Ozena

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"O Z E N A"

A THESIS
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GRADUATE FACULTY OF THE STATE UNIVERSITY OF IOWA,
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by

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Ozena as derived from the Greek signifies properly a stench and had its place in early medical nomenclature. Primarily ozena was given to a pathological process of the nose associated with the exhalation of a disagreeable odor.

The early Greek and Roman writers, Pliny and Celsus, limited its meaning to fetid ulceration of the nose. Pollus Argina regarded it as a rottening and purulent ulceration, caused by saturation of the interior of the nose by a sharp humor. This condition was maintained until the twelfth century when Actuarius first proved an ulcerative process was not necessarily present and that ozena was caused by a decomposition of the secretions.

This theory of Actuarius was further developed at the beginning of the seventeenth century by Joannes Crato, who regarded this condition as an infectious disease. At the end of the seventeenth century, Vienssens, Reminger and Gunz, maintained that it was not an independent disease but depended upon suppuration from the nasal sinuses. The above history was taken from Sendziak's description of atrophic rhinitis.

THEORIES OF ETIOLOGY AND PATHOLOGY.

Hereditary.

Treitel has recorded cases of ozena in small
children, the mother of two of them also suffering from it.

Adams reported ten cases belonging to three families, the older members had atrophic rhinitis, while the younger had hyperplastic purulent rhinitis.

Parker\textsuperscript{26} suggests that cases occurring in the same family may be due to inherited roominess of the nasal cavities.

Lock\textsuperscript{6} says that hereditary predisposition is often very marked. He reports one family in which the father, mother, three girls and one boy were affected. Another family four sisters, one brother and the mother were affected, in this case the affected persons all had broad flat noses, while four other brothers and the father had narrow prominent noses and escaped the ozena.

Grunwald\textsuperscript{27} states that the only evidence of hereditary predisposition consists in the fact that frequently several members of the same family present the symptoms of ozena. The advocates of this theory forget to mention the fact that this is quite exceptional.

\textbf{Contagion.}

Perez reports ninety-eight cases in which infection took place from one member of the family to another, thirty-six cases from some one outside of the family.

Lermoyez believes it to be an infectious condition stating that the organism causes a purulent rhinitis which develops into an atrophic rhinitis.

Mermod\textsuperscript{12} regards the fact that ozena may be unilateral
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as proof of its non-contagiousness.

THE SEQUEL OF CHRONIC HYPERTROPHIC CATARRH.

Zuckerkandl\textsuperscript{17} regards ozena as a chronic hypertrophic catarrh of the mucous membrane, which led to atrophy of the bony structures of the lower and sometimes the middle turbinates.

Baungarten\textsuperscript{5} states that there is an early hypertrophic stage of ozena.

Adams regards it as the end stage of a hyperplastic purulent rhinitis.

Reik\textsuperscript{34} says that as a result of the constant hyperemia of the turbinates they increase in size. The effect of this is to reduce the breathing space which still further increases the trouble. The hyperplastic stage of inflammation is not infrequently followed by an atrophic stage, this leaves the nasal passage way widely dilated and such secretions as exude from the thin mucous tissue tend to collect and undergo decomposition with the result of foul smelling crusts.

Goodale\textsuperscript{42} regards this process as a primary atrophy and not a sequel to any hypertrophic process.

Shurley\textsuperscript{46} says that Berliner thinks that the primary cause of this disease is hypertrophy of the middle turbinate, and its pressure against the septum thereby producing a stagnation of the secretions.
Due to Abnormal Patency of the Nose.

Ozena most frequently affects those types of faces in which the nasal fossae are wide and the septum is short. If this disease begins early in life it may itself have a marked effect upon the shape of the face.

Fraser and Reynolds report a number of cases in which the roomy side showed ozena and the narrow side only the condition of purulent rhinitis.

Zaufal was the first to say that a congenital deficiency or some pathological change affecting the inferior turbinates causing them to retain their infantile size and thus leading to a widening of the inferior meatus. This renders more difficult the expulsion of the secretion. He also claims that alteration of the air current through the nose results in the arrest of development of the bridge of the nose, giving rise to the broad, saddle-back type which is characteristic of ozena.

It has been claimed that this inherited weakness which derived from the parents due especially to tuberculosis, rickets and syphilis which cause the abnormal patency to be the cause of ozena.

This inherited "tissue weakness", manifests itself as a poor development of the nasal mucous membrane and therefore less vitality to withstand infection.

Numerous causes have been suggested to account for the increase in size of the nasal cavities in ozena. A few of the most important ones are as follows:-

Firstly - the inherited shape of the head. This
type of facies is often seen without ozena, and is not always present in old standing cases;

Secondly, vascular changes due to the fact that the vascular sinuses are destroyed because of the sclerosis of the fibrous connective tissue;

Thirdly, irritation by the constant decomposing discharge; this if long continued leading to impairment of nutrition of the parts.

Fourthly, the pressure of the crusts, caused by the drying of the secretions, upon the underlying mucous membrane causes an anemia.

Fifthly, in which toxins come from the decomposing discharges and crusts and penetrating the mucous membrane, submucous tissue, including the periosteum and bone.

Sixthly, in which the turbinates have been destroyed by disease as can happen in syphilis.

Gruenwald believes that atrophy is due to crust formation. Lack says that it is difficult to believe that atrophy can be caused by pressure of crusts.

Where ozena exists on one side only in the cases studied, it was constantly only the larger side which is attacked and that in very marked deviations of the septum it is limited to the concave side. In typical cases where curvature of the septum is sufficient to efface one nares, the enlarged side of the nose has the picture of classic ozena, on the narrow side is ordinary catarrhal rhinitis due to mechanical obstruction without crusts or atrophy.
Rundstrom\textsuperscript{25} states that atrophy of the turbinates and abnormal width of the nasal passages are not one and the same thing; but wide nasal passages may be present long before atrophy, either of the turbinate bone or of the mucous membrane, and hypertrophy of the mucous membrane may be present.

\textbf{DUE TO MALDEVELOPMENT OF THE BONES OF THE NOSE.}

Hopmann thinks that this manifests itself in early life either as an osteoporotic or as an osteosclerotic process. If there is a rarefying osteitis present, it may remain for a considerable time. The bony skeleton of the whole nose suffers and widening of all the nasal structures results. This together with a lessened resistance of the mucous membrane to disease leads to a purulent condition in the nose, hence formation of crusts and fetor.

Lack\textsuperscript{6} denies the presence of bone disease in five cases examined by him.

Eugene S. Talbot\textsuperscript{14} states that in man's evolution certain structures develop and others are lost for the benefit of the organism as a whole. Since the face, jaws and teeth are undergoing such rapid changes, these structures with transitory characteristics are more easily involved in disease than any others in the body. In the development of man periods of stress due to readjustment of environment occur. In man's evolution certain parts disappear for the benefit of the organism as a whole; in the evolution of organisms certain organs disappear.
Periods of stress occur when the functions of some organs are lost and those of others gained by development. The law of economy of growth centers around this struggle for existence. It is because of this fact that physiologic atrophies and hypertrophies (arrest and excess in development) occur. The first period of stress is the most important, as far as the head, face, nose, jaws, and teeth are concerned and it occurs at about the eighteenth week of fetal life. It is also called the senile or semian period. The retrogressive phase of evolution underlies all pathology of the face, nose, jaws, alveolar process and teeth. In this reverse phase, in which symmetry of the body as a whole is sacrificed to changes in the nose, jaws, alveolar process and teeth to preserve the gain in brain matter.

If the brain is normal the structures of the body will develop normally. When arrest of brain development occurs, degenerates of various classes will result. The causes which bring about arrest or excess in fetal development at the first period of stress are fatigued reproductive organs of either parent.

A common retrogressive development includes the entire head and face. The fore-head recedes, the nose is upturned, its base being flat, broad and sunken and the jaws protrude.

The second period of stress occurs after birth at the time of development of the first set of teeth, at which time the child is apt to contract all the children's diseases.
Should any of the eruptive fevers due to contagions or infections occur the effect on the growing structures of the child is most marked. The bones of the face, nose, jaws and teeth are the first affected. It is not uncommon for development of the nose to be arrested in utero or soon after and remain so throughout life. The development of the bones of the nose may become arrested at an early time and necessarily result in arrest of both the antero-posterior and lateral development of the face.

Whenever arrest of the development of the jaws takes place there is also nasal stenosis with atrophies or hypertrophies and deformities of the bones of the nose and mucous membrane.

**DUE TO SOME SPECIFIC MICROORGANISM.**

Caldera and Yagia\(^1\) stated, that if it is an infectious disease due to some specific microorganism, one might expect its presence would be demonstrated by a complement fixation test. They report ten cases none of them demonstrating complement fixation and they think that it is improbable that this disease is due to any specific microorganism.

Numerous bacteria have been found in the fetid secretions from cases of ozena by the many different writers. The organism that is found most frequently is the Bacillus ozena; it is morphologically and culturally almost identical with the Bacillus mucosus capsulatus, from which it cannot be definitely separated. Whether it is a separate species, or merely an atypical form changed by environment has not been stated.
Lack\(^6\) says that the Bacillus mucosus capsulatus is found in almost pure culture in the deeper, fluid part of ozena crusts.

Many of the organisms separated may be met in other conditions. The bacteriology is not settled because of the difficulty of determining whether they are the direct exciting cause of the atrophy or only secondary and then the cause of the fetor.

The Bacillus mucosus capsulatus or ozena is according to statistics the one most frequently found and the one supposed to act upon the stagnant mucopurulent secretions as putrefactive bacteria do. This bacillus along with others may be the cause of the ozenic odor, but there is no conclusive reason for believing that they have anything to do with the cause of the disease.

The pseudo-diphtheria bacillus of Lautman according to Hiss and Zinser\(^16\) culturally show all the qualities of saprophytes. This tends to show that the odor of ozena is due to putrefaction.

Cozzolini\(^43\) regards the microorganism as a secondary event in the etiology.

Some of the bacteria found are:

- Lowenburg - Bacillus capsulatus.
- Abel - Bacillus mucosus - identical to bacillus described by Lowenburg.
- Guarmania - Streptothrix alba.
- Lautman - Pseudodiphtheria bacillus.
- Perez - Cocco-bacillus foetidus ozena.
Pes- Gradeneo bacillus.
Hayek- Bacillus foetidus ozena.
Pfeiffer - Micrococcus catarrhalis.
Pneumococci - Staphylococci, Streptococci.
Friedlander's pneumo-bacillus.
Klebs-Loeffler bacillus.

