

The nature and treatment of ozaena / by Dr Loewenberg ; translated by Dr Kirk Duncanson.

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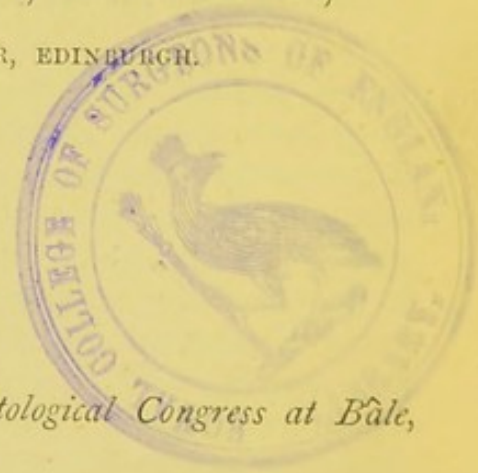
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THE NATURE AND TREATMENT OF OZÆNA.

NOTWITHSTANDING recent works on ozæna, this disease remains enigmatic, and the results of its treatment remain unsatisfactory. For these reasons I have essayed to search into the nature of the affection, hoping to find indications which will help us to combat, in an effectual manner, a disease so distressing for the patient and his surroundings. The following pages will contain a statement of the results obtained by my researches.

Amongst the new resources of our science, two methods especially have appeared to me capable of dissipating the obscurity which still hangs around this disease. These are—

1. Anterior and posterior rhinoscopy.
2. Parasitological researches.

The rhinoscopic examination of the nasal fossæ on the living subject has already given important results in demonstrating to us that *true* ozæna (or simple ozæna) is *characterized*—in addition to the stench and the diminution, more or less serious, of the sense of smell—by peculiar and clearly-defined anatomical lesions. These are an extreme thinning of the pituitary membrane, with atrophy of the turbinated bones, especially of the inferior turbinated bone, and a considerable widening of the nasal fossæ. The enlargement of these cavities is such that in looking into the nostril of those afflicted with ozæna we see a considerable portion of the posterior surface of the nasal pharynx; and when we make the patient perform the act of deglutition, we then see the curious phenomenon of contraction of the pharynx.¹ Moreover, in consequence of the diminution of the inferior turbinated bone, we even see the faucial opening of the Eustachian tube, which we do not usually see through the nostril.

Ozæna is not accompanied by ulcerations, as was formerly supposed. On the other hand, the atrophied mucous membrane takes on coat after coat of solid and obstinately adhering crusts, which give off the characteristic fœtor. According to M. Zaufal (of Prague), to whom we owe a great part of what we know of ozæna, the enlargement of the nasal fossæ would appear

¹ B. Læwenberg, "Les déviations de la cloison nasale" (*Progrès Méd.*, 1883, p. 338).

to cause a retardation of the current of expired air, which then becomes incapable of expelling the secreted matter. This remains stagnant, dries up, and forms the crusts in question. Besides the important results which I have just enumerated, and which have been confirmed by several autopsies, it seems to me that there is not, for the present at least, anything further to be expected from rhinoscopic investigations; and I shall not return to them in this paper, which will treat, on the contrary, especially of the microscopic examination of the products of the pituitary membrane,—a point to which I draw special attention.

When we have to discuss an affection of which the prominent character is a foetidity *sui generis*, indicating a peculiar decomposition, our principal object is naturally the study of the special conditions under which this chemical process takes place, and especially the examination of the micro-organisms which determine it. It cannot be otherwise, for the present extent of our knowledge does not only permit, but even compels us, to investigate the microbes whose multiplication accompanies the elaboration of the odoriferous product.

The decomposition in ozæna giving rise to an odour quite distinctive, it appeared to me probable, *a priori*, that we should not find there the group of common bacteria of ordinary putrefaction, but a special microbe. It was equally improbable that we should meet with a fungus; for, besides the fact that mucédines do not set up decomposition accompanied with putrid emanations, I have found the reaction of the mucus alkaline in fifteen patients out of sixteen, whom I have had occasion to examine and to treat since I studied ozæna from this special point of view; now, fungi prefer acid media.

The first microscopical researches gave me results which were in conformity with my anticipations, and these have been confirmed in a most convincing manner by subsequent observation. As I have already indicated at the London Congress (discussion on ozæna), I have always found in the nasal mucus of those affected with ozæna a special microbe, unique and characteristic. This is a very large coccus, always found, so to speak, in pairs, and these grouped in chains—rarely in clusters. This microbe was always motionless, except in one case where it showed a quick and undulating movement.

