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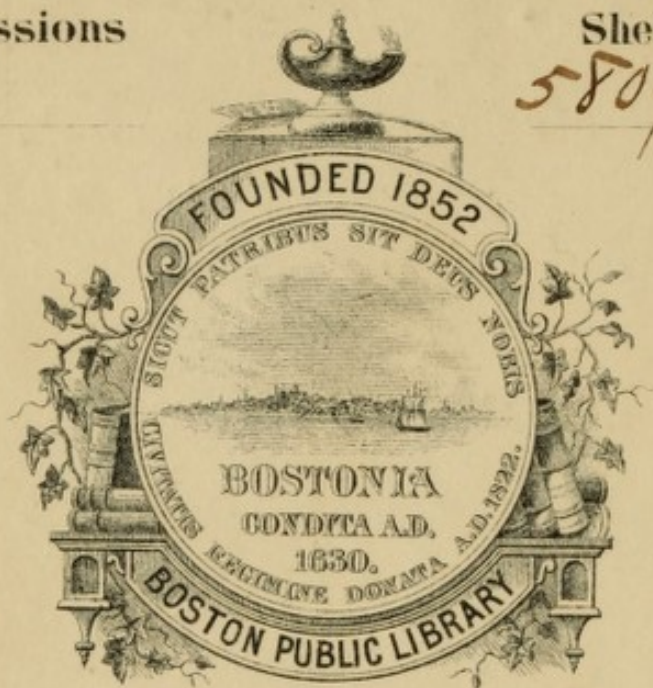
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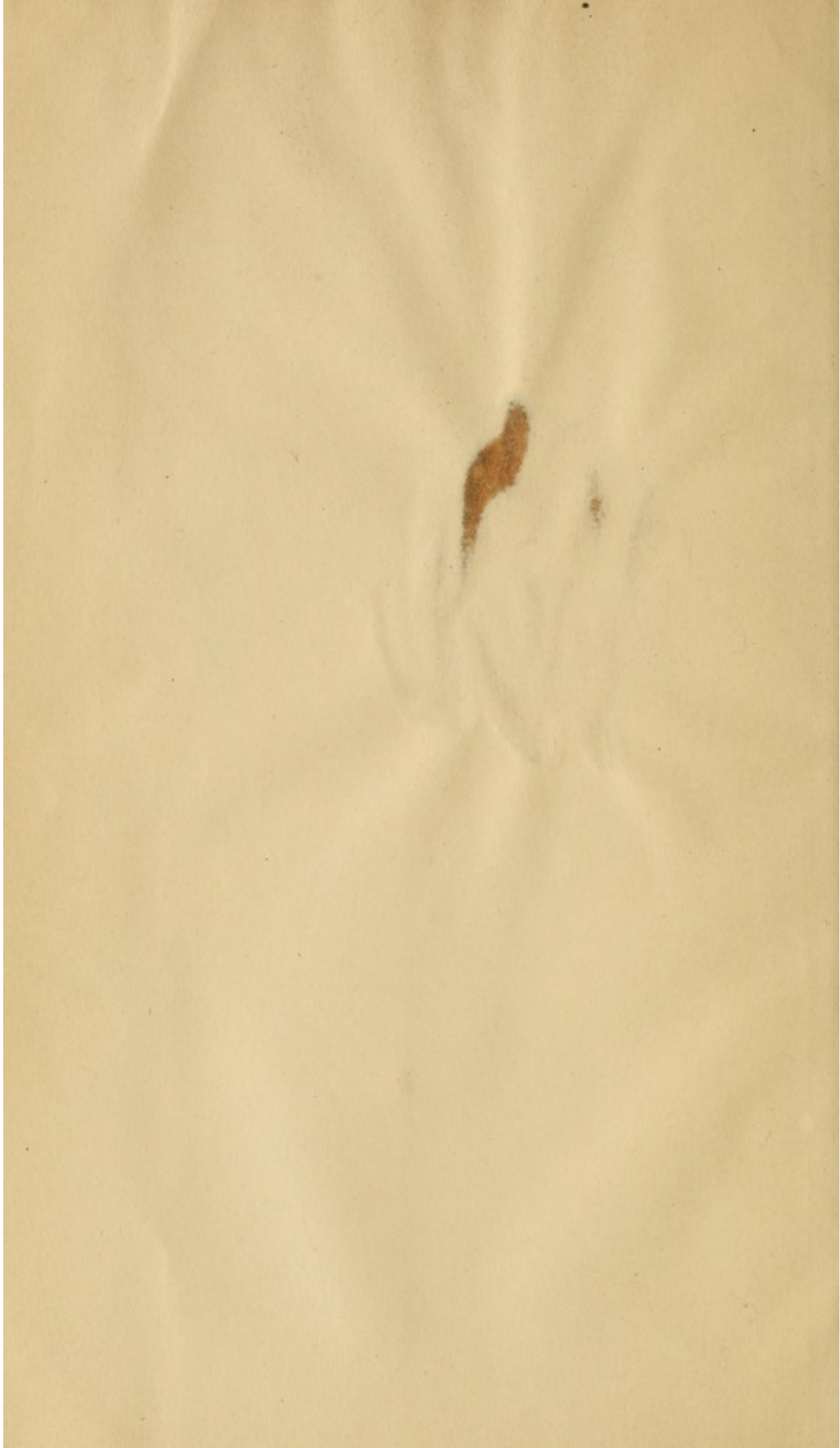
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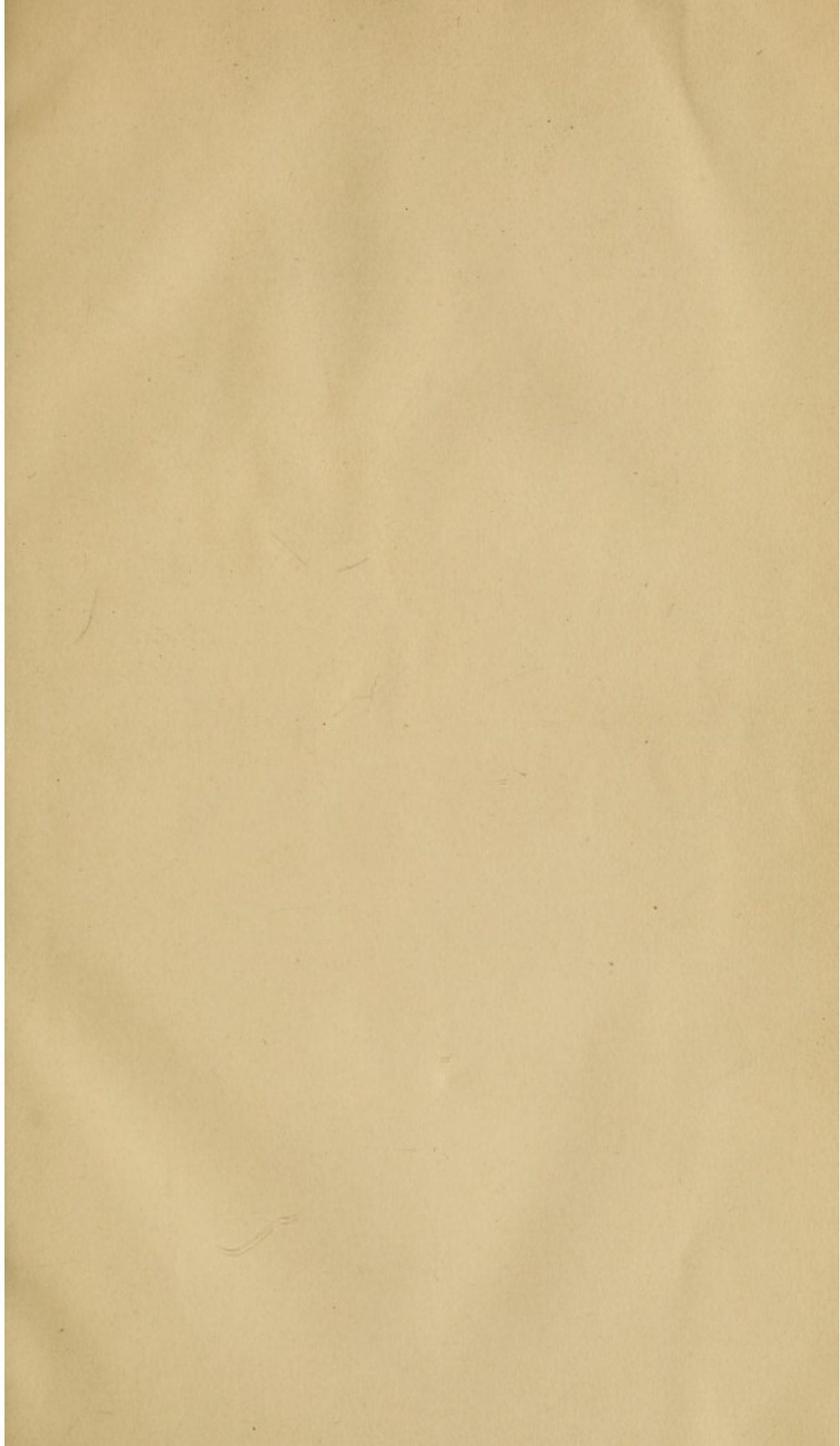
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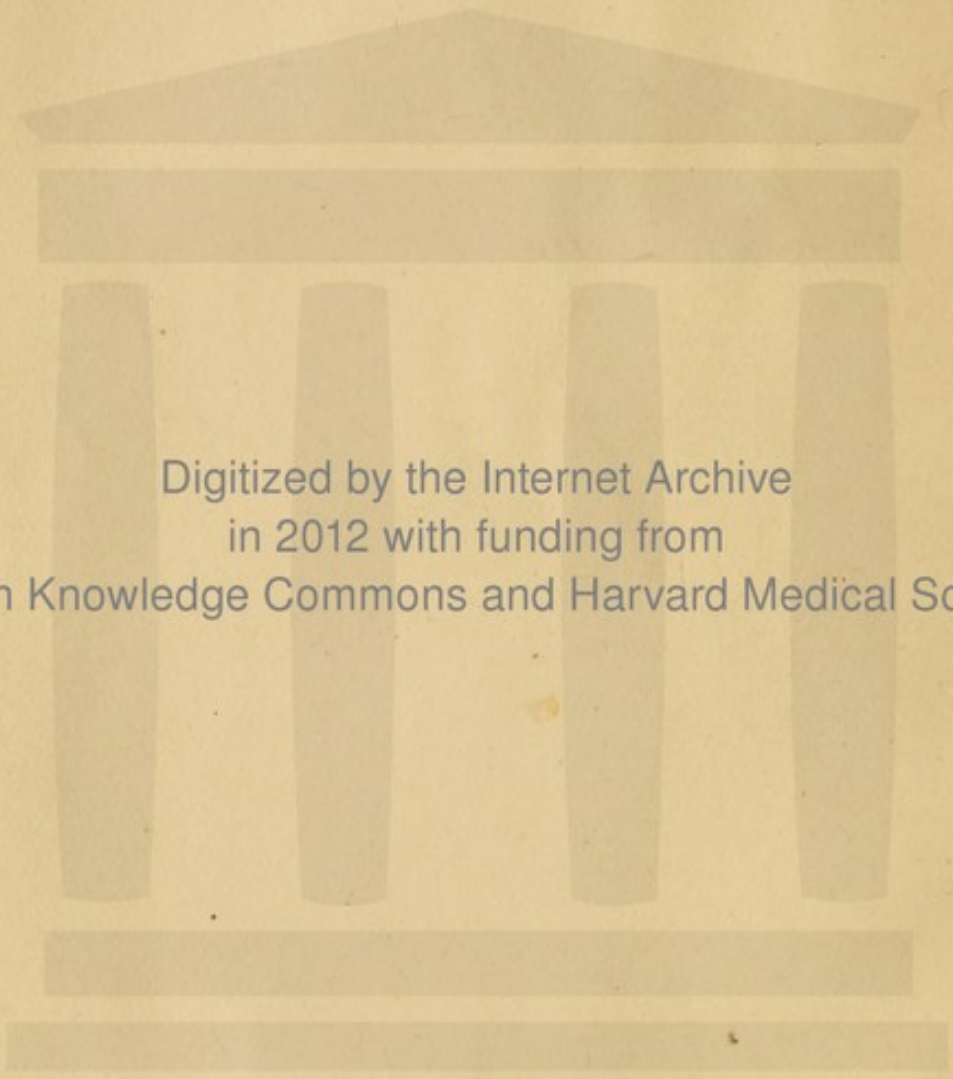
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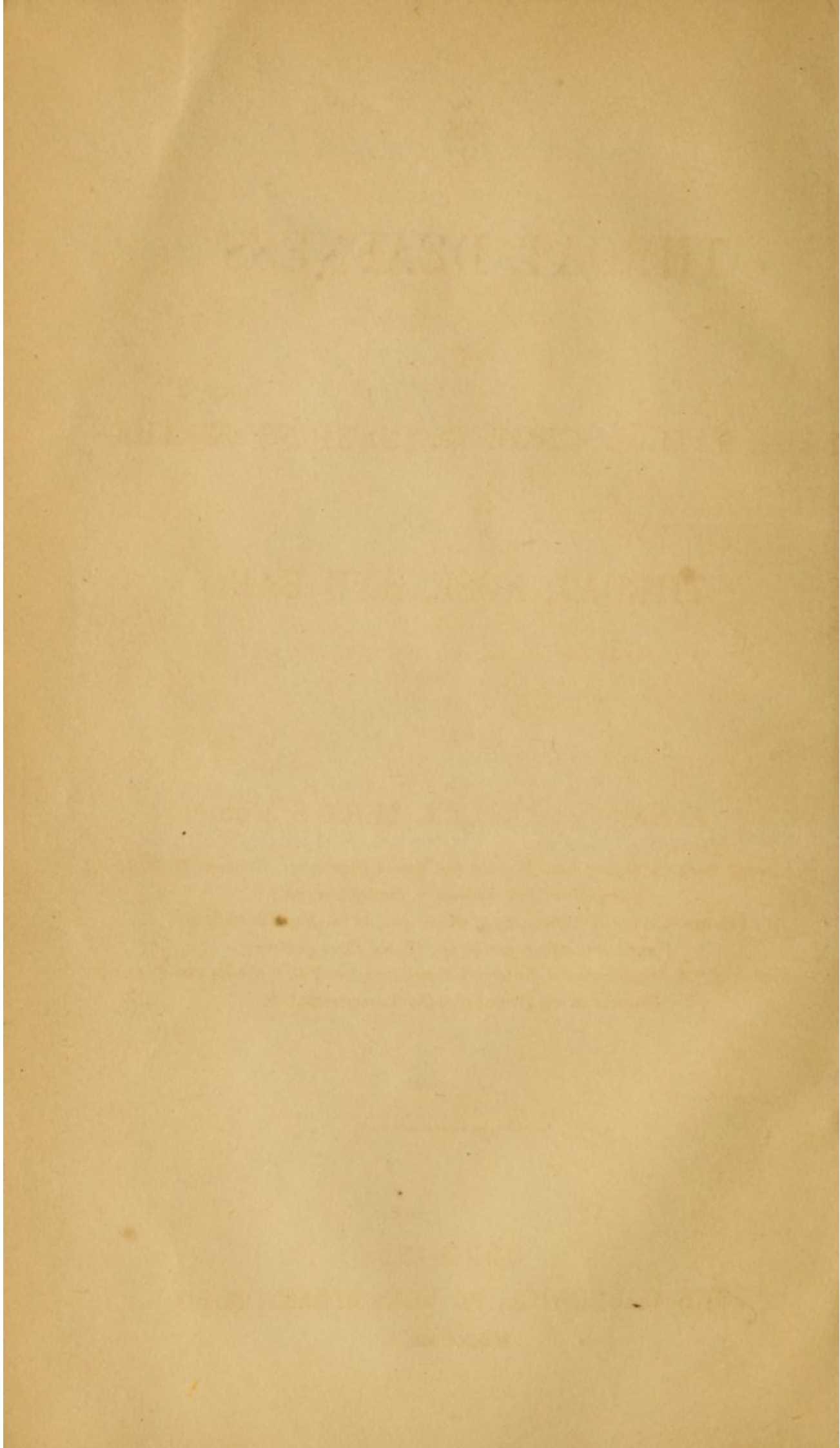




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London Sept. 6, 1853

From Doct^r Mearnsley -



ON
THROAT DEAFNESS

AND

THE PATHOLOGICAL CONNEXIONS OF THE
THROAT, NOSE, AND EAR.

BY

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Henry R. Dalton

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P R E F A C E.