Cobb\textsuperscript{22} states that in over ninety cases he has found pure cultures of the bacillus named by Abel, the "Bacillus mucosus ozenae". On culture media they form a thick, raised, confluent mass. These colonies when lifted with a needle seem stringy. They grow luxuriantly on all culture media.

RESULT OF PURULENT RHINITIS.

Bosworth's\textsuperscript{7} view that ozena is usually the result of a purulent rhinitis in infancy or early childhood. He explains this as follows: A child has an attack of what is called a cold in the head. In the majority of cases it is an acute inflammation, with swelling of the glands in the vault of the pharynx, producing more or less nasal stenosis from occlusion of the posterior nares. This does not result in a congestion of the mucous membrane involving the turbinat tissues, but shows itself in the epithelial layer of this membrane. With the first attack the symptoms do not differ from the process which occurs in adult life, but as these attacks recur there is a tendency to a rapid proliferation of epithelial cells which being thrown off in connection with an excessive mucous discharge, give rise to amuco-purulent secretion. This continues with repeated attacks and develops
into a chronic rhinitis, characterized by no very noticeable nasal stenosis but by more a purulent discharge. This condition continues for ten or twelve years when it develops into an atrophic rhinitis.

Macdonald says that the majority of ozena patients are children or young adults and that it began with apurulent rhinitis which was caused by an attack of measles, scarlet fever, or coryza.

E. Baumgarten found beginning ozena in children between the ages of four and one-half and five years old. He describes first a stage of hypertrophy of the mucous membrane, preceding the atrophic process. This is not a true hypertrophy but merely an intumescence of the inferior turbinates. This swelling gradually disappears until finally we have the picture of ozena present. First there was a one-sided contraction of the inferior turbinate and after two to four years both turbinates were contracted. Then the crust formation and characteristic odor develop. He believes that ozena may develop shortly after birth of the child and that children with eczema of the nasal vestibule should receive particular attention in this respect.

Stelwagon says that eczema of the nares in children is caused by a nasal catarrh.

St. Clair Thomson believes that adenoids are the most frequent cause of purulent rhinitis and makes the observation that ozena is becoming less frequent since these growths have received recognition.
Purulent rhinitis leads to several changes in the nasal mucous membrane. They are, metaplasia of large areas of the superficial ciliated epithelium into the squamous type. Sclerosis of the submucous tissue, small round celled infiltration of the superficial layers of the submucous tissue; catarrhal changes in and atrophy of the mucous glands. Marked diminution in size of the cavernous blood spaces. Atrophy of the turbinate bones the inferior ones being especially involved.

I have seen thirty cases of purulent rhinitis in children who had diseased tonsils and adenoids in whom the purulent condition of the nose cleared up after the tonsils and adenoids were removed.

Grayson as the result of his experience has come to the conclusion that this disease is the outcome of the purulent rhinitis of childhood. He describes its causation as follows: the epithelial instability of the early age, its rapid proliferation and desquamation during the inflammatory disturbance, the proneness of the catarrhal process to become chronic to affect glandular as well as superficial epithelium is enough to precipitate the other pathological conditions that lead to the establishment and process of atrophic rhinitis.

CONSTITUTIONAL CAUSES FOR OZENA.

1- Tuberculosis

Gruenwald states that a general impairment of strength depending on hereditary causes, especially family
tuberculosis, favor the development of the initial focal suppuration as well as the secondary process of infection. Many of Lack's cases gave a history of tuberculosis in the family and two of his cases had phthisis. He thinks statistics indicate that ozena is not tuberculous but that it predisposes to phthisis and other lung affections.

Freudenthal found that in 340 patients with pulmonary tuberculosis 115 had atrophic rhinitis.

Thiesen reports in forty cases of ozena observed, fourteen patients had pulmonary tuberculosis and believed the ozena condition to be a predisposing cause of tuberculosis.

Lackard states that in 275 cases of pulmonary tuberculosis, 49 had nasal atrophy and 44 of these had ozena and says that statistics show that ozena predisposes to pulmonary tuberculosis; that the malnutrition antedating the development of tuberculosis or following its advent may provoke intra-nasal degeneration.

Rabassa and Santina state that "fundamentally ozena and tuberculosis are entirely different. But ozena may precipitate the development of tuberculosis by preventing the nose from properly sterilizing the inspired air, and by weakening the general and local condition to such an extent that if tubercle bacilli penetrate into the submucous lymphatic tissue, the resistance is almost nil.

Nine of our cases have pulmonary tuberculosis and have been or are taking treatment at the state sanitorium
at Oakdale, Ia. Two of these have laryngeal tuberculosis and all have a chronic sinusitis of some or all accessory sinuses. Dr. L. W. Dean made the statement in a lecture, that he was struck with the large percent of cases which had pulmonary tuberculosis that showed nasal obstruction in childhood. He also spoke about the relatively large percentage of tuberculous cases that had atrophic rhinitis and ozena and thinks that the nasal condition may predispose to a pulmonary tuberculosis.

In 120 patients with pulmonary tuberculosis examined during the last ten months the following diagnoses were made:— Atrophic rhinitis 11; sinusitis of some or all the nasal sinuses, 24; hypertrophic rhinitis 30; congenital narrow nose 2; broken nose 1; spurs 24; deflected septum 13; venous stasis of turbinates 1; ulcers on septum 8; adenoids 2; diseased tonsils 28; chronic tonsillitis 5; acute tonsillitis 3; chronic pharyngitis 59; acute pharyngitis 2; dilated blood vessels in pharynx 1; acute laryngitis 7; chronic simple laryngitis 48; tracheitis 3; tuberculosis of the larynx 28; otitis media recurrens 3; otitis media suppurativa 2; adhesive dry catarrh of middle ear 1; chronic otorrhoea 1; otitis externa sicca 2; chronic inflammatory glaucoma 1; cases with q5thentopia 16.

Syphilis.

Frese in reviewing the history of sixty-one cases of ozena finds that it was only possible to demonstrate hereditary syphilis in twenty-six per cent. He regards syphilis as a most probable factor in the causation of ozena, and explains this as follows:—

Firstly — a general lowering of constitution (dyserosia).
Secondly — ozena regarded as a meta-syphilitic affection.
Thirdly, direct local injury of mucous membrane through the syphilitic virus.
He thinks that the last is the most probable.
E. Baumgarten states that lues does not play an important role in the causation of ozena.

Of Lack's one hundred and fifty cases, ten per cent were due to syphilis of which four per cent being due to tertiary and six percent to congenital lues.

Many writers, make the supposition that any disease whose etiology is unknown must be due to some form of syphilis, have not unnaturally thought the same about the causation of ozena.

Caldera and Gagia state that Sobernheim and Alexander lend no support to ozena being a parasypilitic affection.

Milne states that it has been shown by the Wasserman test that ozena is generally but not always of syphilitic origin.

Arzt & Grossman state that after examination of 52 cases they decided,

- Firstly- that the Wasserman test is of great value in rhinolaryngology;
- Secondly, that serum diagnosis does not give any evidence of lues as a factor in the causation of ozena, but on the contrary enables them to exclude this condition as a causative factor.

Of our cases four had syphilis, tertiary stage, of the nose, three being males and the other a female.

DUE TO ACCESSORY SINUS SUPPURATION.

Grunwald's theory that ozena is a result of decomposition
of discharges coming from accessory cavities of the nose is a very plausible one. He claims that ozena can be cured by treating this local affection and states that a number of focal suppurations (accessory sinuses, nasal passages and adenoid tissue) occur with the clinical picture of fetid crust formation in broad noses.

Thomson states that in case of ozena, suppuration in the nasal sinuses is the true diagnosis in many cases. He describes the following difficulties in making a diagnosis:

Firstly- the sinuses are incompletely developed and suppuration in them is comparatively rare at an age when atrophic rhinitis develops:

Secondly, that if suppuration of sinuses is present it is hard to tell which process was there primarily.

Lack's series of cases show only fifteen instances of sinus suppuration.

Fraser and Reynolds say that accessory sinus suppuration is seldom accompanied by ozena and that the majority of their cases of ozena are not complicated by sinusitis.

Ballenger states that he has seen many cases of ozena cured on or greatly relieved by attention to the accessory sinuses. In conjunction with Dr. Joseph C. Beck he has made radiographs of the sinuses made in cases of atrophic rhinitis and without exception the sinuses appear cloudy, as they do in sinusitis, their outline is poorly defined and the area of the cavities is opaque.

Joseph C. Beck states that in all his cases the X-Ray
examination showed some or all of the sinuses involved. Rundstrom says that ozena simplex, or chronic atrophic rhinitis is nothing more than an ulcerative ethmoiditis, resulting secondarily in atrophic rhinitis.

In many cases of ozena the diagnosis of sinus involvement is not made because the secretion being so sticky dries in the ethmoidal cells, and one cannot see any of the secretion flow from them. If these cases are operated on the disease in the cells is soon discovered.

Many of our cases show no odor; this is due to the fact that the mucous membrane is chronically inflammed but is intact in its continuity. In the fetid forms we note a more of an ulcerative process in the sinuses.

Rundstrom also states that ozena is a clinical picture which arises through a chronic inflammatory process in the mucous membrane covering the ethmoidal cells, running a course usually in the form of a purulent catarrh and leading to a retention of the secretions in the cells in consequence of closure of the channels of exit. This retention of secretion occasions in early life, when the tissue is soft and yielding, an ectasia and enlargement of the ethmoid labyrinth and consequently widening of the nasal passages, with an alteration of the exterior formation of the nose. Through the inflammatory process, and the increased pressure on the accessory sinuses, the mucous membrane is destroyed, whereupon the process passes over to the bony tissue in which it excites a rarefying osteitis.
Freidenthal states that when ozena and accessory sinus disease exist side by side, then the ozena is the primary cause and the empyema the accompanying condition.

Pond in discussion of Richards article on Atrophic Rhinitis, says he never had a case without trouble in the accessory sinuses.

DUE TO OTHER CAUSES.

Parker considers ozena as an inflammation of the nasal mucous membranes accompanied by fetor and crust formation. He describes ozena as found in the following conditions:

1- Syphilitic lesions of the nasal cavity.
2- After operation of an inferior turbinate.
3- After operation for adenoids.
4- Nasal gonorrhea after birth, put into the ozena class.
5- Nasal accessory sinusitis.

