ATROPHIC RHINITIS.*

By Mr W. M. MOLLISON, F.R.C.S.

IT has been an interesting task to read some of the literature on the subject of atrophic rhinitis. I say "some" advisedly, because to read all that has been written would mean a matter of weeks or months of hard work. I do not propose to give more than a résumé of the subject at this meeting, laying stress on some of the recent work.

At the outset we are met with the problem, "What is Atrophic Rhinitis?" We all recognise there are at least grades of ozæna, and some cases of extreme atrophy without subjective symptoms. Chavanne examined 372 cases and divided them into two groups:—

(1) Cases of "simple atrophic rhinitis," atrophy of the inferior turbinals and only slight crusting; this group numbered 30 per cent.

(2) Cases of pure "ozæna," 70 per cent.; among these, 70 cases were unilateral with deflected septum.

I propose to deal with the latter group, ozæna characterised by atrophy of the mucous membrane and turbinated bones—notably the inferior turbinate—the presence of crusts and a typical highly unpleasant objective smell. The patient's sense of smell is usually absent.

Controversy has always existed as to the cause of ozæna; many suggestions have been advanced, but it seems doubtful if any one common cause is to be found. There are so many predisposing factors, each of which may appear all-important. One fact does stand out; whatever the cause, the final scene is the triad of symptoms. It is the dreadful social disability from which the patients suffer that has led and still leads to the search for efficient forms of treatment. The author of each line of treatment always appears to be a confirmed optimist.

After studying the various theories on the causation I suggest the following grouping:—

I. Anatomic theory: Racial and familial.

II. Infective theory: (*a*) General infections, *e.g.*, syphilis, tubercle. (*b*) Local infection, from accessory sinus suppuration or from a specific organism.

III. Endocrine theory: Some trophic change in the nasal mucous membrane, laying it open to infections.

* Paper read at the Section of Laryngology, Royal Society of Medicine, London, on 5th March 1926, in opening the Discussion on Atrophic Rhinitis.

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

I. The **Anatomic theory** suggests that undue breadth of the nose is the primary cause, and that crusts and atrophy follow as a consequence. This has been denied, as all the theories have.

Cisler investigated 150 cases and could not find that the shape of the nose bore any relation to the disease. Roy examined 5000 negroes in Africa and Oceania and found no cases of ozæna. On the other hand, he found Chinese and Japanese prone to the disease. He found too, that of Indians in the United States, those living in villages were more apt to develop the disease (6 per cent.) than those living scattered on high altitudes. In his opinion this fact supports the infective theory of ozæna.

The fact that the disease is so much more frequent among the hospital class does not conform to an anatomic theory, nor does the greater frequency in women. That the disease occurs in families cannot be denied; it is when the cause of this fact is sought that controversy steps in. Some insist that specific infection is the cause; others that syphilis or parasyphilis is to blame; others, again, that tubercle is the basis.

Perez is the champion of the infective theory, and quotes convincingly to that end. He found families

with	2	ozæna	cases	. .	56 times
„	3	„	„	. .	22 „
„	4	„	„	. .	13 „
„	5	„	„	. .	9 „
„	6	„	„	. .	twice
„	7	„	„	. .	„
„	8	„	„	. .	once
„	10	„	„	. .	„

He goes on to say that infection is always from man to man or from dog to man.

The following is interesting as showing how the disease attacks a family; but it is an example in support of syphilis as the probable basis. Viggo Schmidt examined the thirty-four children and the nurses in a Children's Home. Four children only were found to have typical ozæna, and they were brothers and sisters:

(*a*) 12 years of age.
(*b*) 10 „ „
(*c*) 9 „ „
(*d*) $4\frac{1}{2}$ „ „

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

He also examined two brothers of the same family living in another Home, in which none of the other fifty-two inmates had ozæna;

(*e*) 14 years of age
(*f*) 8 „ „

Thus six brothers and sisters had ozæna. He found that a maternal aunt had ozæna. The mother had the same condition. She died of aural meningitis. While the father died of aneurysm at 67, he had had syphilis before the birth of the children and his Wassermann reaction was positive. The six children had all typical ozæna with flat noses. All had negative Wassermann reactions. The author gave a good photograph showing the six children, and their noses looked very similar with wide nostrils. They had, too, an alcoholic grandfather, while the father was syphilitic and alcoholic.

