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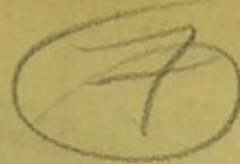
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MYRINGOMYCOSIS ASPERGILLINA

(FUNGUS EAR DISEASE.)

BY

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MYRINGOMYCOSIS ASPERGILLINA

AND

OTITIS PARASITICA.

THE case of ear disease which forms the basis of this communication is one of more than ordinary interest, because, till recently, *otitis parasitica* due to an aural fungus, was regarded by English aural surgeons as an exogenous disease, to be seen only in foreign *cliniques*. The chief interest of the case, indeed, seems to centre in this fact, viz., that the disease occurred in a person who had never been abroad, and was due to a true aural fungus.

In the early part of 1874, Hinton, our most distinguished Otologist, in anticipation of the approaching publication of his admirable work, since issued,* enquired of me if I had seen a case of ear disease caused by an aspergillus fungus, adding that he had not seen such a form of ear disease in England, nor did he know of any aural surgeon who had.

In reply, I was obliged to confess, that, in my own practice at home, I had not seen such a case, although I was familiar with the appearance that it presented, having seen it abroad; and that having regard to the opinion to which I have just referred, I had not looked for this disease, because I did not expect to meet with it. On reflection, however, over many cases of ear disease which had been under treatment by me, I could only now explain their peculiar symptoms and erratic course, by assuming that they were fungous in their nature and

* "The Questions of Aural Surgery," a review of which appears in the present number of this *Journal*.

origin. Hence, I expressed in that reply the belief, that the disease in question was not peculiar to the Continents of Europe and America, and that if diligently sought for at home the fungus would be found. Determined no longer to lie under the bondage of opinion in such an important matter, a bondage which, till now, had prevented independent investigation, I resolved to examine carefully every case, the symptoms of which gave reasonable grounds for suspecting the presence of an aural fungus. This was the result of my determination—in one week thereafter, viz., in May, 1874, I found *aspergillus flavus* in three cases; and in June, *aspergillus nigricans* in both ears in one case, and since then, several cases of the former variety of fungus have been seen by me in my private practice.

No English observer had hitherto recorded such a case, and, therefore, the discovery was considered sufficiently important to merit publication. This I had the honour of doing in the *British Medical Journal* in May last. (See "Note on Fungus meatus auditorii externi.")* Till now, my case of *aspergillus nigricans* (here for the first time fully reported) remains *unique*; but I do not hesitate to affirm that further and widespread investigation will show it to be far from rare.

The varieties of vegetable fungi, which hitherto have been found in the external auditory meatus, are the following:—*Aspergillus flavus*, *glaucus*, and *nigricans*, and the *Otomyces purpurea*. This latter seems, from the statement of Wreden, its discoverer (see "Arch. für Ohren und Augen heilkunde") to be the ascomycete or utricular form of the *Aspergillus nigricans*. The *Penicillium glaucum*, *Graphium penicilloides*, and the *Trichothecium roseum* have been also found by Steudner and others.

Inasmuch as the three first-named fungi are those more commonly met with, and because, as yet, I have only seen the *glaucus* and *nigricans* varieties, I limit my remarks to them. Indeed, seeing that the others were developed on slices of

* Shortly after the date of this "Note," a gentleman in one of the large towns in Yorkshire recorded the finding of the same variety of fungus in a case of ear disease, his attention having been called to the subject by the report of my discovery.

potato and disinfected cork by their discoverers, Hassenstein, Hagen, and Hallier, and not found in a fully developed state in the ear, it seems not improbable that the three first-named varieties of *Aspergillus*, which have been found developed in this situation, are the true aural fungi.

The characteristic structural peculiarities of the *aspergillus* fungi make it an easy matter to differentiate between them. Thus, in the *Asp. flavus*, the spore bearing sterigmata leave about $\frac{1}{4}$ th of the under part of the receptaculum uncovered, while in the *Asp. nigr.* these cover the whole receptaculum. Again, the difference between these and the *Otomyces purpurea* consists in these having no capsular sporangia, or asci, which the last named variety has.

