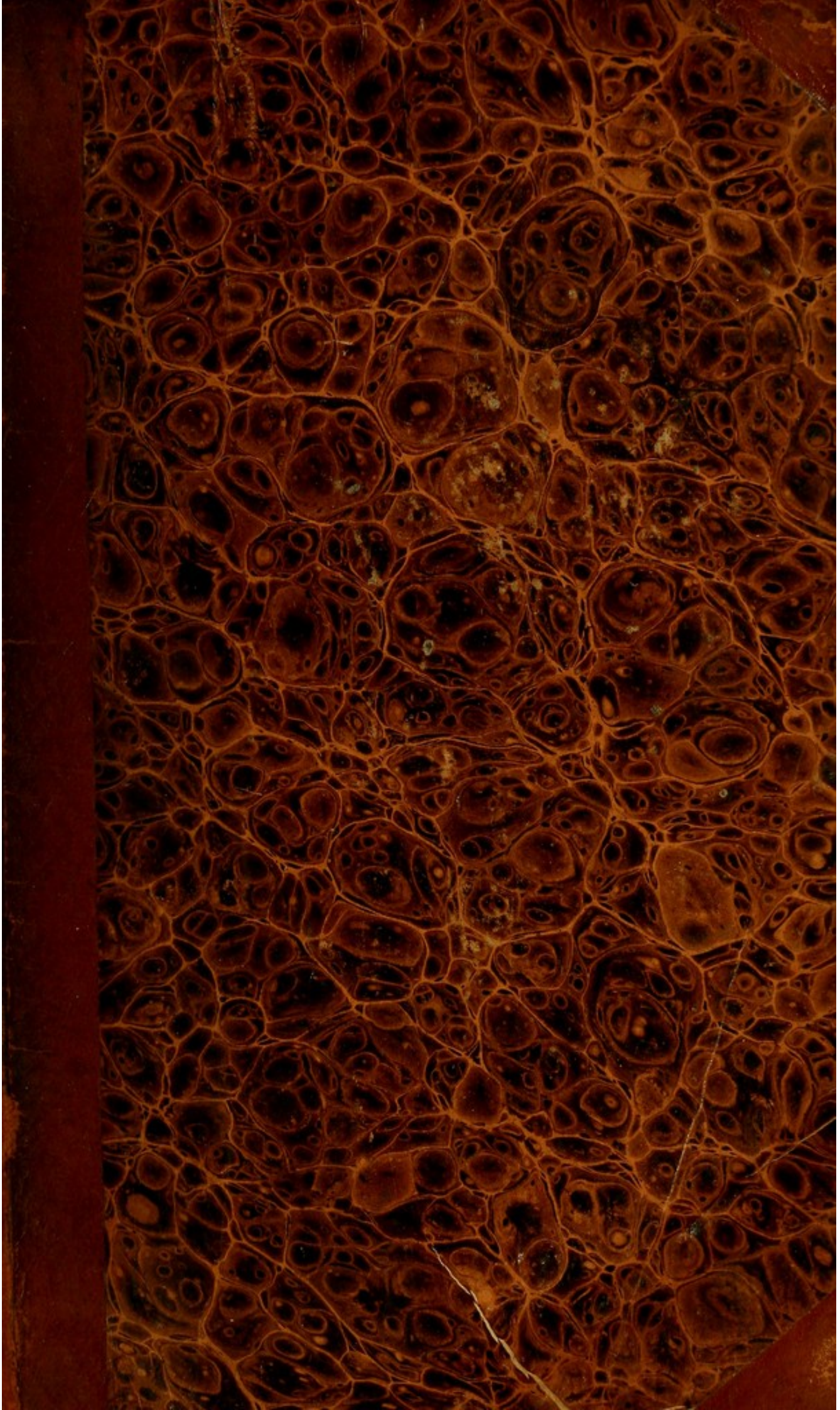
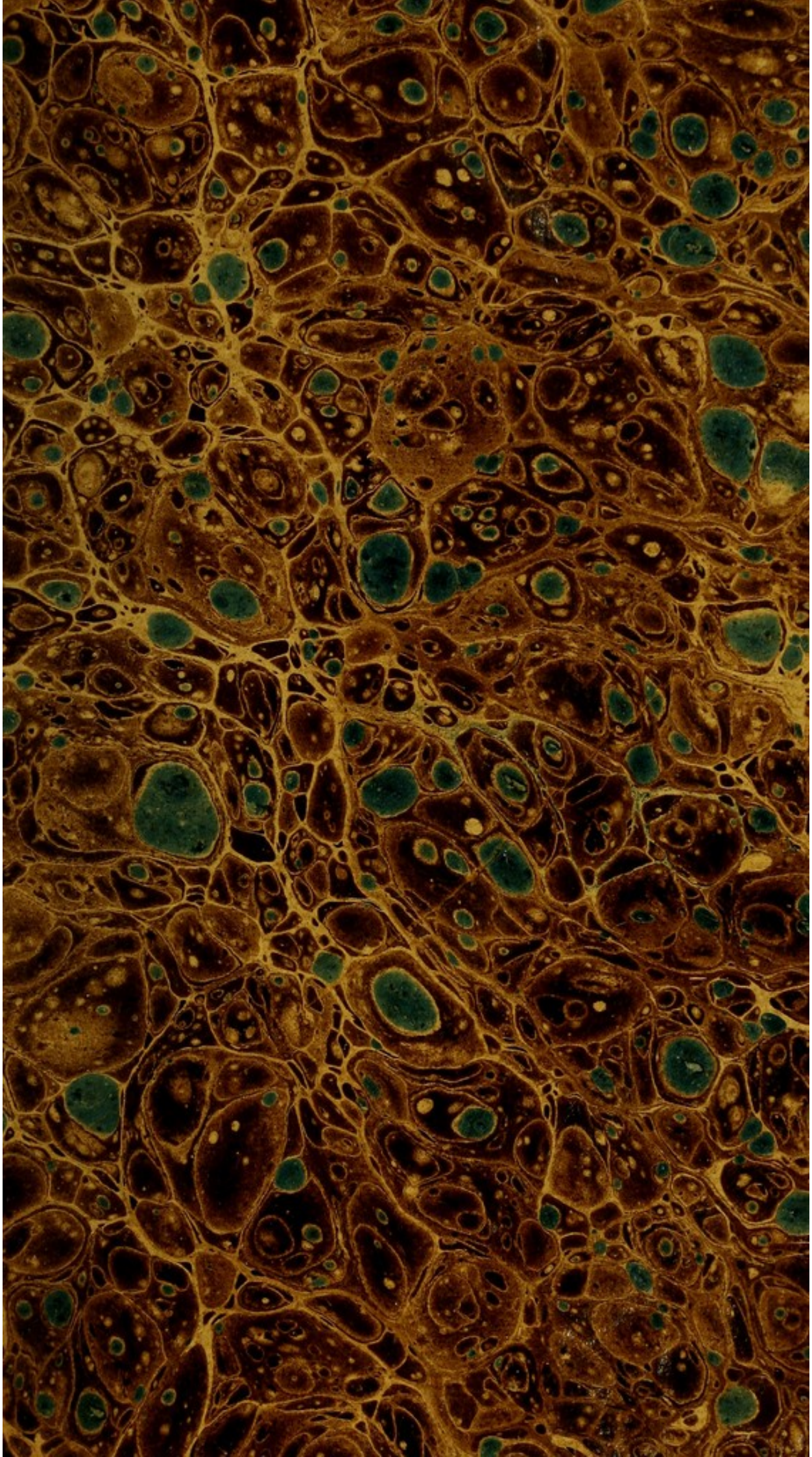
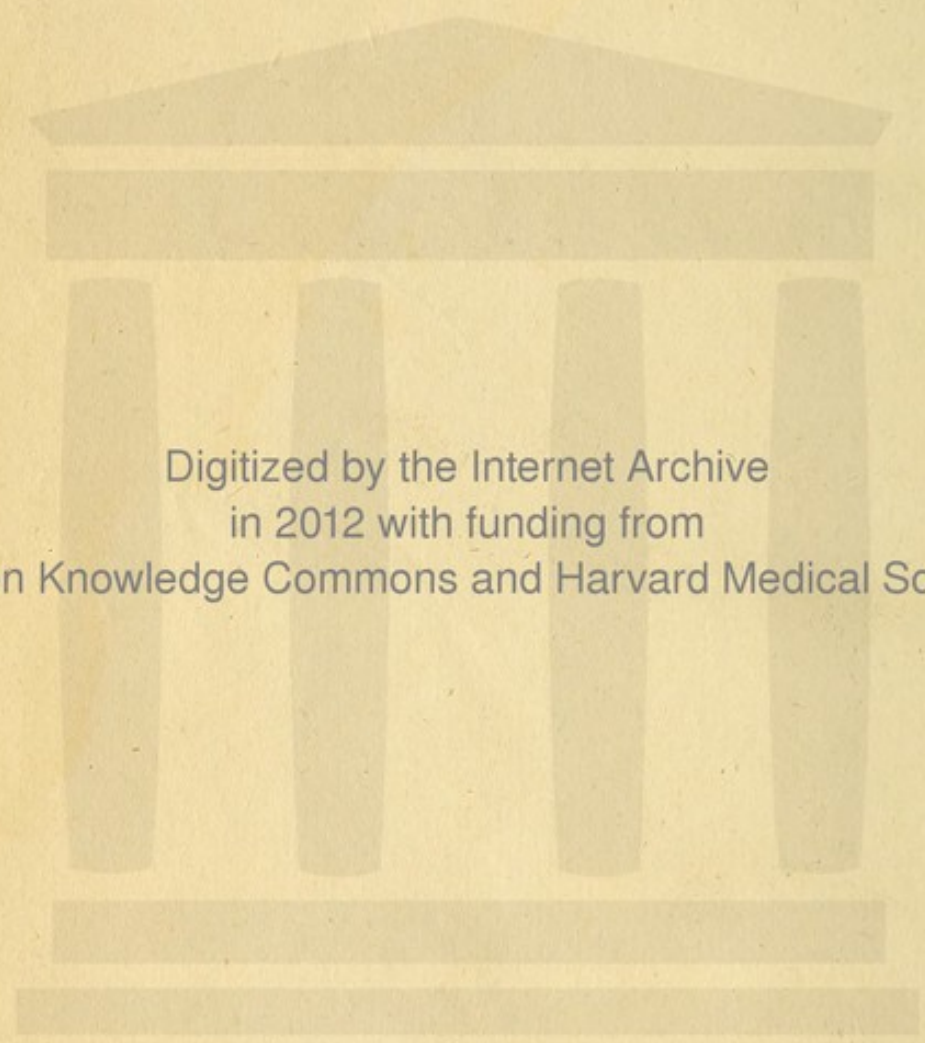
An essay on the human ear : its anatomical structure and incidental complaints : intended not only for the medical profession, but also, for the use and benefit of all persons afflicted with deafness, diseases of the ears, or those alarming sensations of noises in the head : including remarks on the causes and increase of the deaf and dumb : with cautions highly interesting to all mothers and families, by attention to which, such a calamity may be averted / by W. Wright.




JOHN C. WARREN





EXPLANATION

of the method recommended by Mr. Wright,

to examine the auditory passage of the EAR.

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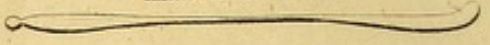
finger & thumb of the left hand holding the Auricle which is drawn
ly upwards to reduce the obliquity of the passage_B the finger & thumb
e right hand holding the Instrument C against the projecting
of the EAR next the face, opening the orifice for the admission of light.

C. an Instrument of Silver Wire

1

made of Silver Wire



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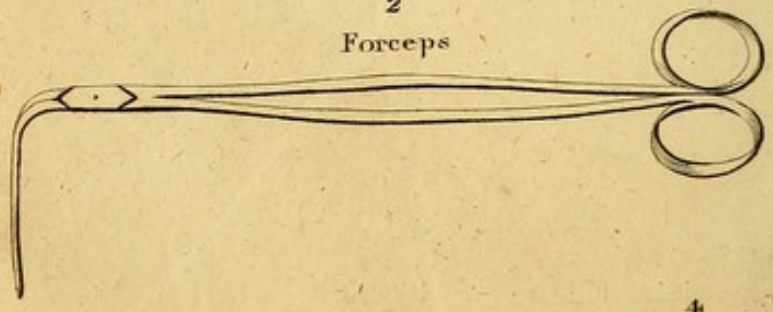

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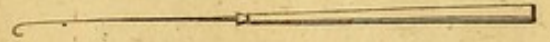
Fine Steel Hook



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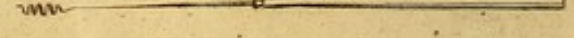
Fine Steel Screw



AN

ESSAY

ON

THE HUMAN EAR,

ITS ANATOMICAL STRUCTURE

AND

INCIDENTAL COMPLAINTS;

INTENDED

NOT ONLY FOR THE MEDICAL PROFESSION,

BUT ALSO, FOR THE

USE AND BENEFIT OF ALL PERSONS AFFLICTED WITH

DEAFNESS,

DISEASES OF THE EARS,

OR THOSE ALARMING SENSATIONS OF

Noises in the Head.

INCLUDING

REMARKS ON THE CAUSES AND INCREASE

OF THE

DEAF AND DUMB;

WITH CAUTIONS HIGHLY INTERESTING TO ALL MOTHERS AND FAMILIES;

BY ATTENTION TO WHICH,

SUCH A CALAMITY MAY BE AVERTED.

BY

W. WRIGHT,

Surgeon, Aurist, & Lecturer in Natural Philosophy & Chemistry,

No. 7, COLLEGE-GREEN, BRISTOL.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, ORME, AND BROWN,

PATERNOSTER-ROW; AND T. AND G. UNDERWOOD,

FLEET-STREET.

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of the method recommended by Mr. Wright

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A

C. an Instrument of Silver Wire

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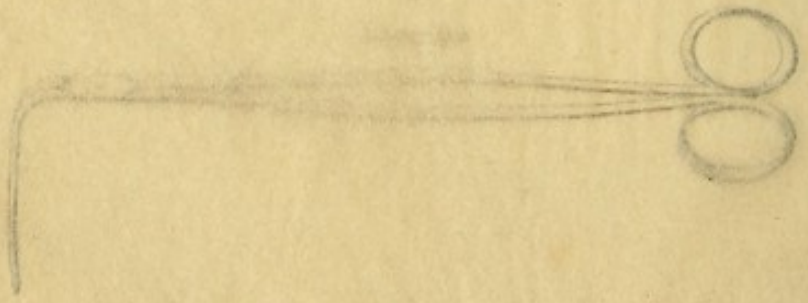

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ADVERTISEMENT.

WHILST in most departments of the healing art, the public have been continually indebted to professional talent, for the communication of fresh discoveries, considerable astonishment was excited, that no *native* abilities were displayed, in a publication of methods for relieving a diminution of the valuable sense of hearing, until Mr. Saunders, in 1806, gave an epitome of his researches and extensive practice.

IN presenting myself before the public, I am sensible of the difficulty of my undertaking; but having proved that my theory is well-founded, by successful practice, and the restoration of those deaf from infancy, and consequently dumb; I feel it a duty I owe to the community, to offer my mite for acceptance into the treasury of human knowledge; and

shall most conscientiously fulfil my duty, to the utmost of my abilities.

From the complexity of the organ of hearing, and the intricacy of its diseases, which I acknowledge to a certain degree, in common with Du Verney and Saunders, I claim, as they did, the indulgence, that this may be considered as an essay only; and shall feel highly gratified, should an explanation of the methods I have adopted, be useful in preventing or relieving the complaints of which it treats, or elicit from any person more capable, an enlarged treatise on the subject.

