse lines I, K, and L.

Draw a curved line external to the straight line A F near to its intersection at I, and do the same on the opposite side to D F, near to its intersection at I, and continue it from I to H on each side.

On each side, and in the inner part, draw a curved line, just within the intersecting line I, to terminate at H, by which means a small space will be left between the curved and straight lines from A H to D H.



The longitudinal divisions will consist of THE CENTRE LATERALS, or spaces on each side of the mesian line or raphé: THE LATERALS on each side of these spaces as far as the inner curved lines: THE EDGES within the curved lines. (1 1, 2 2, 3 3, *fig. 3.*)

The four transverse divisions, beginning from H, will consist of the ANTERIOR FOURTH, the SECOND FOURTH, the CENTRE FOURTH, and the POSTERIOR FOURTH. (1, 2, 3, 4, *fig. 4.*)

From the point H draw the apex of a cone, the base to reach from the intersections of the longitudinal lines of the centre laterals, the apex extending about one-third up the anterior fourth, which will form THE TIP. (H, *fig. 5.*)

Near to the points 1 1 draw the apices of cones, the basis to extend half-way between the anterior and second fourth, and resting on the outer curved line, the apex to extend half-way across the laterals, which will form the SIDES. (1 1, *fig. 5.*)

From A to B and C to D, separately, extend two other cones, which will form the CORNUA; and from B to C extend another cone, which will form the ROOT. (1 1 and 2, *fig. 5.*)

Draw the apices of two cones, from the first transverse line 1 1, to one-third above the second fourth and one-third below the anterior fourth, the base to extend half-way across each centre lateral: the two apices of cones will give the OVAL. (0, *fig. 5.*)

We have, then, in addition to the longitudinal and

transverse divisions already named, THE TIP, THE SIDES, THE CORNUA, THE ROOT, and THE OVAL. Near to the points A and D draw lines verging to the centre of the central fourth of centre laterals. This will divide the tongue into a posterior *third*, or motor division, and an anterior *two-thirds*, or gustatory division. (1 and 2, *fig. 6.*)

These rules for drawing the diagram of the tongue and its divisions will be found to agree very fairly with its anatomy. No other plan that I have been able to discover can effect this object so clearly.

The Second Figure will show more distinctly the longitudinal and transverse divisions.

The Third, the longitudinal divisions alone.

The Fourth, the transverse divisions.

The Fifth, the conic division.

The Sixth, the motor and gustatory divisions.



## APPORTIONMENT OF THE DIVISIONS.

THE CENTRE LATERALS, from the posterior to the anterior fourth longitudinally, are apportioned to the respiratory organs: the larynx, the trachea, the bronchi, and the lungs.

- a.* The posterior fourth to the larynx and trachea.
- b.* The centre fourth to the bronchi.
- c.* The second fourth from the bronchi to their terminal extremities, *viz.* as far as the pleura pulmonalis. (*fig. 2.*)

THE OVAL to the pleura pulmonalis and costalis. (*fig. 5.*)

THE LATERALS are apportioned to the pharynx, œsophagus, stomach, duodenum, liver, spleen, pancreas, and small intestines—in fact, to all the chylopoietic viscera.

*d d.* The posterior fourth, to the pharynx and œsophagus.

*e e.* The centre fourth, to the stomach, duodenum, liver, spleen, and pancreas.

*f f.* The second fourth, also, partly to the above organs, and partly to the small intestines.

*g g.* The anterior fourth, to the small intestines as far as the cœcum. (*fig. 2.*)

THE SIDES, to the kidneys. (11, *fig. 5.*)

THE TIP, to the large intestines. (H, *fig. 5.*)

THE EDGES, to the brain.

*h h.* The posterior fourth, to the occipital region.

*i i.* The centre fourth, to the parietal region.

*k k.* The second fourth, as far as the sides, to the frontal region. (*fig. 2.*)

THE HEART, being the great engine for the propulsion of the blood, takes in the whole of the tongue, as will be hereafter explained.





## ANATOMY OF THE TONGUE.

### THE MUSCLES.

I WILL now give you the anatomy of the tongue, and trust to it for satisfactory reasons for these divisions.

The principal bulk of the tongue is made up of four pairs of muscles.

The genio-hyo-glossi ;

The linguales ;

The hyo-glossi ; and

The stylo-glossi : to which may be added

The palato-glossi.

### THE GENIO-HYO-GLOSSUS.

The anterior fibres of this muscle, or genio-hyoideal portions, arise from a tubercle on the inner surface of the symphysis of the lower jaw, radiate, and pass forward to the tip, more particularly on the anterior fourth and anterior half of the second fourth of the centre laterals. (1, *fig. 7.*)



The centre fibres, or genio-glossal portions, arise above the origin of the genio-hyoideal, on the inner surface of the symphysis of the lower jaw, radiate and pass upward towards the centre of the tongue, more particularly on the second and centre fourth of the centre laterals and laterals, of which they take the whole space, excepting the posterior half of the centre laterals: its fibres verge upwards and backwards to the stylo-glossus and take a portion of the posterior fourth of the laterals. (2, *fig. 7.*)

A thin tendinous fasciculus from the central fibres forms the posterior fibres sent to the os hyoides, which are indirectly connected with the base of the epiglottis, under the insertion of the linguales, or that part forming the root in my diagram.

#### THE LINGUALIS.

The Lingualis arises from the base of the tongue, and proceeds forward towards the tip, but not farther than the apex of the cone forming the tip. (4, *fig. 7.*)

This pair of muscles are situated in the centre of the wedge or posterior third of the tongue: when they reach the anterior half of the centre fourth or point of the wedge, (4, *fig. 7.*) they mix freely with those fibres of the genio-hyo-glossi muscles which radiate on the centre laterals of the second and centre fourth.

The linguales constitute the demarcation or boundary of the centre laterals.



## THE HYO-GLOSSUS.

The Hyo-glossus arises from the outer half of the base and part of the cornu of the os hyoides by three separate fasciculi, which pass upwards and outwards toward the posterior portion of the tongue, supporting the under part of the lingualis by which they are covered in the posterior fourth and posterior half of the centre laterals, and form distinctly the posterior fourth of the laterals, decussating with the fibres of the genio-hyo-glossi as they pass vertically upwards with the stylo-glossi coming horizontally forwards, (5, *fig. 7.*) This muscle assists in forming the thick edges of the tongue at their under side, and internally blends with the longitudinal fibres of the stylo-glossus.

## THE STYLO-GLOSSUS.

The Stylo-glossus arises, tendinous and thin, from the apex of the styloid process of the temporal bone, below and in front of the stylo-hyoideus muscle, and from the stylo-maxillary ligament. It then passes downwards, becomes broader and thinner, and is inserted into the whole length of the entire EDGE of the tongue, and on the under edge of the anterior fourth, as far as the tip. (6, *fig. 7.*)

These muscles constitute the *edges* in the diagram.

## THE PALATO-GLOSSUS.

The Palato-glossus, or constrictor isthmi faucium, inclines from the uvula forwards, and outwards to the cornu and side of the tongue, where it may be said to be inserted.



It is merely covered by the mucous membrane, which it renders prominent, so as to form the arch of the palate. The lateral portions form the cornua in the diagram.

The first four pair of muscles are connected by cellular tissue, and by thin membranous layers, where their planes are smooth; but in many points their intersecting and decussating fibres are inextricable, so that, if as much of the muscles as can be traced were dissected away, some considerable mass would still remain.

The under surface of these muscles constituting the tongue is constantly kept moist by the saliva from the submaxillary gland, which rests on the mylo-hyoideus muscle; this muscle forming, with its fellow, the floor for the tongue.

The duct passes along the side of the hyo-glossus and genio-hyo-glossus muscles towards the side of the frænum linguæ, where it terminates.

Resting against the anterior and part of the central fibres of the genio-hyo-glossus, and supported by the mylo-hyoid muscles, is the sublingual gland, in close contact with the duct and the deep process of the submaxillary gland. Its secretion is poured out near the side of the tongue from several minute orifices.

## THE ARTERIES.

### THE LINGUAL.

The Lingual is given off from the external carotid above the superior thyroideal and below the facial : sometimes it arises from a common trunk with the facial. It is deeply seated, and takes its course forwards, upwards, and inwards above the oshyoides to reach the tongue.

At the posterior edge of the hyo-glossus it is covered only by the integuments, platisma, and fascia of the neck : the motor-lingual or ninth nerve is superficial and superior to it. It then passes above the hyo-glossus, which separates it from the ninth nerve, which takes its course upon the inferior surface of this muscle, at the anterior edge of which they again meet, and terminate between the hyo-glossus and middle fibres of the genio-hyo-glossus, at the posterior third of the under surface of the tongue, so that on each side its situation is in the posterior laterals.

This artery gives off four branches :

The hyoideal ;

The dorsal ;

The sublingual ; and

The ranine.

1st. *The Hyoideal* is given off before the artery reaches the upper surface of the hyo-glossus : it passes along the superior surface of the oshyoides, and is distributed to the muscles at the base of the tongue and lower jaw, to the epiglottidean gland, and anastomoses with branches from the thyroid artery and its fellow on the opposite side.



2d. *The Dorsal* is given off from the lingual, while upon the upper surface of the hyo-glossus. It first runs outwards to the side of the tongue, and then turns upwards and inwards to the superior surface, passing between the hyo-glossus and lingualis at the junction of the posterior laterals and centre laterals. In this course it is tortuous, and sends its terminal branches through the dorsum to form the arterial papillæ of the laterals, commencing more generally from the insertion of the fibres of the hyo-glossus with the centre fibres of the genio-hyo-glossus muscles, traversing the entire length of the laterals as far as the commencement of the tip. It anastomoses with its fellow on the opposite side sometimes more freely than at others, the terminal branches penetrating the lingualis or centre laterals.

In some instances there are scarcely any papillæ seen in the centre laterals: in others they are very distinct. The laterals, nevertheless, in all cases have more papillæ than the centre laterals.

This artery sends branches backwards to supply the stylo-glossus muscle, the tonsil, the ramus, and epiglottis, anastomosing with the ascending *palatine branch* of the facial.

3d. *The Sublingual* arises at the anterior edge of the hyo-glossus muscle, where the artery divides into sublingual and ranine: the sublingual takes its course forward between the genio-hyoideus and sublingual gland, supplying both: it then penetrates the mylo-hyoideus at the floor of the mouth, and is lost upon the chin.

4th. *The Ranine* is the continuation of the trunk: it is continued forward to the tip of the tongue, at the under



surface and between the linguals and genio-hyo-glossus muscles, distributing a ramification to each, and also to the hyo-glossus and stylo-glossus, as well as to the frænum linguæ, by the side of which it runs, arching upwards to the tip of the tongue, where the arteries of opposite sides end in a delicate anastomosis.

These arteries do not anastomose, except at the tip of the tongue, where their aggregations are numerous, and their termini at this point through the dorsum form clusters of papillæ. (N. B. The dorsal and ranine arteries are more connected with the lingual gustatory nerve than with the ninth or motor lingual: whilst the hyoideal and sublingual arteries are more connected with the ninth nerve than with the gustatory.)

The tongue is farther supplied with blood from the ascending or inferior palatine branch of the facial, the ascending or inferior pharyngeal and internal maxillary arteries, which principally occur at the posterior part of the tongue where the hyo-glossus and posterior part of the linguales are situated.

The lingual arteries are more or less tortuous, particularly the dorsal and ascending portions of the ranine.

The tongue is endowed with great powers of retraction and extension, and requires a very large and constant supply of blood. Wherever, therefore, this is necessary, with a limited space, small tortuous canals supply the place of large trunks, as they retain the current.



## THE VEINS.

The veins of the tongue have a very pretty, arborescent appearance. A number of fibrils collect the residual blood from all parts and deposit their contents into one long trunk, the lingual vein, which descends between the sublingual gland and the genio-glossus muscle, then between the hyo-glossus and mylo-hyoideus muscles: it then passes backwards and outwards, accompanying the arterial ramus above the cornu of the os hyoides, and terminates in the internal jugular.

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## THE NERVES.

### THE GUSTATORY.

The Gustatory is the first branch of the third or inferior division of the fifth: it descends between the pterygoid muscles, and while so situated it sends off filaments of communication with the inferior dental branch, in fact so united that they appear part of the same nerve. It receives the fourth fibril of the anterior portion, and is joined by the cord of the tympanum, a branch of Meckel's ganglion just after its separation from the inferior dental.

The two nerves pass first between the pterygoideus externus and circumflexus palati muscles; then between the pterygoideus internus and ramus of the lower jaw: they then pass behind the last molar tooth, underneath the



membrane of the mouth, between the mylo-hyoideus and hyo-glossus muscles, accompanied by the submaxillary duct: it then ascends above the sublingual gland and expands into a broad and flat nerve, assuming a ganglionic appearance; between the lingualis and genio-hyo-glossus, in the situation of the point of the wedge, it then communicates with the ninth or hyo-glossal nerve in passing over the insertion of the hyo-glossus muscle. It then divides into several branches, which accompany the dorsal artery: these are again divided into smaller branches, and surround each terminal branch of the dorsal artery just beneath or on a level with the dorsum of the tongue, through which they penetrate to form the gustatory papillæ, whilst their extreme termini surround the terminal extremities or papillæ of ranine artery at the tip of the tongue.