Gradle says that as a result of his own personal observation ozena begins as a minimal localized focus of characterized suppuration on the middle turbinate with crust formation and gradually extension in area. He also states that ulceration and caries of bone are never found in ozena.

Cozzolini believes that ozena had its beginning in bone and in every case is the result of individual predisposition, the process beginning in an atrophy of the
medullary blood vessels and especially the arterial capillaries of the periosteal zone, then becoming a periostitis or a rarefying osteitis.

Knight\textsuperscript{47} says it is clear that no single theory will explain every case and that several of the causes or conditions mentioned may be concerned in its causation.

Phillips\textsuperscript{48} states that his observations have convinced him that the condition arises from a considerable number of etiological factors acting either alone or in combination.

DUE TO INFLUENCE OF CLIMATE.

Freudenthal\textsuperscript{30} believes that the first stage of atrophy is due to the dry atmosphere especially the warm dry air we inhale the greater part of the year due to living inside so much of the time.

Casselburg\textsuperscript{49} thinks that the climate question is a practical one and that benefit derived from a change of climate may be relative humidity or by mere change of environment from a dry to a moist or from a moist to a dry climate by stimulating the general health of the individual.

TROPHIC DISTURBANCE.

E. Baumgarten\textsuperscript{5} believes ozena is a trophic disturbance of probably central origin resulting in a secretory anomaly in the nose which in turn causes a lessening and drying of the secretion with crust formation. This producing pressure against the mucous membrane causes circulatory disturbances which results in atrophy of certain parts of the nose.
SEX.

Joseph C. Beck states that out of 57 cases, 46 were in females and only 11 in males. In these cases he found anemia was very prevalent. In some of these cases he found some menstrual disturbances.

Most writers are agreed that it is more frequent in the female than in the male. Our cases showed that we had two cases in the male sex to one in the female.

AGE.

Cases have been reported at all ages from two years up.

PATHOLOGY.

Gross - external appearance.

A certain proportion of the patients present the typical physiognomy, which consists of a broad face, with a broad flat nose, and prominent cheeks. The size of the nose is small as compared to that of the head, the bridge and alae are wide and the point of articulation with the frontal bone is much depressed. The base of the nose is wide and appears to spring more from the cheek bones. The tip of the nose is tilted a little making the nostrils look forward and down. The lips are usually thick, expressionless and everted.

Internal appearance of the nose.

In a well marked case the nasal fossa may be found to be fitted with large thick crusts, which if hard are usually a greenish black on the surface and more fluid and a yellowish green color in the deeper parts. In cases not so far advanced these crusts are not so hard
and are a more dark greyish color. There is usually consider­able thick, tenacious, sticky, yellowish colored muco­purulent secretion present. This covers the walls of the nose. When these crusts and excretions have been removed the mucous membrane is a pale pink color appearing very anaemic. In a few cases the nasal mucosa appears more red in color. This red color may be due to an abnormal transparency or to the irritation caused by the removal of crusts. I think the latter is the more probable.

Often there are ulcerated areas near the anterior nares on the septum and inferior turbinates. These are usually covered with a hard scab consisting of dried blood admixed with the muco-pus. These ulcerated areas are caused by the patients in their endeavors to pick out the dried crusts from the nose and so traumatizing the already diseased mucosa. One will be surprised at the space existing between the turbinates and the septum. This appears to be due partly to the small size of the inferior turbinates and partly to congenital undue width of the nasal fossae. Writers have not proven whether this arises from congenital maldevelopment or from atrophy. In many cases the inferior turbinates are the only ones which are atrophied while the middle turbinates may be normal in size or enlarged. In cases with sinus suppurations after thoroughly cleansing the nasal interior one will see mucopurulent secretion coming from the different sinuses. Posterior rhinoscopy will reveal
usually a much more anaemic condition of the nasal mucous membrane, that the crusts are fewer if any, and that the secretions are a greyish yellow color of the same sticky tenacious character as that found in the anterior nares. Considerable of this muco-pus will be found in the nasopharynx.

In a number of cases, the ozena only affected one side of the nose, in all these cases the septum was deviated to one side and this disease was always found on the roomy side.

MICROSCOPIC PATHOLOGY.

The crusts and discharge when spread out on a slide show them to be made up of mucous mixed with pus cells, usually numerous, desquamated epithelial cells, numerous organisms of various kinds and drbris.

The normal ciliated columnar epithelium in beginning ozena shows changes which it is undergoing. First we have a keratinisation of the surface cells, the cilia have disappeared and in many places the cells may be seen peeling off in the form of a small flake. In marked cases of this disease stratified squamous epithelium has taken the place of the normal epithelium and is in the state of constant desquamation.

Lack states that he does not feel assured that there is any definite change in the basement membrane which is limited to atrophic rhinitis.

The submucous tissue is thinner and more fibrous than
normal, this fibrosis has been compared to that seen in interstitial nephritis.

There is an infiltration of this layer by numerous round cells, this is very noticeable just beneath the basement membrane and has been noticed around the glands and blood vessels. This small round-celled infiltration is not limited to ozena but has been found in normal turbinates, in hypertrophic rhinitis and in turbinates when there was sinus suppuration present. A very marked change is the disappearance of the venous sinuses, this is probably due to contraction of the fibrous connective tissue. Fraser and Reynolds report that in one of their cases they found a marked periarteritis present together with great thickening of the muscular and adventitial coats of the vessel, the intima showing no changes. A very striking change is the marked change in the number of glands in ozena. There is usually evidences of degeneration of the cells of the glands. Lack has examined six cases and reports that there was no changes in the bone in these cases.

Zuckerkandl\textsuperscript{17} found that in early cases the inferior turbinate is thin; later on the bone becomes smaller in length and breadth, while it loses its curvature and tends to become straight; he believes that these changes are due to a chronic purulent rhinitis.

FORMATION OF THE CRUSTS.

These crusts are formed from the accumulated secretions by the drying process. Crusts are always more numerous in
those cases where the nasal fossa are exceedingly wide and where there is much atrophy. This tends to prove that in these roomy noses where there is great difficulty of expulsion of these secretions, they are retained in the nose and become very tenacious and stick to its lateral walls until they have become dry by a process of evaporation.

Lack states that degeneration and complete disappearance of the racemose glands and the greatly diminished vascularity of the nasal mucous membrane, and especially that covering the inferior turbinates, render it highly probable that the secretion is from the first deficient in water constituents, and the longer it is retained in the nose the more tenacious it becomes.

The absence of the cilia of the columnar cells which in the normal condition constantly sweep the nasal secretion backward into the pharynx also would tend to help in the formation of these crusts. Grunwald says that the crusts are nothing more than dried pus and the explanation of the crusting must be a physical one.

Porcher says that coagulation of the nasal secretion or scab formation occurs as result of inflammatory secretions of the sinuses coming in contact with the respired air. This assertion is considered by the fact that inflammatory secretion from a tracheotomy wound, coming in contact with air will produce the same coagulation or scab formation.

CAUSATION OF THE ODOR.

There is no question but what the odor arises by saprophytic
decomposition of the masses of secretion kept in a half moist condition by its abnormal adhesiveness.

Lack\(^6\) states that the fetor is almost certainly the result of decomposition of the retained secretions, for if the nose be thoroughly cleansed and then packed so as to prevent crust formation, the discharge which is poured out is at first quite odorless. It is only when it has been retained for some time in the nose and putrefaction has set in, that the characteristic stench is produced.

I have noticed numerous times that in the treatment of this class of cases that the odor always disappears or becomes very much less with a course of treatment in which the first essential was the keeping of the nose clean.

Fraenhel in 1874 suggested that the decomposition of the secretion was due to a ferment and stated that when this change occurred the typical picture of ozena was complete. This theory has not been proven and does not seem to be a likely one.

Krause has suggested that this remarkable odor was due to the breaking up of the fatty acids secreted by the degenerating glands. This is till to be proven and probably never will be.

The odor of ozena is very characteristic and is different from that caused by any other intra-nasal condition.

Grünwald\(^{\text{27}}\) says that those circumstances, removal of which is found by repeated observation and experiment to do away with the fetor, may reasonably be supposed to cause it. As
causes of the fetor, we have either putrefactive processes at the place where the secretion is formed, due, for instance, to necrosis of bone or soft parts, or to presence of a foreign body (such as I would consider carious teeth in empyema of the antrum), or we have putrescence of previously non-fetid pus inside the affected cavity.

In our cases the ones with the most marked odor were the ones in which we found the most atrophy and greatest space in the nasal cavities. In all these the discharge had collected in the inferior meatus, and the patient had great difficulty in expelling it. This shows that this secretion can lie stagnant until saprophytic decomposition can set in and so lead to the odor. In our cases associated with syphilis of the nose, the odor undoubtedly came from the above cause together with that coming from the necrosing bone or sequestri.

SYMPTOMS.

The most important symptom characteristic of ozena is fetor which constantly occurs in this disorder and distinguishes it from other forms of rhinitis. This odor is very difficult to describe and varies in intensity. Usually in the humid seasons of the year the patients feel relatively better and the odor is much less pronounced. This odor becomes more pronounced in advanced conditions that the patients friends become aware of it. In some cases it was very offensive to the patients themselves but in the most cases which were not so well advanced it was not known to them.
Discharge from the anterior nares is a symptom always complained of. This discharge usually dates from childhood and increases in amount until the case is well advanced when it becomes relatively less.

Inability to clear the nose from its secretions and crusts, the cause of which is described under "formation of the crusts".

In the cases not so far advanced a common complaint is droppings back into the throat causing them to hawk and spit, this is usually worse immediately upon rising and persists all during the day. This causes a sensation of accumulated material in the nasopharynx and is largely due to reflected irritation owing to the accumulated secretions in the nose.

Often patients will complain of inability to breathe through the nose, this being due to the fact that the nasal fossae are filled with mucopurulent secretions and in advanced cases with crusts and slugs. Often the entire nasal cavity may be filled with one large hard crust thus completely blocking the nasal cavity. In the early stages the crusts are easily removed, but later they are not; this gives rise to a constant desire to remove the same; numerous methods are tried by the patient to do so, as attempts to dislodge the crusts by picking the interior of the nose with their fingers or with instruments. This always leads to traumatic ulcers on the septum and inferior turbinate which causes bleeding from the nose, another symptom often
complained of. By making traction on the aloe in order to stretch this membrane and so allow greater space in the anterior nares for their removal. Violent blowing of the nose usually does not satisfy the patients and then they will try hawking into the nasopharynx and spitting out the crusts. Many cases complain of itching in the anterior region of the nasal walls and septum, this is a reflex irritation due to the crusts.