THE following pages are reprinted from my larger work entitled "Deafness Practically Illustrated," which has now reached its fourth edition. Twelve years have passed since I first drew the attention of the profession and the public to the intimate connexion between the throat and ear in the following words:—"Almost all diseases of the ear, associated with deafness, originate in a morbid condition of the mucous membrane of the throat, nose, and ear, which becomes affected from a variety of causes, among which cold, the eruptive fevers or exanthemata, especially scarlatina, and stomach derangement, stand pre-eminent, and according as the disease terminates in simple thickening of the membrane, in adhesions, in partial or total loss of the membrana tympani, in disorganisation of the whole mucous lining, in loss of the ossicula or of the inner membrane of the fenestræ, so is the deafness more or less intense and confirmed."

Notwithstanding this plain, unvarnished explanation of the cause of deafness, confirmed by experience in many thousands of cases, which has been propounded in medical periodicals and in my published works for upwards of twelve years, and never even attempted to be controverted, we still hear of ear-drops and lubricating fluids, such as glycerine, almond oil, &c., to be applied to the outer passages of the ear for the cure of deafness! Such monstrous absurdities and unblushing quackery, it is confidently believed will be effectually exposed by a careful perusal of the following pages.

THE AUTHOR.

London, 15, Savile-Row,

June, 1852.

ON THE PATHOLOGICAL CONNEXIONS OF THE THROAT AND EAR.

DEAFNESS, arising from a disordered condition of the throat, though of such frequent occurrence, had attracted so little attention prior to the publication of my first contribution to Aural Surgery,* that many persons, both in and out of the profession, were inclined to ask, "What relation there could possibly be between the throat and the ear?" and "How could a diseased state of the one organ affect the functions of the other?" Though this connexion may not, at the first glance, be evident, it is, in reality, so intimate, constant, and reciprocal, that no observant practitioner could possibly devote himself to the study of the one without being drawn to the examination of the other. In my own practice, I feel bound to declare, that in the diagnosis and treatment of affections of the throat and ear, they have shed a mutual light, the one on the other, conducing in an especial manner to their more successful management.

The connexion between the throat and the ear, in their morbid conditions, admits of description under three natural divisions:—

* "Deafness successfully treated through the Passages leading from the Throat to the Ear."

1. The mechanical relation between the two parts, arising out of the necessity which exists in perfect hearing, that the free circulation of air through the Eustachian tube, and in the tympanum, be maintained.

2. The connexion between the throat and ear caused by contiguity and continuity of structure through the medium of the mucous membrane.

3. The sympathetic connexion between the nerves of the throat and those of the auditory organ.

I. THE MECHANICAL RELATION BETWEEN THE TWO PARTS, ARISING OUT OF THE NECESSITY WHICH EXISTS IN PERFECT HEARING, THAT THE FREE CIRCULATION OF AIR THROUGH THE EUSTACHIAN TUBE, AND IN THE TYMPANUM, BE MAINTAINED.

1. The most obvious relation between the throat and ear is that dependent on mechanical causes; yet it is a singular fact, and shows how little of scientific attention has been given to aural diseases, that the mode of removal of the most simple kind of obstruction of the Eustachian tube—namely, by Eustachian catheterism—is a remedial agent of comparatively recent introduction.

From whatever cause arising, an obstructed communication between the throat and ear is inevitably productive of deafness. When deafness of this kind exists, it can only be completely cured by the de-obstruction of the Eustachian canal. The cases laid down as curable by the operation of puncturing the membrana tympani, without interference with the tube,

are extremely rare; that is to say, cases in which complete obliteration of the passage exists. Even under this rare contingency, the cure is often partial or temporary. Deafness ensues under all circumstances of obstruction or occlusion, simply because when the tube is stopped, the atmospheric pressure is withdrawn from the inner surface of the membrane. When the internal atmospheric pressure is present within the cavity of the tympanum, which it is in the healthy condition, on account of the open state of the Eustachian canal, it of course exactly serves to counterbalance the pressure on the external surface of the drum, leaving the membrane to be adjusted in the proper degree of tension for the purposes of hearing, through the medium of the small muscles of the tympanum and the ossicula. When the internal pressure is withdrawn by occlusion of the Eustachian tube, the external atmospheric pressure alone remains, which is sufficient to force the membrane of the drum inwards, and, by rendering it permanently tense, to put a stop to the action of the tympanic muscles, and to destroy the vibratile properties of the membrane. It is well known that a certain degree of relaxation of the membrane is necessary to ensure its vibration by the action of sound.

The communication between the throat and ear is cut off in a variety of ways. It is by no means uncommon in simple catarrh to have the tumid state of the mucous membrane of the nose and throat which attends a cold, extend into the Eustachian canal so as partially or entirely to obstruct it. In some cases, this engorged state of the mucous membrane remains after all other signs of cold have disappeared, and keeps up a permanent obstruction of hearing. Another very frequent

cause of occlusion is the secretion of a viscid mucus by the lining membrane of the tube and tympanum, which inspissates and remains in the tube, frequently for years, without any successful attempt being made to relieve it by nature alone. When the inspissated mucus is accumulated only about the trumpet-shaped extremity of the Eustachian tube, it often becomes removed, and the attendant deafness is relieved spontaneously by some sudden respiratory action. The patient, whilst yawning, sneezing, blowing the nose, or it may be vomiting, feels a sudden click or "pop," and is instantly relieved of the deafness, and of every other unpleasant sensation.

But adhesion of the sides of the tube, so as to completely obliterate a considerable portion of its length, is the most serious of the affections to which this most important passage is liable; for in this case the guttural communication is probably for ever destroyed. Adhesion occurs sometimes during the course of inflammatory fevers, in the different forms of cynanche, and at other times exists as a congenital malformation. When the adhesion is limited in extent, or only implicates a part of the diameter of the tube, so as to form stricture, it may often be overcome by judicious management. The bands of adhesion may possibly be broken down, or the strictured part of the tube enlarged by gentle and repeated pressure with the aid of a small-sized silver or gum-elastic catheter, or by a stilette of whalebone or cat-gut passed through the Eustachian tube catheter. The most consummate tact (probably to be acquired only by vast experience and practice) is necessary for the success of so delicate an operation.

In all these different forms of obstruction of the

channel of communication between the ear and throat, catheterism of the guttural passage is of the utmost importance, both as a diagnostic and remedial agent.

Vomiting, the only other rational means of evacuating the tube and tympanum, is most uncertain in its action on the ear. I have met with numerous cases in which emetics had been pertinaciously tried without the slightest effect, where the simple introduction of the catheter was sufficient to remove the deafness. We have not, and never can have, anything like an equivalent for catheterism in simple obstruction of the Eustachian tube.

Another obstruction arises from a cause exterior to the tube itself, and affecting it only in a secondary manner: I mean, enlargement of the tonsil gland. The tonsils are placed in the vicinity of the Eustachian canals, and when considerably enlarged, (the enlargement extending in an upward direction,) they press on the mouths of the tubes so as to cause obstruction or occlusion. Strange to say, this has altogether been denied by several writers on Aural Surgery; but I am prepared with abundant proof in support of its truth. The fact has probably escaped the notice of others, in consequence of the enlarged tonsil not being seen on an examination of the throat. In point of fact, it must be felt for, to be detected. The inflammatory action attendant on the enlargement of the tonsil gland, produces adhesion to the arches of the palate between which it is placed, and these adhesions prevent its advancing into the area of the throat, and thus it escapes detection; were it otherwise, defective voice and speech might be the result, but not deafness. If the enlargement encroach still more on the area of the fauces,

then deglutition and respiration may become affected ; and with these of course the general health suffers deterioration, so that the tonsil glands, in a state of enlargement, give rise to a variety of derangements dependent upon the position they take up in the throat. A considerable time has elapsed since I first made known these facts to the profession, but even yet they do not appear to have attracted all the attention they demand. I am anxious to make myself clearly understood upon these points, for I flatter myself the day will come when the enunciation of such facts and opinions will be admitted to be of the utmost importance, and a step gained in the walk of science.

Having experienced the good results of excision of enlarged tonsils, or more properly speaking, morbid growths springing from the tonsil glands, in my own practice, in the various disorders mentioned, I cannot but take pride to myself also, for having been instrumental in causing this important operation to be of frequent occurrence, by disabusing the minds of medical men of the risk and danger attributed to it by authors of eminence and distinction, who, in thus condemning it, cannot have had any practical experience of the subject.

Excision is the only remedy to be depended upon in certain cases, and when performed in a proper manner, I know of no other treatment in the whole range of aural surgery, so uniformly, extensively, and permanently successful. It is worthy of remark, too, that there is scarcely any more frequent cause of deafness in this country than tonsillary enlargement. This mechanical interference with the function of the ear is extremely prevalent among children and young persons.

Sometimes the enlargements are not sufficient to encroach on the mouths of the Eustachian tubes, but the irritation they keep up causes the orifices to be covered by a thick tenacious mucus. Patients in such cases, when the mucus by some accident is removed, hear perfectly for a time, but as soon as the mucus re-accumulates, the hearing is again affected.

There is yet another probable cause of mechanical obstruction of the mouth of the Eustachian tube, occurring in persons of middle and advanced life—persons who have suffered much from dyspepsia, as the result of improprieties of diet—from mental anxiety, or from general debility. In these cases, a relaxed condition of the mucous membrane of the throat is observable. It is seen hanging loose and flabby, and, as it were, in folds. Here I have sometimes suspected an overlapping of the mouths of the Eustachian tubes by the loose mucous membrane, and the results of treatment have occasionally justified the opinion I had formed; for shortly after excision of a small slip of mucous membrane from underneath the arches of the palate, amendment, more or less considerable, has taken place.

These, then, are the chief modes in which a mechanical obstruction between the throat and ear is produced so as to occasion deafness, and also the principal means of relieving the morbid conditions on which the loss of hearing depends.

II. THE CONNEXION BETWEEN THE THROAT AND EAR
CAUSED BY CONTIGUITY AND CONTINUITY OF STRUC-
TURE THROUGH THE MEDIUM OF THE MUCOUS MEM-
BRANE.

2. The next form of connexion between the throat and ear, in aural disease, is that which occurs in the spread of disease from the guttural to the aural mucous membrane. I believe it to be rare that any case of deafness proceeds from the first failure of hearing to severe deprivation of the sense without this connexion coming into play in an important manner, and yet the fact has been completely overlooked. In no published work on Deafness is it even hinted at. In former publications, I have shown that the two parts are connected in diseased states through the medium of the mucous membrane, which lines alike the throat and auditory organ; and I pointed out that when the mucous membrane of the ear is in a morbid condition, we may often effect its cure by applying remedies to the kindred mucous surface in the throat.

I have, throughout my entire practice in aural medicine and surgery, warred against that excuse for the ignorance of aurists—that bugbear behind which they have cloaked their inane treatment—namely *nervous deafness*. By a close examination of disease, by dissection, by physiological facts, and by the action of remedial agents, extending altogether over a great number of cases, I have satisfied myself that nervous deafness is a very rare disease; that is to say, the loss of hearing from disease, torpor, or inactivity of the auditory nerve, the different parts of the external,

middle, and internal ear, comprising the osseous canals, strata of air and liquid, bones, muscles, membranes, and secretions, which form media for the transmission of sound to the nerve of sense, all remaining in a healthy condition. On the other hand, I have contended that the majority of those cases heretofore set down, from insufficient or unskilful diagnosis, as nervous deafness, are in reality dependent on a diseased state of the mucous membrane of the middle ear.

In my Fourth Contribution to Aural Surgery, I stated distinctly that more than two-thirds of all cases of deafness arose out of morbid conditions of the mucous membrane of the ear; and I gave a Statistical Table, showing the mode by which this state of the mucous membrane was produced in 2000 cases, treated at the Institution and in private practice under my care. In 120 dissections of deaf cases, the aural mucous membrane was diseased in no less than ninety-one cases, or upwards of three-fourths of the number examined. This result affords a remarkable corroboration of the novel views of the nature and treatment of deafness previously developed by me on various occasions, particularly in a series of papers published in the *Medical Gazette* of the Session 1841-2.

The continuity and contiguity of the mucous membrane of the throat and ear offer one natural and easy solution of the mode of the connexion observed between diseases of the two parts. The distance from the throat to the tympanal chamber of the ear, by way of the Eustachian tube, is somewhat less than two inches, there being in the natural state a free surface of mucous membrane extending uninterruptedly through the tube between the two parts. Can we wonder, then, that

disease in one spot should be transmitted with the utmost facility to the other in which the same anatomical elements exist? We see daily instances of catarrh extending from the nose to the ophthalmic mucous surface and the membrane lining the frontal sinuses, and from these points it often travels, in less than twenty-four hours, to the ultimate mucous cells of the lungs, or through the whole length of the intestinal canal, distances compared with which, that between the throat and ear is quite insignificant.

Among the most remarkable instances of the spread of a morbid condition from the throat to the ear, by the track of the mucous membrane, are cases of aural disturbance and deafness occurring in the course of the exanthemata, small-pox, scarlatina, and measles, in all of which, throat disorder is an early and a prominent symptom. Deafness is well known to be a common symptom of the eruptive fevers; the congestion and inflammation speedily extend to the Eustachian tube and tympanum, occasioning severe pain in the ear, and deafness, from the alteration caused in the capacity of the *cavitas tympani*, by the engorged membrane.

Unfortunately, in the case of the exanthemata, the decline of the general disease is not always accompanied by restoration of the healthy state to the guttural and aural mucous surfaces. The cavity of the tympanum is so limited in extent, that any morbid change in its lining mucous membrane, however slight, interferes with the free action of the tympanal apparatus, and consequently with the ready transmission of sound. These changes have in themselves little tendency to disappear, unless assisted by

art. The ear, indeed, beyond almost any organ of the body, is peculiarly inapt to throw off any morbid condition that has once been established in its structures. By a reference to the Statistical Tables, it will be found that, out of a large number of cases, seventeen per cent. are caused by the exanthemata alone. Of these, scarlatina (in which disease the throat symptoms are more severe than in small-pox or measles), leaves more deafness than the two latter added together. The *modus agendi* is, without doubt, the accumulation of mucus in the drum, which becomes inspissated and remains sometimes fixed for life, unless removed by catheterism, or some lucky dislodgment from sneezing, vomiting, &c., or, which is still more permanent and serious, the thickening of the mucous lining of the cavity, and in some cases the adhesion and agglutination of its sides together, so as to render the deafness utterly incurable. At other times, the mucous membrane of the cavity ulcerates and erodes the membrane of the tympanum, thus setting up an *otorrhœa* very difficult of treatment, and generally destructive of acute hearing. The mucous surface secretes pus of an offensive odour, and the thickened and spongy membrane is enlarged to such a degree as to protrude through the opening of the drum, into the external passage, forming in this manner a kind of false polypus.

The uniformity with which a common cold extends from the nasal cavities and throat to the ear, along the mucous membrane, is a matter of every day observation. In common colds, the engorgement of the mucous membrane is commonly resolved in a few days, and the increased secretion of mucus is either absorbed

or expelled by way of the Eustachian tubes. Not so, however, in the endemic catarrh or influenza. Here the loss of hearing is more complete, and the morbid state of the ear remains long enough, in many cases, to destroy the efficiency of the organ.

The different forms of cynanche offer other examples of the spread or transmission of disease from the guttural to the aural mucous surface. These disorders rarely, indeed, occur without being followed in their course by ear-ache, and, more or less, inflammation within the ear, sometimes passing away at the decline of the throat disease, but quite as often settling itself in a chronic form within the ear.

As the final illustration of the extension of disease from the throat to the ear, by continuity of surface, but certainly not the least important, I may instance that kind of deafness which comes on slowly, scarcely perceptible at first, and perhaps, not measurable in its increase from year to year, still causing a painful loss of hearing, if measured by longer periods, such as five or ten years, which is caused, or at least preceded, by a relaxed and thickened state of the mucous membrane of the throat. The guttural mucous membrane seems to have grown too large for the surface on which it is laid, and thus fits loosely, hanging at the back and sides of the throat in folds, or presenting little islets of membrane protruding from the natural surface. This state of throat may take its origin from acute or chronic inflammation of the part itself, but more frequently there is little, if any, sign of increased action throughout its whole course. It may often be diagnosed, without looking into the throat, by the state of the nostrils, which are commonly tumid and red at their inner edges.

The condition of the membrane, from whatever cause arising, by extending into the ear, necessarily impedes the hearing; and in the course of years, when all induration and relaxation have left the throat, the patient still remains deaf, from the disorganization which has occurred within the ear. Thus we see many patients of forty and fifty years old, or upwards, with a tolerably healthy condition of the throat, and little appearance of physical disease of the ear, who are, nevertheless, deaf, and whose deafness has been gradually increasing in intensity for many years. On minute inquiry, these persons are often well aware of the bad state of throat, accompanied by the peculiar hacking cough which attends this form of impaired hearing, having existed many years while the deafness was advancing; but for want of a proper diagnosis, such cases generally have all chance of recovery destroyed, from having been treated by some empirical aurist, and sometimes, I am sorry to say, by some professional aurist, as pure nervous deafness, quite independent of physical disease.