The history of this family is, as it were, a link between Groups I. and II.

My assistant, Mr Davies, investigated the familial question and found some evidence in its favour.

Sacles investigated forty families; these numbered 200 individuals, of whom 150 were examined, and of these 60 had ozæna.

II. **Infective Theory.**—(a) GENERAL INFECTION. — It is obvious from these figures that familial investigation leads one to the second theory group, *syphilis* as the cause. Indeed, syphilis ought almost to be included in the first group. The difficulty regarding hereditary syphilis is that so few cases of ozæna show a positive Wassermann reaction. Moulonguet, in 1922, found only 10 per cent. of cases with a plus reaction. I have on one occasion seen a typical ozæna in a child under two, whose Wassermann was positive.

The negative Wassermann, however, should not be taken to indicate absence of syphilis; one may note the analogy of congenital syphilitic deafness where the Wassermann reaction is generally negative.

As regards the association of *tubercle* and ozæna, Alexander, in 1903, wrote on the connection of ozæna and lung tubercle. He pointed out that of ozæna cases 15 out of 22 (68 per cent.) had lung tubercle at autopsy. He showed that of 118 patients with healed tubercle, none had ozæna, but 10 had atrophy of the turbinated mucous membrane. Also

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

of 50 ozæna patients, 22 had lung tubercle and 7 were suspect; 17 only were sound. Larger figures supported the connection of ozæna and pulmonary tubercle.

In 1916, Dan M'Kenzie, M'Keith, and Wyatt Wingrave published their well-known paper to show that ozæna was tuberculous in origin, or, at least, had a very close relationship. Various tests were used on ozænatous patients. Von Pirquet's test gave a positive result in 85 per cent. of cases and some general disturbance in 94 per cent.

By means of injection experiments Wingrave produced tubercle in guinea-pigs, but never produced ozæna. Hypodermic tests carried out by M'Keith yielded positive results in 94 per cent. of cases.

The authors treated cases with tuberculin; the treatment was long and tedious, but local improvement was seen in 10 out of 13 cases, as well as improvement in general health. They suggested that the acid-fast bacillus found in ozæna may really be a modified tubercle bacillus, and pointed out that ozænatous patients were generally in poor general health. In support of this statement there is Trimarchi's observation, that the blood of ozænatous patients constantly shows lymphocytosis and often an eosinophilia.

(b) LOCAL INFECTION.—(1) *Accessory Sinus Suppuration.*—The next theory to be considered is that in which infection of the nose is secondary to suppuration in the accessory nasal sinuses. This view has always had supporters, but it does not meet the objection that cases begin in childhood before the sinuses are sufficiently developed; also that examination of the sinuses even in very marked chronic cases reveals no pus.

Halpen and Schulmann pointed out that there were "many cases of ozæna without sinusitis, many cases of sinusitis without ozæna, and, finally, that many operations were performed on the sinuses without results."

Grünwald, in 1893, considered that accessory sinus suppuration accounted for the foul smell, and published a series of cases in which he had operated on the sinuses with disappearance or change in the character of the smell. Michel considered that the important factor was chronic suppuration in the accessory sinuses, especially the ethmoidal and sphenoidal cavities.

Alexander, in 1903, thought Michel was wrong in stating that accessory sinus suppuration was present in every case, but

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

considered that it was one important factor; he pointed out that children in whom the sinuses were absent might have crusts. Hajek considered a focus was, or might be, often present in ozæna, but that it had not been proved. Wertheim, in 1901, in cases of ozæna, found the lining membrane of the sinuses infiltrated with many subepithelial cells and blood-vessels, but that it was never atrophic.

Lautenschläger has recently revived this theory and has stated that microscopical examination of the lining of the antra and ethmoidal cells shows inflammatory changes, even though it is normal to the naked eye. On the strength of this observation he urged drainage of the sinuses as an essential step in operations for narrowing the nasal cavities.

(2) *A Specific Organism.*—The last section of Group II. deals with the presence of a specific micro-organism which causes the changes characteristic of the disease.