It would not be a difficult task to show the connexion between the secondary senses of sight, hearing, smell, taste, and touch, through the media of nervous communication with the sensorium itself. Anything, for instance, taken into the mouth of a very cold nature, such as ice, will produce a painful sensation in the teeth. Their enamelled coverings have no appreciation: if the teeth appreciate the cold, it is by a momentary communication through the gustatory nerve with the inferior dental. A painful sensation may be felt in the ear, or a sudden deafness which gives place to a singing noise: this is appreciated through the gustatory nerve communicating with the chorda tympani. If anything very hot be taken into the mouth, a heated solid or fluid, or mustard, through the connexion between the first division of the fifth and that between the oculo-muscular or sixth nerve, the sensation is communicated to the eyes, and, through the nasal branch of the first division of the fifth, to the nose, causing



a peculiar twinge, first running down the nerve to its terminations, then returning with increased force, affecting the whole Schneiderian membrane. From external impressions we can have no doubt of a material union. We wish to taste what we smell, if grateful; or what we see, if pleasant, &c. The approaching act of tasting is enhanced by a previous grateful flavour. The gustatory nerve gives filaments to the mouth and palate: hence we have undoubted authority for supposing wherever this nerve traverses, that taste is apparent, though in a less degree than in the tongue. Haller, Ruysch, Kaaw and others have said, and therefore it is nothing new, that taste can be appreciated in the sides of the mouth, cheeks, and palate, which facts I do not doubt; but these parts only appreciate taste the more when the sense is lessened in the tongue. Haller records the case of a girl who had only a swelling for a tongue, yet she could distinguish perfectly all flavours, the absence of the more legitimate organ for the seat of the sense of taste evidently causing a larger distribution of the gustatory nerve around the mouth and palate. One of the first favorable symptoms manifested after, or even before, fever has left is a return of the sense of taste.

The gustatory nerve sends large branches to the sublingual gland, and causes a greater secretion directly anything is tasted, or even before; because, (through the nervous communication of other senses, such as sight, smell, &c.) being first acted on, they act on the gustatory nerve, which stimulates those glands. The greater sense of imagination acts on the inferior sense of taste; so that, being eager to be convinced, it can only gratify itself through the agency of the gustatory nerve. The gustatory nerve does not send filaments, as far as I have been



able to detect, to the mucous follicles. These follicles are necessary to keep up a constant moisture at the posterior part of the mouth, but they have no sense of taste. The gustatory nerve, then, is partial in its distribution, first, to the membrane of the mouth, to keep up all around and about that cavity the gratification which ensues in the healthy person putting what is nice into it. Secondly, to the sublingual or first salivary gland, in order that every thing be rendered sapid as quickly as possible when taken into the mouth. Thirdly, to the anterior two-thirds of the tongue, which is composed chiefly of the anterior and central, and consequently the principal portions of the genio-hyo-glossal muscles, with the dorsal and ranine arteries, which form the largest portion of the tongue. So much is done, and so great a portion of that organ is appropriated to a sense so valuable.

All the nerves of the senses are more connected with each other than with the motor nerves; so that their peculiar union and harmony should be upheld, as well as the superior sense of the mind. But it is to the motor nerves we owe the connexion of one part with another, as is illustrated by disease in one part affecting another part. It would not be difficult to show these connexions, but it is too long a subject for this Paper.

#### THE GLOSSO-PHARYNGEAL.

The Glosso-pharyngeal is the next nerve connected partially with the tongue. It arises from the tractus respiratorius of Sir Charles Bell, by three or four fine filaments, immediately beneath the facial, and above



the pneumo-gastric nerve, from which it is separated by a small portion of the pia mater of the fourth ventricle. These filaments in uniting form a nervous cord, which is situated outward towards the anterior part of the foramen lacerum basis cranii, through which it passes in front of the pneumo-gastric nerve, but separated from it by a distinct foramen, formed from the dura mater. When it has passed out of the skull, it passes to the inner side, as well as anterior to the pneumo-gastric nerve, and internal jugular vein. It first sends off an anastomotic branch, which penetrates the tympanum by a canal placed by the side of the stylo-mastoid foramen, passes to the promontory, and unites with filaments of the vidian nerve, as well as sympathetic filaments from the carotid canal. It next gives off communicating branches to the par vagum and facial nerves, and receives filaments from the sympathetic. The trunk then crosses between the external and internal carotid arteries, where it gives off two slender twigs to be connected with the pharyngeal branch of the par vagum, and assists in forming the pharyngeal plexus, uniting, in the course of the internal carotid, with filaments from the cardiac branches of the sympathetic. It next gives off filaments to the stylo-pharyngeus muscle, and then two considerable rami, which are separated by the styloid process of the temporal bone: these take their course inwards and backwards to the superior and middle constrictor of the pharynx, on which they are distributed, supplying also the tonsil, and mucous membrane of the pharynx; and then passing between the stylo-glossus and hyo-glossus muscles, reaches the tongue, and divides into three terminating rami.

1st. *The superior*, passing into the lingualis muscle,



and constrictor isthmi faucium, the mucous membrane and follicles, and gives a twig to the tonsil.

2d. *The inferior*, passing into the hyo-glossus muscle, and to the mucous membrane reflected from the under surface of the base of the tongue to the epiglottis supplying its mucous follicles.

3d. *The middle*, passing into the tongue beneath the hyo-glossus: it is then directed to the upper surface of the organ supplying the mucous follicles, and the mucous follicles of the foramen cœcum, and those anterior to it, on the posterior fourth of the centre laterals, called now the papillæ lenticulares vel capitatae.

In the tongue the glosso-pharyngeal nerve is placed below the gustatory, and above the motor lingual or ninth. This is an important nerve, in respect to its connexions with the pneumo-gastric; and when minutely considered, will show the more immediate connexion between the stomach and pharynx, associating that portion of the tongue marked out in the map as the posterior fourth of the laterals, referring to the commencement of the alimentary track, and part of the centre fourth of the laterals apportioned to the upper part of the œsophagus. The par vagum communicates by twigs with the glosso-pharyngeal and sublingual.

It is also from the par vagum that the laryngeal nerve is given off, by which the posterior fourth of the centre laterals is connected to the larynx and upper part of the trachea.



### THE NINTH or HYPO-GLOSSAL, or MOTOR-LINGUAL NERVE.

The Ninth or Hypo-glossal, or Motor-lingual Nerve, arises in two portions from the medulla oblongata, in the groove which separates the corpora pyramidalia from the corpora olivaria, by several filaments which pass through the dura mater, and then unite to form a cord which passes out of the cranium through the foramen condyloideum anticum. As soon as it passes this opening it becomes connected with the pneumo-gastric, and then coming downwards and forwards, it passes over the external and internal carotid arteries, the pneumo-gastric and sympathetic nerves, and, after giving off the descending branch, sends one to the thyro-hyoideal and genio-hyoideal muscles. It then passes under the digastric and stylo-hyoid muscles and internal jugular vein, in front of the hyo-glossus muscle, uniting with the anterior formed by the junction of the suboccipital and first part of the cervical nerves. It then passes forward towards the angle of the jaw, courses along the under edge of the tendon of the digastricus, and then rises upward towards the tongue. Just where the motor lingual gives its curve around the digastric muscle, it frequently receives a filament from the pneumo-gastric. It first sends off the descending cervical along the inner side of the internal jugular vein, which supplies the muscles of the neck, and unites freely with the third and fourth cervical nerves. Opposite the thyroid cartilage, the descending branch, and a branch of the first, second, and third cervical nerves form a gangliform enlargement,



from which a branch passes down on the left side of the pericardium to unite with a branch of the phrenic nerve. The motor lingual nerve, or continuation of the nervous trunk, takes its course forwards and upwards, passes between the venus rami of the jugular vein and external carotid, accompanying the lingual artery between the mylo-hyoideus and hyo-glossus muscles, until it reaches the outer or posterior edge of the hyo-glossus; and here the arterial branch leaves the nerve by passing upon its upper or mucous surface, while between the mylo-hyoideus and hyo-glossus muscles it gives off muscular branches, and is also connected with the superior cervical ganglion of the sympathetic, and with the mylo-hyoid filaments of the inferior dental. Upon the inferior or cutaneous surface of the hyo-glossus several junctions take place between the gustatory branch of the third division of the fifth, and this lingual branch. Arriving at the anterior edge of the hyo-glossus, it again meets its corresponding arterial ramulus, and they together pass between the genio-glossus and lingualis muscles; and then, passing forwards and inwards, the nerve is lost by being distributed to the muscles of the tongue, between it and the floor of the mouth. This nerve also gives filaments to the sublingual gland. Its principal situation in the tongue is at the posterior third in the hyo-glossi muscles, and that portion of the lingualis nearest to them, consequently in that part which forms the wedge or motor division: its office is to give motion to the tongue. The descending branch, after contributing to form the ganglion with the cervical nerves behind the thyroid cartilage, gives off filaments to the omo-hyoideal and sterno-thyroideal, and then terminates in the sterno-thyroideal and sterno-hyoideal muscles. The tongue is also supplied with



filaments of the sympathetic from Meckel's ganglion and internal branch of the superior cervical ganglion.

If we descend, in tracing the connexions with that most important of all nerves for the diagnosis of disease, the par vagum, we shall find ample proof that that portion of the tongue which is here called the *laterals* indicates the state of the alimentary canal, and its assisting organs, more than any other part.

The laryngeal nerve, which is a direct branch from the pneumo-gastric or par vagum, will be found in its union to determine to that part called the *centre laterals*, which are more in connexion with the trachea and lungs than any other part of the tongue, consequently will indicate the state of those organs and passages.

The various and more abundant connexion of these filaments of nerves almost direct from the brain, and which course down to the stylo-glossus muscle, will indicate that those parts of the tongue called the *edges* are more in connexion with the brain than any other.

With respect to the *tip* being apportioned to the large intestines, we must trace the connexion of its nerves more particularly through the spinal nerves and sympathetic; and those parts assigned to the kidneys must be traced through the sympathetic nerve and par vagum. The varied currents of blood are so regulated by the action of the heart, that it is in the blood-vessels, and in the aortic plexus of nerves of the par vagum, that we have to find reasons for any diagnosis on the tongue of the more marked diseases of hypertrophy and dilatation of the heart: why the tongue should present, in one case, a simply cracked or fissured appearance longitudinally, which attends most examples I have seen of simple dilatation of the heart; and why these fissures first appear on the



line arbitrarily dividing the laterals from the centre laterals on the posterior part of the anterior half of the second fourth. Also, why the transverse sulci, or chaps, should attend most cases of hypertrophy of the heart; as well as why these chaps, fissures, or sulci, should be more particularly situated on the anterior two-thirds or gustatory division of the tongue. Also why, in some instances, we see the tongue divided by a deep sulcus down the centre, or raphé; and in others, why it should present so very smooth and round an appearance, that we can only imagine a raphé to divide the tongue into two symmetrical longitudinal halves. These varied appearances I attribute to the action of the heart itself regulating the currents of blood, as in all anormal conditions of that organ there is, and must be, irregularity in its stroke or pulse.

I found, by constant observation, characteristic appearances on the tongue in well-marked diseases, which, after some years of practice, I mapped in the manner described; and in the pursuit of causes for these effects, and continually asking myself why these should be, I found that anatomy bore out the truth of the discovery which, as it appeared satisfactory to me, I have now offered to you.





## THE DORSUM OF THE TONGUE.

THE immediate surface of the muscles forming the bulk of the tongue is covered by a "highly vascular rete mucosum, on the surface of which is a firm lamella of condensed cellular tissue, approaching in its characters to elastic tissue," in which Cowper mentions having seen small glands communicating both above and below—above, through the dorsum or upper covering; and below, through the muscles of the tongue. Besides which, this tissue receives the perforations for the passage of the arteries and nerves and small foramina from the surface, which absorb the moisture of the surface. It is also said by Cowper to have small tubes for the roots of the villi that are placed upon the dorsum of the tongue. (N. B. See preparation, with a foramen large enough to admit a crowquill: it runs in a slanting direction under the dorsum.)

The upper surface or dorsum of the tongue is said to be a continuation of the mucous membrane of the mouth and fauces: posterior to the foramen cœcum, in the triangular space on each side of the epiglottis and between the epiglottis and foramen cœcum, and under the tongue as far as the under edges, this appears to be the case. But



the whole dorsum of the tongue anterior to the foramen cœcum, and even its under edges, has a covering peculiar to the tongue itself. In the healthy tongue it is always *villous*, and in the primary diseases *pilous*. In cutting through this covering, it appears to be fine cartilage; whilst it has every similarity, in point of secretion, to a mucous membrane, and merits being called by a name expressive of its three characteristics.

About half an inch from, and in front of the epiglottis, (8, *fig. 7*,) it has a small hole, the foramen cœcum, (9, *fig. 7*,) which has, rising up from its base and anterior edge, two or more mucous follicles. On each side of this foramen are numerous follicles, called *papillæ lenticulares vel capitatae*, from nine to fifteen in number, verging across the posterior fourth of the centre laterals, as far as half of the centre fourth of the laterals, in shape of a cone, the apex formed by the foramen cœcum. (10, *fig. 7*.) These are situated in the wedge before described, and each one appears like a cup and basin. All have flattened heads and a narrow neck to attach the cup to the basin, in which they have a free movement that excites their secreting action. They owe their flattened heads probably to their being constantly pressed upon by the soft palate, when the mouth is closed and the tongue drawn back. There can be no doubt of their secreting a fluid, or they would not deserve the name of *follicles*. These are so distinctly different to the arterial *papillæ* on the gustatory portion of the tongue, that it would not be unwise to re-name them according to their uses, to prevent confusion. Their designation under the head of *papillæ* infers that they are all of the same nature.

In the divisions of the tongue called the *cornua* there are also numerous follicles, which may be seen in this



preparation, or in the drawing taken from it, (11, *fig. 7* :) they are not only situated here, but meet others above the arch of the palate, which is a continuation of the same muscles (*palato-glossi*) and mucous membranous coverings.

The *papillæ fungiformes* are very numerous: they present rounded heads and thin necks, and arise out of a small fosse, or ditch: they are thinly scattered on the centre fourth of the centre laterals, but become more numerous at the sides of this part than towards the *raphé*, and still more numerous on the laterals and edges. They are placed longitudinally on the tongue, in alternate rows, at slight intervals.

The *papillæ conicæ* are very numerous, and are situated on the anterior and second fourth of the centre laterals, and partly on the edges and laterals of the anterior fourth, fewer being distributed near the *raphé* than in these places; but they are most numerous on the *tip*, and the under edges of the anterior fourth, and give those parts an asperated or rough appearance. At the tip they form clusters, and present occasionally in scarlet fever a tasselled appearance at the point of the tongue.