Dyspeptic complaints very frequently cause a morbid condition of the throat, scarcely distinguishable from the idiopathic affection. At other times the bad state of throat is caused by, and is a symptom of, general debility. Indeed, no part of the body is more remarkable than the throat for the readiness and constancy with which it sympathises with the state of the general health.

It must be borne in mind, as of paramount importance, that in the great majority of these cases of ear disease, whether arising from the specific sore throat of the eruptive fevers, the different forms of cynanche, influenza, simple catarrh, or relaxation of the throat,

the throat disorder precedes the affection of the ear. Occasionally we find from exposure to cold, &c., the ear is the first part affected, the catarrhal symptoms subsequently extending to the throat; but these cases bear a very small proportion to the cases in which the throat disorder is the primary affection.

Besides the illustration which may thus be taken from the progress of disease, of the great dependence of ear disease on throat disorder, another series of proofs can be taken from the treatment of aural affections. From the earliest periods of medical practice, gargles have been used as remedies against deafness. These applications have for the most part been composed of astringent or stimulant substances. The actual cautery, the potassa fusa, and the nitrate of silver, are more recent applications. None of these agents can act upon the ear directly; they must of necessity produce their effects by improving the condition of the throat, and by benefiting the hearing in a secondary manner. That they are capable of improving the state of the ear, no observant aural practitioner can for a moment doubt. In my operations for the removal of enlarged tonsils, I have seen in very many cases the hearing restored in which no obstruction to the Eustachian tubes could be supposed, but where the improvement of the hearing could be explained in no other way than by supposing it to depend on an improvement caused in the mucous membrane of the throat, which in its turn improved the state of the membrane within the ears. Guided by a sound and wholesome experience, I have not hesitated, in certain cases of deafness, to remove the uvula, that is, in cases where great irritability of the throat existed, and where

the uvula gave evident signs of being the cause of the guttural irritation. This operation must, I conceive, act in the same way as those operations for tonsilotomy, in which, from the position in the enlarged tonsils, it would be impossible for them to interfere with the integrity of the Eustachian tubes. Certain persons have not hesitated to sneer at these operations; nevertheless, I believe them to be thus capable of a scientific explanation, as I know them in practice to be productive of most beneficial results. A French pathologist has lately published an account of some cases of deafness, cured by applying the actual cautery to the mucous membrane at the back of the throat—a much more severe remedy than any I have ever ventured to recommend.

Evidence such as this might be extended, so as to show the influence excited by the condition of the throat on the organ of hearing. In the instances already cited, I trust I have made it evident that, owing to the continuity of structure between the throat and ear, an injurious or a beneficial impression is rapidly transmitted by the guttural mucous membrane to the mucous membrane lining the cavity of the tympanum. It will, I have no doubt, soon come to be the general opinion, that this same mucous membrane is the principal, and generally the only tissue affected in deafness.

It has been the custom to recommend deaf persons to guard the outer ears from cold. There can be no doubt of the propriety of the recommendation, but I am persuaded that the important part of the ear (the mucous membrane) is more readily reached by way of the throat than by the external ear; so that in guarding

against cold, we should be quite as careful of the throat, as of the ear itself. Having descanted thus much on the connexion between the throat and ear through the continuous mucous surface, I proceed to point out the nature of the nervous connexion between the throat and ear, and its applicability to the explanation and relief of aural disease.

III. THE SYMPATHETIC CONNEXION BETWEEN THE NERVES OF THE THROAT AND THOSE OF THE AUDITORY ORGAN.

3. The sensation of the whole face is principally excited through the medium of the fifth pair of nerves, which is distributed extensively through the superficial parts of the face and side of the head, and which supplies the tongue, nose, and eyes, and, through its connexion with the optic ganglion, the ears. Thus it is largely connected, as the nerve of common sensation, with the four principal senses, including the organ of hearing.

Further, this important nerve supplies the throat, uvula, tonsils and soft palate, by numerous branches distributed to these several parts. It is to two of the localities supplied by the fifth or tri-facial nerve that I have now to claim attention. I have already shown that there is a mechanical connexion between the throat and ear by means of the Eustachian tube, another connexion by means of the mucous membrane extended from one to the other; and I now proceed to demonstrate, for the first time, as I believe, a third and not less obvious and important one, in the pro-

perties and functions of the nerves distributed to the two parts.

It is a remarkable quality of the great sensitive nerve of the face, that any irritation of one part of it frequently produces an irritation in other parts supplied by the same nerve. The instances of this fact are numerous. Thus, ear-ache is a very common sequence of a carious tooth; the pain of tooth-ache being reproduced, as it were, within the ear. The otalgia can be shown to be dependent on the diseased tooth, by its ceasing immediately on the extraction of the tooth. While, again, drinking cold water, exposure to cold air, or anything which increases the tooth-ache, aggravates the secondary affection excited in the ear. In neuralgic affections of the tri-facial nerve, the pain frequently extends from the locality first affected, to every part supplied with sensation by the fifth pair, including the auditory organ. Though in the first instance, pain excited in the ear in a sympathetic manner is purely nervous, yet, after having existed for a time in a severe form, it produces organic disease in the part thus affected. Thus sympathetic otalgia or nervous pain in the ear often passes on to otitis, or inflammation of the ear. But the sympathy excited in the auditory organ, through the intervention of the fifth nerve, is not confined to the branches of the fifth supplying the ear. It certainly extends to the nerve of special sense, the auditory, and probably also to the twigs of the seventh, or portio dura distributed to the tympanic muscles. As an example of this, I may adduce the effect of errhines on the ear. There can be no doubt that, in deafness from torpor of the auditory nerve, the judicious use of sternutatories stimulates

the auditory nerve and the motor nerves of the ear, the stimulus applied to the nose being communicated by sympathy to the auditory nerve. Stimulants applied to the mouth and to the salivary glands probably act in the same manner. With the older writers and practitioners in aural surgery or ear medicine, sialogogues formed a favourite class of remedies; now they have been improperly allowed to fall into disuse, and have disappeared from the *materia medica*. Blisters behind the ear, sinapisms and tartar emetic ointment applied in this situation, probably act in the same manner; at all events there is no direct connexion between the nerves of the skin behind the auricle and the deep-seated distribution of the auditory nerve. Neither is there any direct explanation of the *modus operandi* of these applications. To pursue the subject further, in what other way than by sympathy between the different parts supplied by the fifth nerve can we account for the benefit derived in ophthalmia from spontaneous soreness behind the ears? I believe counter-irritation to be a term without any definite meaning, and not at all adequate to the explanation of this class of facts.

But to return to the subject more immediately under consideration; namely, the sympathies between the throat and ear. A person rarely suffers from quinsey (acute inflammation of the throat) without enduring intense pain in the internal ear. It may be supposed that this is explicable by the continuity of the guttural and aural mucous surfaces in the manner already described; but the explanation is not in this circumstance alone, because the otalgic affection begins early in the complaint, before there has been sufficient time

for the spread of the inflammation from the throat to the ear. Besides, the pain in the throat is continuous, whilst that in the ear is darting and intermittent. The mucous connexion between the two parts often, indeed generally, comes into play in subsequent stages of the disease, and produces sometimes actual otitis; but the pain of this is quite distinct from the piercing nervous irritation in the ears so often felt at the very outset of severe sore throat. When the throat is inflamed without the ear being implicated, it frequently happens, as in certain cases of tooth-ache, that the contact of cold water, or cold air upon the throat, produces intense pains in the ears. I have often in practice had opportunities of witnessing in cases of deafness, during recovery from nervous fever, and some other kinds of impaired hearing, the great facility with which anything applied to the throat affects the auditory nerve. Thus, drinking a glass of ale or porter in many of these cases dulls the sense immediately; the same effect results from drinking strong coffee. This does not occur as part of the general effect of taking beer or coffee into the system. The effect is too sudden; and I am confident, the same would occur were the throat merely gargled with these fluids. Neither is it simply owing to their stimulating effects, for other stimulants, such as gin or brandy diluted, do not produce the same consequences.

Enlarged tonsils are, in the chronic uninflamed state, almost void of sensibility; yet it is most remarkable, that if an enlarged tonsil be seized with a pair of forceps, though no pain may be experienced in the tumour itself, a disagreeable and even painful sensation is frequently felt in the tympanum.

In the operation for the removal of an elongated uvula, patients frequently cry out from the severe pain caused within the ear, though little is felt at the point of excision.

Irritation of the uvula, as I have explained in the former section, often spreads from the uvula to the ear through the Eustachian tubes by continuity of surface; but I am also persuaded, by extensive observation, that an irritable uvula frequently deranges the organ of hearing by purely sympathetic irritation of the ear. I have seen many cases in which tinnitus aurium was manifestly excited in this manner.

In the therapeutic application of remedies to the throat for deafness and auditory disease, I have no doubt that the principle I am contending for obtains to a considerable extent, though it has been overlooked, and many valuable therapeutic aids have become obsolete in consequence. Thus, stimulant gargles to the throat affect the ear in a twofold manner, the one by producing an improved condition of the mucous membrane of the throat, which effect extends along the Eustachian tube to the tympanal cavity; the other by the nervous transmission of the stimulus from the one locality to the other. These actions, though they often occur spontaneously, being produced by the same means, are essentially different in their nature. The one, in its mode of action, is obvious to our senses—the other seen only in its results; the one effect traverses gradually from the throat to the ear over the mucous membrane—the other is often transported instantaneously from one point to the other without in the least degree affecting the intermediate tissues; to use the language of physical science, the one acts at

sensible, the other at insensible distances. I have little doubt that all applications to the throat in cases of deafness, whether stimulants or astringents, have this double mode of action, though sometimes one, and sometimes the other, may preponderate.

I now proceed to a very important and interesting point, which very naturally engages our attention, growing, as it does, out of the study of aural medicine and surgery. I allude to the connexion which exists between the organ of hearing and the organs of voice and articulation. This connexion is so obvious, that it has always attracted the attention of those engaged in the study of aural disease. Congenital deafness is inevitably attended by dumbness. Complete deafness occurring after the powers of speech have been developed, causes a gradual, and generally in the end, an entire loss of natural articulation. Stammer, though by no means dependent on any defect of hearing, occurs, I am fully persuaded, in a considerably greater proportion among deaf persons than among others. We read in Scripture of "one that was deaf, and had an impediment in his speech," and the complication thus mentioned, is one of which all acute and experienced observers must be aware.

In cases of partial deafness, we rarely see an instance in which the defect has not altered, in some degree, the voice of the individual, rendering its pitch higher or lower, louder or softer, than is natural. Deaf persons generally speak slowly, and in conversation are tardy in answering questions even when they hear what is addressed to them. That this does not arise entirely from habit I am persuaded, but rather that the passage of sound from the ear to the mind, the trans-

mission of the will to speak, and the motor power to the vocal organs, are retarded. These alterations of the voice in cases in which the deafness is dependent on actual ear disease, are very different from the thickness of speech, produced in cases of deafness from enlarged tonsils, in which the defective articulation is more dependent on the guttural enlargements than on the ear disease.

As regards the relief of these secondary affections of the voice, of course the main thing to be depended on is the restoration of the hearing, after which the voice gradually regains its natural firmness of tone and distinctness. In the cases of thick speech from enlarged tonsils, and the occasional stammer which I believe to arise from this cause, the remedy is obvious, easy, and complete, in the excision of the morbid growths. By directing the attention of deaf persons to the subject, I am convinced they might often be enabled to preserve the natural voice, even in severe deafness, to a greater extent than is generally done. Patients are themselves placed in a position of great difficulty, because they have no means of measuring correctly the power or tone of their own voices with those of others. This want of comparison and contrast is severely felt. In certain cases, they hear their own voice much more loudly than that of others, and then they naturally lower their own to accommodate it, as they imagine, to others, and hence often become inaudible. On the other hand, when they do not hear their own voice distinctly, they generally speak loudly and harshly to bring it up to the point at which they hear the voices around them. But to remedy this, the friends may do much by making the patient aware of the real relation between his own and other voices.

ON DEAFNESS FROM MORBID CONDITIONS OF THE
MUCOUS MEMBRANE OF THE THROAT AND EAR.

To the attentive observer of health and disease, the mucous membranes must always rank among the most interesting and important of the tissues which compose the human fabric. In an anatomical point of view, their distribution betrays evidence of the most exquisite design, the greatest possible diversity of figure and arrangement being resorted to for the purpose of affording a prodigious extent of mucous surface. So perfectly is this object effected, that the mind even of an anatomist would be absorbed with wonder, could it, at a glance, behold spread out on a plane surface, the space these membranes really occupy, and the immense extent of their ramifications through cells, tubes, canals, reduplications and convolutions, in an almost infinite variety of arrangement and form. They compose, it may be said, the groundwork on which most of the vital functions of secretion, excretion, and absorption are effected: and besides this, are intimately concerned in the perfection of the senses of sight, hearing, smell, taste, and—ininitely more than has been yet imagined—the faculty of speech.

My subject confines me to the consideration of one division of the great mucous track, ramifying throughout the respiratory and intestinal organs. Commencing at the mouth, at the junction of the skin with the red tissue of the lips, it passes inwards to line the mouth, and enters into all the mucous and salival glands, giving off delicate prolongations for lining the different nasal cavities, the cells, and sinuses in the upper jaw, os

frontis, and the other bones of the cranium and face, which are subservient to the senses of hearing and smell. In the pharynx it becomes continuous with the mucous lining of the Eustachian tubes, and through them enters the tympanum as its investing membrane, covering the small membranes which close in the inner ear, and also the external membrane or drum; finally, this part of the membrane spreads itself out on the surfaces of the mastoid cells behind the organ of hearing.

Passing downwards from the throat, its track admits of two important divisions: the one, entering at the glottis, runs down the trachea and bronchial tubes, dividing and subdividing to an infinite extent, to form those innumerable cells in which the vital properties of the air become imparted to the blood, as it flows through the lungs; the other division, or the intestinal mucous membrane, passes down the gullet to the stomach, contributing greatly to the formation of that organ, and becomes the seat of the secretion of the gastric juice, the bile, pancreatic fluid, and the multitude of minor glands with which the intestinal tube is everywhere studded.

Whether in health or in their diseased states, the sympathies of different divisions of the mucous membranes with each other, and of the mucous tissues with structures of an opposite nature, are some of the most constant and remarkable occurring in the animal economy. No one spot of mucous membrane can be affected without a corresponding manifestation in another, and it may be, some remote organ. The most prominent instance of sympathy between other organs and mucous membranes is that existing between these

and the skin. Impressions of cold on the cutaneous surface commonly produce their ill effects on some part of the mucous system. In most persons catarrh of the bronchial membrane is the result, while in others the membrane of the stomach, kidneys, or intestines, becomes morbidly affected. Not less evident is the effect produced by disease of the mucous membranes on the skin. In dyspepsia, where the membrane of the stomach and neighbouring viscera is in a morbid state, the secretion from the skin becomes much altered, and the whole cutaneous surface blanched from its natural colour. Next to the more general relations between the mucous membrane and other organs, I come to the consideration of those bearing more immediately on my subject, namely, the sympathies existing among different parts of the same tissues. I may instance the spread of catarrhal symptoms from the eyes and nose to the bronchial tubes, or the lungs themselves. A still more apposite illustration may be drawn from the common tendency of inflammation of one eye to affect the other in a similar manner. Not less remarkable is the influence exerted by the stomach, in its disordered state, on the senses of sight and hearing, often impairing them to a deplorable extent; indeed, the mucous membrane of the stomach, when in a disordered state, I believe to be the centre from which radiates a large majority of the chronic ailments to which we are subject.

The integrity of the mucous membrane is of absolute necessity to the healthy exercise of all the senses, except that of touch, to which the skin bears the same relation as mucous membrane to the others. A familiar example of this dependence of the senses is offered by

the deterioration, or even entire loss of smell in common catarrh, while the mucous membrane of the nose is inflamed, and the speedy recovery of the sense on the disappearance of the cold.

The great agent in producing this morbid state of the mucous membrane is *cold*; sometimes affecting the internal ear, through the medium of the external passage, but more frequently producing its first effects on the throat, and extending from thence to the middle ear, through the inner or Eustachian passage. The next prolific source of deafness is chronic derangement of the stomach, which affects the ears in all who have any predisposition to disordered hearing. These causes of aural disease thus displaying themselves in morbid conditions of the mucous membrane, I do not hesitate to declare, exceed all others in frequency and importance.

