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OTOLOGICAL MEMORANDA

BEING

CLINICAL OBSERVATIONS

ILLUSTRATIVE OF THE

DISEASES AND INJURIES OF THE EAR.

BY

JAMES PATTERSON CASSELLS, M.D., M.R.C.S., LOND.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS.

Surgeon to, and Lecturer on Aural Surgery at, the Glasgow Dispensary for Diseases of the Ear.

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NOTE.

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J. P. C.

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OTOLOGICAL MEMORANDA

BEING CLINICAL OBSERVATIONS ILLUSTRATIVE OF THE
DISEASES AND INJURIES OF THE EAR.

I.—On malformations of the auricle and external auditory meatus, congenital and acquired; Injuries of the auricle and meatus; Value of early incision in the treatment of the inflammatory affections of the meatus; Injury of the mastoid and rupture of lateral sinus.

Congenital malformations of the auricle are almost always associated with non-development and malformation of the external meatus, and this condition is very generally accompanied by malformation of the tympanum and Eustachian tube. On the other hand, my own clinical experience coincides with the results arrived at by other observers—viz., that in such cases the labyrinth is normal; that, in fact, with irremediable malformation of the other parts of the organ, there may be a perfect sensitiveness to transmitted tones.* Nor is this at all surprising if one considers the manner and process of development of the organ of hearing in intra-uterine life. Inasmuch, then, as these cases come under our notice with the object of having the malformation treated by surgical means, it follows that the knowledge above referred to is not without its value and influence in relation to our practice, because it is not always possible to gain positive evidence of the condition of the labyrinth in early life. If, notwithstanding the possibility of a normal labyrinth, in any given case, we find on examina-

* See on this subject a paper in *Edin. Jour. of Med. Science*, 1847, by Prof. Allen Thomson; also report of a case by Toynbee.

tion that the Eustachian tube is malformed beyond the possibility of executing its functions, or totally absent, any attempt at remedying the malformation of the external ear is hardly justifiable, inasmuch as the tympanum and its contents may be, and probably are, involved in the abnormal change of form. With a normal Eustachian tube, however, any such attempt is not only not questionable, but perfectly warrantable. Such, indeed, was the nature of the following case, in which I endeavoured to make patent the external meatus, but without success:—

Case I.—A child, æt. 3 years, was sent to me for examination. Her state was as follows:—She was cheerful and amiable in temper, in good general health, uttered monotonous, and seemed to hear very loud sounds. Both auricles were malformed, the right one being the worst. On this side the meatus ended in a *cul-de-sac* of about two lines in depth. Examination failed to detect any true auditory canal. The left meatus was normal, or nearly so, in form. The left membrana tympani was seen; its appearance was indicative of simple katarrh of the tympanum and Eustachian tube. On the right side it was tolerably certain that the Eustachian tube was normal; it was not possible to ascertain, however, the actual state of the tympanum. The labyrinths, so far as one could determine in a patient so young, were sensitive to transmitted tones. The hereditary history was quite satisfactory in every respect.

The questions submitted in consultation were as follows:—

1. Is the right meatus present, although occluded at its orifice, and can it be made available for the transmission of sound?
2. Is the malformation double?
3. If not, if the left ear is normal in its essential parts, what is the cause of the deafness?
4. Can the condition of the child be remedied; in other words, is it possible to remove the cause of the deafness in the normally formed ear?

An exploratory incision through the *cul-de-sac* on the right side demonstrated the absence of an external meatus. The examination above detailed had by anticipation answered the second and third questions. As the loss of function on the left

side was apparently due to the katarrhal state of the tissues, experience enabled one to hold out a hope of greatly improving it by judicious treatment. This, with the approval of the family medical adviser, was begun at once; in addition, the education of the child was at the same time instituted by means of vocal object-lessons.

The result, till now, is gratifying to all interested in the case. Since the date of the consultation, not many months have elapsed, yet the little patient's hearing is very decidedly improved, so much so, that she makes attempts to repeat several words immediately after they are spoken to her.* She is still under treatment, with a fair hope of being rescued from deaf-mutism.