These micrococci are generally elongated, but in different degrees; they are sometimes rather spheroidal, sometimes rather elliptical. Sometimes their optical section is almost rectangular, as if they were cylindrical instead of being thinned and rounded at the two extremities. In examining them with the highest powers, for example the homogeneous immersion lens $\frac{1}{8}$ of Hartnack, after having coloured them, especially with the violet of gentian, I have sometimes recognised towards their centre a lighter coloured transverse zone of a whitish hue. I cannot say whether we have

here a formation of spores, or, what seems to me more probable, a commencing division. I have always seen this light-coloured band at points where no contraction as yet made a future scission probable.

If this microbe resembles in form other cocci, it differs on the other hand from them in its greater size. Its longitudinal diameter is, according to my measurements, from $\frac{1}{1000}$ to $\frac{1}{500}$ mm.; rarely have I seen smaller specimens (mesococcus of Billroth). It is consequently larger than the megacoccus of Weigert, which only measured $\frac{1}{1000}$ mm., and whose large size this author admired.¹ The microbe of ozæna is so large that one sees it like a point under a power of 90 (Hartnack, oc. 3, obj. 4). The cocci which I have discovered in otorrhœa are, on the contrary, much less voluminous.

As I have indicated above, the microbe of ozæna is always found, so to speak, as a *diplococcus*, and these often coupled together in chains in the direction of their long axis, less frequently in clusters (contrary to the gonococcus, which, according to M. Neisser,² are never found in chains but always in clusters). These chains are united by a hyaline mass. In one case only I found the cocci connected here and there in the form of zooglœa.

I consider the fact of this microbe being almost always found as a diplococcus an indication of active reproductiveness. M. Neisser having observed the same in his gonococcus, interprets it, on the contrary, as a sign of an extraordinary adherence of the two new individuals to each other.

As to the *method of examination*, there is no special preparation necessary to find this microbe: the first glance thrown on a particle of ozænic mucus generally discovers it in innumerable quantities. I recommend, however, the choice of thin layers, and especially to take the soft mucous filaments which I have always seen stretched between the septum and the turbinated bones. I make preparations in which these filaments, simply spread on the slide and coloured with an aniline dye, exhibit nothing but an infinite multitude of diplococci, exactly similar to a pure cultivation of the characteristic microbe. It is necessary to reject the dried up crusts; besides that their opacity hinders their microscopic examination, the cocci are more sparsely distributed in them than in the thin pieces to which the air gets easy access. The thick purulent masses are equally poor in cocci.

The aniline dyes give magnificent images, especially fuchsine and gentian violet. My coccus takes on all the aniline dyes which I have had occasion to try, amongst others the methyl green which, according to M. Neisser, does not tinge gonococcus. Double colourings, first with an aniline dye and afterwards with carmine, may be employed for studying the penetration of the

¹ *Virchow's Archiv*, vol. lxxxiv. p. 312.

² *Deutsche Med. Wochenschrift*, 1882, p. 20.

coccus in the interior of the cellular elements, or for examining thick fragments.

In one case only (a puny girl of eight years), I saw besides this characteristic coccus, a great number of bacilli; I have confirmed this by frequently repeated examinations of this same child. In this case only was the nasal mucus neutral, whilst in all the others it rendered blue the red litmus paper. As to the other symptoms and therapeutic results, this case resembled all the others I have observed.

In other patients affected by ozæna, I have seen here and there bacilli bent like a sickle, the same as much comma bacilli or angled forms, which are difficult to interpret and classify, and which it will be necessary to submit to further researches.

Granted the rôle that scrofula is believed to play in the genesis of ozæna, I consider it not unnecessary to mention that not one of the micro-organisms which I have found in the course of my researches on ozæna has given the colorations peculiar to the microbe of tuberculosis.

The coccus resembles that of *infectious pneumonia*, and differs only in its greater dimensions. It presents likewise morphological analogies to that of meat-macerations.¹

According to my bibliographical researches the first mention of microbes observed in ozæna is due to M. B. Fraenkel, who, so far back as 1878, said² that the mucus secreted in this affection consists, for the greater part, of pus corpuscles plentifully interspersed (*durchsetzt*) with micrococci. Since then, other observers have ascertained that there may be present cocci or bacteriae, or both together, but all without studying them in detail or considering them as characteristic of ozæna.