The affection of the mucous membrane of the throat to which I refer, may occur at all ages, but happens most commonly in the periods of youth and middle age, especially to those whose occupations expose them to inclement weather. It commonly begins with a sense of fulness and increased heat about the fauces, aggravated by taking cold, and constituting in itself a great susceptibility to catarrhal complaints. There is an increased secretion of phlegm from the throat, which is chiefly troublesome in the morning. On looking into the throat, it appears congested and covered with bloodvessels, assuming arborescent shapes and forming a striking contrast in colour with the pale mucous membrane of the cheeks and palate. When this state has existed some time, it extends to the nasal cavities and the guttural passages, producing a sensation of

stuffing up both in the nose and ears, of course caused by the increased secretion of mucus and the thickening of the lining membrane. It is in this, the first or inflammatory stage, that deafness makes its appearance; and by the aid of catheterism the progress of the morbid state can be accurately traced. During the first stage the affection of the throat is the most prominent symptom. The membrane investing the mouth of the Eustachian canal may be felt by the catheter or probe to be in a tumid state; and the introduction of the catheter gives some pain, owing to the presence of sub-acute inflammation, and is more difficult than at other times, because of the thickened condition of the mucous membrane. The air-douche is, however, the most valuable aid in continuing the investigation, and leading to a correct diagnosis. In the healthy state of the ear the mucous membrane is of very fine organization, secreting a thin mucus, which is either absorbed or carried off by the Eustachian tubes, so as never to accumulate to any injurious extent. The introduction of air into the tympanum, by the air-press and catheter, produces, when listened to by the stethoscope, a continued vesicular murmur, very similar to that heard in the chest in puerile respiration. When the disease of the mucous membrane has reached the ear, and during the stage of increased secretion, the application of the air-douche produces a loud mucous rhonchus or gurgle within the ear, the character of which accurately informs the listener of the comparative fluidity or tenacity of the mucous accumulation. The patient, when the air is thus obstructed, sometimes obtains a temporary relief by a dislodgment of the mucus, accompanied by a cracking sound or pop, which may

take place either in yawning, sneezing, vomiting, blowing the nose violently, or some other sudden respiratory effort. After this state of increased secretion in the tympanum, Eustachian canal, and throat, has continued for some months, or it may be years, it gradually diminishes: the deafness, however, continuing, or even advancing in severity. When the throat of a patient, under these circumstances, is examined, nothing more than slight thickening or relaxation is perceptible. There is often an evident coldness of the mucous surface palpable to the patient, and likewise to the touch of the surgeon. The same feeling of coldness, and even insensibility, extend into the ear. If the organ is now examined by the air-douche and stethoscope, a low vesicular murmur is alone heard, of a smoother character than the normal sound, without the least evidence of the presence of the natural moisture. Besides the physical proof of a dry, unhealthy state of the inner ear, the mucous membrane of the nasal cavities and of the throat are found comparatively dry, and deprived of the natural secretion. The external meatus also, the lining of which partakes of the nature both of skin and mucous membrane, is in the same arid state, being quite void of the ear-wax, which is either not secreted, or its moisture is so rapidly absorbed, that it falls out of the ear like dust, and readily pulverizes when rubbed between the fingers. The membrana tympani is seen shining at the bottom of the passage like a thin lamina of ivory, of an opaline colour, instead of the transparency it possesses in the healthy state.

Sometimes tinnitus is present, but quite as often the patient loses this distressing symptom without any

amelioration of the deafness. Singing in the ears may be present in any or all of the changes that take place, from the commencement of the permanently inactive state of the auditory organ; there is, however, I believe, no certain rule for its existence in this or any other form of deafness.

In dyspeptic deafness a morbid condition of the throat, gradually affecting the ears, is generated, but of a less active kind than the similar affection from cold. It is surprising how large a proportion of the deaf refer to the stomach as the source of the aural malady; but, on a close examination of the early symptoms, they almost invariably remember a troublesome condition of the throat as constituting an intermediate train of symptoms between the stomach and aural disorders. Unfortunately, these cases rarely apply for assistance till the deafness has become confirmed; but if an opportunity is afforded of watching the progress of the ear affection, the same order in the symptoms is observed, and the same changes in the mucous membranes occur, as when cold is the exciting cause of disease.

Many writers on the Practice of Medicine have pointed out the stomach as the source of deafness, but none of them ever suspected the frequency of its occurrence. Unfortunately, aurists have directed their attention too exclusively to the ear itself, to trace accurately the chain of causation by which the disease approaches the organ of their circumscribed studies. Even Kramer, though often approaching so nearly as to render it surprising that he did not arrive at a clearer comprehension of the subject, never suspected the important part played by the mucous surfaces

in the production of deafness: hence many cases are scattered up and down in the pages of his work which might, with perfect propriety, be reduced to the forms of deafness I have been describing.

It is interesting to find how exactly the results of a close study of aural disease accord with the plainest truths of the physiology of hearing. The important offices performed by the proper membranes of the ear are universally allowed. The healthy tension and vibratibility both of the *membrana tympani* and the inner membranes are absolutely necessary for the acute performance of the auditory function. Now these vibratile membranes, forming as they do the propagators of sound, are all intimately connected with the mucous membranes: the two lesser ones covering in the foramina leading to the labyrinth are invested with it on one side only; but the proper drum may be said to be enveloped by it on both sides; as, besides the inner covering, the outer layer, formed of the cuticular lining of the outer passage, resembles mucous membrane much more nearly than true skin, and disease is readily propagated from the membrane on one side of the drum to that on the other. The mucous layers of the vibrating membranes are necessary both for their protection and preservation in the moist state, by which they are fitted to receive the undulations of sound. It has been shown by direct experiment, that moist animal membranes, arranged after the plan of the ear, are considerably more sensitive to sound than the same in a dried state; and this is further proved by the fact, that in many cases where there is a dryness of the *membrana tympani* without any serious disease of other parts, the deafness is relieved for the time by

merely moistening the membrane with a little wet cotton wool.

Seeing, then, the important functions performed by these parts of the auditory apparatus, it is clear that deafness must be the result of the loss of their elasticity, and it is equally clear that disease of the investing mucous membranes to the extent that destroys this property, or increases or diminishes the natural secretion, must, in a structure of such delicate organization as the ear, seriously interfere with the discharge of its functions. Patients thus affected complain of having a film, as it were, spread over the organs, which is, in reality, the case; the sound seems to them to hang in the ears instead of passing on to impart the natural sensation to the clouded nerve.

I would here record my conviction that the forms of deafness referrible to the mucous membranes amount to more than four-fifths of all the cases that come before the aural practitioner, though their nature and cause have never been properly appreciated. It includes what authors have considered the symptomatic deafness produced by dyspepsia, while, in fact, though it is the result of dyspepsia, yet a morbid change has been produced in the ear secondarily to the disorder of the same membrane of the stomach, so that it is not enough to treat the stomach solely, as the relief of the dyspeptic symptoms is at least but palliative, instead of curing the deafness, which is certainly the most distressing part of the twin malady.

In the same category may be placed a great number of cases termed *nervous deafness*. This appellation has been a kind of refuge behind which to place any case of deafness that did not present grossly to the eye,

or suggest to the imagination, some physical explanation of its cause—a sort of *nominis umbra*, which all aurists have had the sagacity not to define, from the certainty of its destroying their attempts to systematise diseases of the ear. It has been thought quite sufficient for an aurist to assure himself, no matter how, that the Eustachian tubes were free, and the external passage clear of obstruction, or even devoid of the natural secretion, the ear-wax, to decide at once that deafness, under such circumstances, must be of a *nervous* character.

Sometimes attempts have been made at refinement, and the minute structures of the labyrinth accused of causing deafness, though we have no knowledge whatever of the healthy functions of these delicate parts, and no facts to elucidate, in the least degree, the effects of any change in their structure, either natural or morbid. The symptoms of the so-called nervous deafness accord with what I have now given, and observed again and again at the Metropolitan Ear Institution, and in private practice, as the unerring result of chronic disease of the auditory mucous membrane. I do not mean to proscribe nervous deafness as a nonentity; so far from this, I have myself written on the causes and treatment of cases unequivocally deserving the name; but I most strongly aver, that in the practice of aural medicine, my compeers have been pursuing a phantom under this name, when, if they had applied themselves diligently to observation and the comparison of facts, they would long ago have discovered the paramount importance of the mucous surfaces in the production of ear-disease.

If we scrutinize the meaning of the term *nervous deafness*, it can only mean deafness in which paralysis

of the auditory nerve is produced by some change in the nerve on the brain ; but this is really the case in but a small minority of deaf patients. A simple test will show the fallacy of the usual diagnosis in diseases of the ear. If the ticking of a watch can be heard when applied closely to the auricle, or held between the teeth; it cannot be the auditory nerve that is in fault, but must be some part of the acoustic apparatus serving to transmit sound from the external air to the nerve of hearing. This test is unequivocal; because the nerve being in contact with the temporal bone, and the bones of the head being good conductors of sound emitted by a solid body, as a watch, when in contact with them, it is much the same as though the sonorous impulse was imparted directly to the nerve. If any deaf readers will try this experiment, very few will find themselves deaf to a watch held between the teeth.

When deafness has existed for many years, of course the nerve of hearing becomes enfeebled from long disuse; but this is no more a valid reason for believing the primary deafness of a nervous character, than for considering cataract a nervous blindness, because the optic nerve loses sensibility to light when it has long been shut out from the eye. The symptoms usually termed nervous are of little importance as a cause of deafness; those of nervous excitable temperament do not often see, taste, or smell worse than others; and there is no reason whatever why the hearing should be affected in such cases. So far from nervousness being set down as a cause of deafness, the allegation should be completely transposed, and the nervousness considered as the result of the deafness. If the deaf were to examine their own sensations, they would perceive

the truth of this. Deafness is so severe a deprivation, that few can endure it without repining, and experiencing the variety of conflicting feelings which go to form nervous excitability, irritability, or nervousness. It is true, that when deafness is fully formed, many of the deaf hear much worse at times of excitement; but this is rarely the case at the onset of the disorder, and is clearly referrible to the state of the brain rather than of the auditory organ. The mistakes made with regard to the assumed nervous deafness are injurious in many respects, and in none more so than as tending to useless and injurious methods of treatment.

The kinds of deafness and disordered states of the ear already noticed, are the most prominent of those arising out of morbid conditions of the mucous membrane, but others of considerable importance in practice remain to be described. Discharge from the ear, of whatever kind, whether acute or chronic, mucous or puriform; from the external meatus, without erosion of the membrana tympani; or from the cavity of the drum itself, with loss of the membrane,—are often the sequelæ of disease of the lining membrane within the tympanum. When this membrane is in an irritable or congested state, the supervention of a cold occasions an active degree of inflammation, constituting *otitis*. This disease, generally, goes on to suppuration, because of the mechanical pressure exerted on the parts implicated by the surrounding bones. According to the treatment pursued, the nature of the constitution, and various extrinsic causes, it may terminate in any of the grades of ear-discharge specified above; or it may run on to the more dangerous termination of caries of the bone, and abscess opening through the mastoid process. In

the simplest form of otorrhœa—namely, from the external passage alone—the disorder is very commonly induced by disease within the drum. In fact, so intimate is the connexion between the *cavitas tympani* and the *meatus externus*, that the former is never deranged without affecting the latter. In the congested state of the mucous membrane of the throat, Eustachian tube, and ear, there is itching and sometimes pain in the meatus, and the secretion of cerumen is either diminished or depraved. I have observed the ceruminous and sebaceous glands of the passage often pass by slow degrees from the natural state to the secretion of mucus, and eventually pus, when there has existed a source of irritation within the tympanum.

It is of great importance to diagnose correctly between internal and external otorrhœa. The common mode of directing the patient to blow through the ear with the nose and mouth stopped, is uncertain, because many in whom the Eustachian tubes are unobstructed, are unable to blow air up to the ear so as to inflate the *membrana tympani*. In my own person, I can readily inflate the right tympanum, but never remember to have succeeded on the left side, except by catheterism. In cases of otorrhœa with a perforated membrane, some who are at one time able to force air through, so violently as to produce a loud whistle, are quite unable at other times to get air through the Eustachian tubes. The rationale of this is difficult to explain. It may be, that the mouths of the tubes are closed by the effort of blowing the nose, or that they are covered in by the soft palate in a valvular manner during the forcible respiration with the mouth and nose shut; or by the interposition of mucus. Here, as in many other

instances, the catheter and air-douche are the only infallible means by which a stream of air may be readily passed through the ear when perforation is present, so as to be heard at a distance of two or three feet.

Many disastrous results have attended the uncertainty about the integrity of the membrana tympani; cases of perforation have been injected with acrid and astringent fluids, and the sudden stoppage of the discharge has produced dangerous cerebral symptoms. I consider syringing to be the great heresy of modern aural surgery, and its practice must certainly have arisen from observing the effects of injections in other and less delicate organs, rather than from any good results which follow its use in ear-disease. If employed where there is discharge with loss of the membrana tympani, it hazards inflammation of the internal structures of the ear, besides the almost sure aggravation of the deafness; and this latter ill result is occasioned with certainty when astringents are thrown in upon the entire membrane, whether they arrest the discharge or not. I feel certain, that the daily use for a month of an ordinary astringent ear-injection would render the naturally elastic and sensitive membrane of the drum tense, hard, and insensible to such a degree, as to deafen the acutest hearing, and the same evils obtain when injected for the purpose of suppressing a discharge. In practice I need not to make the inquiry, for the touch of the probe will enlighten me as to whether my patient has been subjected to such treatment. Syringing the ears is admissible only for the removal of accumulations of indurated wax or foul secretions, and the fact of their presence in the passage of the ear should be ascertained by means of the speculum before it is

resorted to. To syringe upon mere speculation is unpardonable when we possess such facilities for determining or not its necessity.

If I were asked to name, in the order of their frequency and importance, the chief causes which give rise to the condition of mucous membrane and subsequent loss of hearing I have described, I should thus place them:—1, cold; 2, the exanthemata; 3, dyspepsia; lastly, 4, *mercurial medicines*. Some of the extreme and most unmitigable cases of deafness I have ever witnessed were produced by severe salivation; and I must confess that I never saw a case of this kind of any standing, which derived decided benefit either from local or constitutional treatment. If there is in the materia medica a medicine which has the power of acting as a poison to the sense of hearing, where there exists predisposition to deafness, I believe it to be *mercury*. Of course my strictures are directed not so much against its exhibition as a purgative or alterative, though even here it is dangerous to the deaf, but when given with a view to its *specific* effect. From watching the progress of many cases, and from the analogy of the symptoms produced by mercurialization, with those affecting the guttural and aural mucous membrane in influenza, dyspepsia, and the exanthemata, I believe mercury, like them, injures the sense of hearing through the medium of the mucous surfaces. Long after the salivary glands have ceased to be affected, an erythematic state of the throat and fauces remains, often by its persistence affecting the Eustachian tube and tympanum in the manner I have

described, when chronic catarrh has been the exciting cause. It may be argued, that when deafness follows a mercurial course directed against maladies in which mercury is the sheet anchor of the physician, those maladies are quite as likely as salivation to be the cause of deafness. It may be so in some cases ; but I believe the mercury given in excess to be ten times more prejudicial, because I have seen so many instances where this medicine was introduced under other circumstances, and even ill-advisedly, as a curative agent in incipient deafness, with the same results. I might multiply cases in which this has happened, and where patients themselves confidently referred the aural malady to this cause. One case, of a very decided nature, I some time ago attended. It was a patient who was recommended by Sir Benjamin Brodie to consult a gentleman celebrated for his treatment of a local disease from which he suffered, and which was cured by a mercurial course, but at the expense of producing a deafness which is now altogether irremediable.

ENLARGEMENT OF THE TONSILS.

Among the immediate causes of deafness complicated with, or proceeding from, disease of the guttural mucous membrane, morbid growths of the tonsils demand considerable attention, because, although not invariably productive of impaired hearing, they prove so, I am convinced, in a much larger proportion of cases than has ever yet been supposed. I would premise, that while directing attention to these enlargements, I propose to limit myself, as much as possible, to their consideration in relation to the subject of deafness.

The chronic disease of the tonsils usually met with cannot be termed hypertrophy, inasmuch as the augmented size does not consist of the proper glandular substance (these glands being little more than a follicular arrangement of mucous membrane), but of deposits of fibrin, which become organized, though only to a limited extent as regards the endowment of vessels and nerves.

The tumours are of indolent growth, and from their low degree of vitality would often escape notice, but for the train of evils they not unusually excite, especially when their size becomes considerable. If felt by the finger, they are frequently hard and scabrous; but in many instances induration is altogether absent, the diseased part being so soft as to break down repeatedly, if laid hold of by a forceps. In others, the mucous cells on the surface of the tonsils are enlarged, and when such is the case, there is a copious secretion of viscid phlegm. More rarely they become filled with solid matter, of a dirty white colour, which, from its calcareous appearance, I have thought similar to the tartar deposited on the teeth, probably originating in the same way as the *crusta petrosa* from the salivary and other secretions of the mouth. Calcareous deposits I have in three or four instances found imbedded in the centre of the excised growth. In the case of a young lady, the daughter of a surgeon at Woolwich, I found a calculus closely resembling in arrangement a piece of rock coral.