Some of my highly respected medical friends, who perused this work, before its going to press, have suggested, that the explanatory style of it, will enable empirics and incompetent persons to impose themselves on the public; but when it is considered, that the ignorant part of the community will ever be the dupes of this description of people, (several of whom have visited me, pretending deafness,

merely to observe the nature of my applications, and ascertain the form of my instruments) and that the more scientific orders will be able to form proper distinctions, I cannot see the possibility of any mischief resulting from the publication, particularly as I advise no harsh or dangerous applications.

That this essay may be useful to the world in general, I have given very concise anatomical descriptions, merely sufficient to elucidate my subject. Although in possession of the most valuable foreign and native plates, and original drawings, I have avoided introducing them, least the work should become too expensive; but at some future period, they may be submitted to the public, if it appears they are wished for.

From the extent of my professional duties, I have had but little time to devote to the consideration or choice of polished modes of expression; and I therefore trust, that, in the present endeavour to further investigate and

explain a branch of science, hitherto but imperfectly understood, where the object of research is to benefit mankind, the elucidation of useful truths, not the elegance of language, will be the criterion of excellence. In those cases where I dissent from the opinions or practice of others, I hope it will be believed. I do so merely from a conscientious idea that they are erroneous; and I shall be at all times ready to acknowledge any fallacy in my judgment, when convinced of it by sound reasoning, or the evidence of facts.

Some reason may be expected why the announcement of this work was made above three months previous to its appearance, I therefore feel it necessary to state that it has been handed about in manuscript above five months; and the delay arose from the time consumed in forming the necessary arrangements for its publication.

In concluding this address, I beg to return my warmest acknowledgements to my medical

friends, in various parts of the kingdom, who have not only afforded me variety of cases for treatment within their own practice, but have even placed themselves under my care, with the most implicit and flattering confidence.

W. Wright.

7, *College-Green, Bristol.*
Sept. 29, 1817.

AN ESSAY

ON THE

HUMAN EAR.

THE part of the human frame commonly called the ear, but scientifically the auricle, stands distinct from the head, and is formed of thick cartilage, the basis of which is albumin; covered externally with thin skin, and internally with a nervous membrane; muscles, nerves, arteries, veins, and small glandular vessels, complete the structure.

THE shape of the external ear, varies much, according to sex and age, but there are other peculiarities that obtain in all classes, and can no more be reasoned upon, or accounted for, than the difference of features.

THE auricle consists of different folds, terminating in a cavity called the concha, which from its formation, serves as a natural trumpet

to collect the sound, and produces a more forcible impression upon the other organs of hearing. When these folds are not well defined, the upper part of the auricle too close to the head, or the concha is very deficient in depth, there is a natural dulness of perception. Females indeed often injure their hearing in a mechanical way, by binding the ears flat to the head under bands, many of whom might be benefited by ceasing the practice, and wearing small bolsters behind the ears, which by degrees would bring them to their natural situation.

Wounds, bites of horses, or other animals, or in some countries, the ulceration or sloughing of the auricle arising from the part being frozen, may deprive persons of its assistance; and their hearing is accordingly very deficient, which can only be remedied by artificial means.

In wounds of the external ear, the success of the curative process must depend upon the abilities of the surgeon; and if the ear has not been entirely separated he should never despair of effecting a re-union. Sewing the cartilage was in these cases formerly deemed improper; but the modern practitioners use this method, if necessary, with advantage.

The concha is contracted near its centre, into a tube of rather an oval figure, denominated the meatus auditorius externus, or external auditory passage, which like the auricle, possesses diversity of shape and size, but in a more extensive degree; congenital imperforations of this passage, in consequence of a cohesion of the parieties of the membranous lining, are noticed in medical works; but no case of that kind has occurred in my practice, except, that during the period of writing this, I have been favored with the sight of the ears of a person aged about 22, of the city of Bath, and on examination find the concha of the right ear perfectly well formed, but there is no perforation whatever, or signs of an auditory passage; he can hear a watch as well with this ear as with the other, that has the auditory passage, although so very small, that a probe can with difficulty be introduced. He is diminutive in stature; as a mimic, his talents are considerable; as a musician, not despicable; and he is remarked in dancing, to keep most excellent time, which is extraordinary, as his power of hearing is far from extensive.

I have lately had a case of malformation of the bone, but from what cause I cannot trace; but with such considerable thickening and ap-

proximation of the sides of the meatus, that hearing was nearly destroyed. I applied slightly stimulative injections, and introduced hard twisted dossils of lint, properly prepared, which having widened the passage, the sense has returned in almost original perfection.

I HAVE had several cases where severe blows long ago inflicted, produced the deafness; in these I have observed considerable malformation, which I considered to arise from a fracture of the temporal bone, and an improper union having taken place. But it is not merely a malformation of the auditory passage that results from violence applied to these parts, as deafness, in some instances, presenting no appearance of disorganization, can be dated from this cause; whilst in others, I have had to relieve purulent discharges, and in one a polypous excrescence to extract, in consequence of the patient having received a contusion near the ear, about sixteen years previous.

THE degree of violence with which injuries of the head are inflicted, often occasion a rupture of the blood-vessels lining the meatus, and accounts for the flow of blood in such cases, from that passage.

Unusual smallness of this passage has also been considered a cause of deafness, and no doubt, generally speaking, it is; although as an exception, there is a lady in this neighbourhood, whose hearing was all her life very acute, and yet the auditory passage will scarcely admit a probe.

In a case where the meatus became from diseased action, still smaller, in a female about twelve years of age, attended with almost a deprivation of hearing, tendency to discharge, considerable fever, fullness of the vessels of the head, and habitual constipation, complete relief was given, and restoration effected, by bleeding freely, and the exhibition of active cathartics, syringing the ears with mild emollient lotions, warm; and keeping the meatus dilated, after the first symptoms had passed over, with small rolls of lint, well saturated with the ceratum plumbi compositum, increasing the size progressively for about a month; it is now near twelvemonths since I ceased to attend, and the constipation being kept off by a change in living, joined with mild occasional aperients, the patient continues in perfect health.

The cartilage of which the auricle is formed, does not extend far down into the meatus ex-

ternus, the upper part being merely covered with a membranous cuticle or skin, that lines the auditory passage; this skin is perforated with innumerable small ducts, leading to the sebaceous glands of the external ear, and through which, the cerumen or ear-wax is excreted.

If we consider this cerumen, as acting upon a mechanical principle, we shall see its utility; for it lubricates the auditory passage, and by presenting an unequal surface, adapts it for the perfect conveyance and refraction of sounds. As a comparison, if a German Flute is too dry, sound is produced with difficulty, because, although the same column of air passes through it; there are no little inequalities in the internal surface to interrupt its progress, and produce a vibration; so it is with the ear when the meatus is dry and hard; insensibility of hearing is inevitably the consequence.

If the flute, on the contrary, is dipped in water, imperfect, shrill, and discordant noises are the result, from the opposing principle not having sufficient tenuity to produce the proper refraction and vibration; here the similitude again will strike any person who has paid attention to the ears; when they are in a state of

relaxation, and too great moisture, vitiated hearing generally follows. But pursuing our theory, if the flute has been saturated with oil, and left a short time to dry, the pores of the wood absorb what is spread over them, whilst, on the harder parts, it remains in small glutinous globules, which produce a full and perfect refraction, and vibration. The comparison here is still correct; in the well organized ear the small ducts of the glands exude their contents, which stand in minute innumerable protuberances, and looking at an ear of this kind in a good light, it presents the appearance I have pointed out; the cerumen is about the consistence and colour of new honey, and every sound is conveyed to the other parts of the organ, and thence to the senses, in full, perfect, and natural tones.

Having so far considered the cerumen in its mechanical agency, and as acting upon the principle of acoustics, we will next turn our attention to its physical uses; it is, therefore, proper to observe, that the glands from whence it exudes, are dependant on the external nerves and arteries of the subjacent parts, and the latter possess a considerable degree of irritability, which must necessarily communicate to the glands their action, when the system is

deranged from particular causes. Upon this reasoning, therefore, I have founded in some measure my methods of treatment, from the consideration that as medicine properly exhibited will regulate the health of the system, and the tone of the remote parts, it necessarily follows, that the more particular glands and vessels of the ear must participate in the common advantage, and from experience, I am satisfied of the truth of my reasoning, that nine-tenths of the obscure cases of deafness, and vitiated hearing, must be attacked internally, if we wish to conquer the latent enemy, and restore the comforts of our patients; which we shall further consider in the course of this essay, and, I trust, demonstrate beyond a doubt.

It may be very properly inquired how the superabundance of cerumen is naturally to be carried off; to account for which the science of chemistry must be resorted to for assistance.

It is well understood that the skin possesses absorbent and excretory vessels; the latter of which we need only take into consideration. From chemical analysis, it has been discovered that the nature of these excretions are nitrogenous, or truly alkaline in their properties: now, if we mix certain proportions of this gas

with atmosphere air, a reduction in volume will be the result, as the oxygen contained in common air is absorbed, or, I may say, annihilated, in consequence of the mutual attraction; and reasoning upon the fact, that atmosphere air is composed of solid bodies, expanded by caloric or heat into aerial vapour, my argument will not appear chimerical in supposing that oxygen, which forms one of its constituent parts, should produce an absorbent action on these excretions; especially when we daily see metals and every other substance decomposed by it, and as the health varies, so the cerumen, by an alteration in its nature, may have less of that property which the oxygen of the atmosphere can neutralize, and accumulations of gross impurities are therefore deposited, occasioning stoppage in the ears.

Sometimes the auditory passage is incrusted with a species of dry scurf, or scales, and on analysis these exudations appear in some instances to be dried fibrin, and in others albumin, frequently joined with ceruminous particles. These cases are very common, and are generally attended with noises in the ears, pains in the head, and often a tendency to constipation; from there being no visible cause, it is ascribed to nervous affections; the whole

class ,of nervines are immediately resorted to, until at length the patient tired out with medicine, sits down satisfied of his or her nervous debility, and hopeless of relief.

These scales or scurf are detached by some ears, in such large portions, that they obstruct the sense of hearing from their mechanical action; and so considerable has frequently been the accumulation, that much perseverance was required to extract them; but by the proper means being used of softening the lining of the passage, a careful use of the syringe and forceps, I have never been baffled in the attempt, or deceived as to their removal producing a restoration of hearing.

In the East Indies, and hot climates, this species of scurf or scales is very common, and forms a complete lining to the auditory passage; some of the natives make it a sort of business to cleanse the ears of this collection, by means of small instruments adapted for the purpose; but too frequent repetitions of the practice, by these persons who know nothing of the structure of the ear, is found injurious, by causing erosion and inflamation of the membranous lining, which brings to my recollection that a caution may not be improper against the use

of ear-picks, or any other hard substance, unless covered with cotton wool. There also exists in India an opinion, that a very minute species of serpent natural to the country, but not very common, has a great tendency to insinuate itself into the ears of men, or beasts, and all attempts to extract it generally irritate it so much, as to occasion the exercise of its poisonous power, which proves instantly fatal.

Allowing that it is either albumin or fibrin, of which the exudations are chiefly composed, it will seem there must be a superabundance of these qualities in the blood; and as it is well understood that the whole class of nervines promote coagulation, it necessarily follows, that the evil must be increased very considerably by persisting in such a course.

The late Mr. Saunders treated several of these cases, as he considered successfully, upon the antiphlogistic plan, and although the calomel, cathartics, and blisters he used might give relief for a time, yet I have reason to believe, these methods will never effect a radical cure; indeed, as this scientific, and I may say conscientious gentleman, Mr. Saunders, gave up his dispensary for diseases of the ears, in 1814, (as appears by the Monthly Magazine for March

in that year,) in consequence of his thinking no means existed for remedying the defects of that organ, and an intimate friend of his assured me, that out of 1200 cases of this species of deafness, six only were relieved; I feel myself warranted in saying, that I do not think the means he used, adapted to attain the desired end; and from a conviction of their inutility, upon physical reasoning—a consideration of their chemical action—my own early experience—and the sufficient trial Mr Saunders gave these methods, I shall never be brought to believe they can be usefully applied to relieve the extreme cases of this nature, frequently presented by the persons who are deaf and dumb, until men of science and character, after full and patient experiment, and investigation, prove my opinions erroneous, for which I shall accept no evidence except their testimony, or that of *persons* who are *above* being *influenced* by any *consideration*, than that of *truth!!!*

The principle Mr. Saunders acted upon, although he did not clearly define it, was, I conceive, that a decrease of muscular strength might increase the nervous sensibility; but, who that has had opportunities of forming a judgment from actual examination of, or intercourse with, these unfortunates, can assert with truth, that *they*

are deficient in general nervous sensibility? indeed, from the circumstance of their exquisite feeling, as will be seen when I come to a consideration of the action of the ear, in the communication of sound to the senses, it will be evident such cannot be their situation, and therefore we must look to other reasoning upon the subject, and treat the misfortune accordingly, not only as a species of local obstruction of fine and delicate vessels, arising from causes hereafter to be explained, but also in these, as in all cases affecting particular parts of the system; the general health of the whole body, and the natural concurrent action of its various parts, so conducive to perfection, should be the object of attention. The mineral medicines recommended in these cases are not only inefficacious, but even injurious; for I have had several persons under my care, who, after a course of mercury for syphlitic affections, have, through the advice of their Physicians and Surgeons, become my patients, in consequence of deafness, noises in the head, &c. and received relief by perseverance in a different mode of treatment.

Syphilis itself often occasions deafness, and various other diseases of the ears; in all of which it is scarce necessary to observe, that the proper methods of removing the inducing cause

must accompany, or precede the attempt to afford relief from the local complaint.

It is not possible to lay down general rules for the treatment of these cases; for such are their variety, and inducing causes, that they perpetually present new features to the practitioner, and give full exercise for discrimination and study in applying suitable remedies. Sudden checks to perspiration, from changes of temperature, or what is commonly called taking cold, generally afford a period from whence the misfortune can be dated; and repeated examples have enabled me to say, with a degree of certainty, that if the first sensations of noise in the ears are only treated with common attention, and medicines proper for the removal of the original disease of the system freely administered, the local affection will also be almost instantly relieved, especially if aided by topical applications; but the contrary practice unfortunately prevails, and hot stimulating remedies are the only means resorted to; amongst which, even blisters to the internal parts of the meatus have been most injudiciously and injuriously applied.

The class of medicines most useful, are combinations of saline with vegetable cathartics; alkalies, or vegetable productions alone, of the

same nature, prescribed with due attention to age, sex, and constitution.

It frequently happens that a slight hectic fever attends or precedes this affection of the ears, which must be first removed by the usual modes of practice; and the diaphoretics usually administered on these occasions, mostly produce very beneficial effects.

The topical remedies must be regulated with great caution, according to the state of the part to which they are applied; they consist chiefly of stimulants, well mixed with oleaginous particles, or formed with distilled waters of different natures, into chemical compounds by the action of mild alkalies, in the manner of emulsions; amongst them, oil of turpentine, and similar products are eminently useful, both from their stimulating powers, and, as forming such an excellent menstruum for cerumen. Oil of sweet almonds, is not only in some instances a vehicle, but if good, is also highly serviceable from its lubricating and emollient qualities. The modes of applying these are either by using them as injections, moistening the ears with them by cotton wool, on a silver flat-headed probe, No. 1, or introducing dossils of lint or cotton-wool, well sa-

turated with the preparation into the ears, by means of forceps; where it is allowed to remain for two or three days, then removed and replaced with fresh; altering the properties of the remedy as the ear will bear it.