Glancing for a moment at the history of the discovery of aural fungi, we find two cases of parasitic ear disease reported, respectively, by Mayer and Pacini ("Beobachtungen von Cysten mit Fadenpilzen aus dem äusseren Gehörgange" Müller's Arch., p. 401, 1844, and "Supra una muffa parasitica (mucedo), nel condotto auditivo esterno, Firenze," 1851.)

Notwithstanding these earlier discoveries of ear fungus, I think, in justice, all the honour of a new discovery belongs to Schwartz, of Halle, who, in 1865, first called the attention of otologists to the existence and frequent occurrence of a form of ear disease of a parasitic nature. (See Arch. für Ohrenheilk., B. ii. p. 5, 1865.)

The reports of the earlier cases failed to attract the attention of the profession, consequently their significance and importance in relation to aural therapeutics were unrecognised. The reports of Schwartz's cases at once aroused attention, and incited otologists to further search. The result showed that the fungus was not at all rare, for similar discoveries were made in various parts of the continents of Europe and America, chief among those who so reported being Wreden of St Petersburg ("Arch. für Ohrenheilk.," B. iii., p. 1, 1867), and Roosa, Orne Green, and Blake in America. ("Trans. Amer. Otolog. Socy.," 1869, and "Amer. Jour. of the Med. Sciences," 1870.) Curiously enough, however, up till the date of my communication to the *British*

Medical Journal, already alluded to, no case had been seen, or if so, at least reported, in this country.

This supposed non-existence of parasitic ear disease in England was variously accounted for by aural surgeons, those most competent to express an opinion regarding its non-existence as due to some climatic peculiarity unfavourable to this low form of vegetable life—an opinion seemingly well founded, for, as I have just said, till now no case had been recognised or recorded by British aural surgeons. So much for the history of the progress of discovery of aural fungi.

Concerning the origin and development of these fungi, it is impossible to speak with any degree of certainty; indeed, in the present state of our knowledge, to do so would be unscientific. One important fact has been observed, that whereas *penicillium* is found nearly always associated with the aspergillus fungus out of the body, in the auditory meatus the latter fungus only occurs; nor from the *debris* removed in cases of aspergillus ear disease has it been possible to rear the penicillium. The number of cases of ear fungi at present recorded amount to about two hundred, so it does not seem unreasonable to regard this fact as settled, whatever may be its value or bearing. Wreden thinks it is a disease more commonly met with in those who live in damp habitations, and he noticed a case of frequent relapse due to sitting at a window, the sides of which were abundantly covered with the Aspergillus spores. He, in common with Nötling, has noted the history of cases in which the disease followed the introduction of a geranium leaf into the meatus for the relief of toothache. Inasmuch as toothache, of a kind, is a common symptom of some ear diseases, it is not improbable that the fungus existed before the introduction of the remedy named. Bezold considers that the prevalence of parasitic ear disease in Germany is owing to the habit that prevails there of instilling oil into the meatus as a domestic remedy in many ear diseases, forgetting altogether the fact, of which possibly he may not be cognisant, that a like habit prevails as extensively in Britain, where hitherto the disease had not been found, and was

believed not to exist. Moreover, the same objection applies to this opinion as was stated above—viz., that the disease for which the oil was instilled may have been of a parasitic nature, and further, that Sachs, the eminent mycologist, has shown that oil is a valuable parasiticide for such fungi, and that some aural surgeons on that account (Von Tröltsch, for instance) recommend the installation of oil in otitis parasitica.

That the recognition and removal of the fungus is followed by the cure of the disease, is indisputable, but whether the fungus is directly causative or only a concomitant and aggravator of already existing disease, whether some peculiar condition of the tissues of the canal pre-exists favourable to the germination of the spores once deposited, or whether, as some affirm, certain diseased conditions of the tissues can give rise, *ab initio*, to these low forms of vegetable life, are questions ably contested, but, for lack of evidence, undecided, and seem, indeed, to be further than ever from being so, in view of the failure of Wreden to propagate the fungus in a healthy ear. That this fungus is a true parasite and not, as de Bary has affirmed, a saprophyte, is conclusively proved by the researches of Politzer, Weber-Liel, Wreden, and others.