The evidence for and against such an organism is partly bacteriological and partly the result of treatment by vaccines. None but a skilled bacteriologist can assess the evidence; I certainly do not intend to try, but I propose putting forward the views that have been held:—

The specific organism has been said to be (1) the pseudo-diphtheria bacillus; (2) the Abel-Löwenberg bacillus; (3) the Perez bacillus.

(1) The early view was that of Italian workers, namely, that the organism was a pseudo-diphtheria bacillus, and Belfanti and others saw good results from treatment with anti-diphtheritic serum. This view was countered by Gradenigo and other authors, who said they found no improvement with serum, or that if improvement occurred it was only temporary. Neufeld also opposed that view, as he found pseudo-diphtheria bacilli in 98 per cent. of normal noses.

Taptas considered that the infection was due to the Klebs-Löffler bacillus, but that this became overgrown by septic micro-organisms. He injected the patient's blood under the mucous membrane of the inferior turbinates and floor of the nose and septum and got good results in all of twenty cases.

Malherbe and Dujardin-Beaumetz examined cases over a period of three years; they found para-diphtheritic organisms and Friedländer bacilli on direct examination, while on culture the latter grew so freely that it made the para-diphtheritic organisms very hard to find. They found improvement after

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

treatment by vaccines from the para-diphtheria bacillus alone, and later examination showed diminution of the latter organism in the nose, while the Friedländer bacillus remained. They suggested, therefore, that the pseudo-diphtheria was the cause.

Recently Abraham (1925) has found the Klebs-Löffler bacillus present in a series of cases, and he recorded 13 of atrophic rhinitis in which true diphtheria bacilli were found in the nasal cultures; eleven were females and two males. The ages ranged from 14 to 49. All the patients had the same symptoms, which consisted in nasal discharge of several years' duration, formation of crusts, headache, anosmia, and lassitude. With the exception of one case of chronic rhino-pharyngitis sicca the clinical diagnosis was atrophic rhinitis. Infection of the nasal accessory sinuses was not present in any. Two patients had chronic otitis media. Two patients had suffered from diphtheria and two others gave a history of diphtheria in the family.

Treatment consisted in administration of 4000 to 6000 units of diphtheria antitoxin for three days, combined with twelve to fourteen injections of an auto-vaccine prepared from an isolated strain of diphtheria bacilli, or in most cases from other organisms associated with the diphtheria bacilli, such as *Bacillus proteus* and *Bacillus mucosus*. The nose was also irrigated thrice daily with a $\frac{1}{4}$ per cent. solution of chloramine. Abraham concluded that a previous attack of acute diphtheria was the cause of the atrophic rhinitis in these cases. Similar cases had been previously recorded by Pfeiffer.

(2) Löwenberg and Abel, separately, found the *Bacillus fœtidus ozœnæ*, or *Bacillus mucosus ozœnæ*; subsequently the Abel-Löwenberg bacillus was stated to be the *Bacillus Friedländer*.

(3) Perez, in 1899, wrote of the *Coccobacillus fœtidus ozœnæ* as being the specific organism. This bacillus had certain cultural characters; its cultures emitted the typical odour, and intravenous inoculations into guinea-pigs, etc., produced atrophic rhinitis with typical ozæna, and the bacilli were recovered from the nasal secretion.

Later, in 1901, he published more experiments. He also brought forward twenty cases in which the disease appeared to have been transmitted from dogs to men.

In 1907, Perez stated that "every case of ozæna starts from another case of ozæna or from the nose of a dog."

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

He divided the cases into four groups:—

(*a*) Familial infection in a family of eleven; six had ozæna. Familial infection in a family of eight; seven had ozæna.
(*b*) Non-familial infection, but from some other human infection.
(*c*) Canine infection in persons who lived at close quarters with dogs; children who played with dogs, etc.
(*d*) Unknown.

This theory, put forward by Perez, started a controversy which still rages. Among those in favour of Perez's theory are Hofer and Kofler, and among those against it are Greif, Burchardt, Oppikofer, and Neufeld. Hofer (1913) carried out Perez's technique by putting typical crusts into bouillon and then trying to separate the organisms. Shortly afterwards he found it difficult to distinguish the real Perez bacillus from the others; he selected patches of growing bacilli and tried to differentiate the type of organism. He found that the *Bacillus Löwenberg-Abel* grew so thickly that it obscured the other organisms and the coccobacilli could seldom be found.