It may appear a trifling circumstance, to prepare these cottons for the purpose, or place them in the ears, but there is more delicacy in doing so, according to the nature of the ears; and more care to be observed in the method of introducing them, so as to obtain the desired effect, than can be imagined by any person not acquainted with the subject; for which it is impossible to give directions, further than to advise that they are made proportionable to the orifice, not hard twisted, particularly the end; and in placing them caution should be used that they do not press upon the membrana tympani.

It is not always that the auditory passage is in the dry state before described, although the case may have been called nervous deafness, as the meatus is sometimes very moist, and the cuticle looks as though it had been sodden in warm water; the noises in the head and ears, with other symptoms, are here frequently the same, and may occur from a considerable in-

crease of the former affection I have mentioned. The blood in its circulation through the minute vessels of the lungs, may, from latent causes, constitutional disease, or mode of living, have a greater tendency to secrete and retain a superabundance of the oxygen or acid of the atmospheric air; now, as acids act as astringents, it can be easily conceived that these pores or glandular ducts, may be, as I before observed, dried or closed up, in some degree internally from this cause, and externally, by excessive heat exhausting the moisture, or excessive cold producing a torpor of the vessels; or even local fibrile affections, arising from the effects of catarrh, and the exudatory matter being albuminous or fibrinous, and not naturally calculated to pass through them, but forced forward by the propelling power of the blood; laceration, and consequent minute ulceration, with exfoliation of the cuticle, must necessarily ensue; and, thus, these scales and scurf in the meatus, may, I think, be satisfactorily accounted for. When these effects have continued some time, larger ulceration of the orifices of these vessels take place, and, from the moisture continually produced by that cause, and the usual transpiration from the vessels of the ears, the auditory passage is found in the sodden state I have pointed out.

In like manner, as when the ears are in the the dry state, many persons from modes of life constitutional derangement, or even adventitious causes, produce and detach this moist kind of skin in such quantity as to occasion a great diminution of hearing, attended with considerable pain, and the pieces extracted are in some instances of considerable size; on their removal, recent or existing ulceration is discovered, therefore, the mildest means of extraction are clearly indicated; and although the progress of a radical cure must depend greatly on the condition of the internal parts, yet, by attention to the general health, and the means I have before recommended, there are few cases in this stage so obstinate as to resist persevering endeavours. It must, however, be recollected, that if aggravated by neglect, or increased action of the vessels, from exposure to sudden changes of temperature, or other causes, they frequently vary in appearance, and produce an ichorous discharge, which inspissating in the meatus from the evaporation occasioned by the air, not only renders the sense of hearing dull, or in some cases almost obliterates its existence, but provides a foundation for much greater evils. The discharge is often accompanied with a very unpleasant fœtor, and the longer the accumulated substance remains unremoved in the

auditory passage, the more offensive it generally is, while a long sufferance of it there proves injurious, as its acrimonious quality causes the disease to spread, until not only the health of the membrana tympani is affected externally, as scarlatina sometimes sacrifices it by an inward attack, but excrescences of fungous flesh form in the meatus. Medicines tending to correct the blood are clearly indicated in cases of this nature; calomel is useful if exhibited with judgment and discretion, merely as an alterative, followed by proper medicines.

I HAVE found in my practice vegetable cathartics, probably from their natural combinations of alkalies with tanning and other qualities, highly useful in many instances. Some attention to diet will also be necessary, abstaining from wine, spirits, or strong malt liquor, and moderation should also be observed in eating, both in quality and quantity, at any one time, thereby assisting the digestive powers, and progressively communicating health to the system.

TOPICAL applications are also various, but require much attention on the part of the Surgeon; the chief are mild astringents, such as weak solutions of liquoris plumbi acetatis, so-

lutions of sulphatis zinci, in aquæ rosæ, or sometimes infusum rosæ, mellis rosarum, et argentum nitratum, in the proportion of 3 grains upwards, according to circumstances, to about 6 oz. of the first, and one oz. of the second. A diluted decoction of the oak or cascarilla bark, or nut galls, with or without alum, or added to some of the former, is serviceable in particular cases.

Let it not here be understood by any one unfortunate enough to become a patient, that a restoration of hearing is always the result of a removal of this diseased action, or that the natural tone of the vessels immediately return; great discrimination and perseverance is required to produce that effect; and the chemical union of oleaginous and mildly stimulating preparations, with some of the former aqueous solutions, by means of mild alkalies, I have found successful in producing the true natural secretions of the ear, and the tone of the constituent parts forming the organ of hearing.

The next stage of the disease we have to mention is, where polypous or fungous excrescenses have been formed in the meatus, which differ very much in appearance and texture, some being perfectly soft and flexible,

covered with a thin skin, and on the slightest pressure, yield a species of pus of a pale red colour. The visible commencement of this species is mostly characterized by considerable pain in the ear, a slight symptomatic fever, with all the concomitant consequences; these cases, if neglected, frequently assume a serious aspect, and proceed even to threaten life itself.

The antiphlogistic mode of treatment will *here* be evidently pointed out to the practitioner; general bleeding, or local by leeches, or cupping, will be found useful; cooling drinks, in which the acid is blended with saccharine properties, and rendered grateful by aromatics, should be freely given; also frequent cathartics, and sometimes antimonium tartarisatum, sufficient to produce and keep up a degree of nausea, will be advantageous; whilst the ears are washed, twice at least, every day, with a warm solution of some of the mild lotions before-mentioned, by means of a syringe.—When the pain, fever, and inflammatory symptoms are gone, the polypous excresence is in some instances reduced also; but if not, the surgical means of extirpation may be commenced, previous to which, it will be advisable to try the astringent injections before-mentioned increased in strength. If these do not produce

the desired effect, it should be extirpated by the ligament or forceps, according to size and situation, and the part carefully touched with caustic, (argentum nitratum, according to Mr. Saunders's recommendat on, I have used with success,) taking care to bring off any eschar that may form at the proper time. Previous to removing polypii of this kind by the forceps, I have found it useful to touch them with a small piece of lint placed on a probe, or with a camel hair brush moistened with a strong solution of caustic; and this mode, I think, has been useful, not only in giving firmness to the skin of the tumour, and thereby enabling the operator to have a more secure hold, but the escharotic also destroys the sensibility, both of the excrescence and surrounding parts, whereby the pain is considerably diminished; and if attention is paid to the proper time of performing the operation, it is not near so severe as might be supposed.

When these tumours are situated in the bony passage of the meatus, they are not only more difficult to extract, but more dangerous to the patient in their terminations; and although the first appearance is attended with very mild symptoms, perhaps only a few lancinating pains, yet on no account should the warning be unat-

tended to, as, from slight attacks of this description, apparently of little moment, the most serious effects often ensue; for if these tumours are suffered to remain, they gradually increase in size, particularly if the exciting or predisposing cause is not removed, and the pressure being slowly progressive, the pains are unceasing, active inflammation necessarily succeeds, until the disease assumes a malignant, truly cancerous aspect, and the tumours are then denominated carcinodes, or cancerous polypii. By the continual pressure, the membranous parts ulcerate, a fœted discharge blackened with blood from the already sacrificed vessels follow, the bone becomes carious, general ill health, weakness, and stupor supervenes, until death puts a period to the sufferings of the patient, and although fortunately such aggravated cases are not common, yet many families have to deplore the loss of beloved relatives from these slight original causes, which, if properly attended to at their commencement, would probably not have assumed such a degree of malignancy, as to baffle all the efforts of human skill to counteract.

When these tumours are situated nearer the orifice of the meatus, they may grow to a large size without much inconvenience, except diminution of the sense of hearing; nevertheless,

the same means of extirpation (either the ligature or the forceps) should be resorted to.

I HAVE seen many cases where excision had been practised, but always unsuccessfully, as to a radical cure. In extirpation with the forceps, whenever from situation it can be done, the polypus should be taken hold of firmly, as near the root as possible; the instrument must then be slowly twisted, whereby it is more likely to be brought away entire, and we have a less hemorrhage; this, however, can be stayed without difficulty, by the application of argentum nitratum, which I generally have scraped sufficiently taper to force into a quill from its large end down to the point; it is then easy to expose as much of the caustic as is necessary, and by fitting a hair pencil stick to the quill, it is convenient to use; at the other end of this stick a camel-hair pencil may be placed with advantage, to apply a strong solution of the same caustic, and by these means I never fail of staying any effusion of blood; indeed, a stronger solution of sulphate of zinc, or even Goulard's extract, will frequently be sufficient to effect the desired end.

THE actual cautery has also formerly been resorted to in some cases, where the excrescence was superficially situated, but not with

such success as to induce its use. Let it however be fully understood that none of these external means can be possibly serviceable unless medicine is also called in to aid them, and remove the inducing cause; therefore it will be evident, that although surgical aid will be highly necessary, and cannot be dispensed with in these instances; yet, the physician can assist the restoration of the sense of hearing, or prevent a vitiation of it, far more than is commonly believed, and the mere operative surgeon, must often be dependant upon medical knowledge.

The buzzing noises in the ears, I look upon to be chiefly an affection of the external parts of the ear; by which, I mean such parts as are under the influence of the external part of the auditory nerve and vessels; and reason upon them, from the supposition, that as the excretions from the ducts of the glands which we have mentioned, must necessarily extend the vessels, by the too large proportion of albumin or fibrin, which I suppose those excretions in this state of the disease to be composed of; and these vessels being so infinite in number, and dispersed amongst the external nerves of the ear, the continual force exerted to cause these unnatural excretions to pass, or even the constriction of the vessels, from the causes I have be-

fore mentioned, and, thereby, the natural exudations being retained, must produce a considerable vibration on the filaments of the external nerves, and, by sympathetic continuance, may convey that sensation to the organ of hearing; whereby imaginary noises, according to the cause and variety of the disorganization are consequently experienced.

As I proceed, and come to the internal parts, I shall further endeavour to elucidate this subject, and, therefore, shall at present finish with this illustrative explanation of my theory; most of us who have experienced violent headach, can recollect, that in paroxisms of pain, the pulsation of the artery at the temple has been so strong, that it was not only felt, but, by the sufferer could be heard; this arises from the increased action of the blood through the artery, which passing across the plentiful distribution of the hard portion of the auditory nerve, over the temples and cranium, the vibration is, I conceive, produced in the manner I have advanced, and communicated to the more sentient and internal divisions of the ear.

As I intend to conclude my observations on the external parts of the ear, before I proceed beyond the membrana tympani, except some

general remarks on the prevention and means recommended to cure deafness, it will be highly proper to point out the method of ascertaining the state of the meatus auditorius externus; for which purpose, the etching opposite the title page, will, I trust, be fully sufficient, by a reference to the accompanying explanation.

The patient being thus placed, I am enabled in a very moderate light to *see* in most ears the membrana tympani, and never trust to any probe; being fully satisfied from the relation of many respectable persons, that much pain, together with frequent injury, has been occasioned by those who resort to such imperfect means of examination; and, from the facility which the method now recommended presents, I think it is highly preferable and satisfactory. Dilating the ears with forceps which are sold for the purpose, is also such an unpleasant mode of examination, to say the least of it, that, with the use of the probe on these occasions, it ought to be discontinued.

There is sometimes a difficulty in examining the ears, from the obstruction to the view, which the down or small hairs, that in some patients line the auditory passage; in these cases

cotton-wool twisted on the instrument No. 1, thickly covered with any innocent cerate of a proper consistence, being introduced and turned round one way, will cause the down or hair to adhere to the sides of the passage, and enable the eye to command the whole meatus.

I HAVE met with a few cases where a species of malformation in the commencement of the bony part of the passage, presented a kind of ridge, over which I have found it difficult to see; but, by a strong light, leaning the head considerably, while the obliquity of the meatus was altered, as before-mentioned, the obstacle was generally overcome; although in some instances, the formation was such, that it was impossible to see the membrana tympani; and therefore a consideration of other symptoms were necessary to form a judgment of the case.

UPON the whole, I can safely assert, that the practitioner, however high his rank, who occasions pain in the examination of the human ear, or even in performing the common operations necessary for its relief, in cases where no considerable ulceration or polypus is formed, cannot be sufficiently acquainted with the structure of that delicate organ to entitle him to confidence.

Having said thus much as to the examination of the ear, I shall proceed to point out the mode of treating such cases as we have not already considered. Where the ears are clogged with an accumulation of indurated cerumen, I have found filling them with a spirituous or aqueous solution of soap, according to circumstances, diluted with rose, or distilled water, and closely plugged in with cotton wool, will detach it so much in about ten minutes, or a quarter of an hour, that lukewarm water, injected by means of a syringe, judiciously applied, will completely cleanse the ears; and thus, in a short period of time, I have been able in these cases most agreeably to surprize patients of all ages, and duration of deafness, with a complete restoration.

The practitioner will do well, however, not to raise hopes in his patient, because it sometimes happens, that a mere wall of cerumen is formed a very short distance down the passage, and beyond that the meatus and membrane are in a state similar to those cases said to be *nervous;* this forms a species of mixed case, only to be relieved like those I am proceeding to speak of; but all foulness from the ears, on every occasion where it is discovered, should be effectually removed, as a preliminary step to

other treatment, and the meatus should be cautiously wiped out, and cleansed from all that film that generally is observed to line it.

Another kind of mixed case occurs where considerable ulceration has supervened, and the cuticle has partly exfoliated, but remains mixed with the cerumen, and adhering in some points to the internal lining. A curious case of this sort occurred to me about two years ago, in a subject about 12 years of age; she had been deaf about five years, commencing from the time of having the small-pox very fully. On examining the ears they appeared clogged with indurated cerumen; the means I have mentioned were adopted, and one ear was cleansed of its contents, comprising a large, hard, and black eschar, when the sense of hearing returned on that side; the other had only a superficial coat of cerumen, which, on being removed, a white substance was discovered nearly filling the ear; I extricated many considerable portions, and after much perseverance the whole, including one piece nearly the size of a sixpence, which, in some parts of it was 1-8th of an inch thick, and as from its convexity it evidently had covered a protuberance, the opinion of several medical friends coincided with my own, that the origin of it was one or more

of the pustules which had formed in the ear, and the substance extracted was not only the eschar, but the cuticle that had been nearly disengaged from the surrounding parts. This operation occasioned no pain, and a complete restoration of hearing followed. The instruments useful in this case were the forceps No. 2, and the hook No. 3.

Another case of a boy, in whose ears a substance presented itself so hard that no instrument could make any impression on it, I applied a strong spirituous solution of soap in rose-water, as hot as it could be borne, which, having softened the cuticle, I detached the edge of the substance in one part; and supposing this obstruction to arise from ulceration, and that it was more soft where not exposed to the air, I passed sideways a well tempered small steel hook down between it, and the lining of the auditory passage, and when low enough, by turning it, I obtained a firm hold, and drawing the substance gently upwards, and occasionally moistening the passage, after much care and attention, I succeeded in extracting the obstruction from both ears, without any sensation that could be called pain. Afterwards, making a longitudinal incision through one of the extracted substances, it appeared to be formed

of continued ulcerations, each of which had brought off the skin, and was succeeded and covered by others, so that it seemed like the coats of an onion. It is almost unnecessary to add, that the boy hears well.