The only writer who has made extensive researches on this point is M. E. Fraenkel³, but the results of his investigations differ essentially from mine. Whilst I have found (apart from the rare exceptions indicated above) only the large cocci, which I consider as characteristic of ozæna, my confrère has regularly met with:—1st, small cocci; 2nd, large cocci (comparatively rare); 3rd, thin bacilli; 4th, large rods (*bâtonnets*); and, amongst these four groups, *he has especially seen* the first and the fourth, viz., *the small cocci and the large rods*.

How can the so divergent results of our researches be explained? Quite simply, I think, by the difference between my method of examination and that of M. Fraenkel. Strange to say, the learned Hamburg physician, to whom we owe otherwise such interesting researches on ozæna,⁴ has directed his investigations, not to the masses naturally secreted in this disease, but exclusively to

¹ V. Billroth, *Coccobacteria, etc.*, p. E, fig. 28.

² *Berliner Med. Gesellschaft*, 18th December 1878.

³ *Virchow's Archiv*, vol. lxxxix. pp. 499 *et seq.*

⁴ E. Fraenkel in *Virchow's Archiv*, vols. lxxv., lxxxvii., and xc.

those found on the plugs of wadding which had been placed in the nasal fossæ in accordance with the therapeutic procedure of M. Gottstein, who advises us to treat patients affected with ozæna exclusively by the introduction of pieces of cotton into the nose.

Now, it is evident that my confrère has not dealt with the simple pathological products of ozæna, but with a sort of artificial cultivation of all the microbes or spores present in the nose,—a cultivation produced, moreover, not with the natural fluid of the secretion of ozæna, but with the transudation due to the irritation of the pituitary by the tampon, which irritation is admitted by Gottstein, Fraenkel, and other writers. Besides, it is necessary to take into consideration that the presence of a tampon in a nasal fossa greatly modifies the conditions of development of the microbes by hindering, on the one hand, the access of air, and, on the other, the evaporation of the water which enters so largely into the composition of the mucus.

According to my idea, the nasal fossæ form an apparatus analogous to the *aëroscope*, intended, we know, to gather in the germs floating in the atmosphere, in making the air pass over glutinous surfaces which retain and fix the microbes and their germs. Each inspiration exercises a powerful influence on these organisms, so delicate and so light; in gliding along the numerous nasal anfractuosités they are retained by the mucus, especially by the viscous product of the ozænic secretion. Hence it is evident that in this affection the nose contains, besides the pathognomonic microbe, necessarily all the germs of the surrounding air. Only those amongst them which find a favourable medium for cultivation in the exudation produced by the irritative process, and which soaks the plug, and in the impeded conditions of aëration and evaporation which I have just mentioned, develop and multiply there. Neither let us forget that the tampons themselves may contain, previously to their introduction, atmospheric germs, and that, finally, so long as the secreted fluid has not entirely soaked the cotton employed, the inspired air may yet introduce various micro-organisms.

Therefore what M. Fraenkel has studied is only, in fact, the product of a sort of aëroscopic cultivation established under particular conditions, and in an exudation which an irritative process has set up in an ozænic nose. The difference between this "cultivation" and the natural multiplication of the coccus of ozæna in the nasal fossæ of the patient, becomes yet more striking if we examine into certain particulars resulting from M. Fraenkel's researches. After remaining two hours in the nose, the plug still contained a neutral fluid. This gave an alkaline reaction only at the end of four hours. My researches, which have given me besides rather different results in this sense, that after four hours I have still found a neutral fluid, have demonstrated to me, on the

contrary, that the natural nasal mucus is freely alkaline in ozæna, as I have ascertained fifteen times in sixteen cases (see above). That is an essential difference, considering the importance of the reaction of the medium, for the vitality of microbes. It is the same with regard to the consistency of the fluid, which is aqueous in the tampons, whilst the mucus of ozæna is of a pathognomonic viscosity, and dries readily to form the crusts which characterize this affection. Finally, if we remember that the air circulates freely on the mucous surface, but cannot penetrate the plug soaked with liquid (a difference also of the first importance for the development of microbes), it clearly results that the conditions in which M. Fraenkel and I have been placed have differed; that this writer has not had before him the real and natural product of the ozænic process, but a kind of culture established in peculiar and artificially complicated circumstances, whilst my researches have simply been directed to the mucus as it is produced by the mucous membrane of *those affected with ozæna*.