Diminution of the sense of smell is frequently complained of and in advanced cases loss of smell may be a symptom, this may be very disagreeable to the patient and is probably due to a fatty degeneration of the olfactory epithelium. In many cases of ozena the sense of smell is intact.

Dryness of the nose and throat is a common complaint. It is dependent upon the character of the secretion, which tends to dry, so that the patients seldom employ a handkerchief, but simply extract the crusts with their fingers. As infection of the naso-pharynx, pharynx, larynx, and bronchi exist simultaneously, there is added to the disagreeable sensation in the nose the dryness of the throat. It probably results from the loss of normal moisture imparted to it in its course through the nose. Often mucopurulent secretion will hang from the posterior nares into the pharynx where it will tend to dry, causing a sensation of irritation, which necessitates hacking. Headaches are often complained of. These are usually toxic in causation
and are dull and heavy in character, due perhaps to absorption of toxins from the pus accumulated in the sinuses or from the stagnant discharges undergoing putrefactive changes in the nasal cavities. These are located usually in the frontal region. If the sphenoid is affected there may be an occipital headache present.

Eye symptoms. All of our cases have had a chronic catarrhal conjunctivitis, this probably being due to the inflammation spreading up the naso-lachrymal duct by continuity of structure. One of our cases had a purulent dacryocystitis on the same side as the trouble in the nose.

All of our well advanced cases complained of hoarseness which was due to the chronic laryngitis caused by the infection extending from the nose to the pharynx and then to the larynx.

Many of our typical cases show a dry catarrh of the middle ears with gradual loss of hearing as a symptom; this is accounted for by the fact that the infection extends up the eustachian tube to the tympanic cavities.

Harry Kahn states that many patients with ozena have a disinclination for mental application and a lack of ability to concentrate.

All our infantile cases complain of breathing through the mouth, and most of them snore at night, which is due to both breathing through the nose and mouth.

Almost all our cases state that they catch cold easily, this must be due to a lowering of the resistance of the nasal mucous membrane by the constant infection so that it becomes
more susceptible to infection from outside sources.

Complications that may be present are:-

Conjunctivae - all our well advanced cases showed a chronic catarrhal conjunctivitis.

Lachrymal passage - one case had a purulent dacryocystitis, another had stenosis of the naso-lachrymal ducts.

Accessory cavities of the nose, almost all of our cases were complicated with sinusitis.

Pharynx, larynx and trachea are usually the seat of a chronic dry inflammation.

Ears - many cases show dry catarrh of the middle ears.

Organs of digestion in many cases show disturbances.

Several of our cases are very nervous.

Compared states that the various kinds of otitis which are caused or kept up by atrophic rhinitis fetida are more serious and more insidious than those due to other causes.

OZENA AS A SYMPTOM.

Packard in his textbook gives various causes for ozena and then says that atrophic rhinitis may at one time or another result from any if not all the causes mentioned and that the term ozena should be used as a symptom and not applied to the cause.

Knight and Bryant state that in the case of atrophic rhinitis one of the most distressing symptoms in bad cases,
is the fetid odor, or ozena. A term which is mistakenly used as atrophic rhinitis because it also occurs in syphilis of the nose. Malignant growths, in obstruction due to a foreign body and in sinus disease of the nasal fossae.

Kahn\(^{19}\) says that the term ozena is a combination of symptoms both subjective and objective.

**STATISTICS ON CASES STUDIED.**

Of the 30 cases studied, 20 were males and 10 females. Ages varied from 7 to 51 years in the male and from 10 to 40 for the females.

Nine cases had pulmonary tuberculosis.

Four cases had syphilis of the nose.

The various forms of sinusitis present are—

- Pansinusitis—bilateral 7 cases.
- Sinusitis of frontal ethmoids and sphenoid, bilateral 2 cases.
- Sinusitis of ethmoids and sphenoid and antrum, bilateral 6 cases.
- Sinusitis of ethmoids and sphenoid, 2 cases, bilateral.
- Sinusitis of ethmoids, 4 cases. Bilateral.
- Deflection of septum with the atrophy on the concave side 4 cases.
- Beginning atrophic rhinitis 4 cases, of these no diagnosis of involvement of sinuses was made.

Two of the beginning atrophic rhinitis had diseased enlarged tonsils and adenoids.
All of our cases had sinusitis in some form or other except perhaps four and in these the sinuses were not carefully examined.

**TREATMENT EMPLOYED IN CASES STUDIED.**

Where sinusitis was present. Evisceration of ethmoids and sphenoids with drainage of antrums and frontal sinuses. Then cleanliness of the nasal cavities was maintained, by irrigating every 2 hours with normal salt solution; twice daily cleansing nose with cotton on a probe and irrigating with an antrum and frontal sinus canula, followed by suction treatment (Brawley's). This followed by again cleansing nose with a cotton on a probe and in bad cases by again irrigating sinuses with argyrol.

In many cases ichthyol 30 per cent in glycerine was applied locally twice a day.

In the syphilitic cases, tincture of iodine was used locally.

Some of our cases received potassium iodide internally.

A general hygienic treatment was carried out in all our cases.

The straight medicinal or non-operative treatment has been very unsuccessful, this is shown by the large number of remedies and methods used by the various writers. This has led to the general statement that cases of ozena had a bad prognosis. In our cases which were operated on and had the sinusitis relieved or those cases where the septum was straightened had a very marked improvement so much that in a few of our cases the patients thought
themselves well, and had no odor to the slight discharge that was present and no crust formation.

Patients usually object to being treated with ichthyol. Golstein states that after consistently employing all known therapeutic measures for many years he found that he obtained the best results with Ichthyol which he used in different strengths at last using it in full strength without mixture. Because of the odor, of which the patients complained of he switched to Thegenol (sodium oleo sulphinate).
CONCLUSIONS.

That ozena should be considered a symptom and not a disease.

That it is a condition which is not hereditary.

That in cases where it seems to be inherited it is the abnormal patency of the nose which is the inherited condition and that the ozena is a secondary result.

That it is non-contagious.

That the odor is due to saprophytic decomposition of the stagnant mucopurulent secretions and that various organisms may cause this putrefaction. That the Bacillus mucosus capsulatus the one most frequently found is not connected with the causation but is a secondary infection leading to the odor.

That suppuration of the sinuses may lead to this condition especially in people with wide nasal fossa.

That ozena is usually associated with suppurative sinusitis while all sinusitis is not connected with ozena.

That no one theory will account for this condition and that it arises from a considerable number of etiological factors acting singly or in combination.

That sex has nothing to do with the etiology.

That it may occur at any age from two years up.
CASES STUDIED.

1.

Mr. Thomas J. Hession, age 22, Graettinger, Ia.,
Telegraph operator. Catholic. Referred by Dr. Hession.

Entrance complaint - Discharge from nose.

History - discharge began when fourteen years of age when he had measles. Has had a mucopurulent discharge ever since. First noticed a foul odor to nasal exhalations last summer. Has had marked crust formation for four years. Crusts are so large and hard now that he has to pull them out with his fingers. On a cold day his nose feels raw when breathing through it. Has nose bleed very frequent. Has considerable difficulty breathing through nose because of crusts. Left eye waters considerable, no other eye history. Has mucous droppings back into throat causing him to hack and spit. Throat always feels dry and is sore frequently.

Social History - was born in Illinois and has been there and in Iowa ever since.

Family History - Has no brothers or sisters. Father is fifty years old and mother is forty-two.

Pastmedical - had measles at 14 years of age.

Examination - nose- has a large spur left. All the turbinates are markedly atrophied. Many large crusts are found in nose sticking to septum turbinates and lateral walls. Considerable mucopurulent discharge found in all
the fossae of the nose. Very foul odor present.

Naso-pharynx contains mucopurulent discharge, pharyngeal mucous membrane is dry, pale red color and rough.

Antrum - puncture showed much old pus in each.

Laryngeal mucous membrane is a pale red color, cords are white, shiny and move well.

Ears - drum membranes are a pearly grey color, slightly retracted move with Seegles otoscope. Air conduction just better than bone. High notes not impaired- low notes cut down. Hearing with Barany's apparatus. Spoken voice, forty feet; whispered voice, twelve feet.

Eyes- pupils are round, equal, react to light and accommodation. Rotations are all right. Fundi are apparently normal ODV = 4/6 OSV = 4/6. Chronic catarrhal conjunctivitis present.

Dr. Dean's diagnosis is atrophic rhinitis. Dry pharyngitis. Double pansinusitis.

Treatment advised is on each side an antro-meatal operation, curette ethmoids and sphenoids, enlarge nasofrontal ducts.

December 5, 1912. Right middle turbinate was removed; ethmoids and sphenoid curetted, anterior one third of inferior turbinate removed. Antro meatal operation.

Pathology present - much pus and polyps found in right antrum. Ethmoids were all necrotic and contained pus.

Post operative treatment. Nose irrigated every two hours with normal salt solution. Cleansed with cotton on
a probe. Frontal sinus and antrum irrigated. Suction and ichthyol locally twice a day.

December 17, 1913, Spur left removed.

Patient could not stay and have left sinuses repaired, so was given a politzer air bag to use twice a day, and to spray nose twice a day with Dobell's solution, and to return later for left sinuses.

2-

Mrs. F. A. Merrill, age 35, Mediapolis, Ia. Referred by Dr. Potter.

History - When a child, had croup, after which she lost her voice for a few days. Would take cold in the winter and would lose her voice for a few days at a time. Then for a few winters did not have any trouble. For the last few winters has lost her voice. Last year, January first, took a cold and lost her voice which stayed bad for three weeks. Had hoarseness for five weeks. General health has been good. As far as she knows has had no lung trouble. Has had mucus droppings back into her throat causing her to hack and spit, this continues throughout the day. Has had considerable mucopurulent discharge from nose as long as she can remember. Has had some crust formation and has noticed odor to discharges from nose. Has several attacks of tonsillitis each winter.

Examination - April 20, 1912.