It is to be remarked, that the degree of induration of the cerumen is various, and from the action of the air in some cases, becomes externally almost a solid substance; where this is observed, the difficulty of softening it in any reasonable time, is, as I have often found, not only considerable, but almost impracticable, and the use of other instruments than the syringe becomes absolutely necessary; they require, however, caution and practice to prevent pain or erosion of the lining of the meatus. A thin flat probe, somewhat bent and smooth, introduced by the side of the cerumen below its surface, with proper management, will mostly detach the outward hard scale, and allow the saponaceous preparation (which should be regulated in strength, quality, &c. to the occasion) to have some effect; and after a short time, by a repetition of these means, the whole of what remains my be extracted in one large piece. The case of a boy about 14, who was brought to me, considered to be born deaf and dumb, and who really could neither hear nor

speak, was of this description, only of the worst kind; for in his ears the cerumen was perfectly black, and nearly as hard as wood; he now hears well, but is like an infant learning *slowly* the use of lauguage.

Extraneous substances in the auditory passage are not unfrequently the cause of deafness; I have met with several cases of this kind, one a child, both of whose ears were stopped to all appearance by indurated cerumen; but when the syringe was employed, and the cerumen was brought off, a large piece of cotton wool was found in each ear, and was traced to have been put in about twelve months previous. On this being extracted, I was a little disappointed that hearing did not return immediately, I therefore thought, probably the pressure on the membrana tympani might have been the means of relaxing its tone, although no visible defect was observable, and after a few applications of mildly astringent, but oleaginous preparations, complete hearing returned; which proves the necessity for caution to be used in placing dossils of cotton in the ears, that it may not injure the elasticity of the membrana tympani. The other a gentleman where the cotton must have remained a much longer time, and the removal produced the same result after the lapse

of a few days. We have accounts of many substances that have been found in the ears, where accidental causes had placed them, and the extraction of which must depend on mechanical as well as surgical knowledge. A fine hook, No. 3, or instrument, No. 4, are very useful, particularly if the substance to be extracted is soft; but they should never be entrusted to the hands of any person, except he has obtained the method of so placing the ear, as to be able to *see* distinctly the whole passage of the meatus externus, *in most cases.*

Some old foreign authors have recommended on these occasions an incision being made into the back of the ear, at the upper part, because there would be less danger of wounding any considerable vessel, that part being covered with only a glandular skin. If, however, the substance is in the cartilaginous part of the passage it is unnecessary, and if, in the bony part, the extraction cannot be benefited or assisted by any such operation.

Foreign authors have also given us statements of worms or maggots being *generated* in the ear; but cases of this kind that have occurred, appear to have taken place after considerable pain, and most probably they were

the eggs of flies which had insinuated themselves into that passage, attracted by a purulent discharge, and the application of the proposed remedies to destroy them, must be totally inconsistent with the judicious treatment of the complaint; for the highly stimulating spirituous preparations which have been recommended, are very injurious on such occasions.

If they are produced from an adventitious cause, such as was recently mentioned in the public prints, of a Gentleman who had 40 maggots generated in his ear, in consequence of his crushing a large blow-fly in the cavity two days previous, these, or any kind of applications, may be used; but washing the ear out afterwards with a powerful syringe, and strict examination that none remains, should never be neglected.

When large insects have obtruded themselves low down into the auditory passage, their struggles are so violent, that the patient is not always in a fit state to allow the necessary surgical means to be used for their extraction; and in such cases, if the ear is filled with oil alone, it will very soon kill the insect by stopping its bronchiæ; but as every moment is of consequence, the death will be almost instantaneous, if the ear is filled with oil of almonds,

in which a large proportion of the strongest tobacco has been boiled for a considerable time, and when cold, oil of turpentine added in the proportion of a drachm to an oz. This preparation is so useful, that persons in the profession would do well always to keep it by them for these occasions.

The life of the insect being thus destroyed, there will be no difficulty in removing it, or it may then remain in the ear without any material inconvenience, in a healthy subject, until competent assistance can be obtained for its extraction.

A case that presented itself recently will afford a striking example of the length of time an extraneous substance of this nature, may thus remain. I was consulted by a young gentleman of Bridgewater, respecting a considerable deafness in one ear; on examination, I discovered the bony part of the meatus externus was filled with a substance resembling cerumen; I used the methods before-mentioned, that I have generally found successful, but was for a considerable time unable to extract the substance which I distinctly saw; after a considerable exertion of patience, I succeeded, and to my great astonishment found it was a wasp, of which the

wings, head, feelers, legs, and a considerable portion of the tail were perfect; this leading to inquiry, I ascertained that my patient had been stung at the commencement of the auditory passage with a wasp, near five years previous, and impelled by the pain, had suddenly placed his hand upon the spot; he immediately found something crawl into his ear, and move about in it; agitated to the greatest degree by the alarm arising from such a circumstance, he ran to some water near, with which he plentifully bathed the part, and was soon relieved of the pain.

On his return home he was examined by several persons, who, all persisting there was nothing in the ear, he was persuaded through their assurances, that he had removed the insect by the water, and having been rather ridiculed for supposing such a substance could find entrance into the ear, much less remain there, he therefore neglected to mention the circumstance to me, until the extraction of the insect proved the fallacy of the opinions, and restored him to complete hearing.

In another case I extracted the skin of a chrysalis from a gentleman's ear, but how it came there no account could be given; he had never experienced any pain, and only applied

to me in consequence of finding something rattle in his ear. The only way I could reason upon it was, that by some means a maggot, when deprived of its motary power, must have dropped into his ear, and the process of nature being there continued, the fly came to maturity, and taking its flight left the shell behind. From the nature of the business the gentleman was obliged occasionally to inspect, this conclusion appeared well founded.

But in proof that some constitutions will not allow an extraneous body to remain in the ears without being productive of great inconvenience, I shall merely mention the case of a boy and a young lady, the former of whom had considerable ulceration in the lower part of the auditory passage, attended with deafness. On examining the ear, I discovered a large seed remaining there, which being extracted the whole symptoms disappeared.

The other instance was related to me by a medical friend. A young lady had suffered excruciating pains in the side of her face and head for a great length of time—medical gentlemen of the first eminence, both in town and country, exerted their abilities in vain to relieve her; after some time considerable suppura-

tion occurred in the auditory passage of the affected side, and a pea was discharged, from which period a restoration to health took place. Boils sometimes form just within the auditory passage, which are easy detected, and though productive of much pain for a time, by proper treatment, the inconvenience is only temporary.

The suppression or retention of natural evacuations, occasion, as is well known, variety of complaints, and more frequently than is supposed, deafness is derived from these causes; together with all its numberless train of attendant symptoms, and many other diseases of the ears.

In young females I have observed this particularly, having been consulted in a variety of cases of deafness, sometimes where profuse discharges from the ears of a very fœtid nature had taken place, and all topical remedies had been found ineffectual; yet, by ascertaining and removing the inducing cause, relief was generally afforded.

When a person complains of deafness, it is the old and common advice, that the head should be covered at night with flannel, scarlet cloth, or brown paper caps, the inconsistency

of which will be evident after a moment's consideration; for who can think it will conduce to health, or assist in the removal of the complaint, after sleeping in a room from whence all draughts of external air are excluded, more immediately surrounded with curtains, and the head thus loaded with superabundant cloathing, to descend in the morning to the breakfast room through the cold air, with nothing, or, amongst the ladies, probably only a thin muslin cap on. This change of temperature, too often and incautiously pursued, must naturally check perspiration, and such stability is thus given to the disease that it is difficult to remove; a discontinuance of the practice will be advisable, but by those who have adopted these methods, the disuse should be gradual, and the extra cloathing taken away by degrees.

Ladies are particularly liable to many of these complaints from wearing shoes so thin, that they have wet feet by merely crossing a street; and from this circumstance, as well as too little attention to their own health, most of the female complaints, as well as deafness, noises in the head, &c. have their origin; indeed, the conscientious practitioner cannot be too earnest in pointing out these evils to his

patients, and should be particularly cautious, previous to advising medicine, bleeding, feet, or shower-baths, or bathing, (all of which, according to the case, are very useful,) to ascertain every *possible* circumstance, and give it due consideration.

During the period of confinement, after parturition, from the weakness incident to the event, there is greater susceptibility in the system of taking cold, and the organs of hearing are often affected; delicacy of treatment is here also highly necessary, and little can be done towards removing the complaint until the mother ceases to be a nurse; therefore, the most safe practice is by very mild measures, to prevent an increase of the evil, and by judicious treatment to strengthen the system,

Having thus considered the principal diseases of the external auditory passage in adults, I shall now devote a portion of attention to those that more particularly affect children in the same parts. It has been publicly, but not commonly known, ever since Du Verney published his Essay on the Human Ear, (from whose labours *all* who have since written have borrowed, and to whom I acknowledge considerable obligation,) that the membrane cover-

ing the cavity, called the drum of the ear, is again covered in the fœtus with a glutinous substance, which thickens into a species of film or skin, varying in different subjects as to properties and quantity. In some cases, this adheres so closely to the membrana tympani, to which it serves as a defence in the first moments of existence, that when it is not carried off by the usual process of nature, either imperceptibly or visibly, as a slight discharge, it becomes an impediment to hearing, and great care and attention are required to remove it at a more advanced age; in other children it is placed more superficially in the auditory passage, and then, of course, the difficulty of removal is lessened. It is, however, fortunate that none of these little operations are productive of pain, if performed with judgment.

From the ears of infants there is frequently a discharge, arising from the causes beforementioned, probably the aqueous nature of their blood—the relaxation, or, more correctly, the imperfect action of the sebaceous glands; in some this is considerable—in others trifling, and although generally considered of little consequence, or totally unattended to, the necessity of cleanliness will be evident to all persons of common intellect, whilst the more expe-

rienced and scientific, will see the propriety of gently washing the ears by means of a syringe, with some *very* mild lotion; at the same time, all astringent applications should be avoided, as the orifices of the exuding vessels being closed by such treatment, pain of the internal parts arise, in consequence of the humours becoming acrimonious through the accumulated suppression, and at length returning into the blood, and being conveyed by their proximity more immediately to the brain, various disorders, such as convulsions and epilepsies are produced in some constitutions; and in others, strumous affections of the glands take place; all which, to a common observer, may be thought to derive from various other causes; and generally all discharges from the ears of children, and even adults, that are unattended with pain, ought to be stayed cautiously, and more by the use of proper alterative medicines than topical remedies. This method I have always adopted, and am satisfied from experience, that the practice is not only without risk, but is absolutely a preventive of many subsequent diseases that might otherwise affect the organ of hearing.

Proceeding in my subject, I next arrive at the membrana tympani, or membrane that

covers the cavity,* called the tympanum: this membrane is rather of an oval shape; and examined externally, shews a little indentation near the centre, which arises from the annexation on its internal side to the manubrium, or handle of the small bone called the malleus, which I shall notice in the proper place.

By skilful dissection the membrana tympani is discovered to be composed of six laminæ, and commencing from the external side; the first is a continuation of the epidermis or scarf-skin; the second of the skin lining the meatus; the third cellular membrane from the external part; the fourth arises from the periosteum of the meatus; the fifth cellular membrane from the internal part; and the innermost originates from the periosteum of the tympanum. The membrana tympani possesses considerable muscularity, and its vascularity is beautiful.

I have enlarged upon this subject in order to elucidate a particular case, wherein success has followed the methods of treatment that a knowledge of the anatomy of the parts dictated;

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* This is the part vulgarly called the drum of the ear; and which even authors who ought to know better often denominate the tympanum.

and from a consideration of which, it will be obvious that the diseases of the membrana tympani are more numerous than has been generally supposed, and do not appear to have called forth that degree of attention from any author which the subject seems to deserve.

On examining the ears of a young person in a healthy state, with the functions of the organ of hearing perfect, the membrana tympani presents the resemblance of a fine piece of moist bladder semi-transparent; but in various stages of disease this similitude fails, and the discriminating eye of the experienced practitioner, will discover indicating characteristics of the nature of the affection. A little consideration of the delicate construction of this part of the organ of hearing, will be sufficient to convince every person that a derangement of it may be easily effected, by either local or constitutional causes. In old persons this membrane sometimes becomes cartilaginous, or even in a slight degree ossified, in the same manner as occurs in the coats of the arteries; but these cases are fortunately rare.

When the auditory passage has been in the dry state, as mentioned in a former part of this essay, for a length of time, and is neglected,

or improperly treated, under the idea of the case being *nervous* deafness, the membrane is generally found to resemble a piece of hard dry bladder; and being in that state, it must be evident the pulses of air can have but little if any effect upon it, so as to cause vibration. These cases are not uncommon in aged persons; and although little can be expected as to a cure, yet, I have found many that admit of some relief; and all may be prevented from getting worse by emollient preparations and injections, applied with discretion, perseverance, and a full consideration of the case.

Cases have presented where the external part of this membrane appeared to slough off, probably from herpetic ulceration in the lower part of the meatus, which might communicate to the membrane; and when the separation was effected by proper means, I have succeeded in the operation of clearing the membrane of the cloud, that not only obscured its bright appearance, but also obstructed the true conveyance of sound to the senses.

In some instances there has seemed an evident thickening and increased opacity of the external part of the membrane; and in these

cases, attention to the other symptoms mostly assist the recovery of the true tone of the part.

A WOMAN consulted me a considerable time ago, who, by stopping the nostrils, holding the breath, and trying at the same time to force it out by the ears, could swell this membrane until it appeared like a large vesicle; she lived at a considerable distance and I have not seen her since; but think, from the construction of the parts, it must have arisen from a general relaxation, not only of the membrane itself, but also of the articulating ligaments of the small bones and their muscles. Similar to this must be the cases in a greater or less degree, of those persons who hear best in a coach, or whilst a drum is beating; for which, I account, by supposing that the membrana tympani being in a state of relaxation, the sonorous rays of the louder noise cause so great a tension of it, as to give other sounds of a softer and more harmonious nature their full effect.

A BOY about eleven has also been some time my patient on account of deafness, in both of whose membranes, on examination, there was a complete rent, and some little discharge; the diminution of hearing was dated from the period of his having a violent fit of the hooping

cough, after which he complained of great pain in his ears. By the use of very mild and healing injections, and a moderate occasional exhibition of gentle medicine to carry off the discharge, the membrane of one side is now perfect, and the hearing tolerably so; the other side is in a convalescent state.

Amongst other mischiefs which happen from the use of the probe, that of puncturing the membrana tympani is not one of the least; this circumstance occurred in the examination of a lady,(since a patient of mine,) by an incompetent person, and not only occasioned her much pain at the moment, but a great increase of deafness, attended with considerable discharge; the latter probably arising from a laceration of the lining of the tympanum: the membrane is now perfect. But whether owing to the use of an acoustic tube, or the cicatrix formed in consequence of this accident not being speedily attended to, the sense of hearing does not increase in so great a degree as I hoped it would.

A girl, one of three children in a poor family, all born, as it is called, deaf and dumb, had the operation of puncturing the membrane, performed by a surgeon of first rate abilities,

without any benefit; she was brought immediately afterwards to me, and with her brothers could not hear a bugle-horn six inches from their heads. The membranes of her ears are now both perfect, and the whole three are so far convalescent that they can hear a watch tick, and a variety of sounds.

I MIGHT go on to cite many other cases of this nature, where the membrane has become united, or renewed, after accident or design had interrupted its organization; but have generally observed the sense of hearing was more dull on the side operated upon, which I have supposed might, in some degree, arise from the cicatrization, and consequent loss of vibratory power; and although the operation of puncturing it originated from an idea thrown out by Mr. Astley Cooper, yet, having never seen one successful case of restoration to permanent hearing by those means, but many of a contrary description, I do not feel justified in advising the adoption of a practice that does not appear to produce the desired effect. A fistulous opening in this membrane is considered a fortunate occurrence, by the advocates for the operation; but amongst many instances of the kind, I have universally observed, the sense of hearing on that side is nearly obliterated. I

shall, however, offer some further remarks in a future and more proper part of this Essay upon this subject.

