

natural. No other morbid appearances were detected.

"CASE 2.—*Inspection 24 hours after death.*—The body was allowed to lie the usual way on the back till the time of inspection. The calvarium and spinous ridges were removed, fully exposing the theca vertebrarum, down to the cauda equina; there was no effusion on the brain or its membranes, and its substance was natural throughout. No effusion existed between the theca and the vertebræ; the theca was healthy, and betwixt it and the spinal chord was a preternatural quantity of serum. The chord itself was of a pale colour. The nerves on each side of the remaining phalanx of the ring-finger were very vascular. On tracing upwards the ulnar nerve from this point to the elbow, it was of its natural colour, but here again it became very vascular for about the extent of two inches. In the axilla it again presented a similar appearance as at the elbow, the portion of it intervening betwixt these two points being healthy. Tracing the median nerve in the same way as the ulnar, it was found perfectly natural, from its digital branch, which supplied the radial side of the ring-finger (and which, as stated above, was much inflamed), till about the middle of the arm, when it again presented an inflamed appearance for the extent of an inch and a half. The portion of it intervening betwixt this part and that confined to the axilla, where it again became vascular, was natural. This vascularity throughout, was not confined to the sheaths of the nerves, but occupied their substance; the radial and superficial nerves of the arm, along with its veins and arteries, were perfectly natural; the lumbar nerves were unaffected; the œsophagus was examined, and found healthy; the trachea appeared inflamed, and contained a large quantity of greenish-coloured mucus; the other thoracic viscera and digestive organs natural."

PRACTICAL OBSERVATIONS ON THE
PATHOLOGY AND TREATMENT
OF
DEAFNESS.

No. III.

By JOHN FOSBROKE, M. D., Cheltenham.

THE predisposing causes of deafness are, hereditary transmission; unknown imperfections of the structure of the organs of hearing; debility arising from other diseases, and especially weak and disordered states of the pulmonary organs. The doctrine of predisposition, though it has been limited to particular diseases, is applicable

to almost all. Diseases, whether of the liver, lungs, brain, or of other organs and tissues, are seen continually to descend through families, and, in fact, to form family diseases, derived from one side or the other. Deaf patients very frequently trace their infirmity in this manner from their progenitors. I have been consulted upon deafness by more than one member of the same family at the same time, as in the instance of Lady B. and her daughter Miss G. B. A lady, a friend of the late Colonel James Smith, of Cheltenham, fell out of a window at Norwich, in a state of pregnancy, and instantly became deaf in one ear. The child produced by this pregnancy was born deaf in the corresponding ear.

In the absence of hereditary predisposition, as indeed in the majority of those who go deaf, there would appear to be some original condition of the organs, which renders them in a particular degree susceptible of being acted upon by the exciting causes. Otherwise, why should it occur that under all the same conditions of the case, the same remote causes should produce it not in one individual immediately excite it in another? This original condition consists probably in some original imperfection in the constitution of the ear in structure and function. Also the ears, comparatively with other organs, are constructed with a superior delicacy, and more exquisite sensibility of impressions of all kinds, and, from that circumstance alone, are more liable to be affected by all the general exciting causes of disease. Hence, bodily and mental disorder, general constitutional derangements, co-operating with the disposing cause, may either induce deafness, or returns of it. I have known many patients who entertained a notion that shortness of breathing, or "weak lungs," had led to their deafness. General debility is followed by an enfeebling of this sense. Hence, deafness frequently occurs in the last stage of consumption. It comes on as a monitor of old age, often goes away,* and returns again, till it becomes fixed. An old lady, now æt. 85, became hard of hearing at 75 æt., recovered, became deaf again, at last permanently. She loses her hearing totally when attacked with catarrh or other smart indisposition. The aged frequently grow deafer and deafer imperceptibly to themselves, marking the participation of the failing sense in the progressive wearing out of the whole frame.

Very little certain knowledge has been obtained of the proximate causes of deafness, or of the pathological conditions of the parts of the ear after death. Examinations have been very rare. In the museums of the School of Medicine of Paris, Trinity College,

* These disappearances generally coincide with the coming on of some other affection.