Nose - Septum is straight. All the turbinates are
enormously atrophied. Considerable mucopurulent discharge in nasal fossae on both sides. Many crusts found on septum and on lateral walls of nose. Foul odor to the discharge. Mucous membrane a pale red color.

Antrum puncture showed some shreds of pus in each.

Pharynx - mucous membrane very pale, dry and granular. Tonsils are submerged and very badly diseased with pus down in the crypts.

Larynx - mucous membrane is a pale red color, a catarrhal ulcer is present on the end of each vocal cord.

Chronic tracheitis present.

Dr. Dean's diagnosis - diseased submerged tonsils. Atrophic rhinitis, ethmoiditis, chronic pharyngitis, laryngitis and tracheitis.

Treatment advised. First, enucleation of tonsils. Second, curettment of ethmoids on each side. Ichthyol in nose. Steam inhalor. Silver to pharyns and larynx.

May 11, 1912, Tonsils were removed.

June 15, 1912, Ethmoids cured left.

Treatment - nose cleansed with cotton on a probe twice a day. Suction and ichthyol. Nose irrigated with normal salt solution every two hours during day.

June 22, 1912, Discharged from hospital to go home and continue treatment.

July 15, 1912, Curettement of ethmoids and sphenoid right. Treatment same as described above.

August 1, 1912. Patient to use suction twice a day at home also steam inhaler.

September 11, 1912. Nose is very clean. Throat looks fine and larynx seems normal. Is to continue treatment.

October 12, 1912. Seems to take cold easily since the weather has gotten colder. Has some hoarseness, noise is not clear now. Considerable headaches between eyes. General condition is better. Nose is fairly clean. Darynx is a little inflamed. Is to use steam inhaler and take a course of salicylates.

November 15, 1913. Nose is in fine shape. Weighs more than ever has in her life. Throat bothers a little. Larynx looks much better. Is to continue treatment.

January 18, 1913. After cold weather started had pain in and much discharge from nose in worse on right side. Has large crusts in nose with a foul odor. Last two weeks nose has been best since operation. Takes cold easily and that causes trouble. Throat has been sore and outside of neck is painful to touch. Most of her trouble now is her weak voice.

January 20, 1913. Antromeatal operation left.

February 13, 1913. Antromeatal operation right.

Treatment is cleansing nose with cotton on a probe then irrigation of antrums followed by suction and then the local application of ichthyol and clycerine.

March 12, 1913. Left antrum is clean and right is fairly clean.
March 22, 1913- Nose is in fine shape. Antrums are nearly clean. Has an acute laryngitis, should use the steam inhaler.

April 2, 1913. Nose is very much better than we have ever seen it. Is to continue with her treatments.

3-

Mrs. Stella Ritche, age 28, Mystic, Ia., Housewife. Referred by Dr. L. L. Lugar.

Entrance complaint - tearing of left eye.

History - three years ago the left eye began to tear, was worse when she had a cold. At times it would burn, itch, smart and feel as if she had fine sand in eye. One year ago had left inferior canaliculus opened and irrigated after that for a time her condition seemed cured. Six months ago had the duct opened and irrigated again. At this time pus could be pressed out of tear sack. Since then the condition has been gradually becoming worse. Last week an abscess formed at inner canthus, this was lanced and pus escaped. Has no trouble with right eye. Has considerable mucopurulent discharge from her nose with crust and scab formation. Much mucus droppings back into her throat, causing her to hack and spit. Has no difficulty in breathing through nose. Catches cold very easily. Has noticed some odor to nasal discharge. Nose feels sore and raw on left side.

Past medical history - measles, mumps, scarlet fever when small.

Examination-

Eyes- Right- chronic catarrhal conjunctivitis, pupils
round equal, react to light and accommodation. Rotations are all right. No nystagmus present. Fundus is apparently normal. Nasolachrymal duct is open.

Left- located within one-eighth of an inch from the inner canthus over the lachrymal sack is an abscess. The surrounding tissue shows a chronic inflammation. Chronic catarrhal conjunctivitis. Pupil is round, equal in size, with right; reacts to light and accommodation. Rotations are all right, no nystagmus present. Tears flow over lower lid. Fundus is apparently normal. ODV = 6/4 OSV = 6/4.

Ears - right and left. External auditory canals contain some soft wax. Drum membranes are a dull pearly color, slightly retracted and move with Sergles otoscope.

High and low notes are not impaired. Air conduction better than bone. Hearing with Barany's apparatus. Spoken voice, 40 feet, whispered voice, 15 feet.

Nose - Septum is deflected to left with a large spur left. Turbinates both inferior and middle are atrophied. Lots of crusts found and considerable mucopurulent discharge. Posterior ends of inferior turbinates are atrophied and covered with a mucopurulent discharge.

Chronic pharyngitis.

Tonsils are small, fibrous and submerged.

Larynx is apparently normal.

Dr. Boiler's diagnosis - large spur left; septum is deflected to left, atrophic rhinitis, and suppurative lacrymocystitis left.
Treatment advised - left lachrymal sack should be removed; septum should be straightened.

Jan. 17, 1913, left dacryocystectomy.


Staphylococcus albus was found in pus from tear sack.

Earnest Sell, age 20, Traer, Iowa. Farmer,

Referred by Dr. Tayler.

Entrance complaint - discharge from nose.

History - has had difficulty in breathing through nose ever since he can remember. Has a heavy feeling in his head all the time, especially if he has a cold. Catches cold easily. Snores at night, has considerable mucus droppings back into his throat is worse in the mornings. Has never been able to smell. Many crusts and scabs form continuously in nose. Considerable discharge from nose which is a greyish yellow color. This has a foul odor. Although patient does not notice odor now.

No history of eye, ear or throat trouble.

Past-medical history only measles and whooping cough.

History of similar condition in two brothers.

Examination-

Eyes, right and left - conjunctivae are slightly injected. Pupils are round, equal, react to light and
accomodation. Rotations are normal, no nystagmus present.

ODV = 6/5  OSV = 6/5.

Ears - right and left.

Some soft wax in external auditory canals.

Drum membranes are slightly retracted, dull greyish pearl color move with Seege's otoscope. High and low notes are not impaired. Air conduction is better than bone.

Hearing with Barany's apparatus. Spoken voice 40 feet, whispered voice, 15 feet.

Nose - Septum is fairly straight; nasal mucous membranes are a pale red color. Many thick hard brownish colored crusts on turbinates, lateral walls and on septum. Considerable mucopurulent discharge in all fossae. Inferior and middle turbinates right and left are very small and atrophied. Very much space between turbinates and septum. Antrum puncture showed much old pus and mucus in each antrum of Highmore. Transillumination showed each antrum clouded. Crescent under orbit very dull.

Pharyngeal - mucous membrane shows a chronic inflammation.

Tonsils are small, fibrous and submerged.

Dr. Roger's examination - pulps are vital in all teeth of superior maxilla except upper first molar. Pulp in this has been removed. Would exclude teeth from causing any trouble in antrum.

Dr. Dean's Diagnosis - Parisinusitis right and left.

Treatment advised - first a double radical antrum operation. Second - curette each ethmoids and sphenoid and open
nasal frontal duct.

Operation March 7, 1913, double radical antrum operation (Denker). Outer walls of each antrum were so necrotic that periosteal elevator broke through into antrum. Polyps—much pus found. Inner wall was necrotic.

Post-operative treatment. Nose cleansed with cotton on a probe, each antrum irrigated with normal salt followed by suction treatment, then irrigation of antrums with two-percent argyrol.

March 9, 1913. Patient developed acute follicular tonsillitis, nose is in better condition.

March 17, 1913. Patient has an abscess in left cheek which was lanced.

March 30, 1913, patient discharged, nose fairly clean is to return and have ethmoids curetted.

Mr. Alvah Colvin, age 34, Waterloo, Ia. Mason, not referred.

Entrance complaint - Inability to breathe through nose. Discharge from nose.

History—has had a thick yellowish greenish discharge from his nose for last eight years, with very much crust formation which completely stopped up his nose in the mornings. Has droppings back into his throat causing him to hack and spit up thick mucopurulent discharge. Friends
have noticed a foul odor to his breath for last three years and at times can detect it himself. Has noticed that he has difficulty in smelling for several years and thinks that it is becoming worse. Catches cold very easily and they usually last for one week. Often when people are talking to patient he does not hear what they say. Has never had any earache or discharge from ears. Has never had tonsillitis. Throat becomes raw about once or twice a year. No history of any eye or lid trouble. Has never worn glasses.

No history of epilepsy in family.

Past medical history - measles when small. Mumps at thirteen years. Gonorrhoea when 19 years of age. Denies lues.

Family history - father alive and well, sixty-two years old, is troubled with a great deal of discharge from nose, thick yellowish color with a foul odor. Has never been troubled with since boyhood. Mother is alive and well, fifty-eight years of age. No history of any nose trouble. Has three brothers ages 28, 26, 18 none of them have any nose trouble. Has one sister age 21 years (has no nose trouble) but has droppings back into throat causing her to hack and spit much worse in the mornings, has been so troubled for last four years. One uncle on father's side had much purulent discharge from nose which two girls and one boy had a great deal of discharge from nose, one of the girls became deaf. One aunt
died of tuberculosis at age of 37 years. Paternal
grand father had carcinoma of lip.

Social history - white, male, age 24, married has
one boy age three years. Is a mason by trade. Has always
lived in Iowa. Chews and smokes occasionally. Drinks
some beer occasionally.

Eyes - conjunctiva of lids of both eyes are pale red
and slightly rough. Pupils are round, equal, three m.m.
in diameter, react to light and accommodation. Rotations
are all right. No nystagmus present. Fundi are apparently
normal. ODV = 6/5 OSV = 6/5.

Ears - right-

Drum membrane is a pearly grey color, whiny, is not
bulging or retracted. Cone of light is bright and definite,
and it moves with Seegle's otoscope. Air conduction
better than bone. High and low notes are not impaired.
Hearing with Barnay's apparatus, spoken voice 40 feet,
whispered voice, 15 feet.

Left - external auditory contains a small amount of
soft wax. Drum membrane is clear pearly color, shiny not
retracted or bulging and moves with Siegle's otoscope.
Air conduction better than bone. High and low notes not
impaired. Hearing, spoken voice 40 feet, whispered voice 15
feet.