Malformations of the auricle, which are acquired, are always met with in females, and are, for the most part, the consequence of foolish prejudice; for the leaders of fashion, regarding the *uncovered* auricle as detracting from, rather than adding to, the beauty of the face, do their utmost to hide it from the public gaze, and elderly ladies, setting aside fashion for personal comfort, cover the auricle with multitudinous wraps to exclude the cold; in either case the result is the same. The elevations and depressions of the auricle are effaced, and the angle at which it stands out from the head is destroyed, so that it lies oftentimes in close contact with the post-auricular region. Such an auricle is useless, or nearly so, for the purpose of hearing. This malformation is not in itself of so much importance, however, as to merit special remark, except perhaps from the student of the beautiful in nature, were it not that it is directly the cause of a condition of the tissues which in advanced life gives much annoyance; I refer to collapse of the orifice of the cartilaginous meatus. That the orifice of the canal, otherwise healthy, may become collapsed in the way I have affirmed, anyone can prove for himself who presses firmly with the finger tip upon the outer margin of a well-formed auricle. The effect produced by this manœuvre upon the entrance of the canal is as follows:—The posterior segment

* She now (Jan. 1876) speaks pretty well.

of the orifice is seen to approach towards the anterior one, thus narrowing the orifice of the canal. Needs it to be asked, what result would follow if the pressure thus applied were continuous? In regard to this malformation, my experience may be summed up in a few words. Except in two instances, and these not associated with a flattened auricle, I have never seen a case of narrowing of the orifice of this canal from collapse of the tissue in one of the male sex; nor have I met with a case in a female in whom the auricle was in every respect normal. In one case—a young lady—the auricle was turned back, but not flattened, yet the orifice of the canal was distinctly small; it was narrowed, but not by collapse. True collapse consists in the posterior segment of the orifice of the canal approaching, in the manner above described, the anterior one, and nearly or quite touching it, and is to be distinguished from simple narrowing in the following manner:—If you make traction upon the auricle, upwards, outwards, and backwards, this proceeding restores the natural caliber of the orifice of the meatus, if the contraction be the result of collapse, but it has little or no effect upon the meatus narrowed by disease or otherwise. This distinction is not of slight importance in practice, even were it possible at first sight always to satisfy oneself as to the cause of the narrowing; for the treatment which is applicable for the relief of the orifice diminished by collapse of its healthy tissues, may be, and commonly is, inappropriate for the cure of that concentrically narrowed by disease.

For the relief of the deafness due to complete collapse of the orifice of the external meatus, I use, with benefit, a lightly constructed tube of vulcanite, and find it superior in every respect to those formed of metal. I may, however, remark, that even this appliance is seldom called for, for the collapse is rarely so complete as to hinder the ingress of sound. A very small chink, indeed, suffices for its passage. The deafness, which is the symptom most complained of in these cases, is more frequently caused by accumulations of cerumen and epithelial debris, which fail to make their escape, by reason of the constriction at the orifice of the canal.

Narrowing of the canal itself is either congenital or the

result of disease, and situated either in the cartilaginous or osseous sections of the meatus.

In speaking of the narrowing which is caused by disease, I do not here refer to that condition of the canal in which its caliber is encroached upon by adventitious growths, but to the concentric narrowing due either to a hypertrophy or contraction of its own tissues, to which I shall revert by and bye.

Congenital narrowing of the external auditory meatus is generally situated in the osseous portion of the canal, and is associated with a similar condition of the osseous portion of the Eustachian tube. If the soft tissues entering into the formation of the last-named canal and the tympanic lining membrane are healthy, the double narrowing just mentioned is compatible with good hearing. The danger, however, of great, if not total, deafness occurring in such a case is at once evident from the fact that a very slight katarrhal tumefaction of the tissues suffices in such circumstances to close the canal. In a simple uncomplicated case of narrowing of the external meatus, fair hearing is found even when the aperture for the transmission of sound hardly admits of the point of a small probe; from which fact one can infer how important a part the Eustachian tube plays in the function of the organ.

Case II.—The following case, which I saw upwards of a year ago for the first time, is of more than ordinary interest in several points:—The patient was a healthy young lady, æt. 13. In infancy and childhood she heard “quite well.” Five years ago she became slightly defective in her hearing. This state of matters continued to get worse till now, when her deafness is so great, that she only hears loud conversation quite close to either ear. Tested by the watch, the ears seem equally perceptive—viz., $\frac{2}{72}$ ”. In every respect her general history is satisfactory. The cause assigned by her parents for the deafness is as follows:—When about seven years old, the patient had an eruption on the scalp, for the cure of which cold lotions were constantly applied. In the application of these it was not always possible to avoid wetting the neck and sometimes the child’s clothing as well; in this way they think she caught cold in the throat and became deaf.