The divergence of the results of a cultivation on the one side, and of the produce of the disease itself on the other, becomes apparent when we try to multiply the characteristic microbe of ozæna by sowing the mucus of this disease in the cultivation fluids. For example, I have introduced, whilst taking the necessary precautions, several flasks containing, some of them veal soup, others dissolved Liebig's extract, with the mucus from ozæna, where even under the highest powers of the microscope the large cocci were apparently the only microbes present. The flasks and the liquids had been sterilized in a laboratory specially designed for bacteriological researches. Contrary to my expectation, the result has always been, not the exclusive multiplication of the large coccus, but the predominance of a crowd of other microbes, resembling slightly those found by M. Fraenkel, and among which especially the small micrococci were abundant and active. Later, some mould-fungi have floated on some of the Liebig's extract cultivations. Cultivation experiments on sterilized slices of potato have not been more successful.

None of the attempts to cultivate the special coccus in liquids having succeeded, I am experimenting at present with the materials employed by M. Koch,—peptonized gelatine and agar-agar. With the aid of these substances I have, in fact, succeeded in obtaining pure cultivations, containing only the large coccus, by implanting in them fragments of the mucous filaments, which are chiefly made up of coccus (see above). In my cultivations the cocci form chains diversely bent; here and there more voluminous individuals are found, in which the spores develop (comp. Zopf, Spaltpilze, p. 51, and fig. 15, 9).

I am trying at present to inoculate animals with the produce of these cultivations, in order to communicate ozæna to them.

The experiments of this kind which M. Fraenkel has tried, however interesting they may be, have been made with the liquid from the tampons, consequently, as I have just explained, with the produce of a particular culture multiplying a crowd of micro-organisms instead of with the microbe, which is to me the characteristic organism of ozæna.

In the liquid contained in the plugs and in the artificial cultivations, for example in that made in the soup, there goes on, as I think, a process of *selection*, which I explain thus: the nose collects, as I pointed out before, all the germs present in the atmosphere. In the peculiar conditions of ozæna, that of the special microbe alone is developed; in the artificial cultivations, on the contrary, there exist other conditions of nutrition, aëration, etc. Conformably to these conditions, other germs suppressed in the nose by the coccus in question develop to the exclusion of this latter. Something analogous takes place in the fluid in the plug, and I can testify to this, as I have myself ascertained in the nasal mucus after the employment of a tampon, besides the coccus of ozæna, the presence of small motionless bacilli, which I had not found previously to this application.

Besides the fluid extracted from the plugs, M. Fraenkel has also directly examined the nasal ozænic mucus, but, as far as it appears from his publications (*loc. cit.*), only on the dead subject, consequently under conditions quite unfavourable to the investigation of micro-organisms. Whilst on the living subject their development is constantly influenced and modified by the mucus secreted in a continuous manner, the post-mortem decomposition can only give the results of simple putrefaction.

The Pharynx.—In all my patients suffering from ozæna, I have noticed the pharynx, nasal and buccal, to be covered with ridges alternating with furrows. The microscopic examination of the mucus of this region has given me results different from those obtained on the pituitary in this sense, that the cocci present were much less frequent and mixed with a great variety of other objects, especially epithelial cells. I found there also, in one case, elements of very striking form, which must be studied subsequently.

The Nature of Ozæna.—From all that precedes, it will be seen that ozæna is an affection *sui generis*, characterized not only by a peculiar atrophic deformation of the nasal fossæ and a decomposition accompanied by foetid products, neither of which we meet with in any other disease, but besides by the presence of a special coccus. The presence of the latter alone causes the characteristic odour, which its absence excludes. Thus the stagnation of mucus in other nasal affections, in which, of course, this coccus is absent, does not give rise to a bad odour, at least not this peculiar foetidity (for example, in chronic coryza, mucous polypi of the nose, and adenoid tumours of the naso-pharynx; children attacked with

this last affection neither being able nor knowing how to blow their nose).

Is the microbe absolutely confined to the nasal fossæ and the pharynx, and is it not found in other regions? It is impossible at present to answer this question. As for the general aspects of the subject, I think it is often wrong to consider as distinct species the microbes met with in different affections; on the contrary, it seems to me possible that the same micro-organism can cause similar disorders in different organs (disorders which we do not recognise as identical, and which we are in the habit of designating differently according to the localities attacked), or can provoke in different parts of the body disorders differentiated by the conformation of the organs, their circulation, their secretion, the access of air, the temperature of the region, etc.

To sum up my opinions, this is how I look upon the rôle of the coccus in ozæna,—I think that in the normal condition the mucus fixes all the germs brought in by the air (for example, as glycerine does in some aërosopes), but does not constitute a fit medium for their multiplication. I can confirm this fact from frequently repeated examinations of normal nasal mucus, where I have never met with microbes abundantly developed. A pathological change is necessary to allow such or such a germ to multiply and to exercise a destructive action. It is thus that in ozæna, perhaps from the effect of a particular conformation of the nasal fossæ, or a special modification of the secretion,¹ the coccus brought in by the inspired air may multiply on the Schneiderian membrane. Meeting with favourable conditions, it prospers to the exclusion of all the other microbes; for, when several species of these invade a region, generally one only amongst them predominates, because it finds the most favourable conditions for development.