On looking into the throat of a person suffering from such morbid growths, they are seen as tumours on each side of the fauces, protruding from between the palatine arches, and, if drawn towards the mesian line by a

tenaculum, are of much greater size than the first view from the mouth would indicate. The symptoms are, deafness, thickness of speech, or difficult deglutition, according to the position of the morbid growth.

The enlargement which is most apt to produce deafness frequently does not project sufficiently from between the pillars of the fauces to be perceived on looking into the throat; it is hidden conjointly by the anterior pillar and soft palate. Thus it is, as I have verified in many instances, that the surgeon has been deceived, for the condition of the parts is rarely examined *with the finger*, which should invariably be done. Were he to do so, he would not unfrequently detect the enlarged tonsil stealing upwards, and encroaching on the mouth of the Eustachian passage.

The enlargement which is productive of thickened speech, on the contrary, strikes the eye immediately the mouth is opened, and extends downwards in a contrary direction to that which is calculated to produce deafness. If the upper margin of the morbid growth be defined to the eye, thick speech only is the effect; but if the growth ascend, so as to interfere with the movements of the uvula and soft palate, then we have associated with the thickened speech, *nasal speech*.

The enlarged tonsil which interferes with swallowing, is that which projects into the pharynx, almost or quite meeting its fellow, and each is generally attached to its site by a narrow base. I have removed several of such enlargements from persons who complained that they had never been able to swallow their food until they had two or three times returned it to their mouth to be remasticated. Such persons are twice as long at their meals as those about them.

In those cases where the enlarged glands have an extended base reaching from the vicinity of the Eustachian tubes to the bottom of the pharynx, and such cases I have frequently seen, we may look for defective speech, hearing, swallowing, and breathing altogether associated, more particularly if the uvula enters into the diseased condition of the parts.

With such a state of the throat, too, on getting up in the morning, the sensations are most disagreeable. The vitiated secretion of mucus, collected during the night, and adhering to the throat, produces nausea, or even vomiting, for some time, till the tenacious phlegm can be expelled by hawking or coughing. A patient in this state is often an hour or two, after rising, before he gains his equilibrium, and becomes fit for the active duties of the day. The deposition of coagulable lymph, and increase of size, may arise from any cause capable of keeping up a certain degree of irritation about the throat: the effect of cold on the fauces and nasal mucous membrane is frequently productive of such a state; but I should say, that the exanthemata are the most frequent cause of morbid states of the tonsils. Both the commencement and termination of these disorders are attended by a train of throat-symptoms, which often occasion, as their reliquiæ, these disagreeable growths. Children of strumous constitution are exceedingly liable to tumefied states of the throat. When glandular swellings in the neck are observed externally, a careful examination would seldom fail to discover enlargement of the tonsils. This diseased condition doubtlessly depends, in the first instance, on the constitutional fault which develops the whole strumous disease; but when formed, it proves a not

unimportant source of irritation, which, together with the increased and morbid secretion passing into the stomach, re-acts on the system and aggravates the general scrofulous disorder as much, or even more, than the glandular disease. In tonsillary swellings arising in the strumous diathesis, the associated disorder of the mucous membrane generally extends to the mouth and nose, and becomes evident in the tumefied appearance of the lips and nostrils, so much so, that I am often enabled by this sign alone to forejudge the state of the throat and tonsils.

Early childhood is the period in which the mucous membrane of the throat and tonsils is most prone to disease. The development and functions of the glandular system is then in the state of the greatest activity; it is then, also, that scrofulous disease generally manifests itself, and when catarrhal complaints are most common. Children of lymphatic temperament and fair complexion are most often affected with tonsillary disease as the sequel of colds. It would seem as though, when the skin is of fine and delicate organization, the mucous membranes are also possessed of more than their wonted susceptibility.

An analysis of the modes in which the enlarged tonsil interferes with the sense of hearing, offers a new and as yet an untrodden field for the student of aural disease. By modern writers, the most obvious connexion between deafness and diseased tonsils, that in which the enlargement presses on the guttural extremity of the Eustachian tube has been overlooked. Kramer entirely denies the existence of deafness from this cause, and Itard scarcely refers to the subject; though it was held to be of much importance by many earlier

writers. Among others, Wathen mentions it as one of the sources of deafness most certain to be removed "by surgical assistance;" and Valsalva relates a case of ulcerated tonsil, in which the presence of a tent blocked up the Eustachian tube, and occasioned deafness, showing most satisfactorily what Kramer seems to deny, that these passages may be obstructed at their guttural extremities. By some it has been denied that the tonsil glands can ever obstruct the tube, on the ground that when the tonsils are enlarged to any extent, they become pendulous, and are removed by their weight from the natural position. This is by no means true, if assumed as the general rule, or indeed in any sense but as the rare exception. I have pointed out that, when it does occur, the functions interfered with are those of deglutition and respiration. In the most frequent kind of enlarged tonsils, where the glands maintain their original position, or at least extend in every direction, the Eustachian tubes are generally compressed. There is another variety of enlargement which I am not aware has ever before been noticed; it is where the diseased growth is confined to the upper margin of the tonsil, and which, from being hidden behind the veil of the palate and the anterior palatine arch, is quite out of sight when the throat is merely examined by the eye. In numerous cases I have verified this interesting observation, and effected cures by the indications of treatment which the knowledge of it afforded. We never can be certain that the tonsils have no share in producing deafness until these bodies have been examined carefully with the finger. In some instances, where nothing morbid was visible in the throat, the upper part of the tonsils has been of

such magnitude as to produce, in addition to deafness, nasal speech, from encroaching on the posterior nares. These novel views have afforded me the most gratifying results, and they must henceforth exert considerable influence on the future treatment of deafness.

Whether the Eustachian tube be lessened by the general bulk of the morbid growth, or only by the pressure exerted by enlargement of that part of the gland nearest to the guttural opening, the effect is the same, and is easily explained by a reference to the physiology of the ear. The exclusion of atmospheric air from the cavity of the tympanum is universally allowed to cause deafness. This has been accounted for in various ways: by some it was thought that sounds reached the ear through the Eustachian tube more easily than by the external meatus, and the fact that some deaf persons open their mouths when attempting to hear was considered a confirmation of this hypothesis; but it is found that a watch, or any other sound, becomes more indistinct when applied to the vicinity of the tube than when held before the mouth of the auricle. Other physiologists believe the freedom of the Eustachian tube necessary to admit of the motion of the air of the tympanum, when it vibrated under the influence of the membrane of the drum. But the laws of acoustics do not admit of the motion of the contained air under the influence of sonorous undulations. The idea of Itard, that the tube performed a similar office for the ear which the hole in the drum-head does for that instrument, is equally incorrect. The hole is of use, not in assisting the vibrations of the air of the drum, but as a channel by which the sonorous undulations can reach the ear. Without the

hole, the sonorous vibrations and the resonance of sound in the closed cavity would be equally intense, but there would be no means of conducting the sound to the external air and the ear but by the solid walls of the drum; and the sounds excited in the air by membranes, as the drum-head, are only transmitted with difficulty and loss of power to solids such as the drum-cases. The true explanation of the loss of hearing by closure of the tube, seems to be that the vacuum caused by the loss of air in the tympanum, places the membrane of the tympanum under the influence of the atmospheric pressure. We can easily imagine how a weight of 15lbs. to the square inch must affect such a delicate membrane, as the drum of the ear. The membrane of the tympanum, when the cavity is a vacuum, bears an actual pressure of more than 7 lbs., as it is more than half an inch square; it becomes preternaturally tense, and its vibrations, on the impulsion of sound, are greatly impeded. Unfortunately there is no *vis conservatrix* to defend the membrane from this condition, as the small muscles and bones of the ear act as pulleys and levers, to make the membrane tense when liable to injuries from loud sounds; and there is no adaptation of an opposite nature but the free egress and ingress of air to the *cavitas tympani*.

Besides the closure of the Eustachian tubes by the actual pressure of enlarged tonsils, there are other modes in which these glands deteriorate the organ of hearing. They act as a constant source of irritation in the throat, and render persons liable to repeated colds, which affect the whole mucous lining of the pharynx, nasal passages, Eustachian tubes, and tympanal cavities. There is always danger of these

catarrhal affections exciting deafness, even when the original enlargement of the tonsils does not prove of itself a cause of loss of hearing. Sometimes when a small amount of tonsillary disease exists, it will occasion thickening of the contiguous mucous membrane of the Eustachian tube, or the engorgement and thickening will extend to the tympanal cavity, causing in either case deafness of a very intractable character. When there is hypertrophy of the tonsil glands, or disease of the uvula, a morbid secretion of the mucous membrane is kept up in the Eustachian tubes, and within the tympanum. The lodgment of mucus, which always tends to become inspissated, is as certain a cause of deafness as occlusion of the tube by thickening of its membrane; but it is not near so difficult of removal, and is occasionally got rid of by a sudden pop, caused by laughing, sneezing, coughing, vomiting, or some other sudden respiratory action.

I have observed some instances in which *otorrhœa* could be traced distinctly to enlargement of the tonsils; they were cases in which the disordered condition of the throat had given rise to irritation within the tympanum, which had taken on inflammatory symptoms, and ended in suppuration, the matter discharging itself through the ruptured membrane of the drum. Another very troublesome complication of ear disease, *tinnitus*, often occurs as the sequel of irritation in the throat and hypertrophy of these glands. Tinnitus rarely exists without a marked degree of deafness; but it does sometimes happen when the tonsils are not of sufficient magnitude to occasion deafness, though loss of hearing generally follows, when this distressing symptom has once established itself.

Already I have insisted on the paramount importance of a healthy state of the mucous membrane of the ear to perfect hearing. I have advanced the novel view, that by far the greater number of deaf persons have lost their hearing by a diseased condition of this same mucous membrane. This I have substantiated by facts, and have pointed out the better methods of prevention and cure which must result from such an improved knowledge of the pathology of the ear. The modes in which external agencies can affect the lining membrane of the tympanal cavity are, in the first place, through the external passage and the fibrous membrane of the drum, and in the second, through the Eustachian tubes entering to the ear from the throat and posterior nares. Of the two tracks, there can be no shadow of doubt that the latter is by far the most frequent. The external passage enjoys a comparative protection from cold, on account of the presence of wax, and the structure of the *membrana tympani* forms a very efficient protection to the middle ear in this direction. On the other hand, the mucous membrane of the throat, from its extensive sympathies with other parts of the body, and its exposed situation, is more frequently disordered than any other part of the system of mucous membranes whatever. And it must be borne in mind, that the membrane of the throat is continuous through the medium of the Eustachian tubes; consequently, the ear and the hearing are in danger of suffering, whenever there is a morbid state of the guttural mucous membrane.

I trust I shall be excused for any seeming prolixity in dealing with this branch of my subject. I have been purposely diffuse, because I am persuaded that

medical men do not sufficiently appreciate the connexion which exists between diseased states of the throat and the production of aural disease. The subject is especially worthy the thought and attention of those who attach any value to such outrageous absurdities as glycerine, almond oil, and ear-drops generally. That such quackeries should find advocates among qualified medical practitioners in this the nineteenth century, is disgraceful.

Having now shown my views of the manner in which deafness occurs, through the intervention of the mucous membranes, when these are brought within the influence of certain injurious causes, I will endeavour from this point to glance briefly at all the most important forms of deafness (as they occur in other authors), for the purpose of showing how many of them may be referred to morbid states of the mucous surface, as the chief exciting cause of deafness.

Acute and Chronic Otitis.—In these diseases, the mucous membrane is the first tissue affected, though the continuance of the disease in either form often leads to disease of other structures, especially the osseous and muscular contents of the *cavitas tympani*. Suppuration of the ear, through the *membrana tympani*, may justly be regarded as the termination of inflammation of the mucous membrane, the tumefaction of the membrane having closed up the minute opening of the tympanic extremity of the Eustachian tube; and the pressure exerted by the closed cavity upon the inflamed membrane occasions pain resembling that which happens when the pulp of a tooth inflames within its osseous envelop. In the chronic form of

disease, the same thing happens, but in a less marked degree.

Internal and External Otorrhœa.—In the first, the discharge comes from the cavity of the tympanum, with loss of continuity in the membrana tympani; in the second, the discharge is secreted in the external meatus alone. Internal otorrhœa is always the result of inflammation of the mucous membrane or otitis, and generally of the acute form of this disease. External otorrhœa generally comes on in consequence of irritation of the membrane within the tympanum. Sometimes it occurs in cases where there is no sign of disorder on the internal side of the drum, appearing *per se* from the lining of the passage. But even granting this to occur oftener than I believe to be the case, I consider the pathological characters of disease of the lining of the meatus to be altogether different from those of the skin, and closely resembling, in this respect, mucous membrane. The cuticular lining, as it is termed, and the sebaceous follicles, secrete an unctuous matter in sufficient quantity to keep the canal and external surface of the membrana tympani in a moist state. In the progress of otorrhœa, the unctuous matter gradually passes from the natural secretion to the copious discharge of mucus or even pus, without the intervention of suppuration, circumstances which never occur in the common integument. Moreover, when this has established itself, the secreting surface has the closest similarity to mucous membrane.

Obstruction of the Eustachian Tube.—It is scarcely necessary to mention that this state is caused by thickening, increased secretion, or adhesion of the

mucous membrane, in all cases where the occlusion is not caused by mechanical pressure, as from nasal polypi, enlarged tonsils, &c.

Polypous Growths in the Cavity of the Tympanum, or the Ext. Meatus.—When these arise, it is invariably after the existence of disease of the lining membrane, with discharge.

The forms of ear disease I have mentioned far outnumber all others in the frequency of their occurrence. There only remain diseases of the auricle and labyrinth, nervous deafness, and deafness from accidents, such as blows, and the introduction of foreign bodies into the ext. meatus. Of these, diseases of the labyrinth are very infrequent; and I have already shown that the term *nervous deafness* is only deserved when there is paralysis of the auditory nerve, so that it is not at all applicable to the great majority of the cases to which it is given. Disease of the auricle, also, seldom exists, save as an extension of disorder from the passage in cases of otorrhœa.

PROPHYLAXIS.

Before entering on the treatment of deafness proceeding from morbid conditions of the mucous surfaces, it will not be out of place to give some attention to the best means of warding off disease in cases where there exists predisposition. Prophylactic measures are of great importance, because at least two-thirds of the gross amount of deaf cases are of slow progress, and generally spread over so long a time, that an excellent field is offered for defensive operations before they become confirmed.

Timely attention, such as the generality of people

are able to command, would greatly lessen the number of the deaf. Unfortunately, it is common for those who are threatened with loss of hearing to argue, that from the tardy advance of the evil, the causes which are producing it cannot be very powerful or deeply rooted, and they flatter themselves that time will of itself bring relief rather than aggravation. Thus it is that thousands, by culpable neglect, throw away the invaluable chance of recovery offered by early treatment and prudential self-regard. The tissues of the ear are so solid, and shut out from other organs, that when once a diseased habit has been established within it, it is only with the greatest difficulty the enemy can be dislodged. Nothing more surely proves the slow-stealing advance of deafness (in a general sense) than that very few of the deaf are able to name the precise date of their misfortune. They can generally remember that long before they considered themselves deaf, there were times when conversation in a large room, or in the society of several persons, required unusual attention to be correctly apprehended. That in damp weather, or whilst eating, or when the back was turned to the speaker, the difficulty was increased. That words containing certain consonants, as *l* or *s*, were sometimes mistaken for others, this being the case especially with proper names; that the voice of a stranger, or conversation in a strange room, was less intelligible than one to which the hearer had been accustomed. All these facts are interesting, as being among the first signs of failing hearing. On their earliest manifestation, it would be wise to place the auditory organ in the best possible state of defence. As the mucous membrane is the chief point affected by

injurious influences, all causes that act upon it prejudicially should be held in apprehension, and cold and humidity, being by far the most frequent of these, and affecting the ear in the greatest variety of forms, should be guarded against with the most sedulous care. When deafness has commenced, every fresh catarrh will be sure to add something to its aggravation. Sudden transitions from heated assemblies to the cold air, or *vice versâ*, are much more likely to occasion cold than exposure either to an uniformly high or low temperature, and should therefore be avoided. I have known persons liable to catarrh who guarded against it by never entering a warm room from the open air in cold weather, without lingering a minute or two in the hall or lobby, and on passing out, observing the same precaution. A distinguished member of the House of Commons, who consulted me, gave it as his opinion, that at least one-half of that assembly suffered in a greater or less degree from deafness in one or both ears. This is, perhaps, too much to say of the whole House; but from my own observation I have no doubt of its correctness if applied to those who are constant in their attendance, and have been many years in Parliament. The late hours, and the incautious habit of many of the members, who prefer a cool walk home after a protracted and exciting debate, to the safety of a carriage, are quite sufficient to account for the prevalence of impaired hearing among our legislators. The same may be said of the habitual frequenters of theatres, or other crowded assemblies. A stream of cold air upon the head when the rest of the body is heated, is the frequent cause of severe and sudden deafness. Washing and sluicing the head and ears

with cold water, pouring cold water into the ear (as is sometimes done by way of practical joke), having the hair cut short in cold weather, sleeping with the head uncovered—bathing of any kind—are also among the most prominent causes of deafness.