These, indeed, are but conjectures that afford no aid in the solution of the mystery surrounding the origin of the disease; but it is well that this difficulty does not affect its therapeutics; for, as I already said, the removal of the parasite ensures the cure of the disease; a result which is suggestive of the question—What are the curative measures?

Before answering this question, however, it is necessary to speak of the signs by which one may *readily* recognise a case of ear disease, due to aspergillus. Speaking generally, the subjective symptoms from which the patient suffers are those usually met with in cases of ceruminous accumulation in the auditory canal, but, in addition, there is *pain*, not lancinating, like that of acute tympanitis, or the dull and throbbing pain of otitis furunculosa, but a burning deep-seated sensation, as if pepper grains were lying in the depths

of the external meatus; a sensation, moreover, which usually is not increased by pressure upon any part of the external ear region, and which is nearly always lessened or temporarily removed by injections of tepid water into the canal. These are the ordinary subjective symptoms from which patients suffer. The objective signs, which for purposes of diagnosis are of more importance to us than those just described, fall to be spoken of when I come to relate the history of the case which has suggested these remarks. Meantime, it may help to a better understanding of that case, if, in the first place, the natural history of the disease itself is considered.

It may be accepted as a well-established fact, that the aural fungi are immediate producers of diseased action in the tissues. This may be accepted even in the face of the statement of Lucae and others, that they have seen aspergillus growing in a healthy ear. If this were so, then these fungi could not be called true parasites, and de Bary's statement already referred to would hold good, that they were saprophytes growing upon dead matter, and promoting its more rapid destruction. Not doubting the *bona fide* character of Lucae's observations, I am disposed to say that *only in appearance* were the tissues of those ears healthy in which he observed the fungus growing. In my own experience, at a very early stage in the history of these cases, even when a very delicate *mycelium* alone is discoverable on the membrana tympani, I have observed an injection of the malleal vessels. Indeed, all observers are agreed that this seems to be the first observable fact in the train of morbid processes forming the natural history of cases of myringomycosis. Next, there is the formation of what appears to be a false membrane, which, gradually increasing in thickness, hides not only this injection of the vessels but even the true structure of the membrana tympani from view. At this stage there is decided impairment of the function of hearing. This gradually increasing deafness, however, is due to a mechanical cause, viz., the increased thickness of the membrana tympani, and not to the fungus; for only after

this false membrane is formed do the primary elements of the fungus become visible in the form of a delicate growth of mycelium. Springing out of this mycelial under-growth we by and bye find fruit bearing hyphens (either asci or conidia, with sterigmata and spores) of the fully developed fungus. The next step in the morbid process is the detachment of the pseudo-membrane, the exuviation of the epidermic layer, and exposure of the highly sensitive corium upon which the detached spores or asci lie, and increase the irritation. It is now that the subjective sensations of heat or pain are felt by the patient, and, as may be inferred, a great increase in the deafness. At no time is there a real purulent discharge from the meatus, unless the membrana tympani has been perforated and the tympanum exposed to direct communication with the external air, and then only from the irritation thus engendered.

Once recognised, the treatment of this ear disease is extremely simple. It consists in the complete removal of the fungus and the products of the inflammatory action, such as exuviated epithelium, pus, etc., from the external meatus, and the prevention of the re-growth of the parasite. This is generally accomplished without much difficulty by the free and judicious use of the syringe and tepid water; the cautious use of a suitable parasiticide and restoration of the tone of the tissues of the external and middle ear, if the latter has become involved in the diseased process. These measures carried out with due care for a few days ordinarily effect a radical cure.

Syringing with tepid water alone, without the subsequent use of a parasiticide, may suffice to effect a cure as some observers declare (Professors Roosa, Knapp, and others), but, for my own part, especially after studying the experiments of Küchenmeister, and the evidence which the history of the following case affords, I would not trust to it alone, nor would I rely upon a *watery* solution of any of the numerous parasiticides, with the exception, perhaps, of the hypochlorate of lime. I quite concur in the opinion expressed by Hallier, and confirmed by Küchenmeister, that of all parasiti-

cides those into the composition of which alcohol entered were most effective; further, that this efficiency was in reality due to the spirit alone.