The membrana tympani, in consequence of fever, or other disorders, is often partially destroyed; but by the use of some of the variety of emollient injections, altered according to circumstances, and aided by proper medicines, it is in most cases restored together with the hearing. It was thought by Du Verney, that in foggy or rainy weather, or when the wind was south, persons heard worse than at any other time, and that this arose from a relaxation of the membrane; it is certainly a fact, that we all hear worse in this state of the weather. I do not, however, conceive the effect to arise from a relaxation of the part, but from the want of elasticity in the air, which is much lessened by the superabundance of aqueous vapour; and all those persons who are deficient in the sense of hearing, are extremely sensible of atmospheric changes. In the depth of winter some cases do not improve so fast as when the weather is milder, and the influence of the sun greater, particularly when the patient is much exposed to sudden changes of temperature; the night air, or frequenting crowded assemblies, must therefore consequently be very injurious;

and many from neglecting the means of relief, with want of proper care and perseverance in the use of prescribed remedie sduring the cold months, have much increased the difficulty of the case.

He also accounts for deafness from catarrh, by supposing the relaxation of this membrane to take place; now diminution of hearing from the effects of a cold, is attended with great fulness of the vessels, and as the membrana tympani is vascular, it necessarily follows that it must suffer a share of the burthen; noises in the ears also are common in this case, and as fever is always attendant, my former reasoning on this subject holds good. I am, therefore, the more inclined to this opinion, from the acknowledged circumstance that tinnitus aurium, or noises in the ears, is the never failing concomitant of fevers, and when they are acute, or not accompanied by catarrh the same effect is produced, although not precisely by the same causes; and similar modes of treatment should be adopted in regard to injections, only by varying the qualities in the first they may be merely emollient, and in the latter, a proper quantity of oleaginous particles will be advantageous. Indeed, it is worthy the consideration of the humane and enlightened mind, whether, by the assistance of these or any other

topical applications, such as the injections of proper gargles very gently through the meatus inferior narium, or lower passage of the nose, which is easy performed, and occasions no pain, we might not ward off the dreadful havock which scarlatina and cynanche maligna often cause in the organs of hearing.

I HAVE in several instances experienced, in my own practice, that by a careful adoption of topical applications the most severe pains have been alleviated, which would probably have produced very injurious consequences, if suffered to proceed; and I therefore, entertain a hope these suggestions may stimulate scientific research to join in aid of those suffering under such calamities; the subject is highly important, for it does not merely involve the sense of hearing, but even life, and several instances might be adduced, where scarlet fever having been succeeded by ulcerations and polypii in the auditory passage of the ears, the disease was left to nature, till it acquired that fatal degree of malignancy which I have before mentioned, and the result of which has been explained.

IN violent pain, arising from catarrh, fumigations with the steam of herbs are frequently advised, but I do not think they produce the

benefit expected; and prefer injections into the meatus, of warm solutions of Goulard's extract very weak, with a few drops of tincture of opium. Decoctions of barley-water and agrimony are also *said* to be useful. Sometimes, a poultice of bread and milk with onion boiled in it applied round and over the ear, and the heart of a roasted onion placed in the orifice will give almost instant relief.

When the pain is deep seated, and appears to feel as if in the throat, the relief may be accelerated by gargles, or inhaling the steam of various preparations to which camphor is added; and after the inflammation has subsided, the re-establishment of health to the part may be promoted, and hearing assisted, by holding in the mouth a decoction of cloves in red wine, or red wine and water, with or without the addition of a little vinegar; which should be as warm as possible, and frequently repeated; but as in all other cases of this nature, medicine must be called in to our assistance.

The case of a fine girl between 9 and 10 years of age appears so singular, that a relation of it will prove the great utility of a strict examination of ear by the power of vision, and

will, in similar instances, probably induce a more full observance of the state of the membrana tympani; indeed it was partly for this reason I gave so full an account of its formation. This child was brought to me towards the end of Feb. 1816, under the assurance from her highly respectable friends that she was born deaf and dumb, and my advice was requested as to the possibility of rendering her any service. I discovered by close examination, that the membrana tympani had a very unusual appearance, seeming as if inflated by some liquid; on touching it very slightly with a small blunt instrument, guarded by cotton wool, a little indentation with a degree of fluctuation took place; and reasoning upon the formation of the part, and the appearance of the case, I conceived it to be some fluid between the laminæ of the membrane; and stated to her relatives, that it was a case of experiment—that my means would be gentle but very gradual, as I depended on promoting absorbent action: they consented to place her under my care; and by treating the case with great caution as a species of anasarca, at the end of three months she had considerable perception of hearing, which has daily increased. She now hears nearly every sound; and by unremitting attention and incalculable pains, has made such great progress in speaking, that

she is enabled to hold short conversations; to ask for nearly every thing she wants; and her intellectual faculties, which appear naturally good, are daily developing themselves.

This case, and several other of the same nature, must convince those one who have seen them, that all pretences of restoring persons to speech almost instantly, who have never heard, or are commonly said to be born deaf and dumb, are not only impositions upon the public, but insults to common sense. The knowledge of language, must necessarily be communicated gradually; and the difficulty of doing so, to those who have attained the age of this child, is greater than teaching an infant; for persons in this unfortunate state, generally make a variety of sounds, to which probably they have associated certain ideas of objects; therefore, when they are restored to hearing, and after some time are begining to talk, great care is necessary to prevent them from recurring to the use of those sounds in explanation of their thoughts.

Successful cases of this nature are so astonishing, that those persons who do *not* know me may consider them exaggerated, or that the relatives of this child, and others, are under

some powerful *influence* or delusion as to the facts; but such is the high respectability of the first, and the character of the latter, that a reference to them would satisfy the most incredulous; and those who *do* know me will be convinced that I could not descend to exercise any *influence* or *art*, to obtain a concurrence in my relation of these cases.

FREQUENTLY we have cases where inflammation occurs amongst the vessels in the membraneous lining of the cavity, called the tympanum, and this may arise from a variety of causes; those that have been defined are acute fevers, obstructions arising from violent colds, sore throats, &c. all of which producing inflammation with considerable pain, suppuration takes place; the membrana tympani at length bursts, and an evacuation of the pus follows, after which some little respite from the pain succeeds; but unless the inducing cause is removed, this process is again repeated at intervals, until the discharge is continual.

LOOKING at the anatomy of the ear, it will appear that the power which must be necessary to burst the membrana tympani, would be sufficient to force a passage through the eustachian tube, particularly if we consider its

oblique position towards the pharynx, unless, indeed, the eustachian tube was also closed by the inspissation of the outer portions of the mucus, which, I am inclined to think, must generally be the case; but so few are the opportunities afforded to those inclined to study these subjects, of ascertaining the exact situation of the parts by the dissection of persons thus afflicted, that it remains more a matter of conjecture than it ought to be, consistent with the welfare of the community.

Mr. Saunders considers the puriform discharge from the tympanum a local disease, and that general remedies are inefficacious, advising a dependance to be placed on direct applications to the parts affected; now, if we turn our attention to the causes from whence this disease springs, we shall find them of a general nature, and although the remains of any disorganization may be more evident, or peculiarly afflictive to certain parts than to others, in consequence probably of their delicacy of structure, or even the distinguishing character may be altered; yet, I have uniformly observed, topical remedies alone are of little or no avail. A more insuperable objection presents itself to the use of these "direct applications to the parts affected," because such is the disposition of the

membrana tympani to unite, that there is no entrance for them; and the only service they can possibly perform, where there is a tendency to convalescence, must arise from their beneficial effects on the external membraneous lining of the auditory passage, to which the inflammatory symptoms may have extended, and by the well known sympathetic properties of the nervous system, a restoration of any particular part to health will benefit the adjacent parts.

The cavity, called the tympanum, contains within it four small bones, which are annexed to, and indeed form a part of the wonderful mechanism of the membrana tympani; the first is called the malleus, and is articulated into the upper part of the bony ring in which the membrana tympani is placed where it does not complete the circle; the smaller extremity of the malleus, called the manubrium or handle, descends over, and adheres to that membrane. The malleus has two muscles belonging to it; the first has been denominated by Du Verney the external muscle; it is placed upon the exterior part of the passage called the eustachian tube, which passes from the ear to the back part of the palate, and continuing its course upwards, and rather backwards, it enters the tympanum, and is inserted into the thin process

of the malleus, just below its head; the use of this muscle is to produce a relaxation of the membrana tympani.

The second muscle the same author calls the internal muscle; it is hid in a bony semi-canal, formed in the os petrosum, or hard portion of the temporal bone, to which it is firmly attached. A part of this semi-canal is without the tympanum, and is contained in the upper part of the eustachian tube, and the other extremity entering the tympanum advances to the fenestra ovalis, (which we shall mention in its place,) and there forms a little elevation, over which the tendon of the muscle passes across the tympanum from oneside to the other, and is inserted into the posterior part of the handle of the malleus, a little below the insertion of the first muscle. The origin of this muscle is at the place where the bony part of the eustachian tube ends, and it is covered with a nervous coat throughout; its contraction draws the malleus inwards, and consequently produces a tension of the membrana tympani.

The next bone is the incus, which is articulated with the malleus at its large extremity; the small part descends nearly parallel to the

malleus, and forms an articulation with the os orbiculare, a small bone nearly round; this again is articulated with the bone called stapes, from its resemblance to a stirrup. No cartilage is found at the points of union of these bones, they being merely connected by ligaments; but they are all covered with a periosteum.

The base of the stapes is of an oval figure, corresponding to the aperture denominated fenestra ovalis, into which it is sunk, and exactly closes, and is there fixed by the help of a membraneous lining, which, whilst entire, prevents it from either descending to the bottom of the cavity, or rising to the top of the aperture.

The two branches and the base of the stapes form a kind of frame, to the bottom of which is fixed and joined a membrane, which might with propriety be called membrana stapedeus; it is of very fine texture, and possesses great vascularity. The stapes has a muscle also connected with it, which is concealed in a tube of bone formed out of the os petrosum, near the posterior part of the tympanum, whence it takes its origin; this muscle swells towards its centre, and ends rather abruptly in a small tendon, which is inserted into the head of the stapes a little below its articulation, with the os orbiculare.

Du Verney thinks, that as this muscle, by its contractile power, draws the basis of the stapes a little outwards, it extends the fine membrane with which the upper part of its basis is covered; and, therefore, as it extends it more or less, it renders it proportionably disposed to receive the vibrations of the membrana tympani, and communicate those vibrations to the vestibule and labyrinth; and that also, by such extension, the vibrations of the malleus and incus produce a better effect than they could do if this extension did not take place.

There is, beside these bones and muscles, a branch of a nerve which has been denominated chorda membrana tympani; this takes its origin immediately from a branch of the fifth pair of nerves; it follows the course of the external muscle of the malleus, upon which it is placed, and enters into the tympanum through the same aperture, passing across the membrana tympani into a small canal in the os petrosum, where it joins, or forms a plexus with the trunk of that part of the auditory nerve, called the hard portion of it.

The use of the chorda tympani has not been satisfactorily explained, and like much of the internal ear is involved in considerable obscu-

rity. By some this nerve is thought to act mechanically, in the same manner as a cord placed on the bottom of a drum, which communicates its agitations to the parchment of that instrument, and increases the sound. By others it is believed, that as there is a communication with the hard portion of the auditory nerve, and the other branches of the fifth pair of nerves, which are distributed to the parts that serve to form and modulate the voice, the connexion of hearing with speech is explained, and hence that sympathy upon the approach of any ungrateful sound between the teeth and the organ of hearing; and this reason has been given, why men and birds excite one another to sing, and that persons born deaf are also dumb.

Although this has been hitherto supposition, yet I incline very much to the opinion, and few, if any, have had a better opportunity of judging, by actual experiment, in the cases of several born (as it is said) deaf and dumb; for instance, when we make any vocal sound, persons who have been in that unfortunate state, but have gained a degree of hearing, if you cause them to understand that you wish the noise to be imitated, without allowing them to see your mouth, they will return a similar sound; now this may arise from the astonishing mobility of

the nervous fluid, which receiving the impulsive vibration, communicates it to the senses, and the will at the time according, it is in the same wonderful instantaneous manner followed by the exertion of the organ of speech. When there is a variance between the powers of volition and action, as occurs in paralysis, which has been ingeniously supposed to arise from an obstruction in the circulation of the nervous fluid, we often find the sufferer hears perfectly, but is incapable of speech; and upon the principle which I have advanced, that the more delicate the structure, the more easy it is affected this may be accounted for.

But I shall adduce another proof in support of this opinion; the hard portion of the seventh pair, or auditory nerves, is partly distributed in the external ear, and I have often found in syringing the meatus externus of delicate persons, in the most gentle way, merely with warm water, that vertigo, and even syncope, would suceeed; and as I am satisfied these effects were not either from the fear, or infliction of any pain, but were constantly the result of the operation, I think that the reasoning is good, and the ideas of instantaneous communication between the sensorial faculty seated in the brain, and these external nerves are well founded.

The cavity called the tympanum, is furnished with an external membraneous lining, being a continuation of the pituitious membrane of the nostrils, and of that covering the internal cheeks, salivary glands, eustachian tubes, &c.; it is strewed with infinite ramifications of nerves, lymphatics, and blood-vessels; and taking into our consideration, that trismus or locked jaw is often occasioned by wounds, or painful affections of the extreme parts of the body, which can only be produced by the sympathetic principle, my preventive methods of treating acute diseases, which are likely to affect the organs of hearing, will not, I think, be found hypothetical.

In the tympanum we find two principal passages, the first is called the eustachian tube, which is partly bony, and partly cartilaginous, and descending in an oblique position, forms a trumpet-like prominent entrance into the pharynx, a little above the lower passage of the nose. When the organ of hearing is in a complete state of health, this passage is perfectly pervious; but from the effect of colds, and a variety of undeterminate causes, the humours which are secreted in the tympanum are sometimes inspissated into mucus, and stop this passage; a diminution of hearing is the

consequence, which varies in proportion to the obstruction; on which I shall presently make further observations.

Mr. Astley Cooper as before observed, suggested the idea of perforating the membrana tympani, with a view to let air into this passage when the tube was permanently obliterated; but whether it has been indiscriminately used in cases to which it did not apply, or that the practice is altogether bad, it is certainly falling into considerable disrepute; indeed it is so difficult to ascertain whether this obliteration or closure has taken place, that the experiment should not be resorted to till all other means have failed; and even then, allowing the operation to be performed under every favorable circumstance that can be wished, I doubt whether it can be productive of any permanent utility, for which I offer these as the principal of my reasons:—

It is well known that no atmospheric air can naturally pass into the cavity of the tympanum, except through the eustachian tube, by which I presume, it becomes regulated in temparature to those parts to which it is eventually destined.

From the anatomy of the ear, it appears that the two fenestræ or apertures leading to

the more sensitive parts of the ear, are each protected by a membrane, and both by the situation of that, as well as the apertures themselves being opposite to the membrana tympani, I am led to conclude they are not calculated to receive immediate, but reflected sounds.