He then experimented on dogs with intravenous injections of mixed cultures, and in twenty-four hours he discovered in the dog's nose pure culture of *Bacillus Perez*; in a few days, at post-mortem examination, the inferior turbinates were found to be almost destroyed with much secretion in the nose; in the secretion the *Bacillus Perez* was found in nearly pure culture.

Hofer described the bacteriological characteristics. The culture yielded a quite typical smell. By injection with diluted cultures Hofer produced a serum which agglutinated with *Bacillus Perez*. Hofer and Kofler, in 1914, published results of vaccine treatment, which were satisfactory.

Safranek, in the Onodi Clinic, carried out injection experiments and was enabled to grow a culture from the heart blood, and from this he produced, by intravenous injections, an atrophic rhinitis in the dog.

In 1916, Hofer and Kofler again published the results of vaccine treatment; in nine cases they reported cures.

Greif only found Perez's coccobacillus in 20 per cent. of the cases. He did not consider it had a specific affinity for the nose as he had found it in secretions from the trachea, bronchi,

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

intestines, kidneys, and conjunctiva. Injections of *Bacillus coli* and staphylococci gave the same results. He found no other local signs of ozæna on intravenous injections. Agglutination experiments with the blood of patients proved negative. Horse serum yielded just as good results as specific vaccines and serum.

Burchardt and Oppikofer, in 1916, worked with a strain of Hofer's cultures of *Bacillus Perez;* they did not find the typical smell in cultures, and decided that *Bacillus Perez* was the same as the *Bacillus Abel*, and that both were really *Bacillus Friedländer*. They found no severe rhinitis on intravenous injection nor at post-mortem, and no severe rhinitis even when the animals lived three months after inoculation. With large doses the animals died with septicæmic symptoms and local infection in lungs, pleura, pericardium, etc. Further, in 100 cases of ozæna they obtained no evidence of the patients having been near dogs.

They suggested, too, that serum injections were not specific, but that any serum injection caused hyperæmia of the nasal membrane and therefore improvement. They denied the infectious nature of ozæna.

Neufeld set aside the Perez-Hofer bacillus and put forward the view that familial disease, through several generations, was the cause. He obtained some of Hofer's strain of *Bacillus Perez* and by inoculation produced rhinitic symptoms. In the secretion he easily found *Bacillus Perez*, and at post-mortem examination in four weeks he discovered much muco-pus in the nose and sinuses, but no atrophy of the turbinates. In nearly 50 per cent. of ozæna cases Neufeld obtained pure cultures of *Bacillus Perez* from crusts. He had similar results with *Bacillus pyocyaneus*, *Bacillus paratyphosus*, and *Bacillus diphtheriæ* and *Bacillus Friedländer*.

Salomonsen's conclusions were in opposition to all the work of Perez and Burchardt, and of Oppikofer and Neufeld. He failed to find *Bacillus Perez* in 23 cases. By means of inoculation and cultures, he was unsuccessful in finding *Bacillus Perez* though he discovered one similar to it. He found no characteristic smell. Indeed he could not agree that any specific micro-organism was to be found.

III. **The Endocrine Theory**.—This is a fascinating theory, founded on physiology. Morell Mackenzie put forward the suggestion that ozæna was primarily due to some trophic

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

change in the nasal mucous membrane. Recently Halpen and Schulmann, reviewing the whole subject, advanced the view that the endocrine theory covered most of the ground. They pointed out that Delaconi (1904) suggested that adenoids and ozæna occurred in those with hypothyroidism. They also pointed out that ozæna patients always had a strumous appearance; that the genital glands were undeveloped, and that the hair of such patients was poor. Women provided more than half the cases, and three-quarters of them arose in puberty. The same authors saw signs of internal secretion abnormalities, such as are found in congenital syphilis and inherited tubercle; thus patients suffered from acrocyanosis, low-tension pulse, sluggish reflexes, flushing and sweatings. The menstrual periods were often irregular (12 out of 15 cases); the thyroid gland was enlarged in 9 out of 14 cases. They quoted the case of a girl who suffered from ozæna, which disappeared as soon as her periods began; also a case of Graves' disease with ozæna in which treatment by X-rays cured the Graves' disease and the atrophic rhinitis at the same time.