I am inclined to think that the coccus of ozæna must come from another nose affected by this malady, and that in general the germs must pass through a pathological medium in order to acquire special pathogenic properties. The coccus then multiplies, stifling all the other germs, and causes the nasal secretion to undergo the characteristic decomposition. To make it understood that special conditions are necessary for it, in order to give it the victory over the other microbes, I have only to remind the reader that when we try to cultivate artificially, in certain media, the ozænic mucus which under the microscope appears alone to contain the cocci, these do not multiply, whilst other germs until then invisible, but, of

¹ In reflecting upon the conditions permitting the microbes which incessantly assail organs accessible to the air to establish themselves in certain individuals and excite parasitic maladies (tuberculosis, for example), I must admit the necessity of a predisposition furnished by an *anomaly of structure*, or what seems to me more probable, *of secretion*. Thus one can imagine that bronchial mucus may be more viscous than usual, or of alkaline reaction, with certain persons, who are thus predisposed to multiply the tuberculous bacilli, the microbes prospering *generally better in media feebly alkaline*.

course, also present before and merely repressed by it, are alone developed, this medium permitting them to predominate over the coccus of ozæna (veal soup, Liebig's extract, and sterilized potato).

The conditions of multiplication of the coccus are found realized in a perfect manner in the nasal fossæ of those affected with ozæna, less so in their pharynx, for I have found the microbe less frequently there, and probably still less in the Eustachian tube. I come to this conclusion on account of the rarity of affections of the middle ear in ozæna, a point to which I shall return. Once established in the nose, the coccus invades the mucous membrane, and also, I think, the bony substratum of the turbinated bones, by producing atrophy of these parts.

The General Condition of those affected with Ozæna.—The health of persons affected with ozæna is generally feeble, and I have always observed that they have an unhealthy appearance and pale complexion. I have been specially struck with the pallor of the noses of those affected with ozæna. In my opinion, this weakening of health arises not only from the incessant inhaling of the gaseous products of the ozænic decomposition, but also from the deglutition of its non-gaseous products, amongst which there are certainly some very injurious. This fact, which I do not remember to have seen mentioned, is to me indubitable, since I have proved the presence of the coccus in the mucosities covering the posterior wall of the pharynx, and which are assuredly swallowed from time to time.

The Contagiousness of Ozæna.—As I said before, I think the coccus must come from an ozænic nose; my hypothesis is closely connected with that of the contagiousness of ozæna admitted by some writers. Thus, M. Bossowski¹ cites the case of a young girl of 18 years in whom the affection broke out some weeks after cohabitation with a man affected with ozæna. The last case of ozæna which I have seen also concerns a young woman, 20 years of age, an unmarried mother and wet nurse, who, according to her own statement, only became affected with ozæna some months since. The extremely flat nose of this person presents in the interior all the most confirmed characteristics of ozæna, atrophy of the turbinated bones and of the mucous membrane, adherent crusts, abundant cocci, etc.

According to the patient, the father of her child, a young man of whom she has lost sight, was exempt from all nasal or syphilitic affection, so that the origin of the disease remains obscure in this case. Besides, in studying the question of the contagiousness of ozæna, the statements made by patients such as I have just cited ought, in my opinion, to be taken with much reserve, when we consider the little attention which certain

¹ Bossowski, Clinical Reports by Professor Korczynski, of Cracow (*Przegląd lekarski*, No. 44, quoted by Virchow and Hirsch, *Jahresbericht*, 1880, ii. 124).

individuals give to questions which seem to them of less importance as touching their health than as touching their coquetry and their desire to look well.

If contagion takes place, it is certainly by the microbe, but yet this requires favourable ground for its establishment, a condition which we must allow for the propagation of all contagious or infectious diseases (see note, page 10). Particularly in ozæna does this necessity seem to me to be clearly brought out, because the affection is rare, whilst the occasions for its propagation are innumerable. Thus, for example, we very often see in a large family one child only attacked with ozæna, in spite of the intimate and incessant contact of the children with each other during play, and with their parents, and the promiscuous use of pocket-handkerchiefs usual with children. I have in my practice a family in which, amongst several children of both sexes, two young girls only are affected with ozæna, the youngest in an advanced stage, the eldest apparently so slightly that the ozæna was only discovered by me when examining her nose, the mother having incidentally mentioned that the eldest sister was attacked with complete anosmia. Examination discovered all the symptoms of ozæna, the enlargement of the nasal fossæ with diminution of the bulk of the turbinated bones, foetidity, formation of crusts, and, above all, innumerable voluminous diplococci. It is worthy of notice that these two sisters, who much resembled one another, were the only members of the family who had flat noses. It is impossible in this case to determine whether the affection had been communicated by one sister to the other, or if it had broken out with each independently by reason of the vicious conformation of the nose,—a congenital disposition which would have favoured the invasion of the microbe.