These two last-named classes of *papillæ* are different from the *papillæ lenticulares*: these, we have every reason to believe, are follicles for the secretion of mucus, consequently glands of the smallest degree. The latter, on the gustatory portion of tongue, are generally supposed to be terminations of nerves, which, however, is not true. Nerves are white throughout, and do not alter in colour at their terminations more than in their centre. Now these are evidently red; and I believe them to be arterial termini, having a more or less conical, flat or bulbous shape, arising out of a ditch, or fosse, at which point the nervous filaments from the gustatory terminate. I present this very



much exaggerated drawing, that I may not be misunderstood, of a bulbous papilla arising from a fosse. (*fig. 8.*)

Physiologists have considered the papillæ to be terminations of nerves, for this reason: on placing any pungent sapid body on them, it has become instantly apparent to the taste; whilst if the same had been placed on any other part of the tongue it would not have been so soon perceptible. The reason is this: taste is keener during a moist state of the tongue than when it is dry. If a single grain of any salt is placed on the top of one of the papillæ, the saliva or moisture instantly dissolves it, and it flows in a sapid form into the fosse: the distance is not so great but that it is momentary. If a grain of any salt is placed on another part of the tongue, it becomes immediately dissolved, and flows with the saliva through the pile into the fosse at the base of the papillæ, and is there appreciated. If the papillæ were nervous terminations, this sapid substance would have to flow to the top of them before taste could be apparent.

Again, Nature would be unwise to place so delicate a structure as the termination of a nerve in so prominent a position, when so many substances are put into the mouth either too hot or too cold, the sensation from which would be a thousand times more painful than it is if the nerves terminated here. The more we examine Nature, the more we must wonder at her wisdom. Without lessening the power of taste, how beautifully she protects the sense by furnishing it with a nourishing fabric, and by surrounding the fosse with a villous or pilous coat, whilst the arterial bulb is capable of contraction within it, or elongation through it; and how admirably she provides it with a constant supply of moisture to dissolve solid substances, rendering them in a fit condition to be tasted!



The saliva from the numerous glands about the mouth, from the mucous follicles of the tongue and cornua, from the submaxillary, sublingual and submucous glands, does not alone supply the moisture to the mouth, but a large portion is exhaled from the arterial termini or papillæ. As moisture is incumbent with an unimpaired sense of taste, we find the gustatory apparatus so situated, that both artery and nerve are mutually dependent on the integrity of each. If we isolate a papilla and part the pile from the fosse, it will be seen pretty distinctly with the naked eye, but better with the assistance of a glass.\* If a patient be in a full habit of body, and his blood contains more than the normal quantity of fibrin, so that the papillæ are elongated, they will be distinguished, beyond a doubt, as belonging to the blood-vessels. If the papillæ are elongated and full, they show a state of general fulness of blood, and that more fibrin is circulating in proportion to the serum, at which time there is less exhalation from these, and consequently less from all other blood-vessels.

The secreting organs, the glands, in this state of the blood, are equally unable to obtain their proper quantity of blood from which to eliminate their secretions: the next step is that, moisture being required, and none to be had, fever supervenes, with a dry tongue, and loss of the appreciation of taste.

I think, Gentlemen, you will not deny that practical observation of the state of the papillæ and the tongue is a

\* A small portable microscope, with a reflector at the end of the tube, has been constructed by Mr. Hawes, Optician, 95, Cheapside, for this purpose, as well as for examining the eye in all stages of disease. It is an excellent aid to the study of diagnosis, and merits the attention of Oculists and Glossologists.



highly important diagnostic mark of the state of the blood, and the probability of what may take place if you do not render assistance in time to check a fever.

When the papillæ are not visible, you will always find a moist tongue, and great susceptibility of taste, but you will have no fever. The papillæ will increase and decrease in prominence and appearance in every stage of disease, from being entirely invisible, as in Chlorosis, to being elongated, and presenting a tasselled or fringed state: what are the causes of these changes? They will expand on the surface and fill up the fosse, or they will stand erect out of it. To my mind, the papillæ are of equal value with the pulse in the diagnosis of disease.

It is not every high, hard, full, or labouring pulse that will warrant general depletion, unless other prominent features of diagnosis combine with it. Of the two, the pulse is more fallacious than the tongue: the state of the papillæ will often clear up a point of most vital importance.

I must not, however, be understood to say, that, unless the papillæ are visible, bloodletting is not enjoined. It often happens, when they are not discernible at all, that local or general depletion may be absolutely necessary, though the blood may not present the least trace of an inflammatory character.

The distinctness of the papillæ will often present itself in two opposite stages of disease. First, when the system is so far oppressed with plethora that the organs act imperfectly; and secondly, when they act too much from over-excitement, through the presence of too much blood. This frequently happens in peculiar states of the large intestines, a costive habit of body being indicated by a cluster of florid papillæ at the tip of the tongue; and the



same appearance may be present when the bowels are in a constant state of irritation, and during the frequent voiding of small stools. These two states are not opposed to physiology, as the same cause may produce these opposite actions. The contracted state of the gut, and imperfect secretion of mucus or exhalation from the arterial terminations, may produce the costive state, as the absorbents of those parts will remove the fluids from the moist fæces, and make them scybalus; whilst a deficient action of the absorbents will prevent the retention of the moist fæces through a contracted state of the bowels from overcharged vessels. This latter is the worst condition of the two, as it may go on to inflammation.

The papillæ at the tip of the tongue will also indicate the presence of internal hæmorrhoids, or congestion of the hæmorrhoidal vessels, particularly when they present an asperity at the utmost tip and under edges. The redness at the apex of the cone of the tip, at the posterior half of the anterior fourth, will lead you to the diagnosis of an inflammatory action of the colon, particularly the transverse arch, when pain is felt at the *scrobiculus cordis*—a point of the greatest importance, considering the proximity of that gut to the stomach.

It is, in fact, perplexing, and frequently leaves a doubt whether the stomach or the transverse arch of the colon be the seat of pain. If it be the stomach alone, the red appearance of the apex of the cone or tip will not be present, but the state of the posterior and centre fourth of the laterals will indicate it. Should it be the transverse arch of the colon, and not the stomach, that part of the laterals indicating a state of integrity of the stomach, and the tip, showing the part only affected, very little time spent over the diagnosis of the case will set us right as



to the true cause, and place us considerably above our patients. An inflammation may exist in the pleura when no papillæ are visible : but the tongue will be thicker and redder ; or should it be limaceous at the posterior part, as it sometimes is, the *oval* will be free from the pile or fur, and present a little bare place.

I must here remark that a thorough knowledge of Glossology will sometimes detect deception. When the tongue is silent, it will tell the truth. The sick tale is not unfrequently an untrue one : those who have had most practice are best acquainted with this fact. If disease were not made a cloak for deception, I should not be so bold in stating this ; nor would the authors of the article on FEIGNED DISEASES in the 'Encyclopædia of Practical Medicine' have been called upon for so able an exposition of these melancholy truths. Anything, therefore, that places the physician above his patient is a step gained by science.

Glossology tends to this desirable end. It is my practice, in most cases, not to allow a patient to tell me his sick tale till I have seen his tongue. When my observations and diagnosis are completed, I then say what is my opinion of his malady, requesting him to be candid with me, and state how far it agrees with what he has to complain of : should there be any difference, this leads me to examine the tongue more minutely. Something, probably, that might have been overlooked at first, is made apparent ; or, should this not be the case, and I see no reason to alter my first diagnosis, I do not hesitate to differ from him : at all events, I am not misled by anything he has to say.

The dorsum of the tongue presents many interesting appearances besides the papillæ, well meriting the attention of the physician. Its surface sometimes seems entirely



free from any extraneous covering; at other times, it is loaded with the extraneous matter termed coating or fur. These various appearances are supposed to indicate a healthy or diseased state of the body. They have, however, never been defined, as characteristic of disease, except in a very limited degree.

The tongue presents at times similar appearances in really different disorders: it is in the situation of these various coatings or furrings that the difference lies. As medicine and diet have frequently changed the aspect of the tongue in a few hours, the medical man has been so baulked that no sure diagnosis could be drawn from it. A commonly dyspeptic person may present a tongue more foul and coated than the patient with a severe disorder. Owing to this changeability, the tongue has received no marked attention from the profession. The parts that foul, more especially in some diseases, and clean in others, and the laws for this fouling and cleaning, have been imperfectly understood, or so disregarded, that no advance has been made for many years in the knowledge of these curious phenomena. The sum of the information furnished us by our predecessors is so trifling, the description of the tongue in disease so vague and general, that I will call your attention to almost all that is said of it in this loose and indiscriminate nomenclature.

First, as to COLOUR, it is said to be

Brown,

Light brown,

Dark brown,

Thick brown fur,

Black,

Pale lilac,



Red,  
Reddish,  
Yellow,  
Yellowish fur,  
White,  
Whitish fur.

Secondly, as to the COVERINGS of the tongue :

Covered with numerous and crowded white points,  
Covered with a yellowish white and moist crust,  
Coated,  
Coated with a tenacious viscid mucus,  
Coated with a soft mucous substance, and clammy,  
Less coated,  
Rather coated,  
Foul,  
Furred,  
Furred, resembling the fibres of coarse velvet,  
Loaded.

Thirdly, as to the PAPILLÆ :

Universal enlargement of the papillæ,  
Elongated florid papillæ,  
Papillæ greatly enlarged at posterior part,  
Papillæ elongated at the tip, resembling a tassel or fringe.

Fourthly, as to GENERAL APPEARANCES :

Aphthous,  
Œdematous,  
Chapped,  
Creased or folded,  
Dry,

Exsanguineous,  
 Flabby,  
 Fissured,  
 Glazed,  
 Indented,  
 Lobulated,  
 Moist,  
 Parched,  
 Papulated,  
 Semi-transparent,  
 Smooth,  
 Swollen,  
 Sore,  
 Sulcated, with or without deep edges.  
 Tender,  
 Tumid,  
 Tremulous,  
 Ulcerated.

Fifthly :

Deviating little from the natural appearances,  
 Clean and moist,  
 Clean.

In fact, scarcely any or no mention is made of these appearances occurring in particular parts of the tongue, and certainly no reason is given why the surface of the tongue should be so covered.

These questions have often arisen in my mind : What is the natural and healthy appearance of the tongue ? What is the state and real appearance of a clean tongue ? Is what is called a clean tongue always indicative of a healthy state of the system ? We see an anormally clean tongue



after scarlet fever, at which time the system is in the greatest danger from the inroad of dropsies, swelled glands, which frequently become the seats of abscesses, and other diseases. I do not mean an anormally red tongue, which no one can be much deceived in; but a tongue not much differing from the colour of the lips, without fur or coating of any description. The tongue is often clean and healthy (and thus nothing can be gathered on which we can form any sort of diagnosis of the state of the body) when the patient has some abdominal tumour. Indeed, those who have had patients suffering from carcinomatous tumours may remember that the tongue appeared so healthy and clean as to excite surprise. But are there no assignable causes for these contradictory conditions, of a healthy tongue with a disease that must prove fatal? and if there are, what are they?

The appearances of the tongue which I have described above, by which we are said to judge of the state of the system, depend on causes affecting the covering of the dorsum; the common characteristic of which, in the healthy state, is rough, or villous, varying from this character, in the first departure from health, by these eminences becoming more or less of a pale hue; sometimes red or pink, at others each little spot is tipped with white, and gives it the appearance of regular dotted lines or *striae*. As these villi increase in length, they form a pile which lies so close as to present a perfectly smooth surface. The first, or healthy state of the tongue may be said to be a smooth moist surface to the eye, well supplied with mucus, the papillæ indistinct, and the villi in their radiated lines of dots slightly tipped with white, not so visible as to disturb the dotted appearance, but giving it a pale pinky lilac colour. But for this state of the tops of the



villi, the tongue would be red. As soon as morbid causes in the system produce the primary stage of disease, these white dots increase in size, and consequently seem to lie closer on the top of each of the villi. This appearance I have distinguished by the name of LIMACEOUS, from its resemblance to the *limace candidissima* of Ferrusac, the drawing of which (*fig. 9*) is twice the size of life. These villi on the tongue do not run parallel with the longitudinal or transverse divisions, but at an angle of thirty degrees from the raphé to the edges on each side, in irregular lines, some terminating at the middle of others, and some running direct to the edges.

This species of tongue is by far the most common of all that come under the eye of the practitioner, as it accompanies all degrees of dyspepsia, and *malaise*.

Accordingly, it may be called

Simply limaceous,

Milky limaceous,

Creamy limaceous,

Buffy limaceous,

during which time a distinctness of the striated appearance lasts.

Health has its laws, and disease has its laws. The first departure from health is disease; disease must therefore have its indications.

The next step is shown by these dots losing their distinctive character by the villi increasing in length; the striated appearance then gives place to the PILLOUS; the villi becoming elongated, overlap one another, producing a more or less furred state. (See preparation.)

This fur is not a moveable deposit, capable of being scraped off: if it were so, a patient might scrape his tongue



to deceive his doctor ; but the Glossologist is not to be deceived by any scrapings.

The laws of nature in the increase of morbid actions are not to be counteracted by so simple a manipulation : the natural removal of this appearance can alone effect this. The science of glossology is inseparably connected with this natural law ; this law with harmony and consistency ; consistency and harmony with simplicity ; simplicity with truth ; which must be the foundation of any structure built to last, or it will fall with the first breath of doubt.

The pile of the tongue having increased with disease, presents a smooth coating or furring, varied by colour. Its first pilous appearance resembles fine velvet ; then coarse velvet ; and in others, when the pile is long and the saliva copious, it resembles a spaniel's back just out of the water, its shaggy coat parted down the back (or raphé), wet and smooth, and distinctly pilous on its sides. These appearances yield us the velvety tongue, brown, black, drab, buffed, &c., according to its colour, or the short or long piled velvety tongue. One description, the short-piled gray or slate-coloured velvety tongue, is connected with a state of the system most difficult to manage,—a state in which your patient will lead you to complaints affecting the whole body ; so that you may chase disease like an *ignis fatuus*, and be led into a labyrinth of speculation of what may, or may not be, the cause of disease, and what the disease itself. Almost inextricable difficulties are around you when this appearance of tongue is presented. Of all my patients none give me so much trouble, and so little satisfaction, as those who come with this kind of tongue. They go about neither well nor ill. You in vain try to fix the disease to a particular spot. Pain will be complained of



in one part which flies to another and distant part ; and though you give your most serious attention to it, neither patient nor medical man will be satisfied. It is diagnostic of the firm hold which a close morbid deposit has upon the surface of every mucous membrane throughout the body ; and hence the various complaints which it is our painful part to listen to in these cases.