They attributed the affection of the nose to disturbance of the sympathetic control via the spheno-palatine ganglion; this ganglion, they stated, contained the vasomotor control of the nasal mucous membrane as well as the secretory control fibres, and damage or paralysis of this ganglion system led to lack of dilatation of the vessels in the nose, which in turn damaged the nose, particularly the most vascular part, the inferior turbinate. Lastly, they pointed out that drugs which stimulated the sympathetic system helped to improve the nasal condition, namely, adrenalin, eserin, and pilocarpin. They injected adrenalin into the spheno-palatine ganglion, and found that improvement resulted.

Liébault and Moers, on the supposition that ozæna was connected with disturbance of the sympathetic and endocrine systems, gave adrenalin $\frac{1}{1000}$ by the mouth, 40-60 minims daily, and found that improvement took place.

The interesting case recorded by L. Reverchon and G. Worms supports the endocrine theory.

A man, aged 32, was wounded by a bullet in the right preauricular region; the bullet was at once extracted through the mouth; the wound did not heal for some weeks. Six weeks after receiving the wound he began to have symptoms confined to the right side of head, facial spasms, pains every day, but subsiding at night so that

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

they did not prevent sleep. The pain started in the deep zygomatic region or in the mouth or nose, radiated to the fronto-orbital region and to the vertex and even to the occipital region. The affected parts sweated a great deal. The attacks came on from very slight causes as in trigeminal neuralgia. They gradually lessened.

Four months after receiving the wound nasal symptoms were first noted:—

(1) A running of mucus from the right nose without the patient realising it; (2) slight conjunctivitis; (3) attacks of salivation after meals. After about eighteen months his wife noted foul breath. Ozæna was diagnosed.

The authors examined him in 1923, four years afterwards, and they found:—

(*a*) Right facial anæsthesia; (*b*) anæsthesia of right conjunctiva; (*c*) abolition of sensation in right nasal fossa, in the palate, gums, teeth, right half of tongue; (*d*) lessened sensibility of right membrana tympani, and the slightest touch of a probe gave very marked redness; hissing in the ear; (*e*) slight atrophy of the masseteric and temporal regions; (*f*) nose with foul smell, objective only; many green crusts from the right side, typical ozæna atrophy and crusts; perforation of the septum (trophic) with insensitive edge. The left side was normal.

Negative Wassermann reaction; X-ray showed fracture and a separated piece of bone deeply in the zygomatic fossa.

The symptoms were those of the spheno-palatine ganglion syndrome. The authors mentioned two cases, published by Worms, of atrophic rhinitis following traumatic trigeminal paralysis.

After hearing each of these theories one feels one ought to have no doubt that the author is absolutely right, his arguments are so sound and convincing. But, fortunately, or unfortunately, cases arise which undermine any theory. The following is an example.

A young man about 20 was referred to me at Guy's Hospital in September 1914. He was sharing a tent with several other recruits, and the smell from his nose was such that his comrades could not support his presence. I found the left side of his nose normal, the right side very roomy and containing much greenish crust; far back was a darker object, a foreign body, a plum-stone as it was shown to be after removal. This had been in the nose for about thirteen years, as far as the patient could decide. A few days after removal all smell had entirely disappeared and apparently the ozæna was cured.

A second case was also a hospital patient. She had been operated

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

upon by an assistant for nasal obstruction, and by some means the whole of one inferior turbinal had been removed. In three weeks she had a typical ozæna.

A third case of ozæna was due to the eruption of a tooth into the floor of the nose.

Treatment.—Treatment follows two main lines : (*a*) Vaccine therapy and local applications ; (*b*) surgical measures to diminish the cavities or to restore the nasal mucous membrane to normal.

(*a*) *Vaccine Therapy.*—Though these controversies have ranged round the question of a specific bacillus, the treatment by vaccines has been continued and lately developed along somewhat different lines from those made familiar to us all.