At the commencement of deafness, when almost everything may be expected from regimen, the most strict attention to dietary rule should be observed: regularity and moderation in eating and drinking, and the avoidance of all causes of indigestion, are as necessary in this as in many of the more serious forms of disease. Besides the ordinary management of the stomach, there are certain things which are especially injurious to the deaf, from producing an unwholesome state of the mucous membrane of the throat. Salted meats, pastry, and greasy substances do this; vegetables in a less degree; the same may be said of malt liquors and of coffee.

When persons are growing deaf, they naturally feel a great anxiety upon the subject, but very often it is not till the malady is confirmed that they discover the wisdom of seeking serenity of mind, and of giving their care to checking the disorder instead of encouraging a hurtful despondency.

If it were necessary, a great deal might be said about the injury inflicted by the indiscriminate use of the many nostrums in vogue for the relief of deafness. Few persons are decidedly deaf who are not able to refer an increase of their malady to some application of this class. Nearly all of them are placed for their asserted curative effect in the external passage; and the great majority possess sufficiently irritating properties to cause a degree of inflammation of its lining

membrane and of the external surface of the membrana tympani. No application to the external passage can produce any favourable change in the state of the middle ear; the most such means can do is to excite the entire auditory organ, and, consequently, the acoustic nerve, so as to render it for a time morbidly sensitive to sound, which sensitiveness disappears, and falls even below the natural standard, when the stimulus is exhausted.

This fact will account for the temporary advantage in hearing which patients generally experienced who submitted themselves to the rubbing in of an ointment into the external passage by means of a soft instrument, as practised by a well known physician. Few left his house who did not for the remainder of the day hear noises louder; but, alas! the improvement was deceptive, it was but the effect of the stimulus, and subsided with it.

If attention to the ears be necessary in the commencement of deafness generally, it is especially so in the forms of impaired hearing, combined with otorrhœa of gradual origin. This is of all aural diseases the most difficult to arrest when it has existed a long time, though at the outset, the most simple means would suffice for its removal. It commonly begins with an altered state of the ear-wax, and a sense of dryness and itching in the ears, which impels the sufferer to pick the passage with pins, &c., and thus provoke instead of ward off the disorder. Protection of the passage from cold, and the use of a solution of nitrate of silver, two or three grains to the ounce, carefully applied with a camel-hair pencil, would generally stop an ear-discharge in its incipient stage.

A most essential point for persons threatened with deafness, is the observance of early hours in retiring to rest. Among the higher classes, it is astonishing to observe the amount of evil inflicted upon those with hereditary or acquired tendency to deafness, who, by implicitly becoming the votaries of fashion, are neglectful in this respect.

TREATMENT.

In the treatment of confirmed deafness, the strictest regard should be had to the cause of the disease, and the stage to which it is applied. When there is a sub-inflammatory condition of the throat, with a sensation of heat in the fauces, or heat and pain in the ear, or when the introduction of a silver catheter occasions pain at the mouths of the Eustachian tubes, local depletion is the great agent in removing the disease of the mucous membrane, and preventing the perpetuation of the deafness. Leeches applied once or twice a-week for a considerable period, either behind the ears, or within the nostrils to the sides of the septum narium, followed, as the disordered state of the throat diminishes by a succession of small blisters, or the moxa, along the margin of the jaw, or dry cuppings behind or upon the ears, form the best mode of treatment for this the most frequent form of deafness. When the pain is more acute, of a throbbing character, and accompanied by tinnitus of a ringing, or pulsatory kind, recourse should be had to cupping, either behind the ears or on the nape of the neck. At the same time, all the prominent causes of deafness should be avoided: a light nutritious diet adhered to, while tonics, and *non-mercurial* aperients, should be prescribed to give

energy to the system. As the progress of ear disease is generally lingering and slow, so also is its removal usually a work of time, under the most favourable circumstances. More good is effected by the steady pursuance of moderate means than by sudden and violent assaults upon the seat of disease. The depletory treatment should be continued, till the gorged condition of the mucous membrane of the throat and nasal cavities has subsided. During the prosecution of the local antiphlogistic plan, catheterism may be resorted to, when it can be performed without giving pain, and the air-douche moderately and carefully applied to dislodge any inspissated mucus which may have accumulated in the tympanum or Eustachian tube; but as long as depletion is necessary, catheterism can only be used as an adjuvant for the purpose I have mentioned. If the introduction of the catheter causes pain, an occasional emetic will prove the best substitute, though it does not so effectually relieve the tympanic cavities of mucus. The state of the mucous membrane of the throat is sometimes much improved by the action of emetics. These means, judiciously varied or combined according to circumstances, will generally serve to subdue ear-disease of the kind pointed out, or, at all events, ameliorate the deafness to a considerable degree. I should mention, that after hearing has once been seriously impaired, it rarely or never regains its pristine acuteness; the cure can only, in the majority of cases, be considered as comparative, though often quite sufficient for the purposes of ordinary communication.

In this form of disease, acute otitis is very liable to supervene, requiring a most energetic antiphlogistic

treatment by means of abstinence, purgatives, and local depletion, sufficient, if possible, to alleviate the pain, and prevent its termination by suppuration through the membrane. When this latter accident has happened, the hearing often returns; and the discharge, with perforation of the membrana tympani, may continue a patient's lifetime, by attention and cleanliness, without any considerable deafness. If the discharge disappears, and the membrane cicatrizes after suppurative perforation, which frequently happens, though it has been a subject of doubt, deafness, differing in degree, has occurred in every case of the kind I have ever witnessed.

Since the publication in the *Medical Gazette* of my paper on perforation of the membrana tympani, and the proper cases for its performance, I have met with a most interesting case, which singularly confirms my view of the applicability of the operation to certain cases. It occurred in a mechanic who had, many years before his application to the Institution, suffered from otitis, with suppuration through the membrane, which after some time closed, the discharge ceasing at the same time. When he came to me, he had had a second attack of inflammation of the ear, and I found that, from the stoppage of the discharge after the first attack, to the commencement of the second, twenty years had elapsed, during which time he had suffered from deafness. When I saw him first (in the second attack), the otitis was so far advanced that suppuration speedily came on; and the moment the membrana tympani ruptured, the hearing was very considerably restored, showing, most satisfactorily, that the cicatrized membrane had been the cause of deafness, and that a fair

chance is afforded by puncture, or rather trephining the membrane, in cases where it can be gleaned from their history that there has been discharge from the middle ear, followed by cicatrization. In the case referred to, I took means to maintain the opening through the membrana tympani, and the man has ever since retained an excellent degree of hearing.

In the second stage of deafness, from a morbid state of the mucous membrane, where the inflammation, if at all present, is of a purely chronic character, and where the membrane is thickened, and its secretion in the throat, nose, and ear, considerably increased, counter-irritation by moxa or blister, applied behind the ear and along the margin of the lower jaw, and catheterism, with the air-douche, promise favourable results. These local measures are, however, successful only after the most strict and unremitting perseverance. Many of such cases, especially when complicated with, or arising out of stomach ailments, derive remarkable benefit from the use of the hydriodate of potash given in *small doses* of one or two grains largely diluted. This preparation exerts a beneficial influence on the mucous membrane of the throat and ear; it will often lessen the secretion of mucous within the ear, reduce the tumefied membrane of the throat, nose, and ear, to the healthy condition, and altogether remove tinnitus. When the passage has been void of wax for months, it will frequently occasion the gradual return of the ceruminous secretion. Certainly, no medicine that I am acquainted with has an equally beneficial effect on the ear with this, when given, as I have specified, *in small doses*, persisted in for a considerable time. Its therapeutic powers accord with the principle of *similia similibus*

curantur, the first effect being to excite an inordinate action of the mucous surfaces; generally after three or four doses the patient experiences sneezing, headache, heaviness, and drowsiness, rapidly followed by an increased secretion from the eyes and nose, with all the symptoms of common influenza. Unless prepared for the result, the patient reports himself to have "taken another of the colds to which he is so subject." These catarrhal symptoms, however, soon disappear; and not till then are we to expect improvement; for during the persistence of these first effects of the medicine, the patient will experience an increase of deafness the same as from a genuine cold.

Although I have no great opinion of gargles, I have sometimes fancied that the secretion and discharging of the mucous membrane have been assisted by the use of astringent gargles. Probably those most calculated to lessen the secretion from the throat, and remove nausea and other unpleasant sensations occasioned by its relaxation, are composed of alum, zinc, myrrh, &c. When the signs obtained by the air-douche and stethoscope show unequivocally that the lining of the cavity of the tympanum is thickened, its resolution is assisted by the daily application of an iodine ointment behind the ears, and along the margin of the lower jaw.

When the state of ear disease now treated of exists, the occurrence of severe catarrh, or an attack of acute indigestion, may convert it at any time into a more active form, requiring to be treated on the principles laid down when describing the management of deafness from an inflammatory condition of the throat and ear.

During the stage of thickening and increased secre-

tion within the ear, the kind of otorrhœa I have termed spontaneous sometimes occurs, the irritation extending from the middle ear to the external passage. When this discharge exists it is of no great consequence, as has been supposed, to diagnose between the mucous and purulent varieties; they run one into the other, the purulent being usually subsequent to the mucous. The sudden arrest of such discharge should never be attempted; it generally produces an aggravation of the deafness, besides a liability to otitis and disorganization of the ear, or even still graver forms of disease. Astringent injections always incur the danger of such evils, and therefore should never be used. They offer little temptation to their employment in any case, because they never benefit the patient but by stopping the discharge, which, if done, is at considerable hazard, and is of itself but the relief of a small part of the malady.

In the treatment of otorrhœa, I generally limit myself to the use of a solution of sulphate of zinc and alum, one or two grains of each to the ounce of distilled rose-water, to be increased from time to time, but to a very slight degree. This I direct to be syringed into the passage once or twice a day. This injection, if perseveringly used for a month or two, will generally lessen or stop the discharge without injuring the sensibility of the membrana tympani. It may seem a tedious process, but there is no great inconvenience attending the treatment; and I know of no other mode of arresting external ear-discharge without still further endangering the organ of hearing. One benefit attending the use of this injection is, that it entirely removes the disagreeable fetor of most chronic ear-

discharges: this alone would render it of great value in the treatment of aural disease; but it seldom fails to moderate the discharge, where there are no fungous growths in the canal, or erosion of the membrana tympani.

One of the most striking forms of deafness, and fortunately one most easily remedied, is that in which, after catarrhal inflammation of the Eustachian tubes, the tubes and middle ear are gorged with thickened mucus, which often remains fixed the whole lifetime, unless accidentally displaced by a sudden respiratory action, as sneezing, or during the effort of vomiting. The most rational way of cleansing out the obstructed cavities would seem to be the injection of tepid water through an Eustachian catheter, as performed by Wathen. The same end is obtained, and much more agreeably to the patient, by the injection of compressed air, after the manner of Deleau. I adopt the latter, and find that a few operations, or even one, will break down the agglutinated mucus, and admit air to the tympanum, so as to reproduce the hearing in a most remarkable manner. After air has once been admitted it stimulates the membrane to pour out a fluid secretion (capable of being heard by the stethoscope), which appears to carry off the dissolved fragments of mucus by way of the tuba Eustachii. Such cases are by no means rare, and would alone be sufficient to confer value on Eustachian catheterism, even were there no other uses to which it could be applied in the treatment of deafness.

I now pass to the treatment of the third form of deafness, namely, where it is fully formed, where the active stages of the disorder have entirely disappeared,

leaving a thickened state of the mucous membrane, and an almost entire absence of the natural secretion both in the middle ear and the external passage. The disorder thus marked is by far the most frequent among the cases which come before the aural practitioner. The deafness is here sufficient to debar the patient from much of the ordinary intercourse of life; and until this is actually the case, a great number do not seriously think of seeking any remedy; they live on, flattering themselves that because they hear tolerably well at certain times, a change for the better must, sooner or later, occur.

There is, however, no hope of procuring a sudden change to the healthy state where disease has advanced thus far. Stimuli, such as electricity, galvanism, or irritant external applications, do in some cases produce striking improvement, but when the excitement of the organ has passed over, it invariably falls into a more distressing state of torpidity. For this reason such remedies are worse than useless.

The use of the air or vapour-douche, through the Eustachian tubes, daily for a considerable time, possesses more power over the disorder than any other means with which I am acquainted. It will not often effect the cure, but it will generally afford considerable relief. It has often enabled me to set down an ear-trumpet, and give as great a degree of hearing without the instrument as had been previously enjoyed by its assistance. Patients also experience a great degree of comfort from the use of the air-douche, even where no actual improvement is perceptible. Disagreeable sensations in the ears generally attend deafness, which the use of the air-douche dispels for several days. I

have often had to catheterise for months, at intervals of two or three days, persons whose deafness I had pronounced incurable, but who persevered in the operation from the comfort it afforded. The use of the air-douche simply, is often of much service in promoting the return of the membranes of the middle ear to the natural condition, restoring the mucous secretion to the dry surface, and favouring the secretion of wax in the meatus externus.

The use of the air and vapour-douche may be accompanied by other means to invigorate the constitution when this is required, and for the removal of any local disorder. I usually prescribe a course of sarsaparilla and the hydriodate of potash, in the doses adverted to when treating of another part of my subject. No medicine is more calculated to do good than this in the advanced stages of deafness. When the external passage is entirely dry, it will often render the canal moist, and call forth the secretion of cerumen. This alone is a great service; as, when all moisture is absent, the sensations are so troublesome as to give rise to frequent rubbing or picking, which disappear when the passage contains a due quantity of ear-wax. The promotion of the secretions affords great relief in some cases of tinnitus, though I am as yet uncertain what kind is thus benefited, tinnitus being by no means invariably attendant on a dry state of the passage. I believe it will generally be found that tinnitus is caused by a morbid sensibility to the circulation of air in the meatus and middle ear, and the variations of atmospheric pressure upon the membrana tympani, caused by different conditions, as occlusion, or constriction, of the Eustachian tubes; or it may be caused by bands of

adhesion in the cavity of the tympanum, the result of inflammation of its lining membrane. I think the resemblance between tinnitus and the sounds heard by listening to a shell or hollow stone is favourable to the opinion I have here advanced.

Counter-irritation will not often be of service in deafness of long standing. Ointments, containing veratria or strychnia, may be worth a trial, applied behind the ears: certainly not to the passage. Gargles may be used where any relaxation about the throat is complained of; and, in the very chronic cases, I also frequently advise patients to take a pinch or two of snuff morning and evening, so as to produce sneezing. Where, from the circumstances of the patient, frequent catheterism is impossible, this is the best substitute, producing, in a great measure, the refreshing effects of the air-douche.

When the sense of hearing is greatly impaired, the small amount of sensibility is of excessive value; therefore, every conservative measure which I have recommended on the first failure of hearing, should be of additional importance to the confirmed deaf, so that at all events every effort may be made to stay the natural tendency of the decaying sense to arrive at complete extinction.

Stricture of the Eustachian Tube.—Where this exists (and it does exist much more frequently than is generally admitted), it does not follow that the recovery of the hearing is impossible. I believe the removal of the stricture ought to be attempted, on the same principles as when present in the urethra. Dilatation, with a bougie, has not only been said to be a hopeless under-

taking, but the possibility of passing such an instrument into the tympanum has been denied. I admit the great difficulty of the manipulation; but still I have often succeeded in passing a fine whalebone bougie, as proposed by Gairal, into the tympanum. When it has been accomplished, the patient has felt as if the point of the instrument actually presented at the external meatus, and the sensation is so deceptive that it is usual to see him put up his finger, thinking to touch it. When, therefore, from the inability of injecting air, the absence of mucous gurgling, and the deafness supervening on sore-throat, there is reason to believe that stricture of the tube exists, the use of the bougie should certainly be had recourse to, and will, unquestionably, sometimes be of service. Iodine ought also to be administered in the manner, and with the intention proposed by Dr. Manson of Nottingham.