The exaggerated drawing which I exhibit represents the pile firmly attached to, and forming part of the villi ; and if it be true what Cowper, Bidloo, and other ancient anatomists assert, each has a root beneath the dorsum, or cartilagino-mucous membrane of the tongue, which this diagram is supposed to show. The submucous structure must in this state be much irritated. When the pile is long, the tongue presents the appearance of being more foul ; when the tongue is clean it is simply villous, and consequently has nothing about it for the lodgement of sordes. If the villi increase so as to form pile, they must have a base. This base must be constantly generated under the first covering of the tongue, the rete mucosum.

From the simply limaceous to the long-piled velvety state of tongue, these appearances denote a more or less congestive action of the system. If this is removed by proper treatment, the system rises up again relieved from its depression ; but if nature is left to herself, and is her own physician, there is truth in the doctrine of the *autocrateia*, or *vis medicatrix naturæ*. We then see a class of appearances totally distinct from that denoting a congestive state : we have in its place the feverish and inflammatory state. An eruptive fever will, in a few days, so clean the tongue of its long pile as to leave the dorsum bare. The fur or coating will come off in patches and flakes, looking as though the long swarth on the surface had withered for



want of nourishment ; and though we can remove masses, these are made up of innumerable small hairy particles. I have here a preparation of the tongue of a person who died with this coated state of it ; and in its condition you may clearly see what, I am afraid, I have too imperfectly expressed. A portion is here denuded on purpose to show the villi, and the pile distinctly rising forwards. Viewing it laterally, the small pile may be seen distinctly : while, looking in front of it, it appears as a simple thick mass.

The change that takes place through natural causes, from a very much furred red tongue, is never unaccompanied by fever or inflammation. Independently of the tongue being furred, it is large and flabby ; but in the change we speak of it becomes dry, red, bare, and sore on its surface, and in its shape pointed and contracted. Its powers of secretion are lessened ; the exhalations from its papillæ are wanting ; the submucous, sublingual and submaxillary and other glands, cease their action ; nature has lost its tone. Some violent cause prevails in the system for such an alteration. Some organic lesion may present itself. Can these effects come without law or order ? By what laws, then, did the tongue first lose its healthy appearance, and gradually assume, step by step, the threatened result ; and by what action was it that nature directed it, diverted it, and centered it in one part only, compelling that one to take the onus from the rest ?

Gentlemen, I need not carry your minds to the bedside of the patient, with furred tongue gradually getting dry, hard, and brown, with oppressive thirst, flushed cheeks, turgid conjunctivæ, hot skin, pains in the loins, oppressive headach, unable to bear the light or the least noise, to remind you that this is a threatened fever. The



body gets tired out, weary with pain and watching. A few pustules make their appearance on the skin, which are soon followed by a dense mass over its entire surface. What is this stage? All his former oppressions have vanished: but all his morbid humours are distilled to the surface of the body; and nature, not the physician, has effected the relief. Could not the physician detect on the tongue the approaching disease? Could he not judge of its various stages, from the simply limaceous to the velvety appearances which indicated the aggregating morbid deposits and secretions within? In what chemically disturbed and altered states were those secretions; and what the best remedies to oppose their progress, and check their wild career? We should find every altered stage of the system declaring itself upon the tongue, from the least to the greatest amount of evil—from the simple dyspepsia, to the corresponding congestion of organs; and from them to the changes which finally produce fever and inflammation.





## SHAPES OF THE TONGUE.

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IN the primary disease, the tongue has different shapes: it may be wide, thick, large, or flabby, in which state it receives the impression of the lower teeth at the anterior third of its edge, (*fig. 10*;) it may be limaceous or furred. These appearances are dependent on a debilitated and relaxed state of the system from morbid conditions of the secretions. The mucous surfaces will be more or less oppressed by this state: nausea, and sick-headach will prevail; and if they continue any length of time, the rugæ down the edges will become visible at the corresponding parts where the pains are felt in the head, denoting a congestive state of the membranes of the brain. (*fig. 11*.) If the fur or coat be thick down the centre laterals, much expectoration will be present, attended with loose mucous cough; this cough being more or less violent according to the irritation produced by phlegmy mucus in the larynx, trachea, or bronchi. If this be not removed, nature will act for herself, and the absorbents will, in a few hours, take away this congestive deposit along the respiratory track. Acting, however, wisely, but too well, Nature not only takes away that which is oppressing her, but unable, as it were, to restrain herself, removes even the



protecting mucus from the membranes, and leaves them much too bare. The congestive then gives place to the inflammatory stage: the centre laterals presented a coated state—now, they are clean and red, and rise up a little above the laterals.

During the congestive state, the kidneys become very active, the call to void urine is frequent, the absorbents are over-diligent; the kidneys, in fact, do the duty of the bowels, if I may so express myself; the bowels in consequence become inactive, and what motions there are, are scybalous. If this lasts long, pain is felt in the back, with irritation of the bladder and urethra, and external meatus, until, from an active state, the kidneys become morbidly oppressed. Then may be seen the clusters of sand-like particles on the SIDES, in the situation marked out in the map for the diagnosis of this stage of disease. If this state is got over, we see the alteration that has gone on in the large intestines by the cluster of red and very visible papillæ at the TIP. Still, as long as no positive fever or inflammation ensues, the tongue will present its large and flabby appearance.

When the tongue on being protruded shows wide edges, (*fig. 12*,) apparently wider than the mouth, we find rheumatism or gout present, or congestions of the small vessels under the skin, or in the fascia, which become red and turgid. The capillaries then carry red blood and ultimately subside; but, I believe, no well-authenticated case has been made out of abscesses following this state. These vessels only are affected, and not the cellular tissue itself; for when that is affected abscesses take place. After the circulation is restored, the capillaries resume their former duties; but, having once been enlarged, it is no difficult matter for blood in the same state of impurity to



get into them again, and again produce rheumatism. The tongue will then be milky or creamy limaceous until the morbid humours are reduced, become expended in the wear of the system, or are carried out of it.

All these coatings or furrings, and wide and large tongues, are proofs of what I shall term the primary disorders; because I have found that, by certain wise and unalterable laws, these states must exist as proximate elements, awaiting only exciting actions to induce the secondary effects of fever or inflammation, neither of which states can obtain before the primary disorders have reached a certain climax, to be acted on by the exciting causes.

The second great class of appearances are shown in the firm, contracted, red, and pointed tongues. (*fig. 13.*) These conditions are caused by the absorbents acting too powerfully in the first instance, and after gathering up morbid humours from all parts of the body, then conveying them into the blood. The blood consequently becomes too rich in fibrin, and has in itself the elements of disease. We then find inefficient actions upon it, when it reaches organs which eliminate secretions therefrom. The blood, for secreting organs to act upon it, must be sufficiently fluid. If impure, what must be the state of the secretions made from it? We cannot gather grapes from thorns, nor figs from thistles: neither can we expect a healthy secretion from an impure material. If the blood is thick, the eliminating or filtering action of the glands is impeded, and unable to make secretions enough for the hourly uses of the system, which, in consequence, gets dry for lack of the constant moisture which should be generated everywhere, and by every possible means, throughout the entire system.

Disease is Nature's effort to cure, and is the effect of a



cause. These effects, from the above causes, are shown, in our too-elaborate Nosology, all classed and named as such; but where are the causes named and classed? We may have many effects from one cause; remove that cause, and the effects would cease. The same cause in one constitution might produce a different effect in another. The organ which is most overstrained will most suffer. In one, it may be the lungs; in another, the kidneys; in a third, the liver; in a fourth, the brain; and so on, and all from the same cause.

In a congested state of the coverings of the brain, we find the rugæ pale, and the edges of the tongue flabby. In a fevered or inflammatory state, the rugæ are distinct, but the edges glary, and even fiery red.

In congested states of the primæ viæ, the tongue cleans as the corresponding surfaces of the passages clean. If this has been effected by proper medicines, and the morbid humours carried out of the body, both indicate health; but if nature has removed them into the blood, they are then filtered through the skin in the form of pustules, or ichorous eruptions.

If this does not take place, we find some weak internal organ taking the onus from all the rest; and an inflammatory action is set up, which will be detected by the state of the corresponding situation of that organ on the tongue.

Inflammation of the large intestines always produces febrile action of a different character to fevers in general. We find the tip of the tongue become red, and not that the papillæ become enlarged upon it. This redness extends from the apex of the cone even to the border of the whole anterior fourth of the centre laterals. By carefully tracing the large intestines upwards from the colon



by gentle taxis, we discover this; and if we look at the state of the tongue the diagnosis will be confirmed. The power which the heart has in propelling the blood is almost incalculable; and many sanguineous congestions take place from the blood, too rich in fibrin, being forced to the arterial termini. If this arterial congestive action exists for any length of time, can we wonder, when we know the composition of the blood which these terminal vessels exhale, that we have serous effusions? One class of these complaints, Pleuritis, I have been able to detect by that part of the tongue called the OVAL. In pleuritis, this will be bare, the villi denuded, and distinctly seen, when the surrounding parts are covered with pile. It is not, however, unusual to find one set of arterial termini more weak than another. A severe case of pleuritis came under my care lately, in which the whole of the tongue had a creamy pilous appearance, and not a papilla was visible; while the oval was denuded and distinctly villous, as though that part had had a hot iron applied to it.

With respect to hypertrophy and dilatation of the heart, I have inferred that the arteries may assist in causing the appearance of the fissures and chaps on the surface of the tongue. The tongue, when both these diseases are present, is always wider, thicker, and redder, and usually cleaner, than in the normal state: when simple dilatation is present, or just commencing, the longitudinal marks are only apparent, and the tongue is limaceous. (*fig. 14* :) but if hypertrophy is likely to succeed, the fact may be detected by placing the fingers on it, and stretching it sideways, when the chaps will be seen fast forming. (*fig. 15.*)

From my limited practice, I have been unable to detect,



by any appearance on the tongue, disease of the valves, or ossification.

There is, however, an affection of the heart, when neither dilatation, nor hypertrophy, nor disease of the valves, are present, which comes under the denomination of papitation and *morbis cordis*, names certainly but mere words. Palpitation may arise from exciting causes acting on proximate causes, as a matter of course. Sudden fear, or any other sudden mental action, will produce it. Indigestion and dyspepsia will do the same. I have every reason for supposing that the heart may exhibit palpitation, without being itself in a morbid state, or having any disease whatever. The blood is to the heart what the air is to the lungs, a natural stimulant. If no blood went to the heart, there would be no action in that organ; and if air did not visit the lungs, they would cease to play. If the lungs inhale air of a deleterious nature they become irritated, and the respirations are frequent and laborious. Fear will change the chemical character of the blood as suddenly as it will be gradually restored in the course of circulation; and this altered state of the blood will irritate the heart, or it will be irritated through the nerves from the sensorium, which has first felt the change in the nourishing fluid. But when fear has not been the exciting cause, how are we to account for the palpitation coming on when a person is sitting engaged in some quiet occupation, unless we surmise that some irritative quality in the blood has brought on a quicker action of the heart?

I have remarked that thin, spare, narrow-chested girls, from the age of twelve to sixteen, have hearts so irritable that the pulsation could not be counted: the heart is seen to beat externally, and loud enough to be heard when near



them. In few of these cases have I found the heart diseased. The tongue, too, has been without chap, fissure, or sulcus; but it has presented a highly creamy limaceous appearance, and has been velvety at the posterior and centre fourth, and long-piled or short-piled as far as the centre of the anterior fourth. The exciting and proximate causes have been irritation from the blood: when that has been purified, the irritation has ceased, and left no trace of ill effects on the heart itself. Another cause for palpitation may be deficiency of blood, from habitual menorrhagia, the patient being much exsanguined. A lady I knew well suffered so severely from this complaint, that her heart might be heard to beat at several paces from her. The great loss sustained by her had to be made up by the heart's over-diligence in supplying to all parts the necessary fluid, poor and watery as it was, to keep up the *pabulum vitæ*. To the irritation caused by the constituents of the blood producing this increased action of the heart, in the former cases, and to the deficiency in its constituents, in the latter cases, such a condition of disease can only be attributed. In chlorosis, palpitation of the heart forms part and parcel of the numerous effects complained of. Many other causes and effects, in which the heart plays an active part, might be mentioned; and so, indeed, each variety of tongue, bearing on its surface so many facts full of the history of cause and effect, might be made the subject of a separate Paper.

With respect to the kidneys, anormal blood will produce anormal urine, consequently irritation. The three most common changes of that excretion are—

1st. When highly-coloured urine is voided in small quantities: heat and slight irritation will be experienced



at the end of the urethra on the passing of the last drop or two.

2dly. When the urine is thick, and deposits a sediment on cooling: there will be a temporary annoyance or irritation felt in getting rid of the last drop or two, with the sensation that more has to come away. In this case also the quantity will be small.

3dly. When the urine is of a pale citron colour, irritation will be experienced in the bladder, and pain in the pubis, and such a quantity of urine voided as gives relief; and though this quantity may be large, it will be repeated two or three times within a very short period. No annoyance is felt at the extremity of the urethra in this last state, the pain being confined to the bladder. If the patient does not make urine again for several hours, the next he voids will be either brandy-coloured or thick urine. Here, then, is an irritation caused by the fluid the kidneys have eliminated, or by that which they had to act upon.

We cannot say that the kidneys or the bladder are diseased, for if the causes be removed these effects will cease; but if they be not removed, either disease of the kidneys or of the bladder may supervene, from the continual presence of an irritative material. So it is with the heart.