Fernandez Seco makes a vaccine from the predominant organism or organisms ; he begins by giving doses of 100,000,000 reaching to doses of 8,000,000,000 and 9,000,000,000, and finds favourable results in 84 per cent. of the cases.

Rebattu and Proby make a vaccine with 4,000,000 to the c.mm., and mixing it with vaseline smear it on the nasal mucous membrane before or after scarification.

Worms and Manovussakis combine vaccines in bouillons with an anti-gangrenous serum of Vincent and Stodel ; they consider that anaerobic organisms play an important part in ozæna. They apply the mixture locally, either on gauze or by a spray, on alternate days. They see great improvement in less than twenty days.

Doniol-Valeroze also uses local vaccine treatment. His vaccines are made into a powder by Bergeron's method with lactose, added to powdered bile and insufflated into the nose in doses of 400,000,000 twice daily for fifteen days. There was an improvement in all 19 cases. (Some of these had been given Liébault's vaccines without any benefit resulting.)

We may summarise this by stating that local application of vaccines is the most recent method of vaccine treatment.

Other local treatment consists in applications of honey and glycerin which result in an acid medium unfavourable to the growth of the organisms (Tarneaud). Applications of scarlet-red have also been used (Jacobi and Scal). Franchini has used the nascent iodine treatment and washes the nose with 6 vols. per cent. of hydrogen peroxide, and gives potassium iodide by the mouth.

(b) *Surgical Treatment.*—There is not much to add to what I have said in reviewing the operative treatment of

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

ozæna in January 1924.* There are three main types of operation:—

(1) Wittmaack's transplantation of Stenson's duct into the antrum to keep the nose moist.
(2) Lautenschläger's operation to open the sinuses and displace the lateral wall of the nose medially. A combination of (1) and (2) with Halle's modification and Seiffert's further modification.
(3) Operations to diminish the size of the cavities by introducing various substances under the muco-perichondrium or periosteum.

Some of these substances are in the nature of foreign bodies paraffin, celluloid, etc.; others, cartilage or bone, or even simply blood. My own experience of inserting rib cartilage into the nose is not altogether satisfactory. Syme has performed Lautenschläger's operation, and we look forward to hearing his latest results. I have only performed this operation in one case, but, fortunately, the result was quite successful.

Van Wildenberg is enthusiastic over Higguet's operation, which is an endonasal variation of Lautenschläger's operation.

Recently Bourak published his operation for inserting fat in the lateral wall: he makes an incision under the lip, freeing the soft tissues in the floor and lateral wall below and above the inferior turbinal, pushing off the middle turbinal region together with a few ethmoidal cells. He then removes a piece of subcutaneous fat from the gluteal region and inserts it into the cavity thus made. A needle and thread make this easy.

He obtains good results within six or seven weeks; he claims the following for the operation:—

(1) The operation is easy and gives regular and sufficient diminution of cavities.
(2) After-treatment is easy, the results being better than after months of injections of paraffin, electrolysis, high frequency, light treatment, or respiration exercises.
(3) Fixation of lateral wall inwards is obtained without damage of bony wall.
(4) The fat provokes a prolonged reaction and prevents the continuation of the atrophy, and stimulates regeneration in the cellular and glandular elements.
(5) It is satisfactory for unilateral cases.

* *Journ. Laryng. and Otol.*, 1924, vol. xxxix., p. 25.

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

Atrophic Rhinitis

Meurman reviewed the results of 34 cases in which Halle's operation was performed; they were fair, but in 6 of them the patients developed acute otitis media, and one acute mastoiditis.

Other Methods of Treatment.—Almost every man has his own method, and, as I said above, each is an optimist. Kowler gives insufflations of oxygen under pressure; after ten sittings the mucous membrane recovers its normal appearance. Greif uses ultra-violet rays with a specially devised lamp; he cured a case that had resisted other treatments. Leroux-Robert found that half-minute exposures to high-frequency currents killed cultures of *Bacillus Perez;* he therefore used it in the nose with good results; but it must be noted that he first painted the nose with formalin, which made it secrete freely and thus wash away crusts.