As to contagion in general, it is perhaps necessary, in order that it may take place in this affection (and in others), that the micro-organism should have only recently left the medium where it had originated, whilst it will lose its special pathological quality by remaining in media less favourable to its multiplication. In other words, it might be necessary that the coccus should reach a nose still intact, but disposed to ozæna, shortly after having left the organ which had given it birth, whilst there would be no contagion from a germ which had strayed or remained some time on the way. Perhaps this is also one of the causes of the rarity of the affection.

Designation of Ozæna.—It has recently been proposed to change the name of ozæna, and substitute for it that of "*Rhinitis chronica atrophicans foetida*." Now, ozæna being well characterized by all the symptoms which I have just explained, I see no necessity for changing its name. Strictly speaking, we can add the term "simple" or "true" to exclude the only possible confusion, that with syphilitic ozæna. As for the name "*Rhinitis*, etc.," besides the fact that it is rather a

definition than a name, the word "atrophicans" seems to me of doubtful Latinity; and, lastly, it is not the rhinitis that is foetid, but its product.

Complications.—According to my experience, and contrary to received ideas, ozæna is never complicated, so to speak, with affections of the ear. I have observed such complications only in about a twentieth of the patients affected with ozæna, whom I have treated during a practice in otology of twenty-two years. To me, then, there exists no affinity between these two forms of disease.

I will add, on this occasion, that I have scarcely ever met with diseases of the ear attributable to the presence of mucous polypi of the nose, at least unless there co-existed adenoid vegetations of the nasal pharynx (a combination which I saw lately, amongst others, in a boy of eight years, born of a syphilitic father).

Here are, then, two diseases of the nose giving rise to results the most important, and, I add, the most opposite, so far as the respiratory function of the nose is concerned, for the one absolutely obstructs the nasal fossæ, which the other, on the contrary, enlarges to excess, both remaining without effect upon the cavity of the tympanum. From this it seems to me that there is much to deduct from the supposed action of certain nasal affections on the middle ear. The rarity of affections of the ear in cases of mucous polypi which, more than any other malady, cause complete obstruction of the nostrils, also argues against the hypothesis of M. Lucae concerning the injurious effect of the blocking up of the nose upon the middle ear by the aspiration brought about during deglutition. I think that, even when this action takes place, a healthy Eustachian tube allows the different pressures instantly to come to an equilibrium.

With regard to ozæna, it is all the more interesting to prove the immunity of the middle ear in this affection, that in consequence of the atrophy of the inferior turbinated bone the faucial opening of the Eustachian tube is found directly exposed to the inspired air, and, besides, is bathed by mucosities in which I have ascertained the existence of the characteristic coccus.

Symptomatology and Diagnosis.—I shall not speak of the crusts, nor of the foetidity, nor of the signs of atrophy which make confirmed ozæna easily known. I shall only add to the known symptoms the authentication of the coccus by microscopic examination and some phenomena of less importance which I have met with in many cases. There is first a peculiar *nasal twang*, which appears to me due to the resonance of the sounds of the voice in the greatly enlarged nasal cavities. I have already mentioned the filaments of mucosities, which I have constantly seen stretched between the turbinated bones and the septum. I have also frequently observed muco-purulent masses lodged above the middle turbinated bone. These two phenomena, although not exclusively

characteristic of ozæna, have nevertheless appeared to me more frequent here than in other nasal affections.

We shall now inquire whether the recognition of the coccus can be of service to us in the diagnosis of ozæna. It will be specially so in recognising this affection at its commencement and in doubtful cases.

I hope that, thanks to the discovery of this micro-organism, we may be able to decide if ozæna always commences in a hypertrophic stage, a chronic coryza, or not. This question is still disputed, some of the best writers solving it affirmatively, and others, not less competent, negatively. Be that as it may, even those who admit the stage of hypertrophy do not state how the affection can be recognised at this period. Now, the recognition of the coccus will allow us to decide the question. I advise looking for it, for this purpose, in all cases of nasal hypertrophic catarrh in children, and to follow the subsequent phases of the malady. I have already been able to proceed thus in one case, and I am commencing analogous researches in others, but the reader will easily understand that I cannot yet give definite results, these observations naturally having to embrace years.