## THE UTERUS.

ONE circumstance has troubled me in my researches,—that I have not been able to find a place on the tongue for diseases of the uterus or the male genitals. Considering the vast amount of disease of the female in which the uterus plays a prominent part, there must, I am sure, be some reason why this has escaped me, though I believe that organ to be affected very much through the imperfect or morbid action of other organs.

I will here pause to express my admiration of the discovery made by Dr. Lee of the nerves of the uterus. I am happy that it has fallen to the lot of a member of the British School of Medicine to make so noble a contribution to its annals. The diseases attributed to the primary or secondary influence of the uterus are as the sands of the sea. Under the head of Hysteria, what do we not behold? It is only lately that Dr. Lee's Paper became known to me: immediately that I read it, a new mine was opened to my imagination: I fancied I could then account for many apparently unaccountable circumstances in female disorders. I trust that Dr. Lee, who deserves immortal honour for his industry, has stores of observations yet to make on the diseases caused by or generated



from the want of integrity of that organ, of the *effects* of which we know so much, and of the *causes* so little.

One circumstance I should certainly have hesitated to mention here, had I not seen this Paper—the liability of the nerves to increase in size in inflammation, and subside as that subsides. The physiology and pathology of the nervous system is in its infancy; and he must be a bold man who will either acknowledge or deny that the nerves are or are not tubes, but prolongations of the cerebral substance: that some are cineritious; some medullary: that they are a complexity of cords, having separate neurilemmata, when they appear but one: that all these fine threads are encased in a separate neurilemma of their own; and these covered again by a vascular rete, when united to form a single chord. There are wonders—new countries and continents of knowledge—yet to be discovered in this direction. Surely we want not a Columbus bold and adventurous enough to make them.



## CLEANING AND FOULING OF THE TONGUE.

As disease has its laws, so is its progress marked upon the tongue, and the tongue its law of fouling and cleaning.

Properly have the alimentary passages been called the *primæ viæ*, for all diseases take from it their origin. The tongue fouls from the posterior to the anterior part, and cleans from the anterior to the posterior. Place the tongue in the position of the *primæ viæ*, the root at the epiglottis, and the tip at the termination of the alimentary track. The approach of disease will show itself first on the posterior fourth; and the fouling will progress gradually down the tongue from edge to edge in the shape of a cone, as disease makes head, and the first coating of the tongue takes place. (*fig. 16.*) As disease increases, another coating covers that, and another that again, as I have endeavoured to show in describing the progress from the limaceous to the velvety state. The large intestines, on whose integrity so much depends, are the last portion of the alimentary track to be implicated. On a return to health, they are the first to assist and show it. The tongue then slowly cleans from the tip to the posterior part, gradually leaving the edges, so that the receding cone is



more pointed. (*fig. 17.*) The small intestines, the seat of the greatest number of absorbents, next succeed; and then, gradually, the chylo-poietic viscera and lungs. In fouling, the coating extends from edge to edge of the tongue, in a broad-shaped cone; in cleaning, it takes the form of a more pointed cone, the apex of both pointing to the tip, and the base to the root and cornua. *Figs. 16 and 17* illustrate these laws: *fig. 18* shows the manner in which the longitudinal divisions clean.

Here is a drawing of the fouling and cleaning of the tongue in infants. (*fig. 19.*) No. 1 shows the natural state. Nos. 2, 3, 4, and 5, show how gradual the fouling is from edge to edge; and when it has reached the tip, see how the cleaning takes place in these various forms. (Nos. 6, 7, 8, 9, 10, 11; *fig. 19.*) By the one we know, when we see the first appearance, that disease is in progress; by the other, that it is on the decline. If the act of cleaning has taken place, and disease is still present, lay the finger under the frænum linguæ, and notice the under edges, (No. 12, *fig. 19*;) they will inform you to what extent disease has gone, and what effects of it are present: you will find a limaceous appearance here, and an asperated state of the papillæ.

But I cannot now dwell on this: the diseases of childhood are simple, from simple causes, and are beautiful examples of the laws which nature follows; but even to appreciate their simplicity a great amount of study and observation is required.

*Lastly.* The tongue may be divided into two grand divisions, the GUSTATORY and the MOTOR: the anterior two-thirds running up to the styloid process for the gustatory, (2, *fig. 6*;) and the posterior third, or wedge-shaped portion for the motor. (1, *fig. 6.*) The gustatory



division is appropriated to the sense of taste, connected, as we see, by the stylo-glossi muscles, and the nerves which ramify from the brain to them, and other senses, and to the primæ viæ, as I have shown, which includes the genio-hyo-glossi muscles, and the nervous connexion with the par vagum, &c., along which parts we find the chylo-poietic viscera appropriated, the bronchial tubes, and lungs, and pleura, small and large intestines, kidneys and heart. (See *fig. 7.*)

The motor portion, which includes the posterior fauces, the epiglottidean space, the mucous follicles at the cornua, and the mucous follicles anterior to the foramen cœcum, which should no longer be called papillæ, or otherwise should be so called, and the gustatory papillæ re-named : they now rank together, whilst one set are simple mucous follicles, and the other arterial termini surrounded by the gustatory nerve.

The motor portion further includes the pharynx and œsophagus, larynx, trachea, and part of the bronchi. The flexible and varied actions of the tongue are preserved in their integrity by the motor nerves and posterior muscles. The moisture supplied to this part is from the tonsils and numerous follicles : while the moisture on the gustatory portion is kept up by the sublingual glands, which receive large filaments from the gustatory ; as well as from the submucous and submaxillary glands, and exhalations from the papillæ. (See *fig. 7.*)







## CONCLUSION.

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I HAVE to apologize for the length of this Paper, and crave your indulgence. I have endeavoured to shorten it as much as possible, and have omitted much important matter. I could remind you of a thousand questions to which the subject will give rise in your minds. If there are important points which should have been treated, think how I have been obliged already to condense my communication, now perhaps too long, though I have ample matter for twenty such Papers. In dwelling on these important disclosures, I have some claim on your forbearance. The subject is new, and has been a favourite study with me during the few years I have been in practice. My observations have been made in a limited circle, which perhaps may account for many imperfections. In truth, not having the advantage of an hospital to fly to, without neglecting my more immediate concerns, I have in many instances made an observation, and had to wait sometimes months, sometimes years, before a second similar case has occurred. I have not inserted any imaginary circumstances: I have noted what I have seen, and speak what I know.

There may be many errors in my scheme; but I have no fear that any man more learned, or any man with greater opportunities of proving the general truths of this



discovery will triumph over me while detecting these errors. It will be kinder to the public, more beneficial to science, and more honourable to himself, to correct with gentleness any minor defects: for I feel convinced in my own mind that he cannot overturn the general and broad principles of the diagnostic marks upon the tongue. Faults may be found—I have said there may—but I believe the groundwork to be founded on truth; and if I have had the happiness of making only a groundwork, this mere skeleton plan of an addition to our present knowledge, I shall rest contented that I have done some good in the station of life in which Providence has placed me.

There are many indications which require personally pointing out to engage the eye, and instruct it to understand many of the phases and alterations which the tongue undergoes from disease, and from the effects of medicine and diet. Whilst I have been pursuing this research, I have also been endeavouring to find out the laws of Nature, so as to assist, and not oppose her. This has led me to consider in what Vitality consists, and how far it is dependent on the chemical forces? What health really is as a *cause*, and not as an *effect*; what the laws are which uphold it; and what the changes are which first cause a departure from its regularity? What those diseases are which supervene, and how they are to be remedied? If they run a certain course, what is that course; and if by certain exciting causes, acting on these latent and proximate causes, what class of disease will naturally follow?

Imperfect as I know such a Paper as this must be, in which so large a subject is crammed and crowded into so small a space, I have no hesitation in saying that, though discussion may be useful, it would be almost superfluous, until my further observations are superadded.



It is my intention, as early as possible, to bring forward "An Inquiry into Past and Present Theories and Systems of Medicine," in which I shall make known to the Profession at large the discovery of a new membrane, which will considerably strengthen my arguments, and show how much we are dependent on what we make in the decomposition and appropriation of our own tissues ; and particularly how much infant life is supported in this way by one of those wise institutions of Providence, which to know is to admire ; and how old age is upheld and supported by laws, which, if not exactly similar, have the same wise end. The contemplated treatise will clear up many points which may appear dark in this short communication ; and, I trust, go far to strengthen the philosophy of the treatment of disease by the present administration of those remedial agents which have been found to do good, but which are handed down to us more as the result of experience than of philosophical induction.

Important truths are only to be elicited by a great expenditure of time and patience ; and he is the wisest man who spends them liberally and ungrudgingly, when they are paid down for a good purpose—to add to Knowledge, and benefit Mankind.







DESCRIPTION OF THE PLATES.

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PLATE I.

*Fig. 1.*

Mathematical division of the Tongue.

*Fig. 2.*

Longitudinal and transverse division of the Tongue.

*Fig. 3.*

Longitudinal division of the Tongue.

PLATE II.

*Fig. 4.*

Transverse division of the Tongue.

*Fig. 5.*

Conic division of the Tongue.

*Fig. 6.*

Gustatory and motor division of the Tongue.

*Fig. 10.*

The Dyspeptic Tongue receiving impressions of the lower teeth. The dotted line shows the natural size of the organ.

## PLATE III.

*Fig. 7.*

Epiglottis, mucous follicles of cornua, foramen cœcum, mucous follicles, and muscles of the Tongue.

*Fig. 8.*

Gustatory papillæ of the Tongue.

*Fig. 9.*

Limace candidissima of Ferrusac.

## PLATE IV.

*Fig. 11.*

The rugæ, or serrated edges of the Tongue occurring in congestion of the membranes of the brain, the effects of which are headaches, vertigo, &c.

*Fig. 12.*

The wide or Rheumatic Tongue. The dotted line shows the natural size of the organ.



*Fig. 13.*

The pointed Tongue of Fever and Inflammation. The dotted line shows the natural size of the organ.

*Fig. 14.*

The longitudinally fissured Tongue, indicating dilatation of the heart and effects of irregular circulation of the currents of the blood. The longitudinally dotted lines show the situation of these fissures: the circular dotted lines show the natural size of the organ.

## PLATE V.

*Fig. 15.*

The longitudinally and transversely chapped, fissured, and sulcated Tongue, indicating dilatation and hypertrophy of the heart and effects of irregular circulation of the currents of the blood. The longitudinal and circular dotted lines show the situation of these fissures: the circular dotted lines show also the natural size of the organ.

*Fig. 16.*

Laws of the Fouling of the Tongue, from the posterior to the anterior part, from edge to edge.

*Fig. 17.*

Laws of the Cleaning of the Tongue, from the anterior to the posterior part, in a more pointed cone-shape than in fouling, and leaving the edges.

*Fig. 18.*

Laws of the cleaning of each apportionment of the Tongue, *viz.* of the edges, the laterals, and centre laterals.

## PLATE VI.

*Fig. 19.*

The natural Tongue of the new-born infant: the laws of Fouling by a white cone from edge to edge; and the laws of Cleaning in pointed or in deep cones, leaving the edges: also, the effect disease has on the under edges of the anterior fourth of the organ.



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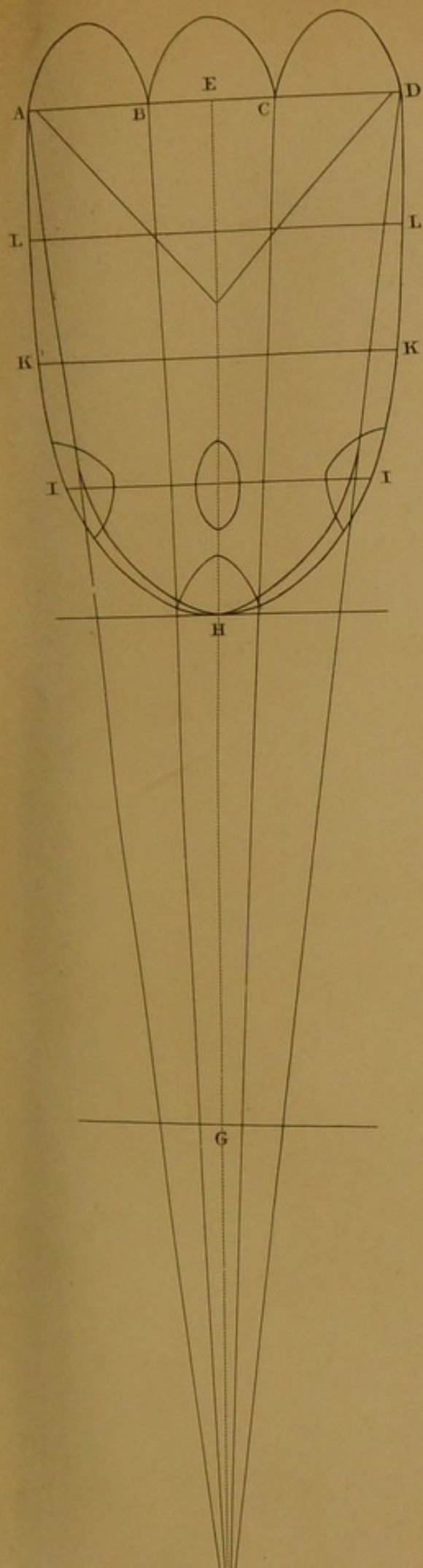