Dublin, the University and College of Surgeons of Edinburgh, where the stores of instruction in morbid anatomy are so abundant and excellent, I found no preparations of importance, except of diseases of the brain, of which deafness was only one of the symptoms. Some few examples are scattered through the medical journals. They exhibit changes of structure, which, for the greater part, from their nature and situation, afford very little prospect of successful treatment of the class of cases to which they belong. The physicians of that extraordinary and magnanimous people the French, with their accustomed zeal and superior perseverance in pathological anatomy, have recorded numerous aural examinations of persons dying deaf. The morbid appearances were chiefly accumulations of pus in the cavity of the tympanum, caries of the bones of the ear, inflammation of the membrane covering the cochlea and semicircular canals, and erosion and opening of the fenestra rotunda. In deafness of a single ear, the membrane just mentioned was found opaque and thickened, and its proper fluid was wanting. (*See Archives, Oct., 1824.*) M. Blandin, supplementary professor of anatomy in the Ecole de Médecine, to whose attentions I am indebted, found in a man born deaf an ossiform concretion in the labyrinth, whilst the optic nerve was atrophied to a simple cellular filament. "The most common species of deafness," says the very able pathologist, Professor Macartney, of Dublin, "arises from inflammation extending from the auditory passage to the membrane of the tympanum. An immense effusion of mucus into the tympanum takes place; ulceration follows; the chain of bones is thrown out. The patient is rendered incapable of regulating the impressions of sounds; he sometimes finds them too loud, and cannot discern them when low. The impression is produced on the organ without his having the power of regulating it."—*MS. notes of Pathol. Lect., 1829.—J. F.*

All the above changes, and the deafness to which they gave rise, were ascribed to inflammation, in almost every case of a chronic nature. Scanty as are these facts, they bear powerfully and obviously upon the principle of practice to be observed at the commencement of deafness, when only, there is much hope of success. Though aware of the difficulty of investigating structure so minute as the ear, and of the necessity of a practised anatomical hand and pathological eye, I cannot but regret that opportunities are neglected of examining those who die deaf in our large institutions. No private practice, I am sorry to say, can ever afford sufficient opportunities.

One thing is certain, that the morbid action going on in the internal ear and pro-

ducing deafness, does not always extend to disorganization of the parts, or permanent injury of the sense, for I have seen very obstinate and long-continued deafness disappear upon the occurrence of diseased action in another part of the body. Mr. Giller, a young man who applied to me in 1827-8, had been deaf five years in the left ear; he had sounds in this ear like the boiling of a kettle, and a continual discharge from the external auditory canal; the Eustachian tube was pervious. Sometimes he could hear a watch with the deaf ear, at others he was so totally deaf with it, that when lying in bed with that ear towards the door he could not hear persons entering the room. He was liable to constant spitting, and once every three or four months to spontaneous diarrhœas with blood, attended with great pain and weakness. Three weeks before he came he had had spitting of blood, which was relieved by Mr. Averill. He was subject also to pains in the back and side. After trying other remedies for the deafness some time, he took the tinct. of iodine. The deafness went off, but inflammation of the chest followed immediately, after which, upon his convalescence, the deafness returned. Dr. Parry relates the case of a lady 50 æt., who, being affected with jaundice, dropsy in two forms, and total want of urine, had also been deaf for two months. Twelve hours before her death her natural hearing returned. "This must be ascribed," says he, "to the diminished activity and fulness of the vessels." He gives another case of noise in the ears and deafness in a lady aged 76 (she lost the noise when in a carriage), with cough, shortness of breath, threatening of suffocation in the night, and swellings of the legs. *She happened to lose thirty ounces of blood by hæmorrhage from an issue and the deafness left her.* (*Posthumous Works, Vol. I. p. 554.*)