Polypi in the Outer Passages and Middle Ear.— Much has been written concerning this troublesome and frequent accompaniment of ear-discharge. Some have recommended astringent or caustic applications; others the ligature; and some excision by the knife. Their removal is, however, most easily effected by means of a triple-bladed forceps. The blades of the instrument should be insinuated along the sides of the polypus, as near to the point from which it sprouts as possible, so as to embrace its whole length, and then by pulling and slightly twisting, it may generally be brought away altogether. Those who recommend ligatures in such cases can scarcely know much about the matter, for generally the polypi which have grown to such an extent as to appear at the outer orifice of

the passage are so impacted within it, as positively to show the indentations and convolutions of the meatus upon their surfaces when extracted. The impossibility of putting a ligature round the neck or root, must, in such cases, be evident; the knife cannot be used, for the same reason. Besides, after all, it is making much ado about nothing; for the removal of polypi from the ear is one of the safest, and simplest, of operations connected with aural surgery. Every case on which I have operated in this way has done well. When the diseased growth is in its incipient stage, a careful inspection of the passage is necessary to make it out exactly, for it either springs from the walls of the tympanum itself, or from the surface of the meatus, near the margin of the membrana tympani. Surgeons should accustom themselves to look into the external meatus, as considerable practice is necessary to enable them to see any change which may exist at the bottom of this passage. The little silver speculum recommended by Mr. Wilde of Dublin, aided by Mr. Avery's lamp, will enable the practitioner to explore the passage of the ear with the utmost possible accuracy, and apply his remedies with precision.

With respect to tonsillary enlargement inducing deafness by interfering with the integrity of the Eustachian tubes, and keeping up a morbid condition of these and the tympanal cavities, I have before remarked that the diseased growth, from its position, is often more palpable to the touch than the eye. For this reason the throat should be always explored with the finger when it is supposed to be implicated. When the tonsils are arrived at a state of induration, operative means are indispensable for their removal. Previous to this con-

dition, local bleeding, counter irritation, emetics, and iodine, will be found the most successful remedies. In my earlier operations for the removal of these morbid growths, I tried all the means recommended by authors,—ligature, caustic, the guillotine knife, common bistoury, and scalpel, with none of which I could be satisfied. It seemed to me that a strong knife was necessary, which would not bend as the probe-pointed bistoury often does when opposed to an indurated tonsil, nor tear in the scissors-like manner of the guillotine, an instrument which, however specious in its appearance, will be found altogether inapplicable in practice, except in the rare cases where the tonsil is pendulous. The same, I believe, may be said of any apparatus for the application of ligatures. The scalpel I rejected, because of the risk of wounding the back of the throat with its point. To avoid these various objections, I imagined a knife with a hawk-billed extremity, strong back, and placed at an angle with its handle. With the assistance of a powerful-springed tenaculum, the surgeon acquires command over the morbid growth he is about to excise. To assure my readers of the perfect adaptation of the instruments, I need only remark that I have now removed upwards of 3000 morbid growths from the throats of more than 2000 patients, variously afflicted with the ailments to which these enlargements mainly contribute or entirely give rise, such as—imperfect, thick, and nasal speech; difficult deglutition, impeded respiration, throat-cough, throat-deafness, and though last, not least, the imperfect development of health and strength in youth. I have performed this large number of operations with these instruments without one failure or accident. If surgeons generally were aware

of the entire safety and simplicity of the operation, its more frequent performance would, I am sure, soon put an end to all debate on the description of instruments to be employed, and especially as to any difference of opinion of the curative results of the operation.

I am in the habit of performing the operation thus:—I place my patient opposite a good light, and on the mouth being opened to the greatest possible extent, I introduce the powerful-sprung tenaculum over the tongue, and include within its grasp as much of the morbid growth as possible, carefully avoiding the arches of the palate, which are sometimes adherent to the growth. I then draw out the diseased tonsil from between the pillars of the fauces diagonally across the throat, and over the bridge thus formed I introduce the knife held like a pen. As I cut forwards toward myself, I keep slightly dragging at the tenaculum, so that when the excision is completed, the morbid growth, tenaculum, and knife, are all withdrawn together at the same moment. The operation takes less time than will the perusal of this brief description of its performance.

The fears of the timid may be allayed by stating that the removal of a morbid growth from the tonsil is almost a painless operation, if performed with ordinary skill, and with a due regard to the mode of seizing the growth by the tenaculum. If more than the diseased growth be included within its grasp, pain necessarily follows; but it must be a clumsy and inexperienced operator who could thus manipulate. It may safely be set down as an axiom that if either pain or hemorrhage attend the operation, parts have been needlessly wounded, for the growth to be removed has neither

nerve to give pain nor bloodvessel to bleed. It is neither more nor less than a deposit of fibrin, the result of repeated inflammations.

ON OBSTRUCTIONS OF THE NOSE IN CONNEXION WITH DEFECTIVE HEARING (NASO-GUTTURAL DEAFNESS).

The disagreeable effects of obstruction of the nose on the expression of the face, the respiration, the voice, and the sense of smell, are well known; but its connexion with deafness has been little if at all noted, and yet I have no hesitation in saying that the majority of cases of deafness which come before me, labour under, or have laboured under, in the course of the disease, more or less obstruction of the nose. Not that such a condition is invariably attended by defective hearing, for there are few who have not at some time or other experienced the discomfort and inconvenience of inability to breathe through the nose. A large class of persons will be found permanently subject to this annoyance; and a much greater amount of evil arises from such a condition than has hitherto been imagined. The obstruction depends on chronic inflammation or thickening of the mucous surface, which throughout the windings of the nasal cavities and passages, goes by the name of the *pituitary, schneiderian, or olfactory* membrane. It often exists to such an extent as to block up the passage of the nose entirely; and thus obstructs the principal channel through which respiration is, or ought to be, performed, as well as impedes the performance of various other functions, which will presently be adverted to. Owing to the great difference in the calibre of the nasal passages in different

persons, it happens that in some the slightest tumefaction will cause obstruction, while in others their calibre is so large that it may exist to a great extent without producing inconvenience.

This kind of diffused enlargement of the mucous membrane, throughout all the convolutions and cavities of the nose, obstructs the passage quite as much as the presence of polypi.

Persons thus troubled are obliged at all times to keep their lips apart, or their mouth open, to enable them to breathe, and in time the features acquire a contracted and vacuitous expression, even in the most intelligent. As the mouth often closes involuntarily in sleep, the impediment to breathing becomes a frequent cause of broken and disturbed sleep, in the same manner as I have described when adverting to the effects of enlarged tonsils in this particular. This is especially the case in children. Cases are frequent in which they have a thickening of the nasal membrane to such an extent, that although it does not produce entire stoppage, yet the impediment is increased so as to render it complete, on the slightest accession of cold. Here the trouble to the breathing, especially in attempts to sleep, becomes quite as distressing as when the tonsils are seriously enlarged.

The voice also becomes much affected, the back part of the nasal passage being converted into a shut chamber; consequently, the sounds produced in the throat and mouth acquire a nasal resonance and timbre, which distort the voice even more than enlarged tonsils. From the want of a passage for the breath behind the soft palate, and through the

nose, there is not infrequently a great difficulty in pronouncing letters in the production of which the soft palate is concerned. In short, it is of essential importance to a proper method of speech, that the air should have free ingress and egress through the nose.

For the same reason, there is generally experienced a difficulty in hawking mucus from the back of the throat and the posterior nares. Expectoration cannot be properly and freely performed. From the same cause, also, there is frequently a difficulty, and even an impossibility, of blowing the nose, which is excessively inconvenient and disagreeable.

The effects of this kind of obstruction to the sense of smell are very perceptible. Without the power of inspiring through the nose, we lose in great measure the capability of drawing odorous particles within the sphere of the olfactory nerve. In addition to the difficulty thus occasioned, it is certain that a tolerably healthy state of the mucous membrane is necessary for the proper exercise of the sense. Common catarrh may be taken as an instance, in which the obstruction caused by the swelling of the mucous surface, and the alteration in the secretion from the nasal, or schneiderian membrane, either blunts or temporarily destroys the olfactory sense. Those in whom the nose is permanently obstructed by thickening of the mucous membrane, are much in the same situation, as, in addition to the simple obstruction, the secretion of mucus is generally disordered either by excess or deficiency.

But I was led to notice this disagreeable affection

more particularly, from an interesting case which came before me some years ago, in which the other evils I have described were combined with deafness. A well-known stockbroker consulted me for deafness, who for years had never been able to breathe through the nose. The mouth was consequently always slightly open, giving a vacant expression to the countenance, and the voice had assumed that peculiar modification and tone vulgarly, but erroneously, called *speaking through the nose*, owing to the closure of the windings and hollows of the nasal cavities. The obstruction in this, as in other cases, arose from a general thickening (the result of repeated inflammation) of the lining mucous membrane of the throat, nose, and ear. Catheterism of the Eustachian passages was employed with great success in restoring the hearing, but the relief of the deafness was scarcely more apparent and valued than the comfort afforded to my patient by being enabled once more to breathe through the nose, which had been accomplished by the frequent passage of the Eustachian-tube catheter along the floor of the nostrils. On the recovery of this patient's hearing, he was supplied with the elastic nasal probe, presently to be described, and has continued to use it ever since, with as much regularity as his tooth-brush, the one being, he assures me, as indispensable to his comfort as the other.

I have since seen and treated many cases in which deafness appeared to depend on the nasal obstruction to a much greater extent than in this case, where the affection of the mucous membrane extended into the ears. This induced me to seek for the cause which could produce such an effect; and I am come to the conclusion, that *a free state of the nasal passages, as*

well as of the Eustachian tubes, is of great importance to the acuteness and preservation of the hearing.

It is generally acknowledged that the presence of air is necessary in the tympanum, and also that the air should not differ greatly in temperature from the air on the external surface of the membrane of the drum. The means by which these requirements are provided for, are well known to be the Eustachian tube ; but I believe, in addition to this, a free state of the nasal passage is a necessary auxiliary, and that without it the function of the Eustachian canal cannot be properly performed.

This view is supported by the anatomical position of the mouth of the Eustachian tube, which points towards the external nasal aperture, and is directly in the line of the passage of air through the nose both in inspiration and expiration ; further, the trumpet-shaped extremity of the tube, and its direction, obliquely backwards to reach the middle ear, favours, and appears to provide for, the entrance of air to the tympanum in inspiration rather than in expiration.

It is not that simple stoppage of the nasal passages can cause deafness, because the nose may be closed without producing the slightest immediate effect on the hearing ; but I consider that when it is permanently obstructed, the want of a free circulation of air in the tympanum lessens the sensibility and acuteness of the auditory organ, or favours the accumulation of mucus in the middle ear. By examining my own sensations in ordinary expiration, I believe that air does not enter the tympanum during this act, but passes out from the ear with the expiratory stream of air escaping from the nostrils.

In a sudden and forcible respiration, when a greater quantity of air is attempted to be expelled than can find a ready exit, it happens differently. It then regurgitates, and rushes into the Eustachian tube and tympanum with great force, and can be felt to strike against the drum, or heard to escape through the external meatus in cases where the *membrana tympani* is perforated. The same occurs in yawning, in which, although the expiration is prolonged, it is more forcible than usual. In yawning, the greatest effect of this kind is produced when the act is performed in a subdued manner, with the mouth nearly or entirely closed. Air enters the Eustachian tube and middle ear to a still greater extent in sneezing—an act in which the communication between the air tubes and the mouth is sometimes shut off by closure of the palatine arches, so that the breath passes upwards, and escapes by the nostrils alone. There is in sneezing also a violent preliminary inspiration, which generally drives air up the Eustachian tubes with considerable force.

Hence it occurs that yawning and sneezing are occasionally the means of curing deafness, dependent on obstruction of the passages leading from the posterior nares to the ear, the sudden rush of air breaking up and expelling any inspissated mucus that may have accumulated therein. In many cases of deafness, also, which do not arise from obstruction, it is remarkable that sneezing and yawning frequently occasion temporary benefit, and improve the hearing.

Treatment of Obstruction of the Nose.—Before my attention became especially directed to the subject, I was accustomed to depend on medical treatment alone for the removal of nasal obstructions; acting in this in

accordance with the principles laid down in the medical treatment of enlarged tonsils. This plan was, and is, often of great service in dissipating the tumefied state of the mucous membrane; but from observing the great amount of comfort and benefit which occurred from passing the Eustachian-tube catheter, in cases where the malady was complicated with deafness, I was led to adopt an instrument fitted more particularly for freeing and enlarging the passages of the nose. At first I used the catheter for this purpose, but soon found it advisable to have a new instrument, straight, to avoid the curve which exists in the catheter, and flexible, to accommodate itself to any sinuosities of the passages. This shape and material fit the elastic probe for passing readily along the floor of the nostrils, without occasioning the slightest inconvenience, and without difficulty.

The effects of this instrument have answered my most sanguine expectations. It has relieved a large number of cases, to whom other kinds of treatment would have been ill suited and inefficacious. The majority of them were cases of simple obstruction; but it has also proved of essential service in cases of deafness, complicated with thickening of the mucous membrane. The passing of the probe once or twice a day soon dilates the canal to such a size as to permit the passage of air to and fro; and, in addition to this, it appears to exert a salutary influence on the tract of mucous membrane extending to the ear.

I have already developed my views relative to the condition of the mucous membrane in connexion with deafness; and it is in accordance with the principles laid down, that I consider the naso-guttural probe acts

in relieving deafness arising from disorder of the aural mucous surface.

Sternutatory medicines have often been recommended as a remedy for deafness, but for fulfilling the same intention, the probe will be found far more efficient. Its effects are somewhat different, though both, in appropriate cases, stimulate the nasal mucous membrane to a healthy action ; but the elastic probe is infinitely superior, because it mechanically dilates the contracted passages and does not rob the mucous surfaces of the natural secretion which is necessary for their healthy condition, but of which sneezing tends to deprive them.

It will not be out of place to remark that the habitual use of errhines, especially the common snuffs, has sometimes the effect of producing chronic engorgement of the mucous membrane of the nose, and thus occasions injury to the hearing and other functions.

In some individuals, the *septum narium* is inclined so much to one side, without any external disfigurement, that it is impossible to breathe, or to pass the probe, through the contracted aperture. Where this is the case, the operation should never be attempted ; and there is rarely any cause for it in cases of this kind, because of the increased size of the opposite passage. There are other cases, however, in which the nostrils and nasal canals are congenitally of small size, where the elastic probe, or any instrument capable of gradually dilating them, will be very beneficial. Of this kind was the case of a nobleman, whose nares were so small that the passage of the Eustachian catheter, in Paris, by Deleau (a very experienced operator), occasioned much pain ; but the careful performance of the same operation in this country, by means of a catheter of small

size which I had made expressly, afforded his lordship considerable relief, as far as the nasal obstruction, from which he suffered, was concerned.

Little, if any, instruction is required to enable a patient to manipulate upon himself. The following directions, however, will serve to elucidate the subject:—

Mode of using the Naso-Guttural Probe.—Until expertness is acquired, the patient should place himself before a glass, holding the instrument between the finger and thumb. He then introduces it into the nasal opening, in an *horizontal* direction. Being once inserted, the slightest force will cause it to glide along the floor of the nostril uninterruptedly, until its extremity strikes against the back of the throat, the sensation of which is instantly distinguished by the patient. Here it should be allowed to remain a few seconds, and then gradually withdrawn, to be introduced in a similar manner along the opposite nostril. The operation should be followed by blowing the nose until the passages are free to admit the ingress and egress of air to and from the lungs.

I am extremely unwilling that the instrument should be supposed to be vested with greater powers than it in reality possesses; but I am bound to express my conviction, the result of careful observation and experience, that in many cases of deafness, attended by nasal obstruction, by producing a healthy action in the mucous membrane of the nasal passages, and causing a free circulation of air through them into the Eustachian tubes, it will be found not only the means of warding off an increase of the disorder, but in many cases the means of essential relief or cure.

When it is recollected how many thousands of cases

of deafness, proved to be irremediable by ordinary means, are rapidly approaching by almost imperceptible gradations towards total deafness, the importance of any remedy which affords even a chance of arresting the disorder, still more of ameliorating or curing it altogether, will be duly estimated. One or other of these results will, I have little hesitation in saying, frequently, very frequently, follow the employment of the instrument in question. This is not its only advantage, as it proves, as I have said, of much service, by removing the obstruction to the voice, smell, and respiration, and is beneficial in other minor points.