Nose - septum is thickened and is deviated to the
right touching turbinates on right side. Inferior and middle
turbinates on left side are very small, atrophied. Mucous
membranes covering them covered with a grey-colored muco-purulent excretion with much crust formation. After removing the discharge the mucous membrane appears a red color. There is a very foul odor to discharge. Middle turbinate on right side is enlarged and inferior turbinate right is not so small as that on left side. Septum is seven cm long at inferior meatus. Posterior ends of both inferior turbinates are small covered with some crusts, most on left side, mucous membrane a light color.

Tonsils are small, fibrous, submerged and diseased. Pharynx is rough, mucous membrane being a pale red color. Laryngeal mucous membrane is a pale red color. Cords move all right.

September 30, 1912, patient had a Gleason operation on septum.

Miss Florence Gesling, age 9, Ainsworth, Ia., schoolgirl. Referred by Dr. Laird.

Entrance complaint - difficulty in breathing through nose.

History - has had difficulty in breathing through nose for the past three years. The child was apparently had a cold for the last three years. Nose is stopped up all the time, and discharges a yellowish colored material which has a bad odor. Has considerable mucus droppings back into throat causing her to cough considerable. Takes cold very easily.
Past-medical history - chicken pox at six; scarlet fever at 8 years of age.

Examination - nothing pathological found in examination of eyes or ears.

Nose - it is filled with a purulent discharge, crusts on middle and inferior turbinates, considerable pus seen coming down over middle turbinates. Inferior turbinates are atrophied. Middle turbinates are enlarged. Septum is straight. Antrum puncture and irrigation showed them both to be negative. Large bunch of adenoids present. Tonsils are small and diseased. No pus from frontal sinus after waiting for twenty minutes.

Pharynx is chronically inflamed. Tonsils are diseased. Larynx appears normal.

Dr. Boiler's diagnosis - atrophic rhinitis. Ozena present. Tonsils diseased, adenoids present.

Operation - October 13, 1911, tonsils and adenoids removed. October 18, 1911, patient put on Branley's suction and ichthyol and glycerin (aa) applied locally twice a day. October 31, 1911, nose is much better but still contains pus. November 4, 1911, right middle turbinate removed. Ethmoids and frontal duct curetted. Treatment - nose sprayed with adrenalin. Dobell's solution 5 parts for 12 hours and irrigated with normal salt water every 2 hours. Then cleansed with cotton on a probe and suction twice a day.

November - nose is improving, crusts are not so large as they were before.
November 24, left middle turbinate removed, Sphenoid and ethmoids curetted left. Same treatment as above.

December 14, nose is in good condition. Very little discharge is present. No crusting. Patient discharged. Dr. Laird is to treat nose twice daily with Ichthyol and glycerine and place on suction.

Mr. Carl Sweely, Age 15, Rodman, Iowa. Occupation, school boy. Referred by Dr. Van Gordon.

Entrance Complaint - discharge from nose.

History - has had a greenish discharge from his nose as long as he can remember. Been blowing scabs and crusts from his nose for a long time. Has much mucus droppings back into his throat causing him to hack and spit which was much worse in the mornings. Throat feels dry. Bad odor to discharge from nose. No history of eye, ear or throat trouble.

Past-medical history - measles when small.

Examinations-

Eyes - chronic catarrhal conjunctivitis present.

Right and left pupils round, equal, react to accomodation and light. Rotations all right, no nystagmus present. Fundi are negative ODV = 6/4  OSV = 6/4

Ears - some soft wax present in each external auditory canal.

Right and left - drum heads appear normal. Air conduction better than bone. High and low notes not
impaired. Hearing with Barany's apparatus. Spoken voice 40 feet, whispered voice 15 feet, for each ear.

Nose - septum is thickened and fairly straight. Much mucopurulent discharge and many large crusts in each side of nose. All turbinates are very small and atrophied. Many crusts in superior meatus and pus is found coming down from above on both sides. Antrum punctures right and left were negative. Posterior ends of turbinates greatly atrophied and covered with a mucopurulent secretion. Much odor present.

Tonsils are small, fibrous and diseased. Pharynx shows a chronic inflammation present. Palatal arch is low and broad. Larynx appears normal.

Dr. Dean's diagnosis - atrophic rhinitis, ethmoiditis and sphenoiditis, right and left.

Operation - January 26, 1912, right middle turbinate removed, sphenoid and ethmoids curetted right. Nasofrontal duct curetted.

Treatment - nose sprayed with adrenalin 1 part, Dobell's solution 5 parts for twelve hours and then irrigated every two hours with a warm normal salt solution. Nose cleansed with cotton on a probe. Suction twice a day followed by a local application of Ichthyol and glycerine.

Operation - February 1, 1912. Left middle turbinate removed. Ethmoids and sphenoid and nasofrontal duct left curetted.
Treatment same as above.

February 6, 1913, considerable crusting on right side of nose not so much on left side.

March 13, 1913. Patients nose in good condition Left hospital without permission.

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David Kensinger, age 22, Tipton, Ia., Occupation, Farmer, Referred by Dr. Howard.

Entrance Complaint - blows large scabs out of his nose.

History - As long as he can remember has been blowing scabs and crusts from both sides of his nose. Has always had a greenish yellowish discharge from his nose. Nose feels dry and itches considerably, no pain present. Has much mucus droppings back into throat causing him to hack and spit much worse in the mornings. Nose bleeds occasionally. During the past three years nose has been stopping up considerable - much worse whenever he has a cold. Throat feels dry at times. Has had a sore throat occasionally but it does not bother him very much.

Past medical history - chicken-pox, mumps, measles, whooping cough when a child. Rheumatism two years ago.

Family history is negative.

Examination -

Eyes - right and left - conjunctivae of both eyelids
somewhat hyperemic. Pupils round, equal. React to light and accomodation. Rotations are normal, no nystagmus present. Fundi were negative.

ODV = 6/5       OSV = 6/5.

Ears - right and left, canals appear dry and scaly. Drum membranes apparently normal, air conduction better than bone. High and low notes are not impaired. Hearing with Barany's apparatus, spoken voice 40 feet, whispered voice 15 feet.

Nose - septum thickened, deflected to the left with a large spur left. Many dried crusts on right and left sides of septum, much thick mucopurulent secretion present with a very foul odor.

Inferior and middle turbinates are atrophied.

Mucous membrane is a pale color and contains ulcerated areas on both sides of the septum, also on left inferior turbinate.

Posterior ends of inferior turbinates are atrophied and covered with mucopurulent secretion.

Pharynx - mucous membrane is a pale pink color and granular appears very dry.

Tonsils are small, fibrous and diseased.

Larynx - chronically inflamed, cords are white and move all right.

Diagnosis - Dr. Dean, septum deflected to left with large exostosis. Ethmoiditis with resulting atrophid rhinitis.
Treatment - nose cleansed with cotton on a probe. Suction with Branley's apparatus twice a day and ichthyol and glycerin (aa) applied locally. This was continued for two weeks when nose was in very much better condition. Then a submucous resection of the septum was performed December 9, 1911.

December 14, 1911, patient developed an acute serous catarrh of left middle ear.

December 17, patient complains of pain in both ears. Both drum heads found to be red and bulging. Paracentesis performed on both drum heads.

December 28, 1913. External auditory canals still wet and are packed with tympanic packs. Eustachian tubes inflated. Nose is in very good condition, septum straight and very little scabbing.

February 8, 1912. Nose is in excellent shape. Septum is straight. Ears in good condition. Patient is discharged from hospital and to return in two weeks.

February 22, 1912, patient returned to hospital, nose is in good shape.

Treatment - ichthyol and glycerine applied locally to nose, suction twice a day.

February 24, 1912, patient in good condition is to return in two months.

Patient did not return.

Sydney Maiden, male, Protestant, age 24, Born June 20, 19
Lives in Iowa City, Ia., Junior Medical Student. Born in Pomeroy, Ia. American, Lived in Iowa all his life.

Entrance complaint - crust formation.

History - first noticed discharge from nose when twelve years of age and has always had it since; crust formation began eight years ago. No odor noticed by patient to exhalations from nose. Cannot smell at all, has been so for six years. Has droppings back into throat causing him to hack and spit. Does not catch cold easily. Nose feels dry, but throat does not. No headaches. No history of eye or ear trouble.

Past medical history- measles at ten, chicken pox at eight, mumps when twenty-one, scarlet fever at four.

Family history - has four brothers and ten sisters. Three sisters dead, one died of typhoid fever at thirteen. The other two causes unknown. Patient is the ninth child, no history of nose trouble in family except in one brother who has crust formation in nose.

Examination - eyes - right and left - conjunctivae of all lids is a pale red color and rough. Pupils are round, equal react to light and accommodation. Rotations are all right. No nystagmus present. Fundi are apparently normal. ODV = 6/4 OSV = 6/4.

Nose - septum is thickened opposite middle turbinate is fairly straight. Inferior and middle turbinates are markedly atrophied. Some crust formation on septum and turbinates. Mucous membranes are a pale pink color in posterior nares.
on each side they are a grey color. Some mucopurulent discharge in middle and superior fossae. Posterior rhinoscopy shows marked atrophy of turbinates. The mucous membrane is almost a grey color.

Pharynx shows a chronic inflammation.

Tonsils are small, fibrous and submerged.

Larynx appears normal.

Ears - right and left - some soft wax in external canals. Drum membranes are pearly, shiny color, not retracted. Air conduction better than bone. High and low notes not impaired. Spoken voice 40 feet, whispered voice, 15 feet with Barany's apparatus.

Transillumination shows antrum clear.

Antrum puncture was negative.

H. L. Page, age 43, - Referred by Dr. Droz.

Entrance complaint - discharge from nose.

History - five years ago first noticed discharge from nose. Has crust formation in nose causing difficulty in breathing through same. Has droppings back into throat causing him to hack and spit - this is worse in the mornings. Coughs up crusts. Has some trouble with his sense of smell lately. During the last eight months has noticed some odor to his breath. Throat feels very dry all the time. Catches cold easily. Has had a cough for the last year. No history of eye or ear trouble.

Past medical history - has had the diseases of childhood.
Family history - is a married man, has three children, two boys and one girl, no history of nose trouble, no history of nose trouble in patients parents.

Examination-

Nose - septum is fairly straight each inferior turbinate is very small. Middle turbinates are gone, ethmoids and sphenoids are eviscerated. Mucous membrane is a pale red color and is covered with a muco purulent secretion. Some crusts on septum inferior turbinates and on lateral walls. Antrum puncture showed old pus in each antrum. Pharyngeal mucous membrane is a pale pink color almost grey, is very dry and shiny, some mucopurulent discharge in nasopharynx.