I do for my own part believe firmly that if deafness were treated like acute ophthalmia, with decisive bleeding at its first coming on in plethoric subjects, it might be cured and prevented from establishing itself. M. Lallemant observes, "Occasionally in otorrhœa the discharge from the ear ceases in consequence of some other operation going on in the system, as the epoch of puberty, pregnancy, &c., or some pathological fluxion or determination to a particular organ. Sometimes these discharges alternate with attacks of rheumatism, catarrhus vesicæ, leucorrhœa, &c. In some cases the new disease is so violent that it is necessary to produce a drain near the ear by seton, and to adopt the rigid antiphlogistic system of treatment." No certain rule of practice can be inferred always, or even often, from these spontaneous evolutions or changes of determination. Professor Andral, jun., an authority of the

first class, remarks that though preternatural accumulations and congestions of blood in the capillary vessels may exist independently of organic alterations, they cannot be removed by bleeding or other means, because the local congestion is merely the effect of the exciting cause, and so long as that cause exists, though we leave but one drop of blood in the body, that drop will obey, in despite of all our bleedings, the summons of the irritating cause and fly to the part affected. It is, therefore, he adds, the exciting cause which we should endeavour to investigate and counteract, a principle so fully recognised by the Italian school as the basis of their counter-stimulant system.

The above facts prove the occasional disappearance of even old deafness, and also show that the diseased action, however protracted or obstinate, is not such as always to produce alteration of structure. The question is, in these cases, in what can the diseased action have consisted? Some say in a nervous affection, but I am disposed to believe it is far more probably in congestion of the venous capillaries. We see a slow, irritable inflammation of the eye, especially of its conjunctival membrane, which continues a length of time, creates some deposition on the iris and retina, but not the same rapid and destructive changes as inflammation from increased arterial action. May not the ear be similarly affected? Congestion is an interesting, and a by no means well-defined action. After venous congestion of the intestines, we see the veins tortuous, the parts blue and green, like an English snake, and an attempt at effusion of coagulable lymph, with but little effusion and little adhesion; the appearances quite different from those of the same part after acute or chronic inflammation; and we say, this person died in congestion, not of inflammation; but what are the characteristic and discriminating symptoms? There is less pain, and it comes on more in paroxysms. The inquiry is important in relation to the treatment of deafness.

Whatever may be the proximate cause, or pathological conditions, which constitute deafness, no such characteristic symptoms, I apprehend, will ever be ascertained in different cases as will enable practitioners to discriminate, with precision, during life, the different morbid conditions to which the internal ear is subject. Most, or all, the symptoms which I have described may occur either together, or at separate periods, in the same case. Indeed the symptoms in every case of deafness are remarkably uniform, notwithstanding the refined distinctions of many scientific and disinterested writers and the pretences of *aurists*, who are mere traders in the diseases of the ear.

Abiding strictly by all that can be known by the operations of the senses of the morbid conditions of the organ during life, and preferring rather to confess my own ignorance than take advantage of that of others, by ascribing these cases to causes of which I can have no ocular or other demonstration, I consider that deafness is divisible, generally, into only two kinds, *deafness with and deafness without discharge*.

In cases of *deafness with discharge*, I have observed, that the inflammation only, not the discharge, affects the hearing. The deafness, which is worse during the continuance of the inflammatory symptoms *alone*, as also the pain and throbbing, which are often in that case very severe, are ameliorated on the appearance of the discharge. The discharge in different cases, and in the same cases at different times, varies in quality and appearance. M. Lallemand says, with truth, that—"The smell, colour, and consistence of the discharge, vary much in different individuals, and in the same individuals, under different circumstances."—Deafness, with discharge, is sometimes periodical. In the case of a tradesman's son at Cheltenham, who applied to me, it came on annually. About the middle of the last century, M. Mery published an account of a very severe case of deafness, with discharge, in a girl, which came and departed periodically. The patient, when lying upon the grass, was seized with excruciating pain in one ear, which was followed by paralysis on one side of the face. An insect, like a large grub, was extracted, and other means being used, the girl is reported to have recovered, though small portions of carious bones were discharged from the tympanum.

All cases of deafness *without discharge*, have received the general appellation of "nervous deafness." The application of this hypothetical term is merely a proof of our complete ignorance of the real causes, seated so deeply and interiorly as they are in the several varieties of deafness, if such there be, and of the discriminating symptoms, if any, by which such supposed varieties are to be distinguished. But under the simple division which I have chosen, those parts of the ear, and its appendages, which come within the scope of actual observation, present some morbid phenomena in deafness worth detailing.