I am in the habit of recommending an elastic tube and bottle, for the purpose of washing the back part of the nares, the upper part of the throat, and the mouths of the Eustachian tubes. In a tumid state of the mucous membrane in these situations, it is of great importance to apply astringents, or whatever else may be employed, to the parts immediately affected. This is very imperfectly done in the usual method of gargling, especially when the posterior nares and mouths of the Eustachian tubes are intended to be acted upon. The action of the veil of the palate in most cases effectually prevents the gargle from reaching its destination. With the elastic tube and bottle, this can be done with the utmost certainty, and in cases where deafness is occasioned by tumidity of the mouths of the Eustachian canals, with the most satisfactory results, cleansing away the vitiated secretion of mucus, and reducing the membrane to its proper condition, and thus enlarging the calibre of the tubes.

The apparatus is composed of a caoutchouc bottle for the reception of the gargling fluid, and of an elastic

tube to convey the fluid across the floor of the nostril to the mouth of the canal.

*Mode of using the Naso-Guttural Tube and Bottle.**

—The bottle being charged with the injecting fluid, the tube is introduced along the nostril in the same manner as the probe. Before pressure is exercised upon the bottle, it is necessary to withdraw slightly the extremity of the tube from the back of the throat, to admit of the fluid being expelled; or the contents of the bottle may be squeezed out during the act of withdrawing the instrument, whereby not only the throat and adjacent parts, but the nasal passages also, become well washed by the injection.

During the first two or three times of passing both the nasal probe and the tube, slight titillation of the nostril is produced, and sometimes the eyes become suffused with water for a few moments, but this is the only inconvenience which the operation (if such it deserves to be called) can occasion.

If the facility of washing the throat through the nose were known, it would not be long before it would become a general practice; for it is very certain that gargling the throat through the mouth, though so frequently recommended, is but rarely accomplished. Owing to the action of the veil of the palate, the gargling fluid is confined to the cavity of the mouth, and rarely enters the throat at all.

* The Naso-guttural Probe, and the Naso-guttural Tube and Bottle are sold by Higgs & Co., Chemists, 33, Piccadilly.

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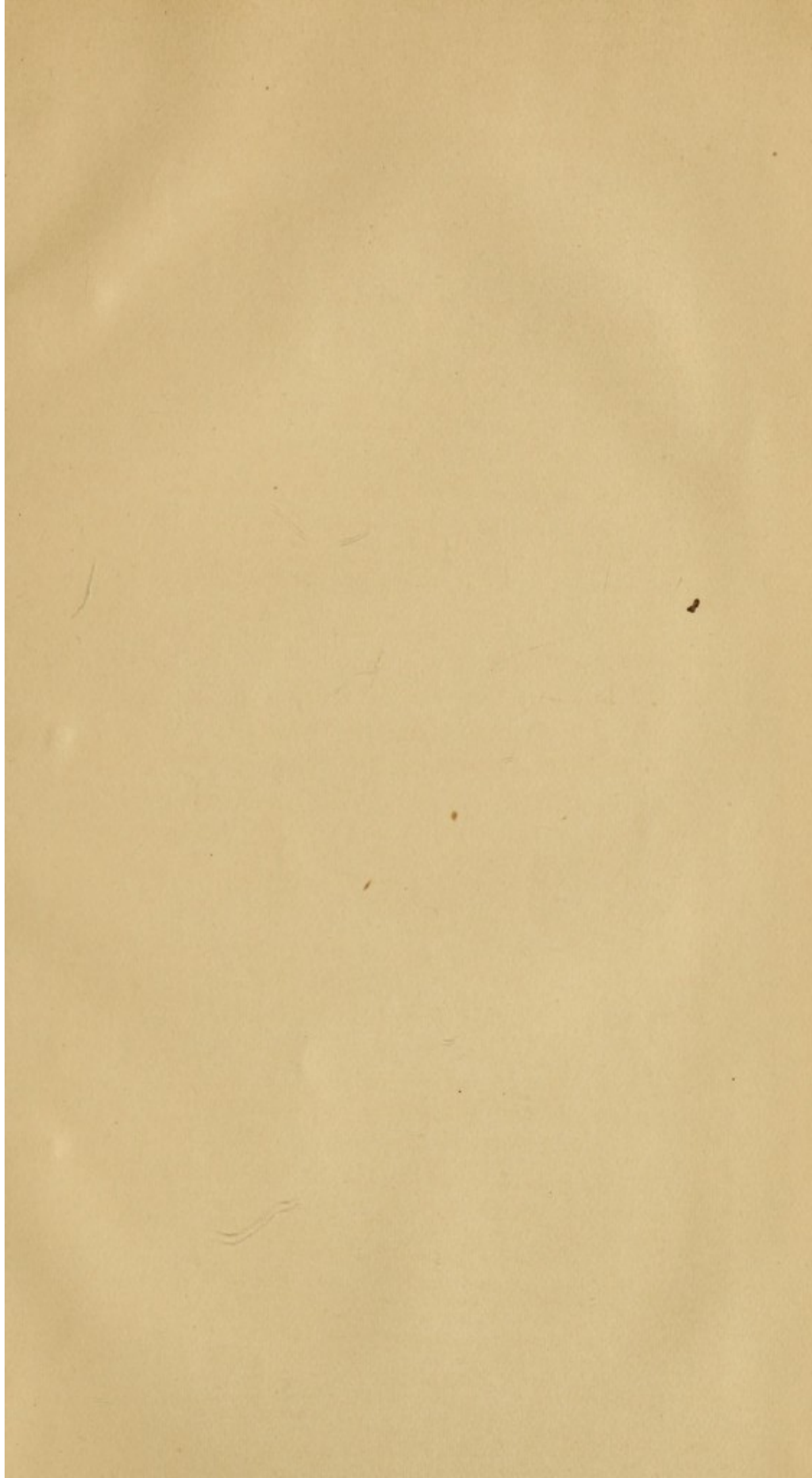
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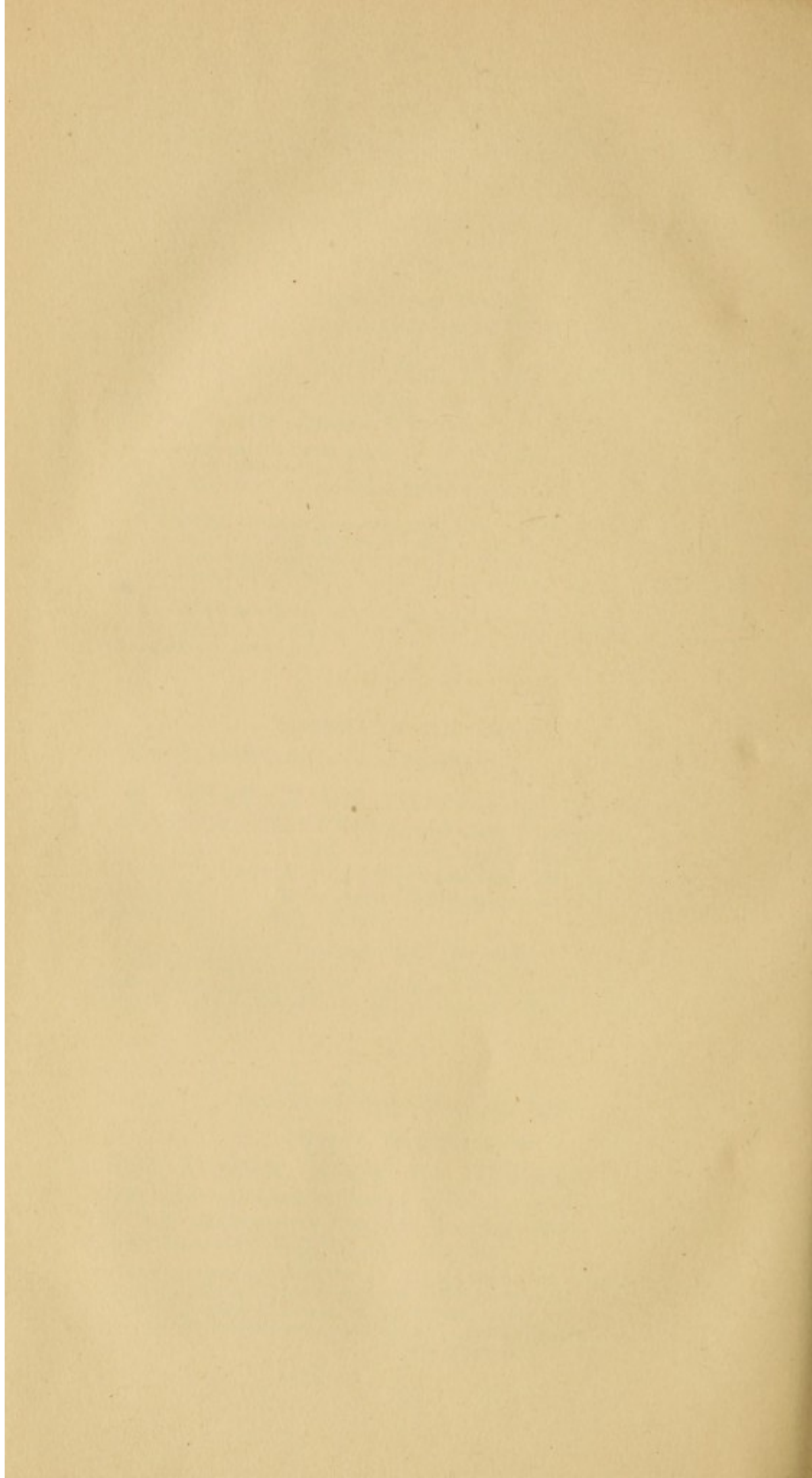
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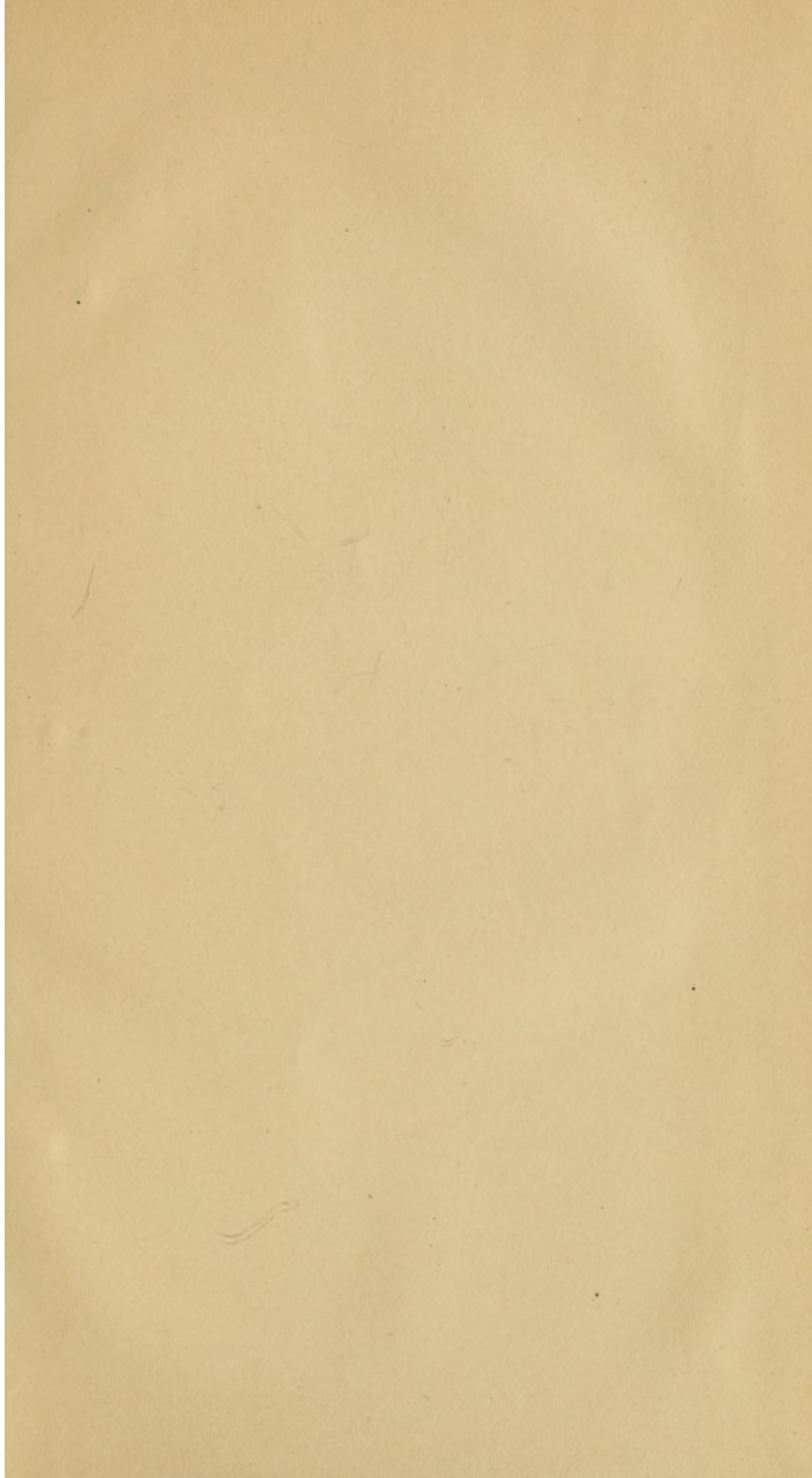
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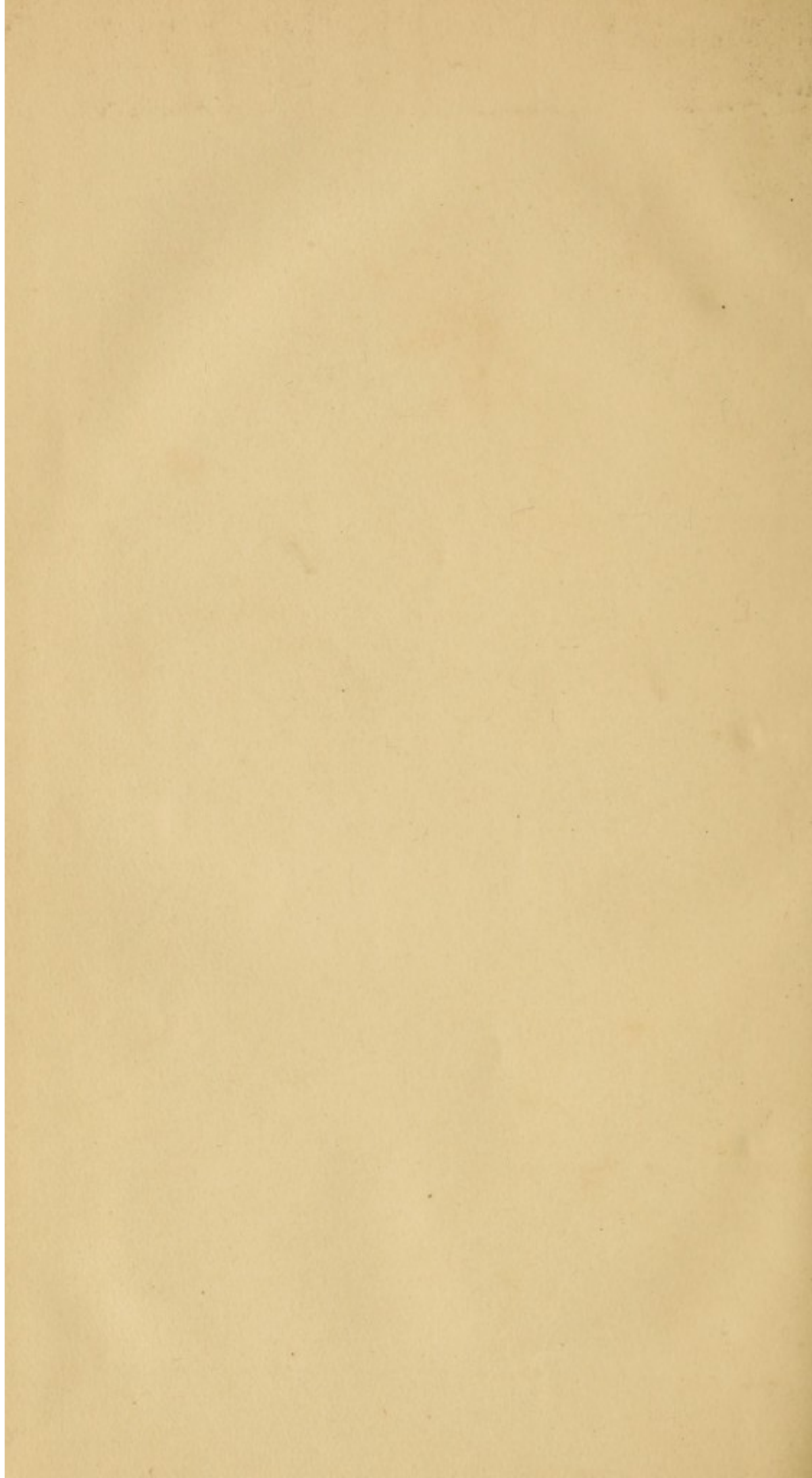
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