On examination, both meatuses are seen to be normal in the whole of their cartilaginous portions, but each canal in the osseous portion is contracted, the opening left in the constricted part hardly admitting of the passage of the point of a small probe. On the right side it is just possible to see the membrana tympani, but on the left side it is impossible to catch a glimpse of this part of the ear. The condition of the tympana is therefore inferred from the results of the auscultation of these cavities. Both labyrinths are normal as to perception of transmitted tones. The naso-pharyngeal cavity in its entire extent is congested and relaxed; from its appearance and the tone of the patient's voice, I infer that she has suffered for a very long time from nasal katarrh. Both Eustachian tubes are katarrhal and contracted in their osseous portions. Diagnosing the case as one of double congenital narrowing of the osseous portions of the external meatuses and Eustachian tubes, and that the deafness was in great part caused by the katarrh of the latter, now chronic in character, I was compelled to regard the case in an unfavourable light. Indeed, inasmuch as the young lady's parents declared that she was becoming deafer daily (and knowing the progressive character of the deafness that usually follows katarrhal changes in the tubes or tympana, I was disposed to attach some weight to the statement), the chief object of the treatment, since carried out, had in view the arrest of this increasing deafness. Accordingly, general hygienic measures were recommended, which were intended to improve the general tone, while local measures were carried out, with the object of diminishing the congestion of the naso-pharyngeal mucous membrane and of effecting the removal of the post-nasal katarrh. These happily soon brought about a much healthier condition of the membrane of the post-nasal region. It was hoped that a persevering use of this general and local treatment for some months might so improve the nutrition of the affected tissues, that the progressive katarrhal changes in them might become arrested and the function preserved. The correctness of the diagnosis and of the principles of treatment have been confirmed by a year's observation of the case. The hearing is now improved to $\frac{4}{72}$ '' , and the naso-pharyngeal

mucous membrane appears much healthier. The improvement to ordinary conversation is, however, more apparent than it is to the watch, and I feel satisfied that the better hearing is in consequence of the healthier tone of the whole tissues, particularly of those entering into the formation of the Eustachian canals. This improvement gives grounds to look for ultimate success in the attainment of the objects had in view at the outset of the treatment—viz., arrest of the progressive katarrhal changes and preservation of the function.

There are some points of interest in connection with the case just related that deserve attention. It may be questioned, for instance, if the patient ever heard well, as her parents affirmed. Although this statement rests alone upon their unsupported word, I am disposed to regard it as in some measure reliable, on the following grounds:—The simple uncomplicated malformation of the parts, above described, was not likely to diminish the hearing distance below what those accustomed to accurate observation might have justly regarded as “fairish hearing;” and the parents meant no more, when they stated that their daughter heard “quite well” in her early years. Further, the very small portion of the right membrana tympani seen on examination, together with the appearance of the naso-pharyngeal tissues, and the râles heard during auscultation, gave grounds for the belief that their katarrhal state was of comparatively recent origin, probably coincident with, if not caused by, the accidental wetting of the garments, as already mentioned. As to the probable cause of the naso-pharyngeal katarrh, I consider the one alleged by the parents as reasonable, and not altogether unsupported by observation, for I have found bad katarrh of the tympana and tubes in otherwise healthy people who perspire much about the head, or who have indulged for a time in sea or other bathing. How to account for many of these cases, unless by saying that they arose from “a cold in the head,” or katarrh of the naso-pharynx, the consequence of drying the hair of the head imperfectly, I do not know.*

* *Apropos* of this subject, the discussion at the Congress, held in Wiesbaden, in 1874, did not elicit an explanation more reasonable than the above.

The varieties of narrowing of the external meatus usually met with, due to pathological changes, are the slit-like narrowing of the canal at the point of junction of the cartilaginous with the osseous portion, caused by contraction of the fibrous tissue uniting these parts, and the irregular narrowing of this latter portion by one or more hyperostoses. Both are deserving of notice, because they may not only diminish the hearing, but seriously imperil the life of the patient, by hindering the free exit of natural or morbid secretions. Concerning the origin of these pathological states, I think it is sufficiently clear that they are the consequences of disease in other parts of the organ, most frequently of all in the tympanum. That they are, in fact, the consequences of a perverted nutrition, brought about by the greater afflux of blood to the organ. Although I have seen numerous cases in which the canal was *almost* closed by one or other of these morbid states, I have never seen it completely occluded by them; indeed, I should be disposed to say, inasmuch as I have not seen such a case in the whole of my private and extensive public practice, that such a morbid state of the canal is very seldom met with, *i.e.*, complete occlusion due to pathological changes.