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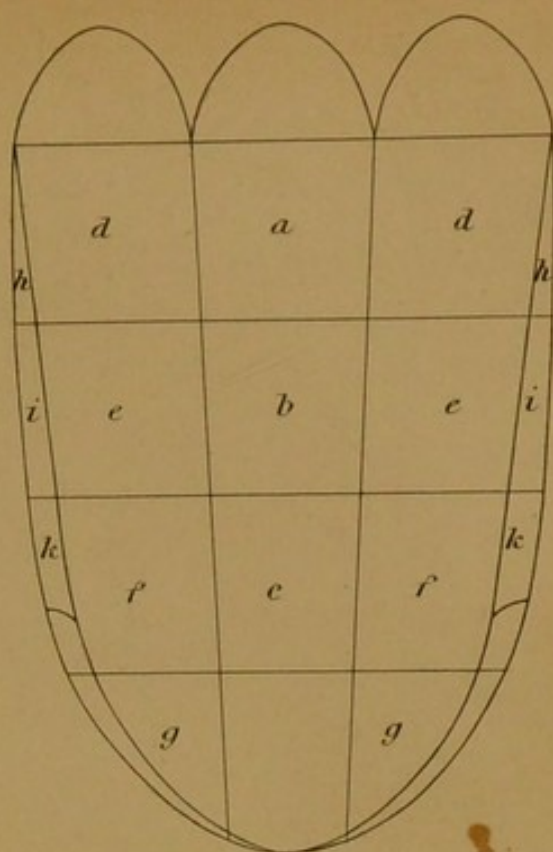
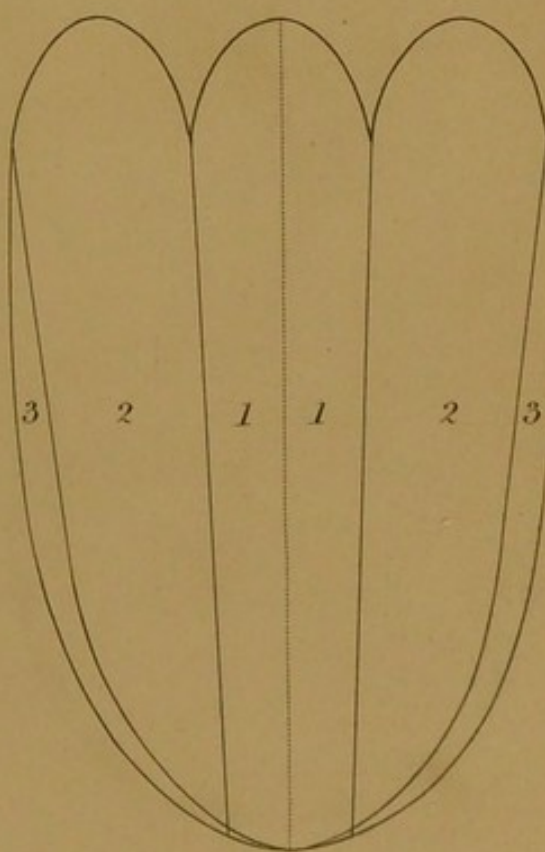


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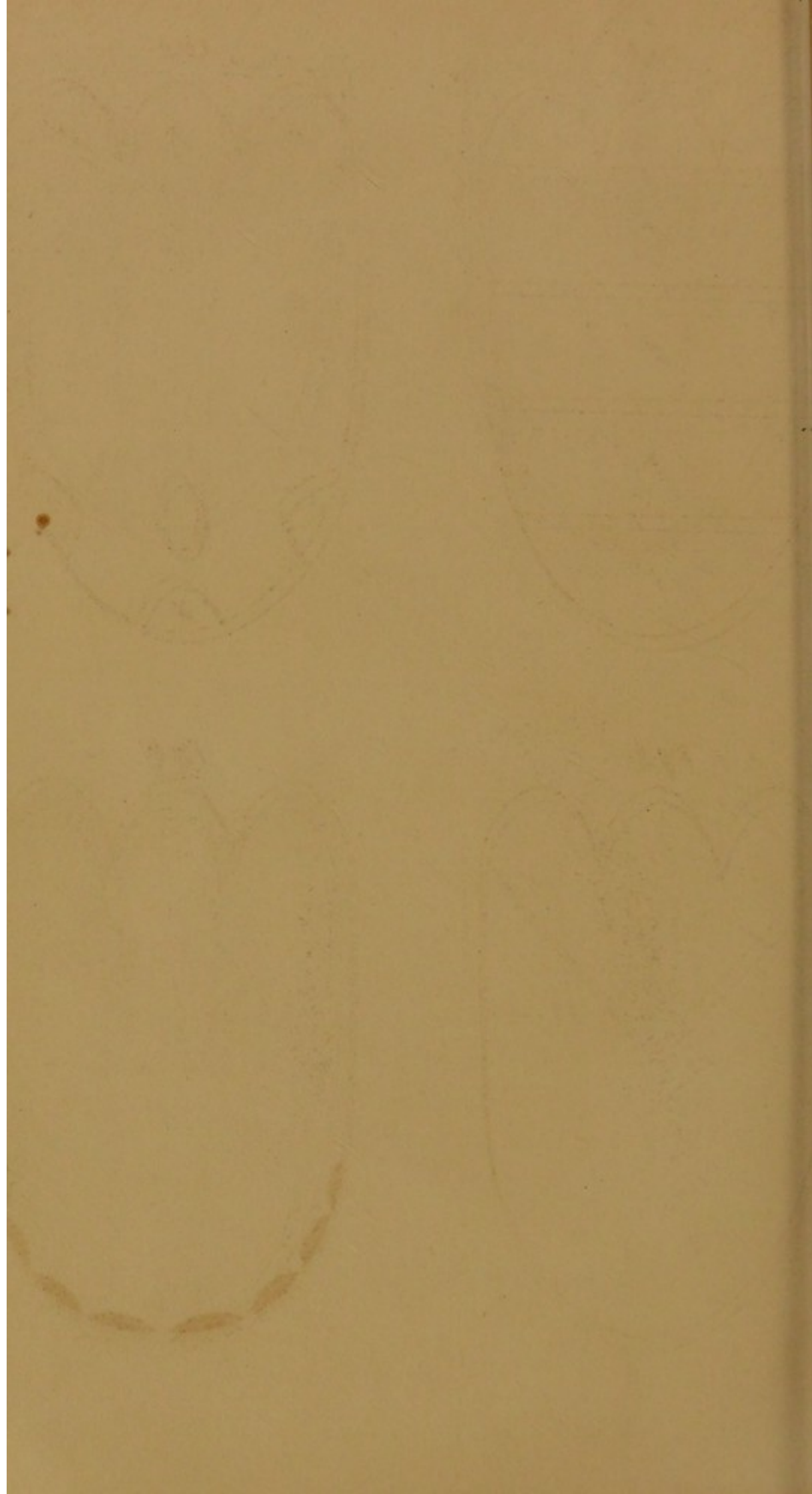




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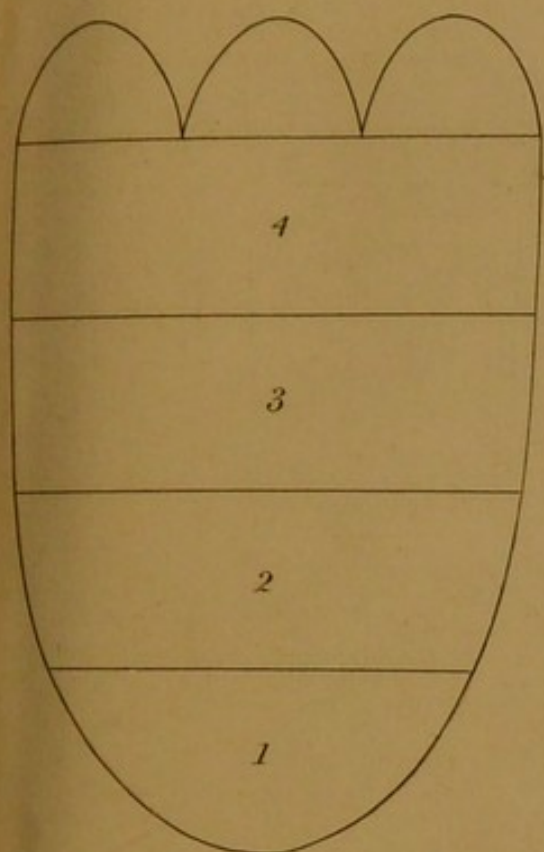


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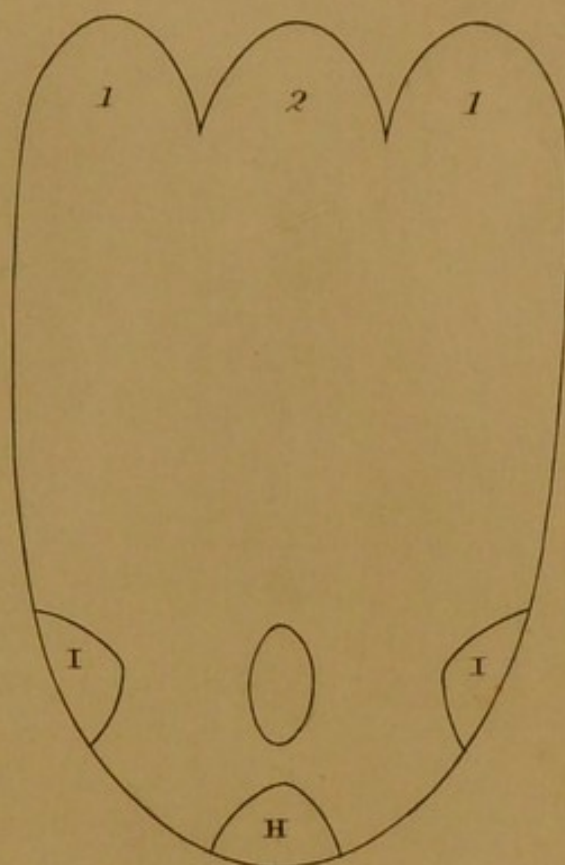


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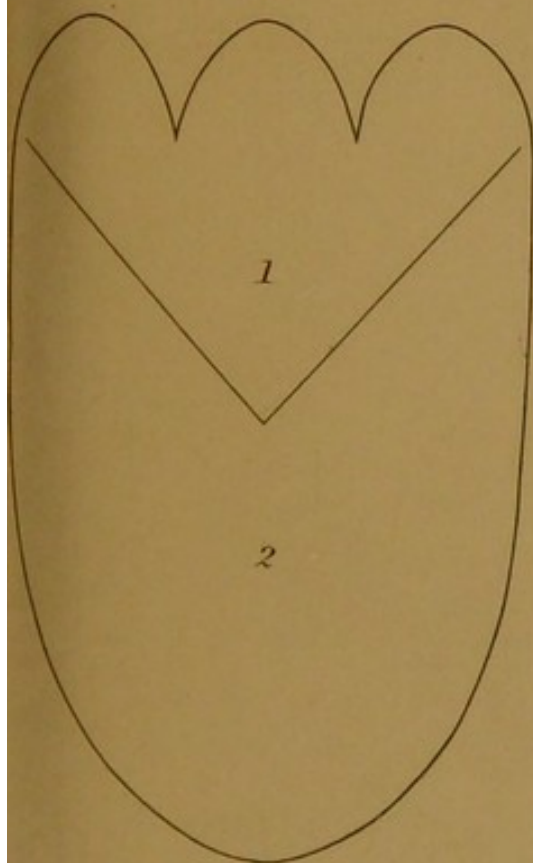


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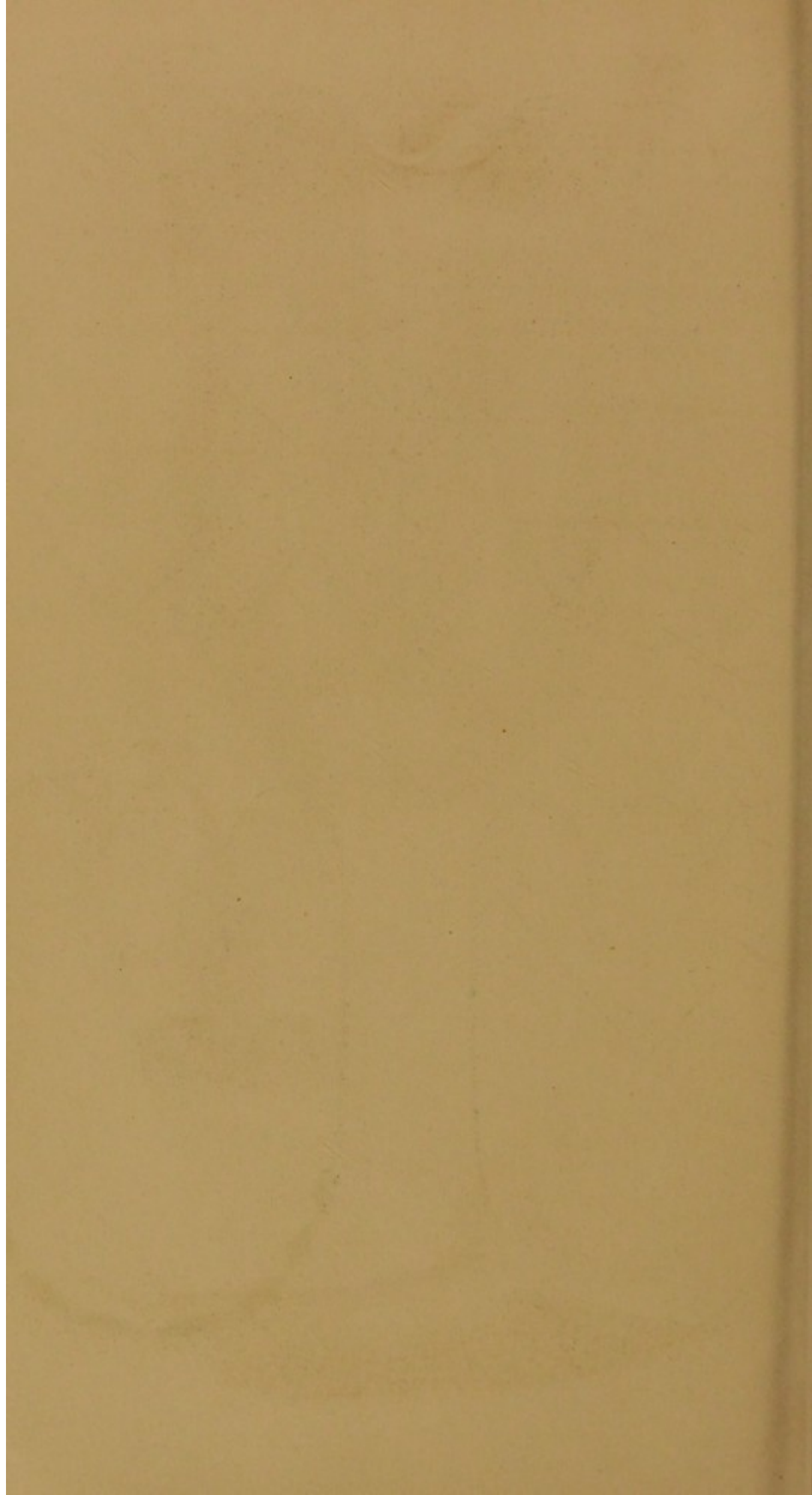