Larynx shows a chronic inflammation.

Tonsils are fibrous and diseased.

Eyes - conjunctivae show a chronic catarrhal conjunctivitis - pupils are round, equal, react to light and accommodation. Rotations are all right. Fundi are apparently normal.

June 11, 1912, Dr. Dean's diagnosis - ozena with sphenoid and ethmoidal trouble.

Treatment - ethmoids, sphenoids and naso-frontal ducts curetted right and left.

Oarla Britton, Age 16, Kalona, Ia., Schoolboy.

Entrance complaint - offensive discharge from nose.
History - has had a purulent discharge from nose as long as he can remember. Has much crust formation with a foul odor to exhalations from nose, so much so, that the school teachers object to the boy going to school. Has mucus droppings back into throat causing him to hack and spit, often coughs up crusts. Has difficulty in breathing through nose because of it stopping up with crusts. Nose bleeds often. Throat feels dry and sore most of the time catches cold very easily. No history of eye or ear trouble.

Past medical - measles, mumps, and chicken-pox when small.

Family history - three children in family, one sister has the same thing.

Examination -

Nose - septum is fairly straight - cartilage is thin and is giving way. Many hard crusts found on septum and on turbinates. Much mucopurulent discharge in inferior and middle fossae. Turbinates are all atrophied, especially the inferior. There is a foul odor to the discharge in the nose.

Naso-pharynx contains mucopurulent discharge and pharyngeal mucous membrane is dry and rough.

Larynx appears normal.

Tonsils are enlarged and diseased.

Palatal arch is high and narrow.

Examination of eyes and ears was negative.

Dr. Dean's diagnosis - ozena.
Treatment advised - sinuses should be drained. Nose irrigated with normal salt solution. The use of iddides and mercury internally and the application of tincture of iddine to the septum.

- 12 -

Mr. Fred Nelson- Emmetsburg, Ia., Age 24, farm-work. Referred by Dr. Powers.

Entrance complaint - inability to breathe through nose because of crust formation.

History - has always had difficulty in breathing through nose. Has lots of purulent discharge from nose which is of a greenish yellowish color, which has a very foul odor. Friends have told him last summer of the foul odor to his breath. Has much mucus droppings back into pharynx causing him to hack and spit which is much worse in the mornings. Thinks his power of smelling is interfered with. Does not catch cold so very easily. Throat feels dry at times. Never is hoarse. No headaches now but five years ago had many severe frontal headaches. No history of eye or ear trouble.

Past medical history - measles at four, mumps at six.

Family history - one cousin has nose trouble similar to patients. No other history of it in family.

Nose - septum is thickened and deviated to the right and has a spur on top of deviation opposite inferior turbinate and middle meatus.
Right inferior turbinate is enlarged touching the septum; middle turbinate and meatus cannot be seen because of large spur on turbinate. Mucous membrane in right side of nose very red and hyperemic. Left inferior turbinate is atrophied somewhat being three-fourths of a cm. from septum.

Left middle turbinate cannot be seen because of the mucopurulent, yellowish greenish secretion in middle meatus, this extends down to the floor of the nose and is dried into soft crusts on septum, floor of nose, and inferior turbinate. Left middle turbinate is very large, touching septum. Posterior end of right inferior turbinate is enlarged and the mucous membrane over it is polypoid color. Posterior end of left inferior turbinate is atrophied and the mucous membrane over it is light pale color. Much mucopurulent excretion in middle meatus posteriorly. Very foul ozenic odor noticed to exhalations from nose.

Antrum puncture was negative, both right and left.

Tonsils are small, fibrous, somewhat submerged and diseased.

Nasopharynx - the mucous membrane is a pale red color and very dry.

Pharynx is red and covered with purulent excretion.

Laryngeal mucous membrane is pale red color, appears dry, cords are white and shiny and move all right.

Ears -

Right: external auditory canal filled with soft wax which when removed left walls very red.
Drum membrane is retracted - a pale grey color, cone of light not bright and high and low notes not impaired; air conduction better than bone; drum membrane is movable with Siegle's otoscope. Hearing with alarm - spoken voice 40 feet, whispered voice 15 feet.

Left - external canal contains considerable wax. Drum membrane is slightly retracted dull grey color, cone of light not very shiny, is movable with Siegel's otoscope. Air conduction better than bone. High and low notes not impaired. Hearing with alarm - spoken voice 40 feet, whispered voice 15 feet.

Eyes - conjunctivae of both eye lids are hyperemic. Pupils are round, equal, react to light and accomodation. Rotations are all right. No nystagmus. Fundi, ODV = 6/4 pt no correction. OSV = 6/4 no correction.

Dr. Boiler's examination - Septum deviated to the right with a spur on top of deviation.

Ozena left.

Pharyngitis acuta.

Operation 10-11-12.

Gleasons operation - two splints put in on right, one on left side. 10-12-12, splints changed, awful odor present; 10-19-12, splings left out. Balsam fern applied to deodorize the foul odor. Considerable discharge present; 10-21-12, nose treated with Ichthyol and glycerine, equal parts of each; 10-26-12, discharged from hospital. Nose is fairly clean. Should return later to have middle turbinates and ethmoidal
cells curetted; 12-16-12, ethmoids and sphenoid curetted on left side. Treatment - nose irrigated, suction twice daily. Ichthylol and glycerine locally; 12-23-12- discharged nose is fairly clean.

Lee Loewenberg, age 7, Goodell, Ia., Referred by Dr. J. E. Marek.

Entrance complaint - frequent sore throat.

History - has had tonsillitis every winter since childhood. Does not breathe through nose very well. Snores at night, catches cold easily, has some mucopurulent discharge from nose, also some crust formation. Parents have never noticed any odor to breath.

Family history and past medical history negative.

Examination:

Eyes and ears are apparently normal.

Nose - septum is deviated to the right. Each inferior turbinate is atrophied. Each middle turbinate is enlarged. Mucous membrane is a red color. There is some muco-purulent discharge in middle and inferior meati on each side and a few semi-dry crusts in nose.

Palatal arch a little high and narrow.

Tonsils are diseased, and nasopharynx contains a large bunch of adenoids.

Dr. Boiler's diagnosis - atrophic rhinitis (beginning)

Diseased tonsils and adenoid, deviated septum to right.
Operation - tonsils and adenoids removed.

After operation he developed a cervical adenitis which he had for one month.

Miss Emma Bogs, Age 18, Iowa City, Ia., Occupation, Clerk. Referred by Dr. Mullin.

Entrance complaint - difficulty in breathing through left side of nose.

History - has had difficulty in breathing since she was three years old. This is usually worse in the winter time. Crusts and scabs have been forming in right side of nose as long as she can remember. Has considerably mucopurulent discharge from her nose and much droppings back into her throat causing her to hack and spit which is worse in the mornings. Throat feels dry and sore all the time. Takes a cold quite easily and is always complicated with tonsillitis. No history of eye or ear trouble.

Past medical - scarlet fever, measles and whooping cough when a child.

Examination:-

Eyes - right and left- conjunctivae of lids is hyperemic and rough. Pupils round, equal react to light and accommodation. Rotations are all right. No nystagmus. Tension is normal. Fundi appear normal.

Ears - right and left - external auditory canal contains
some soft was. Drum membranes are apparently normal. Air conduction better than bone. High and low notes not impaired. Hearing with Barany's apparatus. Spoken voice 40 feet. Whispered voice 15 feet for each ear.

Nose - septum is deflected to left occluding left side of nose. Large spur left. Right inferior and middle turbinates are very small. An area of ulceration on right side of septum and on anterior end of middle turbinate. Considerable muco-purulent discharge is present in all fossae of right side of nose. Numerous dried crusts found on septum and on lateral walls on left side. Mucous membrane is a pale color right side and more hyperemic on left side. Posterior ends of middle and inferior turbinates right are atrophied and covered with a mucopurulent discharge. Considerable discharge found in naso-pharynx.

Both antrums punctured and irrigated, showed them to be negative.

Pharynx shows chronic inflammation to be present. Tonsils are submerged, fibrous and diseased. Larynx appears normal.

Dr. Dean's diagnosis - septum badly deflected to left occluding left side of nose - atrophic rhinitis.

Operation December 9, 1911, submucous resection of septum.

Treatments nose irrigated every 2 hours and cleansed twice a day with cotton on a probe.
December 19, 1912, patient's nose is in fine shape. Septum remains straight. Discharged.

- 15 and 16.

Miss Vera Anderson, age 10, Iowa City. School girl, Catholic, not referred.

Entrance complaint - thick yellowish discharge from her nose.

History - For last five years has had a thick yellowish discharge from nose. Parents or friends have never noticed any odor. Patient has always caught cold easily. She has mucopurulent droppings back into her throat causing her to hack and spit, is much worse in the morning after rising. The discharge from nose has been gradually becoming worse and is more noticeable in the summer. Patient has never noticed any odor to discharge and thinks she can smell as well as ever. Has frequent headaches which are localized in supra-orbital region, these are more severe and occur oftener when she has a cold with her nose stopped up. Has frontal headaches every two or three days when she is in school. She breathes through her mouth almost all the time. Does not snore at night. Had earache several times last winter in left ear. Never had any discharge from ears. Patient thinks she can hear as well as ever. Had tonsillitis four or five times last winter. Print never blurs when reading but she has some photophobia and lachrymation. Has never
worn glasses. No history of lid trouble.

Family history - patient has three sisters and four brothers alive.

One girl five years old has a continuous yellowish green discharge from nose so much that her nose is always stopped up in the mornings. Catches cold very easily, especially during the summer. She breathes through her mouth all the time. Had a thick yellowish bloody discharge from right ear last winter.

One brother eight years old has frequently a watery discharge from his nose.

Mother is forty years old and has always been troubled with catarrh. She has considerable thick, dark, greenish yellow discharge from her nose. Friends have told her that there was a foul odor coming from nose. She has droppings back into throat causing her to hack and spit, it being much worse in the mornings. There is crust formation and drying of the purulent excretions in the anterior part of her nose. During the last two years there has been much more secretions from nose. Thinks she has lost her power of smelling during last year. Frontal headaches dull, thumping character almost all the time, and at times has severe headaches in the top of her head. No history of ear trouble. Print blurs and cannot see to read very well at night. When sewing vision becomes blurred. Some photophobia and lachrymation being present, has never worn glasses. Has sore throat and hoarseness at times.
Patient's father has no history of nose trouble.