The treatment that suggests itself in such cases is, the removal of remote disease, and of the consequent hyperæmia, and the establishment of a healthy tone to the tissues. When this is accomplished, the slit-like narrowing may be treated directly by a tangle or sponge-tent. The hyperostoses may be let alone; as a rule, removal of the irritative cause, in the manner above indicated, arrests their growth, and they give no more trouble.

Case III.—A lady, æt. 76, who was almost completely deaf, complained of great and distressing tinnitus in both ears. Her illness was of many years' duration. On examination, the auricles were seen to be pressed flat to the lateral aspect of the head, and the orifices of the canals closed to a mere slit. This latter condition was only in part affected by the manœuvre which I have already described, as serving to distinguish true collapse from narrowing of the orifice of

the canal; for in truth it was a combination of both conditions: the patient had suffered from chronic eczema of the auricle; this accounted for the hardness and condensation of the tissues of the auricle and orifice of the meatus.

Immediately within the orifices of the meatuses, the canals were normal in caliber, and filled with debris. When this was removed a second contraction was found at the junction of the cartilaginous and osseous portions. The opening in this contracted part was circular, and hardly allowed of the passage of a small probe through it. Suspecting that the deafness, which had not been lessened by the removal of the debris from the more external parts, was in reality caused by accumulations in the canals within these second strictures, I dilated them with tangle, and had the satisfaction of finding that this suspicion was well founded. I succeeded in removing much sebaceous matter, with the result of improving the hearing very considerably.

Case IV.—A gentleman, æt. 40, had suffered for many years from tympanic disease. He was, however, anxious, not on account of this disease and the consequent deafness, but because of several bony growths which, he had been told, were in each ear. The examination showed that the osseous portion of each meatus was the seat of several hyperostoses, and that the caliber of the canals was seriously encroached upon by them. The soft tissues covering these enlargements were deeply congested and exquisitely sensitive. The tympana were seriously diseased and disorganised, and he suffered in addition from more recent, although chronic, katarrh of the Eustachian tubes. As I have already said, the patient seemed more anxious about the bony growths than about the great and increasing loss of function, due alone to long standing disease of the tympana and tubes. This anxiety was caused, I learned, by the opinion expressed by some one whom he had consulted that ultimately complete occlusion of the canals would result from the continued growth of the tumours. While it was imprudent to shut one's eyes to the possibility of the former

part of the statement being verified, I yet felt that I could not give the opinion my unqualified concurrence, simply because I was satisfied that the growth of the hyperostoses, if still going on, was due to the extensive disease and long-continued irritation in the tympana, and that the arrest of this growth was possible by the removal of the exciting cause. I was glad for the patient's sake that I could express an opinion to this effect; it calmed his fears, and he willingly acceded to my proposal to treat the disease of the tympana. Six months' treatment sufficed to remove all morbid active processes, and to improve the hearing very considerably—indeed, to a degree almost normal. At the end of the period just mentioned, the tissues covering the hyperostoses were pale and healthy in every respect, and their unnatural sensitiveness quite removed. The case has been seen occasionally during the last twelve months, and although no apparent diminution has taken place in the size of the bony tumours, it is beyond doubt that they have not enlarged since they were first seen by me. The progress of the whole case is satisfactory; damages, the consequences of long-standing disease, are being repaired slowly, and the hearing, originally much impaired, is now uniformly good, and sufficient for all the business of life.

Injuries of the auricle in this country are comparatively rare, still more rarely are they followed by malignant disease, as in the following case, which on that account possesses some interest.

Case V.—A strong, healthy, labouring man, æt. 50, attended at my *clinique*, and gave the following history:—Several years ago he received a severe blow on the right auricle, without, however, causing any wound of it. Shortly after this, the swelling, which the blow had caused, and which had never completely subsided, increased and ulcerated. Treatment of a kind was carried out for some time without effect. The ulceration increasing, he came to town, and again carried out treatment for some time, with a like failure. At this time, so far as could be learned from the patient, the ulceration was confined to the lobule. On his first visit

to the dispensary it was seen that the ulcerative process had completely destroyed the auricle, and had invaded the lateral aural region, and the whole of the cartilaginous meatus. As might be expected, the hearing was considerably diminished. The right membrana tympani could not be seen. There was a slight degree of sympathetic enlargement of the neighbouring glands, but not so great as the nature and extent of the disease warranted us to expect. The ulcerated surface presented all the appearances of an epithelioma, and the prognosis was decidedly unfavourable, as may be surmised from the site and extent of the disease.