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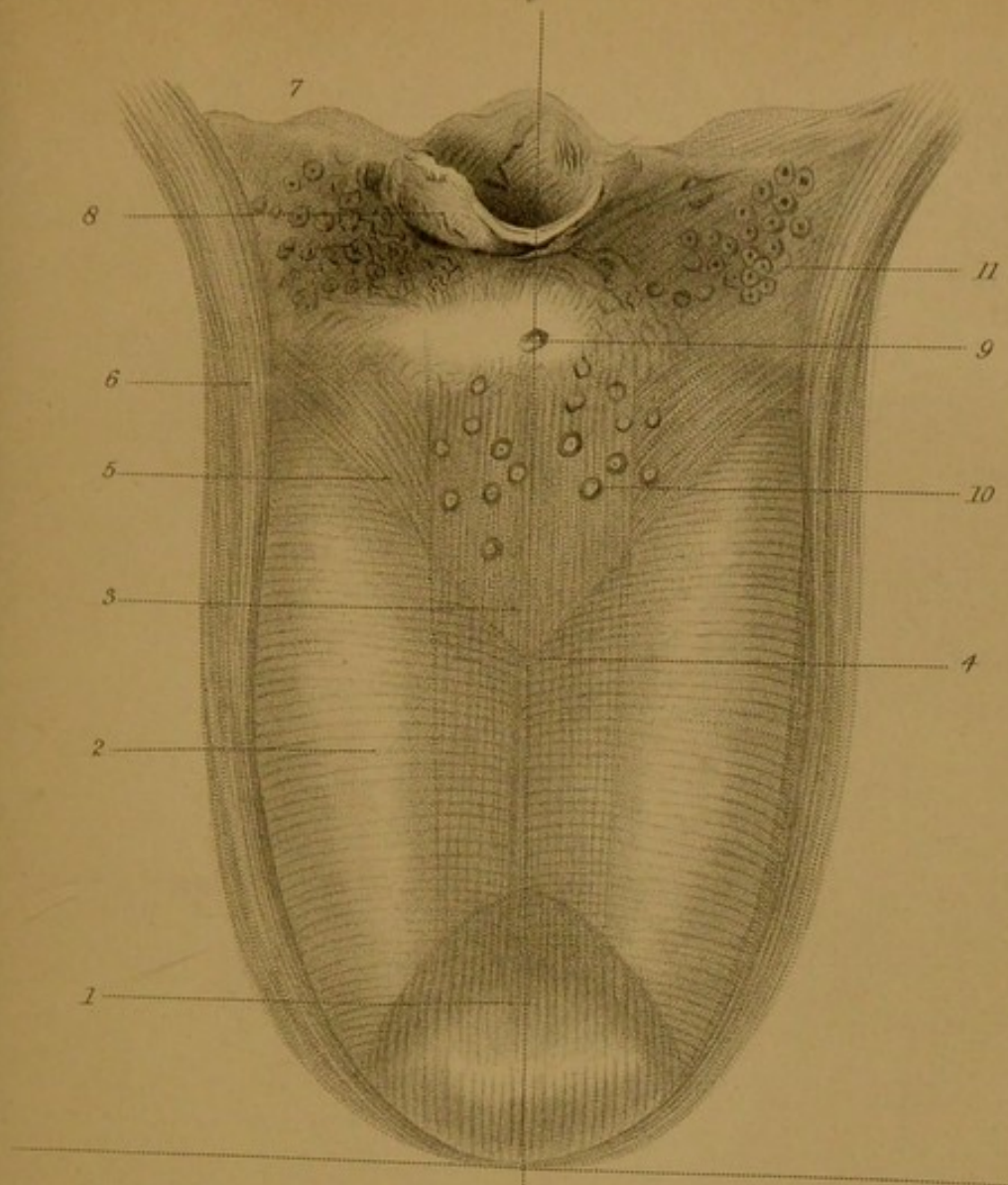


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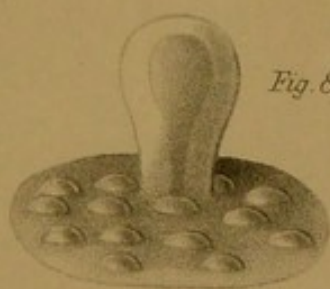
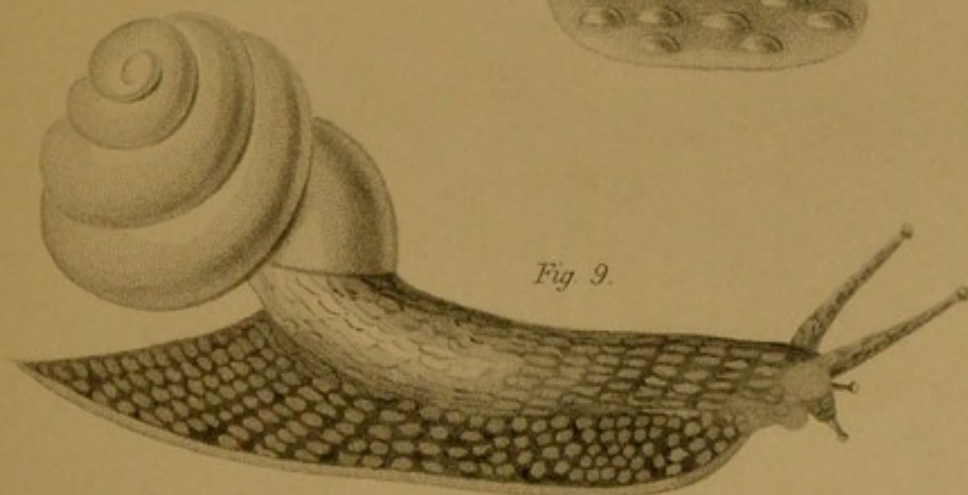
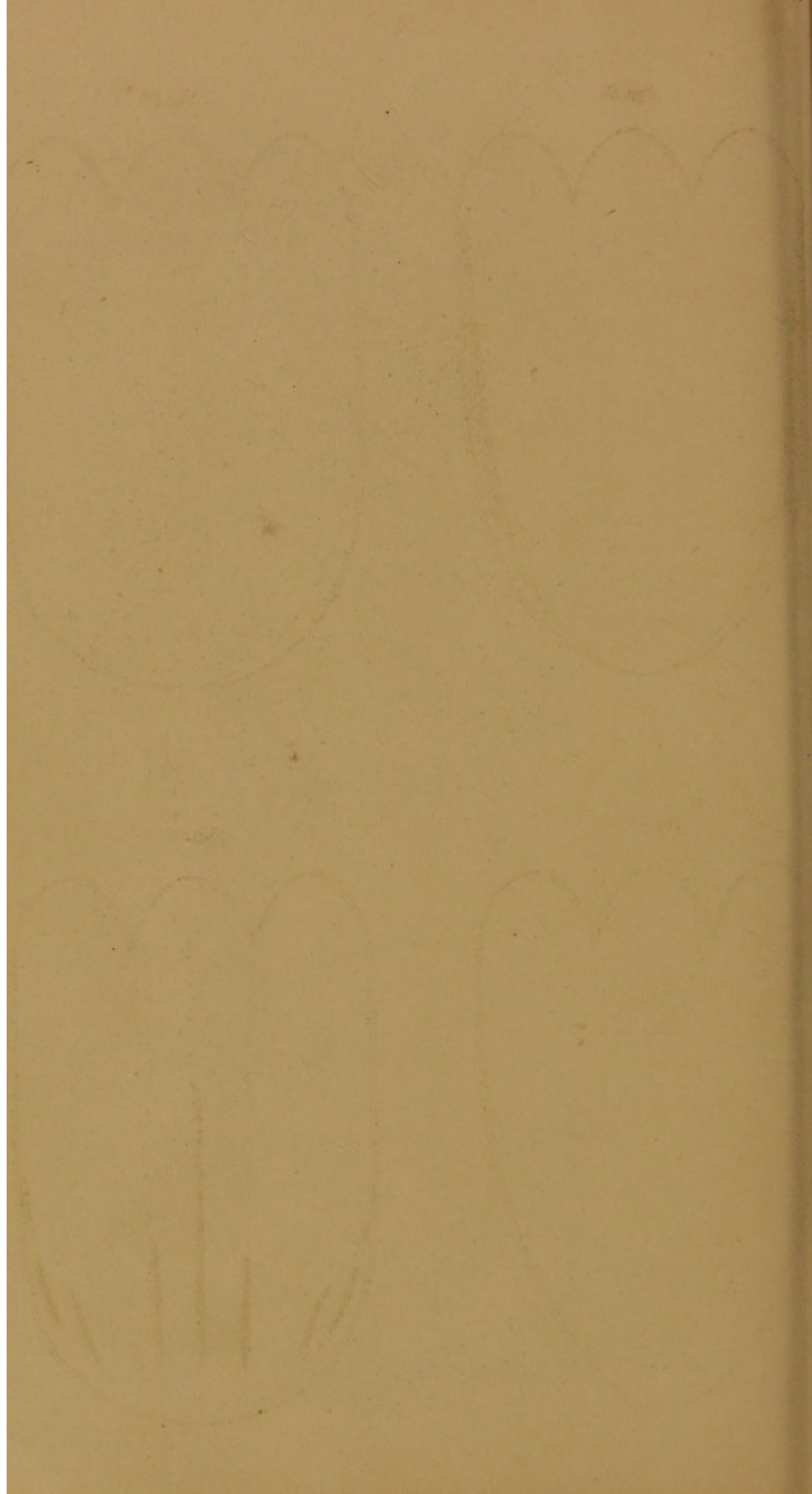


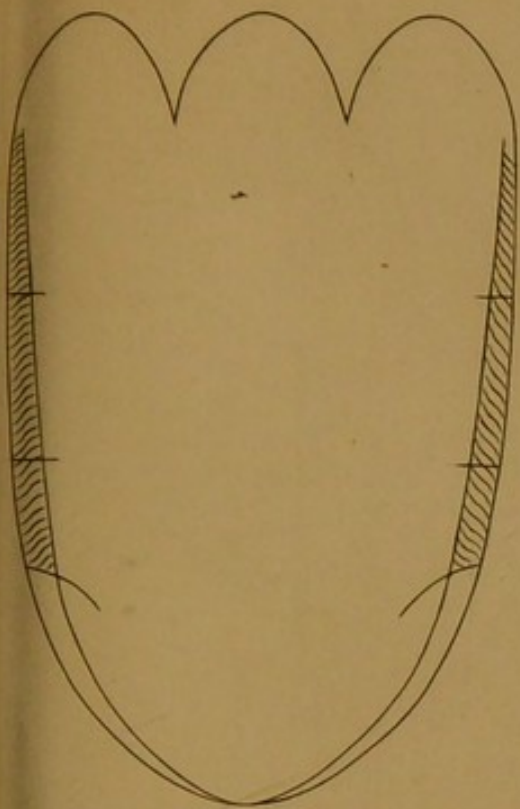
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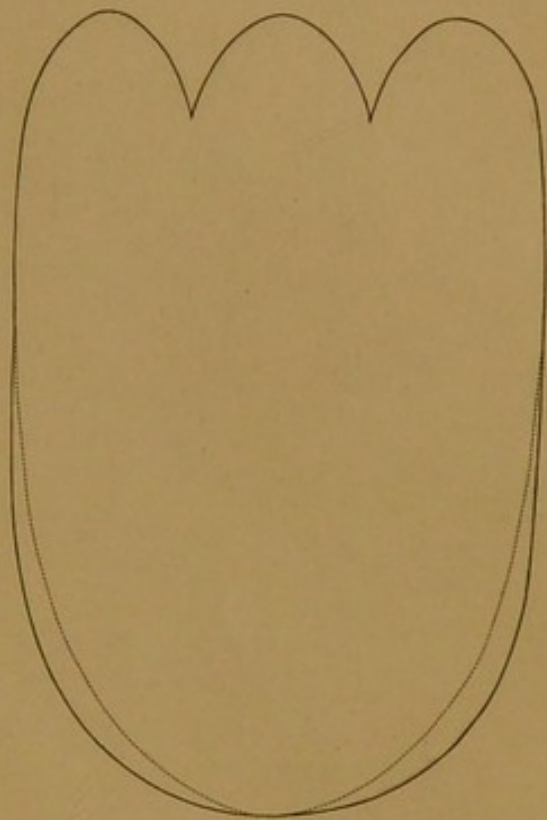