Now by perforating the membrana tympani, a painful sensibility of hearing takes place, which goes off by degrees, till the faculty is nearly or quite obliterated; and this may easily arise from the unnatural and immediate vibration of sound, striking upon these fine membranes, and producing a degree of tension analagous to that produced on the membrana tympani by fevers and many other disorders, which occasion that painful acuteness of the hearing so well known to practitioners. This tension and pressure upon these two membranes, unable from their structure to bear it, must consequently occasion a loss of that elasticity which is necessary to vibration; and this being the principle upon which sounds are conveyed, the internal parts must consequently suffer a diminution or deprivation of the faculty of hearing.

INDEPENDENT of these objections, I have another to urge, founded on the chemical properties, and changes atmospheric air undergoes by passing into the human body. I have before

observed common air is composed partly of oxygen, and that the oxygen is neutralized or absorbed by nitrogeneous exhalations, it is not therefore too much, to suppose that the oxygen contained in the atmospheric air admitted in this unnatural manner, may dry up and alter the nature of the membraneous lining of the tympanum, so as to divest it of its extreme sensibility, and also produce the same effect on the two membranes before mentioned, whilst the continual changes of crude air, passing by this means into the cavity of the tympanum, must necessarily accelerate all these evils; whereas the air transmitted through the eustachian tube is most probably neutralized previous to reaching its destination, and certainly, from the formation of the passage, is not liable to such frequent changes.

Thus far I have felt it necessary, and proper to offer my reasons for objecting to a practice founded on high and respectable authority; and should my observations induce the subject to be re-considered, or produce any further elucidation useful to mankind, my labour will be amply repaid.

Since writing this, I observe a professional gentleman of the name of Asbury, has given

notice in the medical works of a new invented instrument for perforating the membrana tympani; the intention of which is, by regulating the depth the cutting part can go, to prevent the membraneous lining of the tympanum from being pierced in the operation; and from the shape of the perforation made by this instrument being triangular, the orifice, it is thought, may continue open. If the operation is ever serviceable, (which I have given my reasons for doubting,) this invention will probably be found more useful than any other; but I cannot agree in the conclusion this gentleman makes upon his own reasoning.—He observes, when the bones have escaped, the hearing has continued; which he considers to arise from the membrana fenestra ovalis remaining entire. Now when from scarlatina or cynanche tonsillaris, the bones come away with the membrana tympani, it arises from the ulceration that affects the whole membraneous lining of the mouth and pharynx; and this lining being continued, and extending itself down the eustachian tube, into the cavity of the tympanum, and covering, as we have seen, the membrana tympani, the diseased action must be general; and the stapes being fixed by fine membraneous filaments into the cavity of the fenestra ovalis, which are destroyed by the ulceration, it is the first bone generally that

comes away; therefore, the covering, which it has been observed, the base of this bone with its membrane affords to the fenestra ovalis, is necessarily destroyed; and no vibration, it will seem, can therefore take place by that aperture, for want of the necessary membrane.

THE experiment was made by Mr. Cruikshanks, on dogs, who were found to have *some* sense of hearing after the membrana tympani, malleus, and incus, were destroyed; but how long they retained this sense, is not mentioned. His opinion was clearly the same as mine—that the destruction of the fenestra ovalis would obliterate hearing; and how far the membrana fenestra rotundis may convey the sounds partially, we are yet to learn.

WHERE obliteration or closure of the eustachian tube has taken place, it arises chiefly from the causes I have mentioned; except when a nasal polypus, may, by protruding into the pharynx, occasion an obstruction; the latter of course will be relieved by the reduction of the tumour; and from the former causes, the ulceration is so extensive, that it mostly produces the effects I have just mentioned, and in such cases, little, if any thing, can be attained by the operation.

I HAVE been told of many persons, beside the North American Indians, who can drive tobacco smoke from the mouth, through the meatus externus, and yet have acute hearing; but as the statements were probably made to Mr. Asbury, by those who had no idea of the anatomy of the ear, I have been, and shall still remain, sceptical as to its being more than a lusus natura, of which I can cite from the most respectable medical authority, an instance of a man who could not only drive smoke through the meatus externus, but also out at the corners of his eyes, through the lachrymal duct.

VARIOUS have been the methods adopted, where the obstruction of this passage has been supposed to exist; most of which are calculated to act upon the principle of sympathy, which I advocate.

STERNUTATORIES of various kinds have been tried in some very few instances probably with success, by their stimulating the pituitous membrane, and its continuation through the eustachian tube into the tympanum, thereby rousing it to a degree of unnatural action, and forcing it to discharge slight accumulations of mucus. This has given rise to variety of empirical remedies in the form of snuff; which

are mostly prepared by persons destitute of the least knowledge on the subject.

Masticatories are also an ancient remedy, composed of warm and highly stimulative ingredients; and although I have not found any successful result derived from their use, they may have failed from the circumstance of being applied to improper cases. These may be classed in some degree, with stimulating gargles, formed of a decoction of mezerion and the water of ammonia, which Professor Authenrieth of Tubingen has recommended. I have tried these in one or two cases, without observing any benefit, but I do not consider the experiment conclusive.

Oleaginous and other preparations, joined with essential oils, according to circumstances, appear to me the most effectual of the mild modes of treatment. After several trials of various proportions of ammonia, I cannot give it any place amongst useful preparations in these cases, although it is a favourite remedy with many practitioners.

The various nostrums sold to cure deafness, are formed from some or other of these materials, and being prepared without judgment, often of acrid or highly stimulating qualities,

or frequently applied improperly to cases of discharge; severe pain, and incalculable mischief is produced.

I HAD a satisfactory and singular proof in my own practice about two years ago, of what may be done by the sympathy of contiguous parts, in the case of a gentleman of this city, about 30, who had been partially deaf sixteen years, and had expended large sums in unavailing endeavours to obtain relief; from every symptom I suspected an obstruction, arising from mucus in the eustachian tube, which I explained to him with all its difficulties; the ear being free from inflammatory action, I applied a stimulating injection in the first instance, as warm as it could be borne, and then filled the ear with a similar preparation, but oleaginous; the second day, on repeating the same method, he distinctly felt something descend down the pharynx on both sides as the means were applied, when perfect hearing immediately took place, and has never been interrupted except by a little temporary dulness on his taking cold, which is always carried off by the same application.

As the membrana tympani was perfect on both sides, I conceive this sensation must have arisen from the cleansing of the eustachian tube,

whose cartilaginous and membranaceous parts were stimulated to their natural action, by the effects produced on the external portion of the ear.

To a surgeon of very considerable abilities, who became a patient of mine, I am indebted for a reference to a paper published in the Philosophical Transactions above a half a century ago, by Mr. J. Wathen, Surgeon, on these obstructions of the tuba eustachiana, of which an abstract may probably be serviceable, not only in further elucidation of the subject, but also as it may prompt other persons to follow up Mr. Wathen's practice, in cases to which, after due consideration, it appears applicable. I have not yet had an opportunity of carrying the plan into effect on the living subject, neither should I attempt to resort to it except all other means had failed, and my patient was not only willing, but I was convinced it was such a case of obstruction of this passage as warranted the operation, which, in my opinion, does not occur so frequently as many practitioners are inclined to believe.

We have had many methods proposed to ascertain whether this passage was obstructed or not, but none of them have proved satisfactory. Dr. Sims paid some attention to the sub-

ject, but his remarks have never appeared to me conclusive, although they possess the merit of much originality, which is more than can be said for most of the recent publications on the subject.

A METHOD PROPOSED TO RESTORE THE HEARING WHEN INJURED BY AN OBSTRUCTION OF THE TUBA EUSTACHIANA, BY MR. J. WATHEN, SURGEON.

"Whatever obstructs that passage leading from the ear into the nose, called the tuba eustachiana, so as to hinder the ingress of the air through it into the cavity of the tympanum, is universally deemed destructive to the sense of hearing. Hippocrates observed, that in a quinsy of the fauces, the patient became deaf by its compressing and closing up this tube.* Many practical writers assert the same to have happened from adjacent ulcers, &c.;† and

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* Coac. 11. n. 35.

† Haller in Boerhav. de auditu, p. 380, and 416.—Tulpius 1. n. 35. a tumore palati.—Valsalva cap. v. page 90, a polypo, et ulcere, (viz. a certain yeoman had an ulcer above the uvula, on the left side, which communicated with and corroded part of the orifice of the left tuba eustachiana; which, when he stopped with a tent dipped in medicine, he immediately lost his hearing in that ear, but recovered it as soon as the tent was taken out.)—Orig.

and Mr. W. had known a swelled tonsil occasion deafness. This canal opens into the lateral and anterior part of the cavity of the tympanum; is so shaped that it first decreases, as it descends towards the posterior parts of nose, becoming very narrow, then suddenly diverging; is much enlarged opening into the posterior part of the nose by an eliptic orifice, a little prominent turning inwards and forwards, placed laterally and just above the velum pendulum palati. This canal then is composed of two distinct cones, the extremities of which unite together, but their bases diverge differently; it is likewise lined with a porous membrane, full of cryptæ and mucus cells, continued from, and like to the membrane of the nares.*

"When, therefore, we consider the structure of the eustachian tube, and its free communication with the atmosphere, we may reasonably suppose it subject to inflammation of its membrane, and concretion of its mucus from

* Haller in Boerhav. de auditu, p. 378.—Not e Physioligia Haller de auditu, s. 485.—Valsalva, cap. 2. p. 32. idem fig. xiv.—Orig.

cold, &c. like the external meatus; and though its mucus is of a very different nature, it is, nevertheless, liable to inspissate by heat when its thinner parts are exaled.* And from the form of this passage, we may easily conceive that an obstruction pretty far advanced, is not to be removed without difficulty, and that in proportion, as it is more or less complete, the hearing will be more or less injured. Why then may not this be suspected as sometimes the cause of deafness; perhaps it is not unfrequently so. (e.g.)

"When a patient is somewhat deaf from cold, the outer ear has been examined and found clear of hardened wax, &c. it is yet not uncommon to find himself suddenly relieved by a great noise in his ear; this is probably owing to the breaking away of the congealed mucus, and the instantaneous rushing

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* Morganni and others tell us that they constantly find the cavity of the tympanum in infants always much clogged with mucus; and Mr. Douglas has often observed the same in adults, and is of opinion that it is concomitant with an obstructed tube in general, and that the injection is equally effectual as if the tube only was obstructed.—Orig.

of the air into the tympanum; so that when this disorder is but slight and recent, nature seems frequently to relieve herself; but when more confirmed, her efforts are ineffectual for its removal. These considerations inclined him strongly to think the hearing might suffer from that cause, and he was much confirmed in it by the following very remarkable case:—

"Richard Evans, aged 35, was very deaf in both his ears, yet no visible disorder in the external meatus; it arose from cold, and had subsisted several years, during which time no art or means could procure him the least relief. In August, 1755, he died of the small-pox, in the Hospital, at Cold Bath-fields; Mr. Wathen took that opportunity to examine the eustachian tube of each ear, and found them both stuffed quite full of congealed mucus. This was the only visible cause of his deafness, the other parts appearing in their natural state. As all these concurring circumstances strengthened him in his opinion, they likewise incited him to make trial of an operation that was some time before proposed to the Academy of Sciences, by Monsieur Guyot; but the author having never practised it, he wanted the recommendation of facts to support and enforce it; it

was, therefore, rejected by them as impracticable.*

"Mr. Wathen first introduced his probe a little bent at the end, through the nose into the tubes of several dead subjects; and having thereby acquired a facility, he did the same on a person that was very deaf, and on whom all other means had proved ineffectual; no sooner had he withdrawn the probe than he said he could hear much better. This success excited his further endeavours, so that he had pipes of different sizes adapted to a syringe, and he had since injected the meatus internus in the following manner, with success:—The pipe is made of silver about the size and length of a

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* Hist. de l'Acad. 1724, p. 53. Besides Mons. Guyot proposed doing it by the mouth; which is quite impossible, as evidently appears to any one that will give himself the trouble to examine into it; convinced of this Mons. Petit, (who has lately published a new Edition of Palfin's Anatomy,) proposed, and that learned and skilful anatomist, Mr. John Douglas, first demonstrated the possibility of passing the probe, &c. through the nose into the eustachian tube; and this he has constantly shewn to those who have attended his public lectures; and to him Mr. Wathen freely acknowledged himself indebted for the hint, by which he was incited to make trial on the living, of an operation of so much importance to mankind.—Orig.

common probe, and a little bent at the end; this being fixed to an ivory syringe full of liquor, (viz. a little mel rosarum in warm water,) is introduced between the ala and septum of the nose, with its convexity towards the upper part of the aperture of the nares, and thus continued backwards and a little downwards, till it comes near the elliptic orifice; then its convexity is turned towards the septum, by which the inflected extremity enters the tuba eustachiana with ease; the liquor is then impelled through it into the tube, by which the sordes, if any, being diluted, is washed out and regurgitates through the nose or mouth, or both, with the injection; and if the quantity be large may be seen.

"Six cases are mentioned as being successful. After the detail of these cases Mr. W. remarks, that he endeavoured to ascertain the symptoms that indicate an obstructed tube; but had not been able to do it with any degree of certainty, nor could he see the great utility of it, could it be done; for the only disorders of the ear that at present admit of surgical helps, are those of the external meatus, ulcerated and swelled tonsils, &c. all of which are generally visible; and when they are not the cause of deafness little or nothing is ever attempted, the patient being left to shift for him-

self; but now another probable chance at least is given to the unhappy sufferer, and being the only one, *(e. g.)* the others either improper or tried before without success, may be made use of without delay, or attendance to accompanying symptoms, at least till they render themselves more conspicuous and certain than he had hitherto been able to find them; and as the operation is not at all dangerous, it neither has, nor will, he believed, be thought painful, by those who desire to recover their hearing."

I OBSERVE is has been advanced in opposition to this, that few could bear the tickling sensation of passing the instrument through the nostrils; but if we reason thus, howwould any operation for the extirpation of a nasal polypus be performed? or even the common methods of staying profuse hemorrhage from the nose be borne? As to the operating through the mouth, from a full consideration of the anatomy, and sensibility of the parts, I cannot see how it could be adopted with any chance of success.

ANOTHER surgical method of restoring hearing was discovered through accident, by a German surgeon, of the name of Schumcker. A man of Silesia, who was for a long time deaf, had an inflammatory swelling at the mas-

toidæal process of the temporal bone; an abscess formed, pus was discharged, and injections made into the wound, which passed into the mouth through the eustachian tube, the wound closed, and hearing returned on that side; the surgeon then proposed to perforate to the mastorid cells with the trephine; the patient agreed, and the same methods being pursued, the result was the same; but I confess, I do not find any subsequent case wherein this practice has been attempted, and do not suppose a patient could easily be found who would submit to it.

I SHALL conclude my notice of this part of the ear and its diseases, with a copy of Mr. Grosvenor's account of his cure, given to me by a friend of his, which is still in favour of my theory, and although the symptoms he describes do not indicate obstruction of the eustachian tube to be the sole cause of his deafness, and many persons have ineffectually tried Mr. Grosvenor's remedy, but perhaps in cases that differ materially from his, I feel it proper to introduce it here; but with a caution as to its use, in cases where there is any tendency to fullness of the blood vessels of the head, in some of which the exertion and force advised to be used have not only been injurious, but there is

reason to believe in more than one instance it lately proved fatal.

"COUNT ORLOFF, who, about three weeks ago, called on Mr. Grosvenor, to consult him respecting his Lady, observing how exceedingly deaf he was, recommended the use of tobacco smoke, which had cured a Russian gentleman in three weeks, who had been deaf twenty years. The remedy being so different from any that had ever been recommended to Mr. G. induced him to make the experiment, which is to fill the mouth with the smoke of the strongest tobacco, and instantly to close the mouth and nose, and make all the effort possible, as if you meant to force the smoke through the nose, which must be prevented by holding the nostrils very tight, this forces the smoke through a back passage (the eustachian tube) into the ear. The efforts must be repeated till one or both ears give a crack, when the hearing returns.