In regard to the treatment of the case, the question of excision was considered, but it was decided that the time for successful surgical interference had passed away. So long as the disease was limited to the auricle, the knife offered a prospect of cure, but unhappily the opportunity for employing it with benefit had not been seized by the surgeon into whose hands the case had at first come. Fuming nitric acid, and subsequently chromic acid were applied to the surface with the hope of inducing healthy action, or at least staying the disease.

For a time these applications seemed, on the separation of the slough, to have such an effect. The disease, however, continued to advance, and the poor man discontinued his attendance. At this time I estimated the duration of his life at about 12 months; and as nearly a year had elapsed since I saw him, I quite recently endeavoured to get tidings of the case, but failed in my enquiries.

In the following case of *epithelioma of the auricle*, the result was more gratifying, inasmuch as the free use of the nitric acid was followed by healthy action in the parts, and ultimate cicatrization of them. This case differed from the one just related in two points, as follows:—The pain complained of in the former was inconsiderable, while in this one, in which the ulcerated area was quite trifling when compared with the extensive one seen in the former case, it was excessively acute. The disease in this case was not the result of an injury to the auricle.

Case VI.—A man, æt. 70, in good health, presented himself with the right auricle superficially ulcerated. When first seen the breach of surface was of small extent and limited to the helix. The surface of the ulceration was irritable-looking, its edges serrated and everted. This appearance of the disease suggested the possibility of it being malignant in character, and accordingly general tonics and topical sedatives were applied, and the progress of the disease watched. In a few days the patient returned with a report that his condition, so far as he could judge, was unchanged. Examination of the disease on the auricle showed it to be extending rapidly in all directions. Satisfied that the disease, whether malignant or not, would destroy the auricle if unchecked, I applied the strong nitric acid freely to all the ulcerated surface. When the slough, which this produced, had separated, the surface, with exception of a few points, appeared to be more healthy, and the nocturnal pain had been lessened. Again the acid was freely applied to the ulcerated surface, and with the most satisfactory effect. It subsequently healed under ordinary treatment.

Epithelioma of the auricle is comparatively rare. So far as I can gather, there seems to be, in addition to those reported now by myself, only three cases recorded—viz., by Roosa, Orne Green and Velpeau.

Case VII.—*Frost-bite of the auricle.*—A poor, ill-fed and ill-clad man, who was out of employment, attended at the *clinique*. The right auricle on its outer edge (helix) exhibited patches of black and shrunken tissue. This was supposed to be caused by lengthened exposure to a biting east wind. The parts now black were at first white and numb. The low tone of the patient's general condition indicated the principles of treatment. Under full diet, quinine and cod liver oil, the dead integument separated, and cicatrization took place.

Injuries of the external auditory meatus usually come under the notice of the specialist as the result of ill-judged and violent attempts to remove a foreign body lodged in it.* In

* See my paper in *Brit. Med. Jour.*, December, 1874, "On Removal of Foreign Bodies from the External Auditory Meatus."

such cases I have found it prudent to trust nature with the repair of the damage so heedlessly made by art; so would I advise others. As a rule, these injuries, often of an extensively lacerated kind, do best with the least treatment. Such is not the case, however, with cases of punctured wounds of this canal. The violent symptoms that follow such injuries demand prompt treatment to avert serious and it may be fatal consequences. The history of the following case is given in illustration.

Case VIII.—A boy, æt. 10, had a dispute with a school fellow, whom he struck. In retaliation the patient received a blow on the right ear from the boy, who had in the hand with which he struck the blow a penholder armed with a steel pen, which entered the meatus. It was at once withdrawn by a bystander. Thereupon copious hæmorrhage ensued; in consequence of it the boy became faint, and was removed to his home. During the night he was seized with violent pain in the ear, and when I saw him next morning this had increased in severity. The external ear region was now much swollen, and the auricle projected from the side of the head. On examination, a punctured wound was seen in the superior wall of the meatus, at a point midway between the orifice of the canal and the junction of the cartilaginous with the osseous meatus. Apparently a high degree of inflammatory action had seized upon the loose tissue lying between the cartilage and the mastoid periosteum, and which threatened, I had no doubt, to involve the latter structure if not speedily subdued; this fortunately was accomplished in a short space of time, by unloading the congested tissues. Free local depletion and full opiates were followed by the best effects. Next day the parts, though still swollen, were less painful. A repetition of the treatment and continued rest in bed speedily brought about resolution of the inflammatory action, and in a few days the patient was convalescent. In this case the free and early depletion no doubt averted an attack of mastoid periostitis, which might have had fatal consequences.