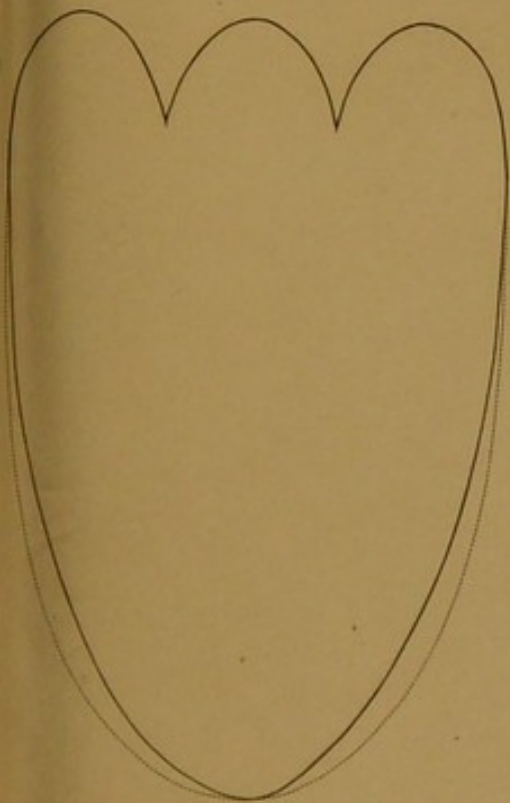
*Fig. 11.*



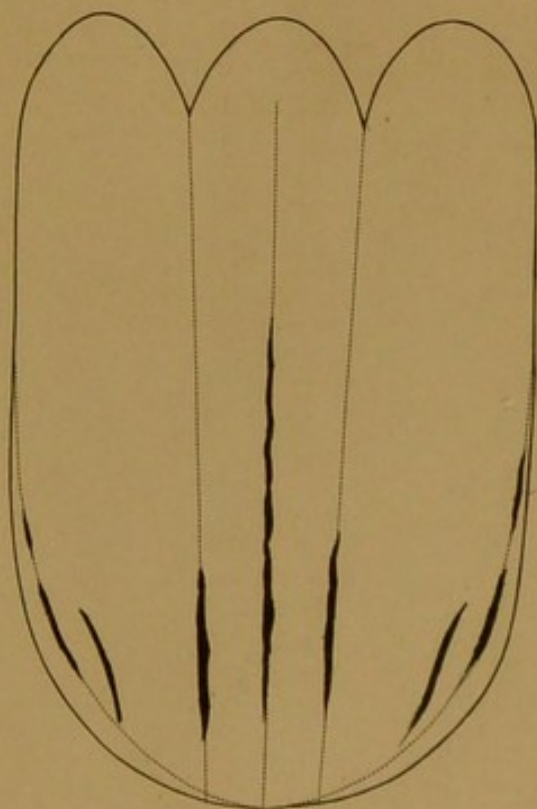
*Fig. 12.*



*Fig. 13.*



*Fig. 14.*



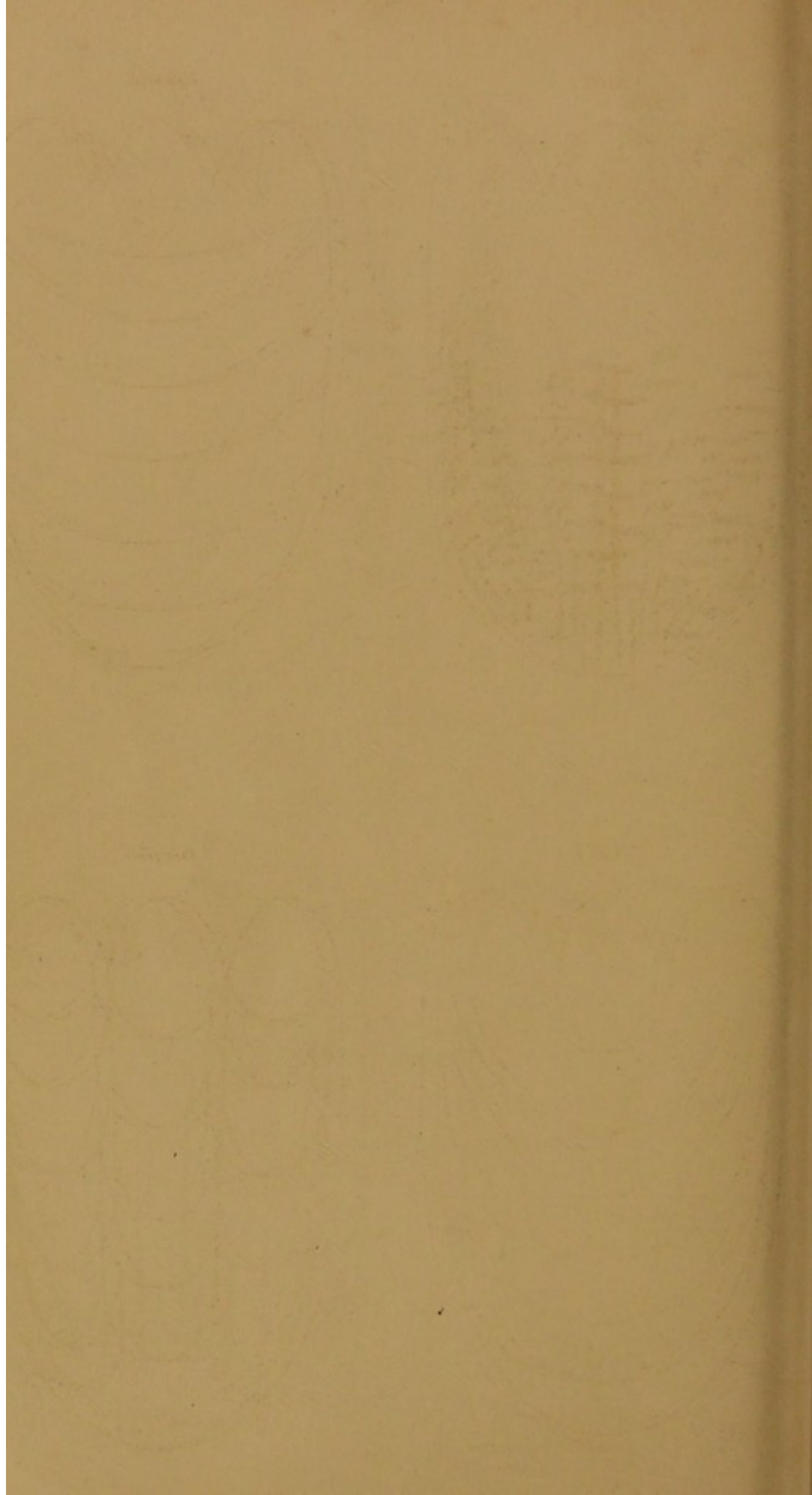




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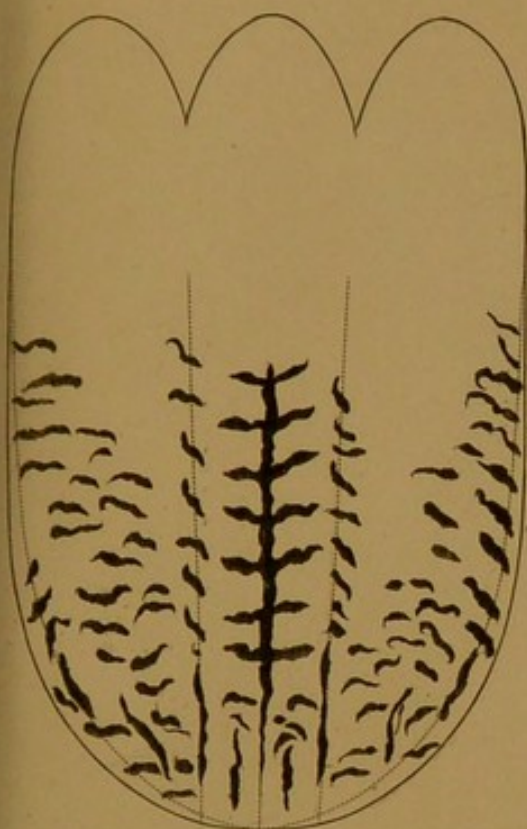


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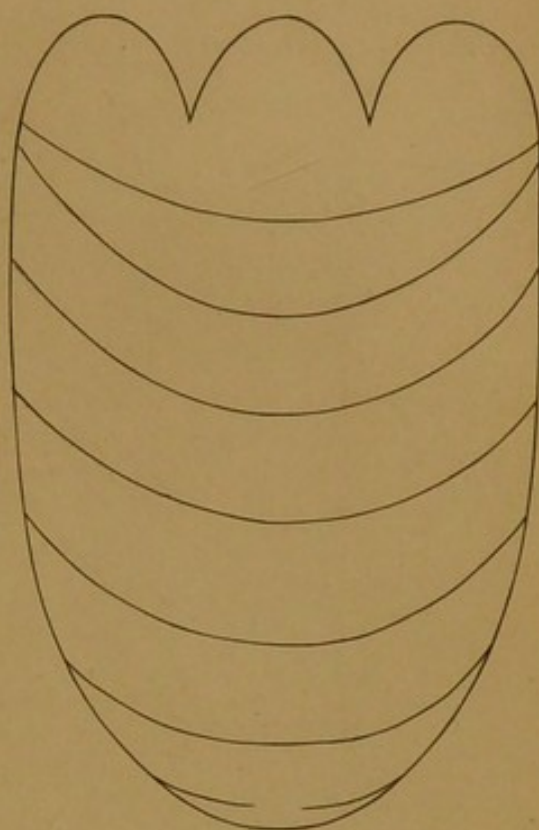


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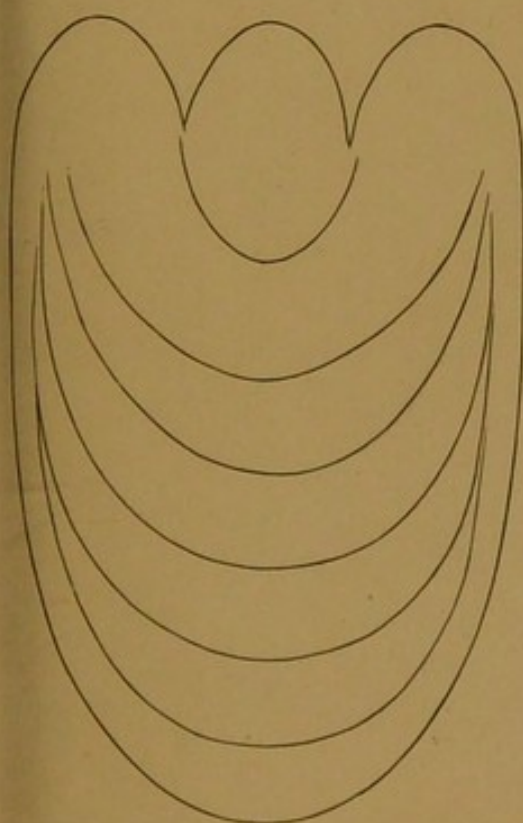


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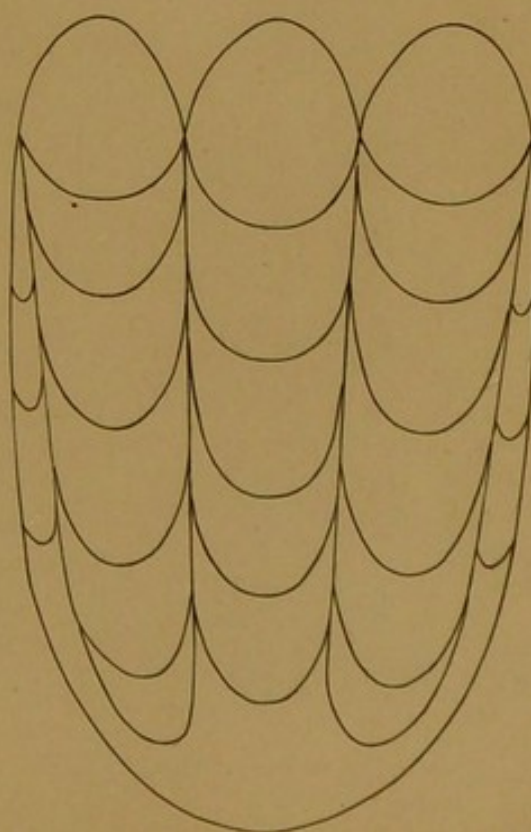
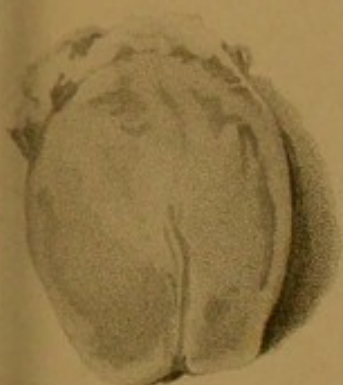




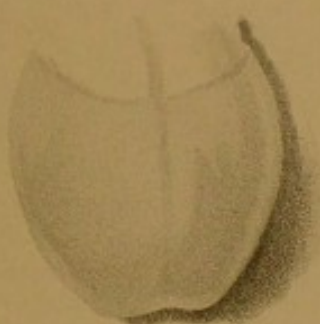


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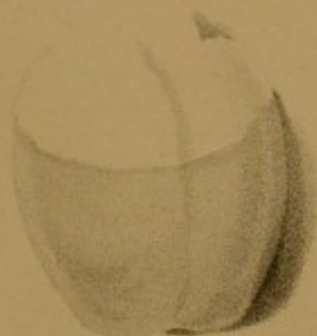
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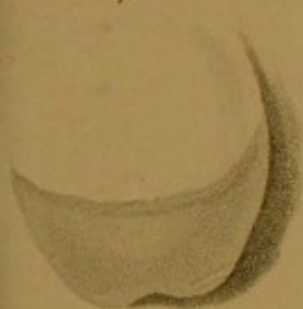
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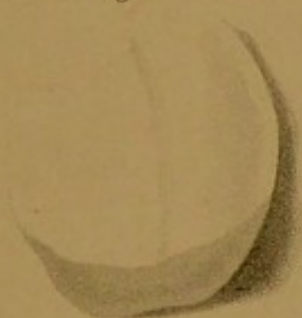
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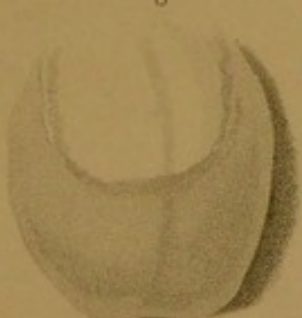
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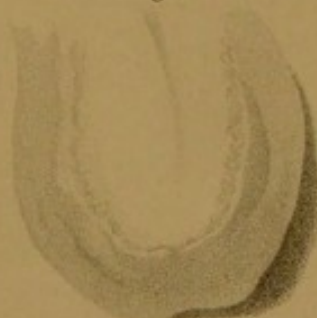
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