If my previsions are correct, the coccus will help us to recognise ozæna at an early stage, and then we shall be able to try to combat this affection under more favourable conditions than hitherto.

If the future alone can decide the value of the coccus as a means of diagnosing the commencement of ozæna, it is not so as regards the second point, for I have already been able to utilize the recognition of the microbe in many of the doubtful cases which present themselves frequently enough to the specialist. They are from the first veritable ozænas, but with little fœtidity, and a modified enlargement of the nasal fossæ. In these the microscope confirmed me in the nature of the affection by demonstrating the existence of the characteristic microbe. On the other hand, from the absence of the coccus, I have been able to exclude ozæna in cases of chronic rhino-catarrh with enlargement (certainly congenital) of the cavities of the nose, but without atrophy—an important result which has permitted me to reassure colleagues and families as to the future of the patients. Besides that, I have had occasion to see several cases of doubtful nasal affections in syphilitic cases, or where syphilis was suspected. In all these cases I found the coccus, and the subsequent course has confirmed the diagnosis of simple ozæna.

The knowledge of this microbe would have been very useful to M. Zaufal in obtaining certainty in the following case.¹ A young woman affected with ozæna came, accompanied by her child, to consult him. Finding that the latter had a nose formed exteriorly like that of the mother, M. Zaufal examined it, and found that the nasal cavities had already, “so to speak, in germ the same

¹ Zaufal, in *Prager med. Wochenschrift*, 1877.

tendency as those of the mother, and that at puberty" (*sic*) the child would certainly have ozæna. (I do not know why the learned specialist of Prague insists upon puberty, for I have very often seen ozæna in little children, amongst others the little girl aged eight years, whose case I have cited, page 6, and who has been affected with ozæna for several years.)

If M. Zaufal had known the coccus, the microscopic examination of the nasal mucus of the child would have shown him the presence or the absence of the microbe, and consequently the existence or the non-existence of ozæna.

Therapeutics.—*From the discovery of the microbe proceeds the necessity of exercising an energetically parasitocidal action.* It is necessary to attack the cocci present, removing as many of them as possible and killing those which remain, or at least hindering their vitality so as to prevent their multiplication and their decomposing action. To this end I apply antiseptics by means of a combined treatment, which is made up of three processes employed daily in the case of each patient attacked with ozæna. We shall review them the one after the other.

1st, *The nasal douche.*—I use it with a solution of bichloride of mercury, one of the best known microbicides. I commence with one part of sublimate to 9000 to 10,000 parts of water, and strengthen the concentration in proportion as it can be borne by the patient. The douche is very easily employed in ozæna, on account of the excessive width of the nasal fossæ peculiar to this affection. I have insisted in several papers upon the utility and harmlessness of this procedure, as also on the manner of employing it, and the necessity of acquainting the patient or the person who takes care of him with the mechanism of this injection before trusting them with its use. It is unnecessary to enlarge on the special importance of these injunctions when a substance so poisonous as the sublimate is in question. I add incidentally that I find it useful with many patients to make them sound the vowel â in order to keep the velum palati raised during the douche.

This manipulation, indispensable though it be, does not alone suffice to apply the medicament to the whole interior of the nose, for it does not make the liquid penetrate into the upper parts of the nasal fossæ, unless we employ pressure and give the patient's head an inclination sufficient to make the neighbouring cavities (especially the tympanum) run risks out of proportion to the therapeutic result to be obtained. To remedy this inconvenience I add:—

2nd, *The nasal bath*, which is practised in the following manner: After finishing the douche the patient inclines his head backwards until the nostrils form the highest point of the naso-pharyngeal cavities. Whilst he remains in this position the nose is *gently* filled by introducing the sublimate solution by one nostril until it comes out at the other, the patient meanwhile breathing by the mouth, or saying â (to keep the velum palati raised). We are thus certain

that the nasal cavities are completely filled conformably to the law of communicating vessels.

By means of these two processes, which I have just described, we remove the greater part of the cocci with the mucus containing them, and we vigorously attack the vitality of the remaining, but the action is only transitory. I therefore employ, conjointly with the preceding manipulations, a third process.