Hitherto I have used alcohol either diluted or in full strength, and have good grounds to be satisfied with its action. The principle which may be laid down as a guide to those who desire to use this substance is this—do not irritate the already inflamed tissues; in other words, let the strength of the alcoholic solution fall far short of causing pain to the patient.

A young unmarried lady, when a child, had suppurating ears, the result of cold. Never had scarlatina or measles. For very many years previous to the onset of the present ear disease, she was perfect in her hearing, and free from any ear discharge. About two years ago (July, 1872) she went to reside at Matlock, at which time she had no ear disease. She left that place on the 8th of the following month (August, 1872) complaining of a fulness and burning heat in the right meatus, which after a time was the site of occasional lancinating pains. There was also considerable deafness, and slight discharge from the canal.

The patient is quite clear upon this point—viz., that previous to her visit to Matlock, she was, and had been for many years, free from ear disease.

She avers further, that the symptoms with which she was afflicted towards the end of her visit, were the result of exposure, instancing in support of this statement the following:—After sitting for a length of time on a stone in the open air, she first began to experience the burning sensation in the ear passage. She returned to Scotland on the date mentioned, with the symptoms above described. Originally affected in the right ear, no great length of time elapsed till the left meatus became the seat of similar sensations. All the symptoms becoming more severe, and the general health suffering, the advice of the family practitioner was sought and acted upon.

What may have been the nature of the diagnosis come to by him, it is impossible for me to say, but the patient

states that by his orders leeches were often applied, and very frequent vesication; on more than one occasion a blister extending round the neck, from ear to ear, having been applied. She also says she was mercurialised.

As may be conceived, no relief was obtained by these somewhat heroic measures, and the disease, coming to be regarded as a local manifestation of general debility, was left to take its course.

For a time there was a lull in the more disagreeable and distressing symptoms. This relief was due to the frequent use of the syringe and tepid water, by which means large masses of flaky-white deposit were removed.

After continuing for upwards of a year in this unsatisfactory state, there was a relapse. All the symptoms formerly complained of, and which had never been quite absent, returned with greater intensity.

No benefit following the measures which the family attendant had recommended, it was decided to seek the advice of some one familiar with affections of the ear. So far as I can gather from the statements of the patient and her family, the opinion of the consultant coincided with that of the ordinary attendant. The painful burning sensation, and occasional lancinating pains, were regarded as an irregular form of neuralgia, the result of the general debility. The remedial measures recommended were as unsuccessful as the former ones, and with the exception of occasional and temporary relief from syringing, the patient remained much in the same state up till June of 1874.

When she first came under my notice, she complained most of the left ear, and, in a very slight degree, of the right. There was much tinnitus, a constant burning, painful sensation in the ears, particularly the left, and occasional very slight discharge from it only. The hearing was much diminished, being for the right $\frac{1}{2}$, and left ear $\frac{1}{4}$. The naso-pharynx was congested and relaxed, tonsils slightly hypertrophied.

The right meatus presented a dry scaly appearance, and, with the exception that it contained no ceruminous zone, was normal in every other respect.

The right membrana tympani was yellowish-white in colour and opaque, this latter due to deposition in and between its several layers. Lustre much lessened, the cone being a mere speck. Curvature of membrane almost normal, except anteriorly, there it was very concave. Over the whole surface of the membrane a most peculiar appearance presented itself. On closer examination this was seen to be fungus-like in character, and consisted of a very delicate but finely developed undergrowth of *mycelium*, springing out of which were numerous fructiferous hyphens or *filaments* bearing black sporangia of a spherical form. The whole of the surface of the membrane was covered by the delicate white mycelium, not so by the filaments and their black capitals. Judging from the number of the latter that were visible, the number of the spore-bearing hyphens did not exceed one hundred.