In cases of deafness without discharge, the sensibility of the external porch of the ears, and even of the Eustachian tube, is often so much diminished, that the injection of water, almost boiling, can be borne with pleasure. In passing probes into the tympanum, I have found the mucous membrane of the tube more sensible on one side than the other. So kindly, indeed, is warmth to

the ear, that East Indians, in Cheltenham, have told me, that deaf people frequently lose their deafness on arriving in the East Indies; and I have known some of the Company's officers recommend an East Indian voyage to relations to get rid of their deafness. "A chronic discharge from the ears, with inflammation," says M. Lallemand, "is generally diminished under the influence of a dry and warm temperature, exercise, and low living. In simple cases, it will entirely disappear under these circumstances; it is easily renewed or augmented by the reverse, and especially by cold and moisture, too much intellectual exertion, and excesses of the table. Bonet states, that "A nobleman from the climate of Rome, which is very damp to live in, having removed to the climate of Naples, especially on the sea-coast, found his sight and hearing much improved. Indeed he became perfectly well after going for his recovery to the sulphureous watering-places and to the sudatories (cells in baths for exciting perspiration without washing), which are hot-houses in myrtle groves."—*Sepulchretum de Auriculis affectibus*, tom. I. p. 435. Mrs. Macklyn, the sister-in-law of the state-surgeon of Ireland, four days before her death, when under my care, had so much insensibility of the ears, that she experienced sensations of severe cold from the injection of hot water, till it was raised to a degree at which I could not bear my fingers in it. She had ear-ach from a carious affection of the lower jaws. Quite different is the effect of cold water; it causes painful frigidities, catarrhs, and even an increase of deafness. After warm injections, the rush of cold air is felt more sensibly, and increases the liability to colds. I ascribe to this circumstance that instinct of the deaf which renders them so generally averse from subjecting their ears to treatment during winter. These phenomena are all explained by the exquisite structure and sensibility of the organ to both impressions, hot and cold.

Enlarged tonsils contribute to deafness even when those glands, in their enlarged state, are not so adapted as to compress and close the Eustachian tubes; for I have found the hearing often improved by the reduction of large tonsils, though they did not obstruct the passage of probes through the Eustachian tubes when at their greatest magnitude. Whether in these cases the tonsils contribute to deafness by defeating the impulses of the air, or by modifying the reverberations of sound in the posterior palate and nares, or by association of function with the ears, or by the relative position of the posterior part of the enlarged tonsil to the Eustachian tube, is not ascertained. In deafness of one ear, generally,

a single gland only is enlarged. It should be understood, that simple tonsillar enlargement in deafness coincides, and is complicated, with other causes of deafness, and that such simple tonsillar enlargement often occurs without deafness. The brother of a respectable druggist here, and another person, lately came to me with tonsils immensely enlarged, without any effect on the hearing. Apparently enlarged tonsils often give rise to dyspepsia and disordered states of the stomach, for I have known those affections yield, in deaf persons, in proportion as the tonsils were reduced to their natural bulk.

Feb. 1831.

REMARKS ON THE MECHANICAL MEANS
EMPLOYED IN THE TREATMENT OF

FRACTURES OF THE LOWER EXTREMITIES.

By W. H. NEVILLE, Esq., Surgeon.

(With two Plates.)

It often happens in fractures of the leg, where both bones are broken nearly in the same relative part of their shaft, that, whether the limb be laid on its side, in a state of semiflexion, or extended in the straight position, it is found difficult to keep the broken ends of the bones respectively in such accurate contact, as finally to preserve the proper figure of the limb. The weight of the foot, and the hollow form of the leg at its back and lower part, together with the projection of the heel, constitute some of the difficulties both in simple as well as compound fractures, and a reference to the anatomy of the bones as well as of the soft parts will show us that such difficulties are to be expected. In compound fractures too, a necessity may arise for frequent changes of dressings and bandages, and this is seldom accomplished without some disturbance which it would be very desirable to avoid. The absolute necessity of occasionally moving the patient in bed, is another source of disturbance to the fracture, and the pressure of splints against some prominent part of the limb in order to give proper stability to the whole, is a matter very annoying, and very often complained of.

In the endeavour to obviate some of these difficulties, and to fulfil the primary purposes of the surgeon simply and effectually, I have constructed a new sort of splint for the leg, the utility of which I have proved in some very bad fractures, to the satisfaction of several professional friends, besides having received the complimentary testi-