If one may sum up the subject crudely, the ozæna problem seems much where it was fifty years ago, and treatment is still symptomatic, except as to vaccines and surgery.

RECENT REFERENCES.

Abraham, A., *Deutsch. Med. Woch.*, 18th December 1925, p. 2114.

Baldenweck, *Ann. des Mal. de l'Oreille, du Larynx, du Nez et du Pharynx*, 1925, vol. xliv., p. 855.

*Bertein, P., *Arch. Internat. de Laryngol., Otol., Rhinol.*, 1925, Bd. 4, p. 520.

Chatelier, H. P., *Rev. de Laryngol., etc.*, 1924, No. 6, p. 209.

Chavanne, *Ann. Internat. Otol., Rhinol., Laryngol.*, August 1923.

Cisler, *Ref. in Zentralbl. f. Hals-, Nasen,- u. Ohrenheilk.*, October 1925.

Doniol-Valeroze, *Archiv. Internat. de Laryngol., Otol., Rhinol.*, 1924, vol. iii., p. 1089.

Fernandez, *Second Abst. Journ. of Laryngol. and Otol.*, 1926, vol. xli., No. 2.

Franchini, G., *La Semaine Méd.*, September 1922.

Greif, *Arch. Internat. de Laryngol., Rhinol., and Otol.*, 1924, vol. iii., p. 65.

*Halpen, E., and Schulmann, R., *Arch. Internat. de Laryngol., Rhinol., et Otol.*, April 1925, vol. iv.; and *Ann. des Mal. de l'Oreille, du Larynx, du Nez et du Pharynx*, 1925, vol. xliv., p. 548.

Hutter, *Monatschr. für Ohrenheilk.*, 1924, vol. lviii., p. 394.

*Key-Åberg, *Acta Oto-Laryngologica*, 1918-19, vol. i., p. 621.

Kowler, *Procs. Xth Internat. Congr. of Otol.*, 1922, p. 601.

Lautenschläger, *Zeitschr. f. Hals-, Nasen-, u. Ohrenheilk.*, 1923, No. 1, p. 5, and vol. viii., No. 2.

Lavrand, *Rev. de Laryngol., etc.*, 1924, No. 6, p. 210.

* Comprehensive with further references.

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press

Leroux, Robert, *Rev. de Laryngol., etc.*, 1924.
Liĕbault, G., and Moers, P., *Rev. de Laryngol., etc.*, June 1925.
M'Kenzie, Dan, *Journ. of Laryngol. and Otol.*, 1916, p. 177.
*Malherbe, A., and Dujardin-Beaumetz, E., *Proc. Xth Internat. Congr. of Otol.*, 1922, p. 603.
Meurman, Y., *Acta Oto-Laryngologica*, vol. vi., fasc. 3/4.
Mithoefer, W., *Ann. of Otol., Rhinol., and Laryngol.*, 1924, vol. xxxii.
Perez, F., *Rev. de Laryngol.*, 1924, No. 21.
Peset, T., *Le Journ. de Méd. de Lyon*, 1923.
*Rebattu and Proby, *Archiv. Internat. de Laryngol., Otol., Rhinol.*, 1924, p. 1021.
Roy, J. N., *Ann. des Mal. de l'Oreille, du Larynx, du Nez et du Pharynx*, vol. xl., No. 8.
Scal, J. C., *Laryngoscope*, 1921, vol. xxxi., p. 628.
Schmidt, Viggo, *Monatschr. f. Ohrenheilk.*, 1925, p. 1049.
Taptas, N., *Ann. des Mal. de l'Oreille, du Larynx, du Nez, et du Pharynx*, March 1925.
Tarnsaud, *La Semaine Méd.*, September 1922.
Terbriggen, *Arch. Internat. de Laryngol., Otol., and Rhinol.*, 1924, vol. iii., p. 83.
Trimarchi, *Rev. de Laryngol., etc.*, 1924, No. 12, p. 411.
*Worms and Manovussakis, *Annal. des Mal. de l'Oreille, du Larynx, du Nez et du Larynx*, 1925, No. 8, p. 858.

* Comprehensive with further references.

https://doi.org/10.1017/S0022215100029352 Published online by Cambridge University Press