3rd, After the douche and the nasal bath, the daily treatment terminates with *insufflations of impalpable boric acid powder*. It is necessary to take much care to spread the powder equally upon all the interior of the nasal cavities and the upper pharynx (especially when there exists considerable deviation of the septum), and to reach only these cavities. In order thus to localize the insufflation, whilst it is going on I make the patient pronounce the vowel â that the velum may remain up, and prevent the powder from falling into the larynx. I recommend this method generally for the insufflations of powders into the nasal cavities; it is specially indispensable in the application of more active substances, such as nitrate of silver, the casual penetration of which into the larynx or its deglutition must be absolutely avoided. I do not know if other writers have thought of this precaution, which I consider important.

The insufflations of boric acid powder are for the purpose of establishing on the walls of the cavities of the nose and nasopharynx *a reserve or supply of antiseptic material* dissolving itself in the mucus in proportion as it is secreted.

I have chosen *boric acid* because of its harmlessness, a quality so much appreciated in other diseases, such as those of the eye, and its excellent microbicidal action. In my estimation it is more energetic than appears from the tables prepared by Buchholtz, Miquel, and other *savants*. I will now state, in addition to the excellent practical results which this substance has always given me, the *argument* which I use to explain its therapeutic action. We must not judge of the antiseptic power of a body exclusively according to the rank it holds in experiments *in vitro*, but also consider, when it is a question of application to the animal organism, in what concentration it can be borne. From this evidently depends the dose in which, and the lapse of time during which it may be employed. Now, the tolerance of the tissues being very feeble for the substances which much excel boric acid in the tables of these *savants*, whilst it is, so to speak, infinite for this latter body, it follows that enormous quantities of it may be employed. You may even store it in fine powder in organs where the formation permits, for example, the auditory canal, and, in cases of perforation, the tympanum (I add, in passing, that I have found it advantageous to prescribe this same powder to combat other decompositions, as, for example, foetid perspirations of the feet or armpits).

Owing to greater tolerance on the part of the organism, one substance considerably less antiseptic than another, according to experiments in the flask, may thus, when it is a question of therapeutics, prove superior to a body more active *in vitro*, but which is irritating to the living tissues. More than that, in trying to utilize for surgery the experiments concerning the action of bactericidal substances on putrescible liquids, such as soup, it is necessary to take into account also the resistance of the living histological elements to the microbes, which aids to a certainty the animal body in its struggle against these invaders.

To return to the treatment of ozæna, patients affected by this disease generally come for advice only when the pathological work is already complete, and a thin mucous membrane covers the atrophied bones. At this stage we can no longer think of attacking energetically the pituitary to modify the secretion or even try to suppress it entirely. But we ought to endeavour to act in this direction at the commencement of the affection; the treatment which I have just explained will, I hope, prevent the advent of the pernicious final period of the disease. It would still be possible at this early stage to act vigorously on the mucous membrane by means of the galvano-cautery (especially the cautery acting laterally, invented by me to avoid wounding the septum), as I have already recommended at the London Congress.¹

To dare to undertake this energetic treatment it is, of course, essential to recognise ozæna at its commencement, an impossibility until now, but, thanks to the discovery of the coccus, as I have explained above, it is now possible.

Let me conclude the therapeutic exposition by giving one piece of advice, commonplace enough, that of making the patient change his pocket handkerchief frequently, the products of the secretion carrying on the work of decomposition outside the body (as in the shoes of those suffering from foetid perspiration of the feet). I could cite *apropos* of this the case of a wealthy lady who was obliged to burn her handkerchiefs because no one would wash them.

THE RESULTS OF THE TREATMENT.

The therapeutics of which I have just explained the method give excellent results in hindering the stagnation of the secreted masses and their decomposition by the coccus. This method is, moreover, not only more certain than the treatment by the tampons of which I spoke before, but also infinitely cleaner, especially for every-day life, the patient not being obliged, as with this latter process, to draw out daily pads of cotton wool impregnated with a repugnant secretion. The future will decide if it is permissible to hope for an entire cure, especially at the commencement of the disease, by *my method*. This I cannot as yet affirm. *However, it*

¹ *Virchow's Archiv*, vol. xc. (1882), p. 319.

has not only attained the suppression of the fætidity, and by that the possibility of restoring the patient to society, but also what is quite new, a surprising improvement in the general health.

I mentioned previously what appears to me a pallor characteristic of those affected with ozæna, and their generally unsatisfactory state of health; now, after a certain lapse of time this treatment gives them a fresher complexion and a greater vitality. I think that this amelioration of the general health is due to the patients no longer breathing (nor probably swallowing) the injurious products of the ozænic decomposition of the nasal mucus, henceforth hindered by this treatment.