"THE first night Mr. G. made the trial, after the third effort, the right (his best) ear, gave a violent crack or pop, and to his great astonishment, he heard immediately; he repeats the process every evening, till the right ear regularly cracks, when the hearing improves; about

three evenings ago, the left ear cracked, for the first time, and he now hears tolerably with it; before, it was scarcely possible to make him hear, even with the assistance of a trumpet.

"He observes, that as he continues the practice, it is longer before the effect takes place, so that he now smokes and uses the efforts from a quarter, to half an hour before the ears crack. He means to pursue the plan every night; for in addition to deafness, he was troubled with an incessant noise in the ears and head, which he finds decrease as the hearing improves. He can now hear the clock tick, which before he could not hear strike."

Oxford, Nov. 19th. 1813.

Cases of obstruction of the eustachian tube in my opinion, vary considerable in their nature, and are not only sometimes such obstructions as I have before mentioned, but also frequently of a superficial nature; I shall therefore enter more into the minutiæ necessary for a full consideration of these subjects than any who have preceded me.

It is very well known that in the cavity of the tympanum and the eustachian tube, a species of mucus is secreted, and that the

excretions from the nostrils, (in consequence of the natural formation of those parts) must pass partly into the pharynx, and in doing so, when this mucus is much coagulated from any particular cause, a species of film may be produced, which is sufficient to stop the entrance of the eustachian tube, of which those persons subject to catarrh are very sensible, when that affection occurs. Where this is the case, merely closing the nostrils and mouth, and using a slight force, will certainly break the film; and the use of Count Orloff's remedy, will no doubt produce the desired effect; indeed even the gentle use of it for a time, may by its stimulating action, cause the discharge to be produced more freely, and in a less coagulated state, therefore not so liable to form this obstruction; but when the whole eustachian passage is stopped with mucus, any great force used in this manner, must, by mechanical action, impact it closer; and I am of opinion, many other remedies less objectionable, in the form of sternutatories, and gargles, or injections through the nostrils, joined with outward applications, would be more beneficial.

It may appear strange to mention outward means in these cases as useful, but nothing is more certain than that the outward ear, is ge-

nerally, in these instances, devoid of its natural secretion of cerumen; and continued observation has convinced me, that as these outward vessels resume their natural office, so the internal parts are freed from the defluxions that oppress and destroy their proper functions. I have also remarked, that persons who are afflicted in this way, have generally a peculiar method of speaking, similar to those under the influence of catarrhal complaints.

The constant and excessive use of snuff, often occasions a similar tone in the voice; and in some cases, deafness may possibly originate from this cause; indeed, if we look at the anatomy of the parts, it will appear evident, that either its continual stimulating properties, may produce a more considerable defluxion of serous fluids in this passage, than can be carried off, and which inspissating there, will form an obstruction; or, even this fashionable dust taken in large quantities, may, absolutely, occasion the same effect mechanically.

There is another passage at the top of the tympanum, which is broad and short; this leads to the mastoid cells, which, from their formation, may assist very materially in the conveyance of sound, by forming a species of

echo. Also in the tympanum are two apertures, one called the fenestra ovalis, which we have mentioned as covered with the stapes; the other, fenestra rotundis; this is also oval in its shape, although so named; they both open into a cavity of the os petrosum, or petrous portion of the temporal bone, called the labyrinth, from its intricate and many windings; this is again subdivided into three parts, first, the vestibule, which leads to the two others, viz. the three semi-circular canals, and the cochlea.

The fenestra rotundis like the other aperture, is closed by a membrane about the middle of its passage, so that the air which is believed by many authors to be confined in this space, has no communication either with the common air or that of the tympanum; but whether this is the case, or these parts are filled with the nervous fluid, as supposed by others, no art or experiment has yet been able to determine.

The vestibule is a cavity almost round, situate behind the fenestra ovalis, covered with a membraneous lining, filled with vessels; it has eight foramina or passages from it, five of which belong to the semi-circular canals, one leading to the upper range of the cochlea, and

two others through which branches of the Portio mollis, or soft portion of the auditory nerve passes.

The semi-circular canals are distinguished, one by the name of superior, because it occupies the upper arch of the vestibule; another, inferior, because it surrounds the lower part; and the third, medius, from being situated between the other two. The superior and inferior are joined like a *Y*, and have only one common entrance into the vestibule, in the centre. Mr. Saunders calls these canals, from their position, vertical, oblique, and horizontal.

On that side the vestibule near the face, and opposite to the semi-circular canals, is placed the cochlea, so called from its resemblance to a snail's shell; it is composed of two principal parts, a semi-oval spiral canal, and lamina, which runs spirally upward, following the course of the canal, and dividing it into two; they have separate entrances, one, as before observed, from the vestibule, into the upper range, and the other from the fenestra rotundis, into the lower range.

The auditory nerves are the seventh pair of cerebral nerves, and they are divided into two

portions from their origin, the uppermost and largest being the portio mollis, or soft portion; and the lower the portio dura, or hard portion.

THE portio mollis may more particularly be considered the organ of hearing, and is confined to the vestibule, labyrinth, cochlea, and semi-circular canals, over and throughout which it is divided, and distributed in such minute filaments that it cannot be traced beyond; and on account of its high sensibility, (as before remarked,) it is protected from the external air at the only two passages where it could possibly enter, viz.:—the fenestra ovalis, and the fenestra rotundis, over both which a fine membrane is placed.

VARIETY of ingenious theories have been advanced, in explanation of the manner in which sound is communicated to the senses. Some have considered the external and internal parts to have a similar action to that of two lutes, placed *upon* a table, where striking the string of one instrument the concordant note will be responded by the other; this, it is contended, is produced by the mere mechanical action of the string of the lute, which is struck, communicating its undulation to the wood of which the body of it is composed; the wood conveys

it to the table and the table to the wood of the other lute, which gives it a like effect.

From this it has been advanced that the pulsations of sound, first occasion a motion in the membrana tympani, which continuing through the chain of small bones, till the os petrosum is also affected by the vibration, the labyrinth supposed to be the seat of hearing, with its implanted air of consequence participates in the feeling, and thus the communication takes place upon a kind of mechanical arrangement. In confirmation of this opinion, it is said, that by talking over the head of deaf persons, they will be enabled to hear much better, from the vibrations of sound shaking, generally the cranium, and consequently the os petrosum, and its contained organs of hearing.

This I do not consider as any argument in favour of the opinion; for I have been consulted on the behalf of many persons, in whom the power of hearing was so far extinct, that they could not hear the loudest noise, merely as a sound, although they would instantly become sensible of a very slight blow on the floor, at a considerable distance.

I have taken much pains to ascertain in what way this affected them, and have uniformly

found they described a sensation of feeling to exist internally about the sternum, which I have thought arose from the large proportion and various plexus of nerves in that part, whose branches being dispersed in minute ramifications through every portion and extremity of the body, and from the deprivation of the sense of hearing, that of feeling being more acute, the concussion was conveyed by their means to the situation where it was experienced. It is evident, vibration must be the medium whereby it was conveyed; for in proportion as the solidity of the article struck increased, the sensibility to the blow I always found decreased.

PROBABLY the fact may be, that the sense of hearing is communicated chiefly by means of the nerves; but whether this arises from vibration, assisted by muscular action, or the interference of the nervous fluid, is not to be ascertained; possibly both may have their share in the conveyance, and that there must be a perfect union of their assistance to produce a complete sense of hearing.

I THINK it will, however, not appear unreasonable to suppose, that the membrana tympani being struck by the undulation occasioned in the ear through the impulse of sound, may, by the assistance of the small bones placed at

the back of it, refract it into the tympanum, and from the reverberation occasioned by the cavities of the mastoid cells, the membranes covering the fenestra ovalis and rotundis may experience a vibration, which they in like manner communicate, duly modulated, to the extreme sensible and delicate nerve lining the vestibule, cochlea, labyrinth, and semi-circular canals, all of whose formation are evidently adapted for the most full and perfect conveyance of sounds throughout their whole extent, and the nerve participating, the sensation is communicated to the brain. The vibration of these membranes may, and no doubt is, much assisted by the movement of the stapes, which, when the ear is in a state of health, must partake in the motion given to the membrana tympani; indeed, a close observer will discover, that on any noise being made, the external ear even is visibly affected, and considerable action takes place, which, though more apparent in animals, is sufficiently so in the human race, to evince that the muscles and every other part of this structure must be in unison, and contribute to produce this useful faculty, without which the principal inlet of education would have been closed, and human knowledge so limited, that deprived of the reciprocal communication of ideas, the present degree of perfection in arts or sciences could not have been attained.

It has also been advanced, that the cochlea, semi-circular canals, vestibule, and labyrinth, have all different tones or sounds appropriated to their particular parts, and fancied divisions; and that as these tones are sounded without, they are responded from within, and conveyed to the senses. If this principle is admitted, it will appear that musical ears must be those, in whom the organization and perfect arrangement of tones is most complete.

I will allow that to produce a true musical ear, both sides must be in the same state of health, that the sound may be equally conveyed to the sensorium; and this opinion I support, from the fact of being consulted some time ago by a gentleman, a passionate admirer of, and amateur in, music, who did not so much complain of a diminution of hearing, as of the variance in the sounds conveyed by the separate ears, which occasioned such discord, that he was incapable of enjoying his favourite amusement, and this, I discovered, arose from the diminution of hearing on one side.

There is an orifice in the inferior part of the petrous portion below that through which the auditory nerve enters, which forms a passage for a branch of the internal jugular vein, and carotid artery; these in various minute rami-

fications, are distributed to the cochlea, vestibule, and semi-circular canals, and passing amongst filaments of the portio mollis, which we conceive to be so highly sensible, it will be evident, that many of the noises in the head may arise from internal accelerated or extended pulsation. I have already mentioned some of the other sensations of this nature, which may be external, and am satisfied that there are certain criterions whereby a judgment may be formed of the origin of these noises. When there is any thing like an intermittent sound, I have treated it with success, as increased action, therefore my opinion is not merely theoretical; but having acted upon it with a due regard to the patient, whether young, aged, plethoric, hypochondriac, or whatever other predisposition there appeared, it has proved in most cases successful, and therefore has practice to recommend it.

I AM the more confirmed in this theory also, from the analogy these noises bear to the scintillations, arising from a blow on the eye; for, these sounds are no more real sounds, than the sparks, appearing from the violence done to the eye are true fire; and it is clear, one as well as the other, derive their origin from concussion, and consequent vibration; which, indeed, will even produce noises in the head,

of various kinds, at the moment of the shock; and blows, often inflicted, produce a great deprivation of hearing; therefore, children should never be corrected by such methods.

THERE may be also a perception of this false noise in the head, (without any local defect in the organs of hearing,) proceeding from various diseases, or latent disposition to them; such as delirium, phrenitis, vertigo, epilepsy, syncope, apoplexy, and paralysis; the irregular and disordered motion of the spirits in these distempers, producing considerable agitation in the brain, the auditory nerve must necessarily partake of it; for it is not material whether the motion is at the root of the nerves, or, as before observed, on the external filaments of them, the effect, to a certain degree, is the same; and this is caused as in vertigo, where there is no real rotary motion; or in phrenzy, where imaginary objects are seen, in consequence, probably, of the agitation of the optic nerve next the brain; and the organ of hearing is no more in fault, in these cases, than that of sight, after the disease which caused the false perception is removed.

IT has been supposed slight convulsive action of the membrana tympani, may be occasioned by the inflammation of the blood in head-ache or fever; and whenever these accompany affec-

tions of the ear, topical bleeding may be useful. A due attention to these symptoms, and proper treatment, may sometimes prevent apoplexy, of which, these noises in the head are indications.

If any other sense is, at the same time, affected, we may reasonably conclude the disease is in the brain; and active measures must be taken to relieve the pressure, and prevent a fatal termination.

The peculiar province of each of these internal parts, no human reason has been able to develope satisfactorily; and although we may conclude, from their formation, that they have such particular functions, yet, still, it is only a matter of conjecture.

The portio dura, or hard portion of the nerve, springing from the same root, is carried outwards, and furnishes not only the small nerves that are dispersed over the external ear, but it extends its branches over the cheeks, lips, nose, forehead, and lower jaw; it cannot therefore remain a matter of astonishment, that exposure to severe cold, in affecting this nerve, should communicate its influence to the soft portion arising from the same root, and in consequence render the sense of hearing dull; for I have

shewn that warm liquids injected into the ear, have the power of producing giddiness, and even fainting; and, I think, there is no reasonable objection to the conclusion, that excessive cold may produce a degree of atony throughout the whole organ, from its action on the external nerves.

In a former part of this essay, the state of the ear in the fœtus has been briefly noticed; I shall now proceed further to observe on its structure.—That part of the auditory passage, and also of the eustachian tube, which is bony in adults, is, in the fœtus, merely a membrane, joined, by one of its extremities, to the cartilaginous passage, and by the other, to the membrana tympani, by means of a bony ring, from whence the process of ossification and formation of the bony passage commences. This may reasonably be supposed to proceed faster in some cases than in others, for it will depend upon the nature of the child's nutriment; and presents to mothers, a lesson, to which it will be so much to the advantage of their offspring to pay attention, that few, I trust, will consider it an improper digression

It is a well known fact that bones are formed chiefly of phosphate of lime, united with gelatin and cartilage; and Fourcroy observes,

" that nature has thought fit to place in the first nourishment of animals a quantity of osseous matter, with a view to the necessary celerity of the formation and growth of the bones in the earliest stage of their lives."

And Mr. Parkes in his observations on the subject, but referring to Nicholson's Journal, vol. I. 205, says, " It is a remarkable fact, that the nearer the female approaches to the period of parturition, the more is the milk charged with the calcareous phosphate; and that it is not till the digestive organs of the infant are sufficiently strengthened, to answer the purposes and the work of animalization, that this earthy salt disappears from the milk of the mother." Thus, then, may be traced an existing connection between the infant and the mother, more close than is generally supposed, and tending so much to the well-being of the former, that few mothers duly considering the subject, will be inclined, on slight pretences, to deprive their children of their natural nutriment,—live in such a manner as to vitiate its qualities, or where from circumstances it is impossible to be afforded, they will be cautious not only in regard to the health of the intended nurse, but also in ascertaining, and apportioning the age of the child to the period of *her* parturition.

The composition of the bones of animals varying from those of the human body, we may conclude their milk possesses a different property; and although no visible inconvenience may result from the administration of this, in place of the nourishment provided by nature, yet few will be inclined to bring up children by hand.

It may not be too great a stretch of probability to think, that some of these causes may lay the foundation of a variety of complaints, to which human nature is subject; amongst others, deafness may be, in some measure, attributed to a deficiency in the process of ossification, corresponding with the formation, or maturation of other parts of the system; and it affords a striking example in illustration of my position, that, in a state of nature, neither mankind nor animals, are subject to a deprivation of the sense of hearing, except from the effects of old age.

The eustachian tube, as well as the external auditory passage of the fœtus, has been often discovered, on dissection, to be clogged with a species of mucus; this, in common with the outer obstruction, would probably be carried off by the efforts of nature, if her operations were not counteracted by improper treatment,

which may be said to consist, very materially, in the modes adopted towards children on their first entrance into the world, who are generally greeted with ablutions of soap and water, to which sometimes spirit is added, or applied afterwards.