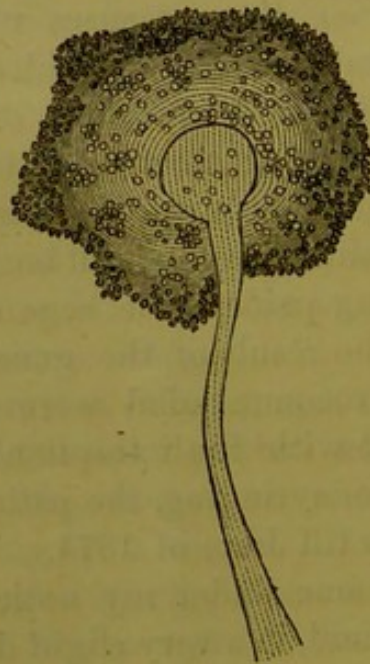


FIG. I.

Spore-head of *Aspergillus niger*, showing receptaculum and spores.—Magnified 140 diameters.—Mounted dry.

Portions of this fungus were detached and removed. Under the microscope they proved to be perfect examples of *Aspergillus Nigricans*.

Examination of the left ear showed it to be affected with apparently the same disease, but the appearances were

totally different. The meatus was nearly filled with argel masses of dead epithelium, interspersed with delicate points of a dark or almost black colour.

A specimen of this debris was examined under the microscope, and proved to be made up of exuviated epithelial cells and other debris; the black points being the spore-heads of the same fungus, viz., the *Asp. Nig.*

After the removal of the fungus from the right ear, there was no change to note in the appearances presented by the meatus or membrana tympani. In the left ear, the meatus was denuded of its epithelial layer, and the dermis proper exposed up to the tympanic ring. The whole surface of the membrane being likewise denuded of its epithelial layer. Along the handle of the malleus, which was indistinctly seen, there was a much deeper degree of colouration. All the tissues were highly congested, and, as might be supposed, very sensitive.

Both Eustachian tubes were affected by chronic katarrh, their tissues thickened, and muscles weak.

In this case the diagnosis was obvious, viz., Myringomycosis Aspergillina (Mycomyringitis) of the right side; on the left, Otitis Aspergillina. The Eustachian Katarrh was doubtless quite independent of the parasitic disease of the external portions of the organ.

The satisfaction experienced at the discovery of the true nature of the ear disease was increased, when the practical results of that discovery were experienced.

In a few days the parasite and its effects were gone. The patient remained under treatment for a short time, on account of the Eustachian affection, and then was discharged, free from all trace of her former ear disease.

After the remarks I have already made, you will be prepared to hear that I relied alone upon the use of alcohol for the destruction of the fungus.

That the specimen of fungus, in this case, is what I represent it to be, you may judge for yourselves. Here is that removed from my patient,* which you may compare

* See Fig. 1.

with this specimen of the same variety of fungus, which I had the pleasure of receiving from my friend, Professor Schwartze, the gentleman to whom, as you may remember, I have adjudged, at the outset of these remarks, the honour of discovering this form of ear disease.

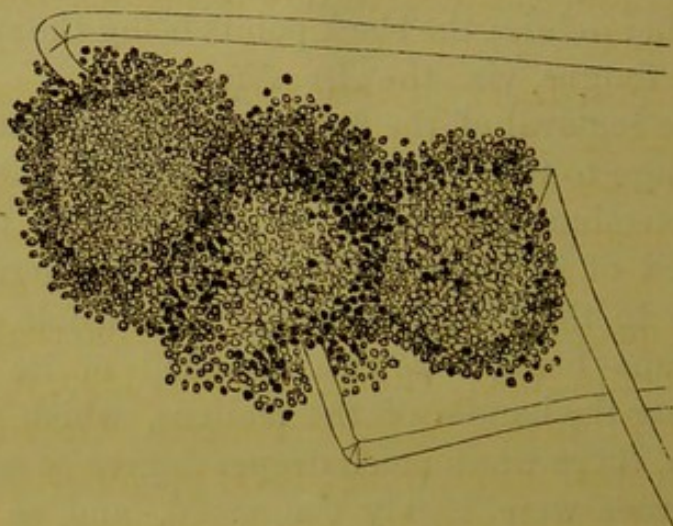


FIG. II.

Spore-heads of *Aspergillus niger* in Prof. Schwartze's case.—Magnified 140 diameters. Mounted in glycerine.

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