The treatment which proved successful in this case might

have failed, indeed may fail in a similar case to the one related, to arrest the onward progress of the inflammation. In such circumstances I should recommend the use of the knife freely, either at the site of the injury or over the mastoid process down to and through the periosteum, because I feel satisfied that delay to incise freely, in the manner I speak of, is fraught with danger, a danger understood best by those who have had to treat such cases when they have been left to take their course unheeded. In the treatment of the inflammatory affections of the meatus, especially otitis externa circumscripta, and periostitis of the osseous canal, it is hardly possible to over-estimate the value of early incision of the tissues as a conservative measure, for experience has shown that nearly all the more serious bone affections can arise, and in fact do arise, out of them, and that such sequelæ are preventible by the early and free use of the knife. Nor is the value of free incision of the tissues limited to the acute stage of these affections. In cases of a most chronic character, it has in my hands proved highly successful. Quite recently I had a succession of cases of periostitis of the inner third of the posterior wall of the meatus, and which had resisted all forms of treatment, for periods varying from 3 to 6 months before being seen by me. After free incision, without exception, about two weeks in each case sufficed to complete the cure. Nor must it be supposed that these cases were slight; judged by the associated symptoms, they were in the highest sense alarming, and might, but for the timely use of the knife, in more than one instance have terminated fatally.

I may here remark that I find it, for several reasons, not requiring notice now, better in cases in which the local abstraction of blood is demanded to apply a sufficient number of leeches at once, and to prohibit after-bleeding by hot stupes as is usually done.

The following case has several points of interest which make it worthy of record. It is reported in illustration of the possibility of recovery after rupture of the lateral sinus, a fact, by the way, not without its value to those who dread

to open the mastoid cells in certain forms of ear disease, lest this important vessel be injured in the course of the operation.

Case IX.—A healthy girl, æt. 7 years, was running across the street, when she fell on her left side before an approaching horse. The animal, going at a sharp trot, planted his hoof, which had been recently shod, on the right side of the prostrate child's head. She was picked up at once by one of the passers-by and brought to the side-walk, a distance of perhaps thirty feet. It chanced that I was a spectator of a part of the occurrence, and seeing a bleeding child carried in a man's arms, I naturally drew near to render what assistance I could. It was a fortunate thing that I did so, as I feel certain that, owing to the profuse hæmorrhage, the unfortunate child could not have survived more than a very few minutes; too few to have permitted the excited helpers to have fetched the child to a surgeon.

What I saw was this: At a distance of say nine feet, a child lying limp on a man's arms, and a thick jet of dark blood spouting over the clothes of the bearer. When we met, a stream of dark blood, seemingly as great in circumference as the forefinger of a child of the same age as the injured one; the child quite blanched and apparently dying, if not dead; a wound over the mastoid, from which the stream of dark blood spouted. All this was noted in an instant, and it was but the work of another instant to plug the bleeding orifice with the finger-tip, to have the injured child carried into a neighbouring house, to have the wound tampioned, as well as the external meatus, to administer restoratives, and finally, when restored, to send her home.

The child lay for many days in a most critical state. The delirium, pretty constant nocturnal pain, and high fever damped our hopes, but happily when the latter seemed about gone she began to improve. The first rude but efficient dressing was not disturbed till eight days had passed: when it was removed, there was no recurrence of the hæmorrhage, and the wound looked healthy. At first sight it seemed as if a more leisurely examination of the parts would enable

me to ascertain the nature of the injury, and the exact source of the great hæmorrhage, which had so nearly proved fatal to the child. All that I could, by careful examination, make out, was an irregularly circular wound in the mastoid region, about half an inch in diameter, opening into the mastoid cells, and communicating with the meatus, which was no more than hurried observation and inference had helped me to at the outset of my connection with the case. A probe could be passed through the external wound into the meatus, and be seen there. So far as I could ascertain, the tympanum and membrana tympana had not suffered injury. For a time, during convalescence, fragments of bone were discharged by the meatus, but the patient made a complete, though slow recovery. The point alone unexplained was:—What was the source of the dark stream of blood? Its character and quantity, together with the site and nature of the injury, in the absence of positive evidence, gave me some grounds for saying that it flowed directly from the right lateral sinus; at all events, I have always regarded it as a case of traumatic rupture of the lateral sinus. The brief history above given furnishes the grounds for that belief, of the reasonableness of which others³ can judge.

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