The folly and evil tendency of such a sudden change of temperature, must be apparent to every person inclined to think on the subject. The effect of warm water even, on the human body, is a loss of a great portion of latent heat, by the evaporation it occasions; and this must be highly prejudicial to an infant, in whom all the powers it possesses are called into action to preserve its existence; and spirits being applied, only produces a more sudden effect; of which, persons inclined to be sceptical, may convince themselves, and sensibly feel the induced cold by the use of the common remedy for the head-ache, viz. æther, applied to the part.

Upon this principle it is that we experience a diminution of health, by exposure to the weather till our clothes are wet; for the succeeding catarrh and febrile symptoms, are not produced by the mere contact of the moisture, but by the sudden deprivation of a large por-

tion of latent heat, arising from the conducting powers of the water, its capacity for heat, and tendency to expand into vapour at higher temperatures.

This disposition to expansibility, increases in proportion as the water is softer, or, scientifically speaking, has a smaller quantity of selenite, or sulphate of lime in its composition; which either in its compound, or separate state, has so great an affinity or attraction for moisture, that, according to its proportions, increased heat is required to produce vaporization; and sea-water containing and holding soda with its combinations in solution, all which have a greater affinity for the aqueous portion of the atmosphere, is still less subject to quick evaporation, and shews a reasonable cause, why the clothes of persons wetted by the sea do not produce such baneful effects.

Thus, upon the opinion I support, a general affection of the system may arise from this cause; and as the organ of hearing is confessedly delicate, even in the adult, and in consequence more susceptible than other parts of the body, both from that circumstance and its contiguity to, and connexion with the brain, whose participation in most diseases no one will deny, it

may be easily conceived that those parts in an infant, which, as I have shewn, are not even thoroughly formed, must be more liable to injury from such treatment. If cold water is used, it has a similar and even a more injurious tendency; for it not only abstracts the natural heat by evaporation, but occasions a sudden torpor in the vessels of the skin, and in consequence of there not being sufficient strength to produce re-action, it must be very prejudicial.

Many eminent practitioners have recently advised that the child on birth is not washed at all, but is wrapped in fine calico, and over that flannel, for the sake of warmth; by this means the mealy appearance of the skin of new born infants (which they consider to be useful to protect them from the action of the atmospheric air,) will peel off, and leave the skin white and healthy.

It is now generally understood, that the cold bath or affusion should be used cautiously, and never where the powers of the body are weak; yet we daily see children subjected to this treatment, sometimes piecemeal with a wet cloth, which is extended even to the head; the child fatiguing itself and nurse by ineffectual strug-

gles and cries, is frequently put to sleep before half the moisture is wiped off, and the most dangerous results, such as catarrh, or common cold, sore throat, enlarged tonsils, &c. too often ensue, which, affecting the organs of hearing the sense is diminished or destroyed, and the poor victim of superabundant care, is considered as being born deaf and dumb. Thus, then, we may trace the increase in numbers of these unfortunates, to the exertions of tenderness endeavouring by art to surpass nature.

As some example of the pernicious effects of bathing, or washing the head, even in adults, and not thoroughly drying the hair, from the difficulty of doing so, I might cite numerous cases, where it not only occasioned the miseries of diminished hearing, and noises in the head, with a detoriation of mental ability, but even the death of the person could be clearly traced to derive from this cause.

In the present age, we should suppose, few need be cautioned against washing the face, neck, and partially the head, whilst in a state of perspiration; yet a want of attention to this circumstance has produced me some of the most difficult and tedious cases I have had to en-

counter, and which I hope, from this caution, will, for the sake of the sufferers, be less frequent.

I HAVE also two young ladies now placed under my care, both of whom became deaf from having the hair cut, and being exposed to a draught of cold air. One of them cannot hear a bugle horn close to her head; and I attribute this extreme deficiency of hearing in a great measure to improper treatment, under the direction of incompetent advisers, as the deafness has been progressively increasing under their management.

I HAVE investigated as much as possible the treatment of those said to be born deaf and dumb, during the early period of life, and find my opinion well founded, by discovering that treatment of the kind I have described; exposure to sudden changesof temperature, or other improper management, are remembered to have taken place during infancy.

IT may be inquired in what way I would recommend nurses and parents to preserve personal cleanliness in young children? To this the reply is easy; I do not object to the use of water to other parts of the body which are

readily freed from moisture. Wash the child in a room not exposed to a draught of air, with water which has merely the chill off, and rub every part completely dry afterwards, with a sufficient quantity of soft cloths thoroughly free from damp; but the old fashioned methods of cleansing the head by means of unguents and and combs, should always be adopted in preference to washing, the superiority of which, to those acquainted with the chemical and physical properties of the two applications, will be evident without further remark; so satisfied am I of the evil tendency of washing the head, that I have not only declined attending, upon conscientious principles, on discovering this practice, has been pertinaciously persisted in; but I certainly never will attend a case of the kind, where I know such a custom has been adopted, unless I am well assured it will be discontinued.

I HAVE paid great attention to all the cases of those born, (as it is said) deaf and dumb, that have submitted themselves to my notice; and observing them generally to present no appearance of organic defect, I have treated them according to their character, as extreme cases of some or other of those various species of deafness, which, in the course of this essay, has been described; and notwithstanding the con-

current formation of the parts, may be of great importance to the perfection of any sense; yet, as it is impossible in most instances to ascertain the origin of this misfortune, we are obliged to trust to reasoning on the subject; and I have found that means can sometimes be successfully adopted, to rouse the vital action of those vessels which it may be supposed are wanting in energy, or in a state of disease from the constriction of other parts; but in these obscure cases, and indeed most cases of deafness of the same nature, it is only by the exercise of *patience and perseverance* that any relief can reasonably be hoped for.

Mr. (now Dr.) Haighton, has been particular in giving an account of a caseous substance found, on dissection, in the vestibule, cochlea, and semi-circular canals, belonging to the ears of a person aged about 30, who had been deaf from birth, and consequently dumb; but we are without any data as to the appearance of the parts when living. I think if this had been noticed, the meatus externus would have been found without cerumen, and the vessels of the sebaceous glands being therefore interrupted in their natural action, the contiguous parts must become overcharged with the matter of those excretions thus diverted from their destined

course; generally speaking, I have found that a removal of obstructions to the full exercise of the functions, and vital activity of these parts, seldom fail of restoring the sense of hearing; and possibly if perseverance in proper means, had been used in the early periods of this person's life, he might have been restored to the full exercise of his faculties.

In consequence of the success which has attended my endeavours to restore the deaf and dumb, several children have been brought to me for advice who were not deaf, although deficient in the power of speech; on examining some of these it appeared the tongue required a little surgical assistance, others had that organ too large, and I recommended they should be left to nature, from a conviction that as the bones of the mouth expanded, in proportion to the growth of the child, whilst the tongue increased slowly in size, it would be the only relief; the result has in many cases proved the correctness of the opinion, for as the children have advanced towards maturity, the parts have become more proportionate to each other.

Want of intellect is also a cause of persons being dumb, and it has been believed, little can be done to assist these cases; indeed, I do

not know that much can be effected by any plan of treatment; but under the impression that it might be diseased or weakened action of the brain, I have recently advised the use of lukewarm salt-water shower baths, mild, but long continued applications of electricity, and the exhibition of that class of medicines most beneficial in carrying off watery humours. In some cases this mode of treatment has already evinced its advantages—in others it has not yet been apparent.

I SHALL now make a few observations and remarks on some of the many popular remedies which have been recommended as certain cures for deafness, and having endeavoured to elucidate the nature of these afflictions, I shall proceed to shew how their existence and various degrees may be ascertained. It is by an insensibility to sounds that we discover the deficiency, and various methods have been, and are, resorted to for the purpose of estimating the extent of the evil; some are insensible to the sound of a bugle horn of one key, but can hear another of a lower or higher, and so in respect to notes from the same horn, flute, or flageolet. There are many persons who have amongst their friends the character of dulness,

or even want of sense; whereas, probably it is only a less degree of hearing, which has continued from childhood; this may be easily ascertained with a watch, held by the chain or string, which, generally speaking, a person should hear at the distance of three feet or more, to have perfect hearing; and it may serve to form some judgment whether there is a want of acuteness in the sense or not; and in all cases of deafness great attention should be paid to the accidents or disorders that precede or accompany it.

The expressed juice or decoctions of a variety of herbs, are amongst the most innocent of these applications; but I do not find any dependance can be placed upon them, as to their medicinal virtues in obscure cases. Where the diminution of hearing has arisen from the mechanical obstruction occasioned by indurated cerumen, they may have performed apparent wonders; but it is more than probable warm water would have had the same effect.

The internal part of a roasted onion is a remedy well known in ear-ache, and where any superficial boil is in the auditory passage, (no uncommon case,) it is of great service in pro-

moting suppuration; or even where pain arises from the effects of cold, it is a good topical application in aid of general means.

Galls of animals, birds, &c. the fat of beasts, birds, fish, and insects, have all had strong recommendations to public favour, and some of these substances may have chanced to render service in slight cases; but they are considerably surpassed by oleaginous preparations, where such means are proper to be used.

I have never seen an instance where the gall of animals has been useful, and although a medical author of celebrity recommends, upon the authority of another, ox-gall and peruvian balsam, in cases of inflammation and suppuration, I certainly should never use or advise it to any of my patients, under such circumstances.

I have recently had a gentleman under my care, who, becoming deaf from cold, had used sheep's gall, oil of sweet almonds, and hartshorn in equal quantities; having a natural full habit; severe pain, inflammation, and ulceration supervened. I was consulted, and by perseverance in the antiphlogistic mode of treatment, and proper topical applications, he has recovered.

ANOTHER case of a boy, who, using a similar remedy, by the advice of some incompetent practitioner, had a profuse discharge of clear water from his ears, so acrid in its nature, that it raised vesicles completely down his neck; but the complaint disappeared by a perseverance in proper treatment.

I FIND in some old authors recipes for making variety of oils and spirits to relieve deafness, each compounded of a heterogeneous mass of articles, which, when mixed, must form chemical compounds of so different a nature to what can be useful, that they are only equalled in absurdity, by the specification of some of the patents for quack medicines. I shall, therefore, dissmiss them as unworthy further observation.

MANY fanciful remedies, such as preparations of earth-worms, snails, ants eggs, hog-lice boiled alive, &c. &c. applied for a certain mystical number of nights or days, require no serious notice.

SALT placed on a pewter plate, in a damp situation till dissolved, is also thought very highly of, and was tried by a young woman lately, who had a thin acrid purulent discharge

from both ears; the pain it produced was excessive, and the discharge increased so much, that she was obliged to apply for relief.

Sea Water has been thought of use in some cases, where deficient secretion of cerumen was considered the only cause of a diminution of hearing; but the benefit, as far as I can trace, (if thus used) is only temporary.

Bathing in the sea in mild seasons, or lukewarm salt water shower-baths, joined with the application of sea water to the ears, and in some cases drinking it, I have recommended, and found permanently serviceable.

Electricity and galvanism have also been greatly depended upon, and highly extolled, as affording certain relief in deafness; but passing over many who have written on the subject without medical knowledge, we will turn to the lectures that a most respectable surgeon delivered to his pupils; who, after relating many instances of deafness in which electricity had been useful, gave positive reason to suppose it would effect a cure in one case out of five.

From this gentleman's abilities, in other departments, it is a matter of regret, that as

he as he was giving directions to young men, who were to be sent into the world to benefit others, he did not describe the nature of the cases he had relieved; or in what particular affections of that organ it might be serviceable; he recommends, from having practised it himself, to electrify the *tympanum*, by means of a wire coated with sealing-wax, all but the end; but I believe it will be difficult to coat a wire with that material, either by heat or dissolution in spirit, sufficiently to prevent the lateral passage of the electric fluid; and, therefore, he was in an error, as to his application being direct to the part he intended. And further, I cannot see the utility of drawing sparks from the *tympanum*, even if he could have passed the *membrana tympani* to do so.

Dr. Wilkinson in his treatise on galvanism, after a concise account of the different kinds of deafness, concludes, by saying, "the principal cases to which it can be applied with effect, is, in a deficient energy of the auditory nerve, or relaxation of the membrana tympani, attended with a diminished secretion of cerumen."

Upon the whole I think, as mere stimulative applications, both electricity and galvanisn might be sometimes attended with suc-

ces; but as other topical remedies do not present so formidable an appearance to a patient, I seldom advise their employment in the first instance, although, after other modes of treatment had failed, I think no person ought to omit a trial of one or both of them; due regard being had to the nature of the case, which should be ascertained by competent ability.

It should be however remarked, that electricity is frequently employed in cases to which the application of its stimulating properties must be highly improper; amongst which may be instanced, discharges from the ears, and many of those pulsatory noises in the head. In the first, the evil will be materially aggravated, and in the latter by the increased impetus it gives the blood, (whose action, as I have already pointed out, is too great, in most of these cases) the most fatal effects may ensue.

After the application of electricity, the greatest caution is necessary to prevent taking cold; for both sensible and insensible perspiration, are excited to a degree far beyond what can generally be supposed, and a want of proper attention to this circumstance, has proved very serious in diminishing the sense of hearing in several instances; one in particular, of a

young lady, who, in consequence of exposure to a damp and cold atmosphere, (about six years ago,) after the operation, has been totally deprived of hearing; and being thereby unable to modulate her own voice, is nearly incapable of articulating sounds which can be understood. She was not under my care sufficiently for a fair trial; but I do not think the case, (with proper treatment,) hopeless.

Having repeatedly received inquiries respecting hearing trumpets, or acoustic tubes, artificial ears, and other mechanical methods of increasing hearing, I gave in May last a public opinion on the subject; and as it may be interesting to many persons, I shall conclude this Essay with the substance of it:—

It is well known, that all tubes having a conical form, will either diffuse or concentrate sound according to the end used; the vibrations of which, form right angles down the whole length of the tube, and as it becomes narrow these vibrations are more quick; therefore, upon that reasoning, it produces such an unnatural action upon the membrane of the ear, that it is liable to vitiate its feelings; and it is a fact, that persons resorting to the use of an ear-trumpet are mostly obliged to increase the size

or length of it, until in the end they can with great difficulty hear at all, even with its aid: in like manner as the power of spectacles are obliged to be increased, and a continual use of telescopes are frequently observed to injure the strength of vision.

The artificial ears invented in France are not injurious; for the pulses of air striking against them produce a stronger *natural* vibration, which being continued into the ear, sounds are more perceptible to the senses; at the same time I think they might be improved; but those with tubes being upon the same principle as the ear-trumpet fall under the same objection.

All these artificial means should only be resorted to when every surgical and medical assistance has failed, and even then, the hand placed at the back of the ear, or a thin silver instrument, resembling a kind of spoon, to hold the ear forward, is convenient, and often sufficient for slight cases.

ERRATA.

Page 14, Line 2, *for* membranous *read* membraneous. The same to be observed whenever it occurs.
18, Line 25, *for* inflamation *read* inflammation.
26, Line 14, *for* fibrile *read* febrile.
31, Line 13, *for* fœted *read* fœtid
35, Last Line, after passage *read* occasion.
60, Line 6, *for* cynanchc *read* cynanche.
61, Last Line, *for* of ear *read* of the ear.
63, Line 6, *for* those one who *read* those who.
73, Line 24, *for* temparature *read* temperature.
88, Line 13, *for* I observe is *read* I observe it is.
89, Line 7, *for* mastorid *read* mastoid.

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FINIS.

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