Mother's father died of so-called "catarrh of nose and stomach". Mother's mother never had any nose trouble. One aunt of patient's on mother's side has a great deal of discharge, thick yellowish color with a foul odor, so bad that she went to California for treatment. One uncle on mother's side has considerable purulent discharge from his nose.

Social history - patient is a female, aged ten, living in Iowa City, Ia., and a school girl in the fifth class. She was born in Cedar Rapids, Ia., being an American and has always lived in Iowa. Patient sleeps in same bed with a five year old sister, has done so for last year.

Past medical history - small pox when one and one-half years old. Measles at three years and pneumonia when five years old.

Examination:

Eyes - pupils are round, equal 3 mm in size, react to light, accommodation and convergence. Rotations are all right and no nystagmus present. Both fundi are apparently normal. ODV = 6/5 OSV = 6/5.

Ears - right-

External auditory canal contains some soft wax. Drum head slightly retracted and is a pearly shiny color with a few small atrophic areas in posterior quadrants. No scars noted. Cone of light is very bright and definite.
Drum membrane is movable with Siegle's otoscope. High and low notes are not impaired. Air conduction is better than bone. Spoken voice 40 feet, whispered voice 15 feet with alarm.

Left - external auditory canal contains some soft wax. Drum membrane is slightly thickened, is light grey color not so shiny or pearly as right. Air conduction is better than bone. High and low notes are not impaired. Spoken voice 40 feet, whispered voice 15 feet with alarm.

Nose - septum is thickened posteriorly and slightly deflected to right. The mucous membrane on septum is very pale almost a grey color. Small spur high up opposite middle turbinate on right side. Both inferior and middle turbinates are very much atrophic and shrunken. Left inferior turbinate is 1 cm from septum and 1/2 cm from floor of nose. Right inferior turbinate is 2 mm from septum and 3 mm from floor of nose.

Considerable brown-greenish discharge with a foul odor in middle and inferior fossae on right and left sides. Some dried crusters on septum and lateral walls of nose anteriorly.

Sensation in nose is somewhat impaired. Anterior nares contain some crusts. Septum along floor of nose is 60 mm from anterior to posterior nares. Posterior ends of both inferior turbinates are small polypoid in color and consistency. Mucous membrane very light color.
External appearance of nose. Skin over nose is a dusty hue and contains numerous condomes. Region of nasal bones is very wide as compared to length of nose and has a gradual slope to rest of face appearing rather flat. There is a slight depression on both sides, just lateral to central ridge and on lateral sides of depression is a slight enlargement.

Palatal arch - it is very high and narrow.

Teeth - they are irregular in size, shape and arrangement, also are poorly kept.

Tonsils - they are small, diseased fibrous and submerged.

Pharynx is light, pale red color streaked irregularly with red and rough.

Nasopharynx contains some mucopurulent discharge.

Larynx - mucous membrane is a pale red color. Cords are white, shiny and move all right. Arytenoids are large and prominent, but inner arytenoid space is not infiltrated. There is some white purulent material in the fossa to right side of aryteno-epiglottic fold.

Antrum puncture and irrigation showed left antrum flakes of old pus, right antrum negative(questionable if in antrum).

Transillumination showed-

No red fundus reflex on right side. No crescent under orbit.

Left side - good red fundus reflex - marked crescent under orbit.
Examination of nose of Mrs. Anderson - showed marked atrophy of all turbinates, considerable mucopurulent secretion in all meati together with much crust formation. Antrum puncture showed old pus in antrums. After cleansing nose and waiting 20 minutes pus was found coming down from frontals.

Dr. Dean's diagnosis - parisinusitis right and left.

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Patient in state school for blind.

Has always had a discharge from nose.

Examination shows - septum fairly straight. All turbinates atrophied considerable mucopurulent discharge in inferior and middle meati on each side. Crust formation on septum and on turbinates.

- 18 -

Albert Blomquist, age 43, Oakdale, Ia., Methodist, Swedish, Referred by Dr. Scarborough.

Entrance complaining - dryness of throat.

History - throat has felt dry for several years. Voice has been husky and hoarse for the past month. There is a trickling sensation in the larynx. Has been at Oakdale for past two weeks. Has some discharge from nose. Some droppings back into throat, but no crust formation. Catches cold very easily.

Past medical history is negative except for a few of
childhood diseases.

Family history - mother and wife died of pulmonary tuberculosis.

Examination:

Eyes - show a chronic catarrhal conjunctivitis otherwise are apparently normal.

Nose - septum is fairly straight. All the turbinates are atrophied. Mucous membrane is a pale color. Some mucopurulent discharge is present in each middle and inferior meati. There is no crust formation in nose.

Pharyngeal mucous membrane is dry, smooth and pale in color.

Larynx shows interarytenoid space markedly infiltrated. Tonsils are small and submerged. Ears are negative.

Dr. Boiler's diagnosis - atrophic rhinitis, dry pharyngitis, tuberculous laryngitis (Dr. Dean).

Treatment - Ichthyol to nose, laryngeal cauter y every 2 weeks, and Tactics acid to larynx locally daily.

Mr. A. Eisenburg, age 30, Oakdale, Ia., Referred by Dr. Scarborough. Born in Vienna, has lived there since, moved to Iowa 1 year ago.

Entrance complaint - discharge from nose.

History - has had a bad discharge from nose fot the last three years which is mucopurulent in character. Catches cold easily. Friends at times tell him of the foul
odor to his breath. Cannot smell at all. Has droppings back into his throat causing him to hack to clear throat which also feel dry.

Eye lids itch burn and smart at times.

Past medical history - had measles at eight and scarlet fever at nine years of age.

Family history is negative.

Examination -

Nose - all the turbinates are atrophied and are covered with crusts and foul smelling mucopurulent discharge. Mucous membrane is a pale red color.

Pharyngeal mucous membrane is pale, rough and dry.

Tonsils are small and diseased. Larynx shows a chronic inflammation.

C. E. Vance, Age 51- Oakdale, Ia.

Entrance complaint - Droppings into throat.

History - has had droppings into throat causing him to hack and spit all his life. Has considerable mucopurulent discharge from nose, with some crust formation. Catches cold very easily. Has had hoarseness of voice off and on for last 10 years.

Family history - married, has 2 boys and 2 girls, no history of any nose trouble. One brother died of tuberculosis of the throat.

Past medical history - had common childhood diseases when small.

Examination - nose, shows septum fairly straight,
all the turbinates are atrophied. Some mucopurulent discharge in middle and inferior meati on each side. No crusts found in nose.

Throat shows a chronic inflammation. Larynx is apparently normal.

Eyes and ears are apparently normal.

Diagnosis - atrophic rhinitis.

Mr. G. B. Williams - age 45, Oakdale, Ia., Patient at sanatorium. Referred by Dr. Scarborough.

Entrance complaint - Hoarseness.

History - this first began twenty-five years ago and comes on whenever he catches a cold. Coughs very little. Throat becomes sore at times. Catches a cold very easily. Has mucus droppings back into his throat causing him to hack and spit which is much worse after rising in the mornings. Has considerable mucopurulent discharge from nose which has been present for about twenty years. Has crust formation in nose which is very annoying to him. Has noticed some odor to discharge. Has no headaches now and only present when he has a bad cold. Light hurts eyes at times, neither history of eye trouble and none of ear trouble.

Examination -

Nose - septum is fairly straight. Considerable mucopurulent discharge present in inferior and middle fossae.
Some drusts found on septum and inferior turbinates on each side. Inferior and middle turbinates are markedly atrophied. Nasal mucous membrane is a pale red color.

Antrum puncture showed much old necrotic material in right side. A large mass of mucus and pus was washed out of left side. Transillumination showed ethmoids and antri involved, right antrum more than left.

Dr. Dean's diagnosis—Atrophic rhinitis with involvement of all the sinuses except the frontal. Chronic pharyngitis and laryngitis.

Treatment advised. Should have the sinus trouble taken care of and the larynx and pharynx brushed with silver nitrate.

Patient did not return for treatment or further examination.

Foster McBride, age 22, Oakdale, La., Patient at Sanatorium. Referred by Dr. Scarborough.

Entrance complaint—discharge from nose.

History—has had a discharge from his nose as long as he can remember. Patient thinks it began about sixteen years ago following a cold. The discharge is a yellowish mucopurulent character and contains crusts. Some foul odor is noticed to it. Does not catch cold easily. Has mucus droppings back into throat causing him to hack and spit, which is worse in the mornings and continues throughout
the day. No history of eye or ear trouble. Throat feels dry at times.

Past medical history, measles, mumps, chickenpox when small and typhoid at eight.

Examination-

Nose - septum is not deflected. Inferior and middle turbinates are markedly atrophied. Considerable mucopurulent discharge found in inferior and middle fossae. Crusts located on septum and on turbinates. Foul odor noticed to discharge.

Pharynx and larynx show a chronic inflammation.

Dr. Dean's diagnosis - atrophic rhinitis, ethmoiditis, chronic pharyngitis and laryngitis.

Treatment advised, evisceration of ethmoids, suction and ichthyol later, silver nitrate to pharynx and larynx.

Mr. B. B. McGee, age 30, Oakdale, IA.

Jan. 2, 1913, patient at sanitorium. Referred by Dr. Scarborough.

Entrance complaint - nose and throat trouble.

History - last winter when she would get up in the mornings she would be very hoarse and her voice husky. Four weeks ago the condition became worse and has been worse since. She is hoarse now. Has mucous droppings back into her throat causing her to hack and spit. Throat and nasopharynx feels sore and raw. Has considerable
mucopurulent discharge from her nose. Catches cold easily and has frequent colds. Has been at Oakdale for seven and one-half months. Has never noticed any odor to discharge or no interference with sense of smell.

Examination -

Nose - septum is fairly straight. Each inferior turbinate is small and atrophied. Considerable mucopurulent discharge found in middle and superior fossae. Some crust formation on septum and inferior turbinates. Posterior ends of inferior turbinates are small, and covered with a mucopurulent discharge. Mucous membrane is a pale color. Middle turbinates are enlarged.

Dr. Boiler's diagnosis - Atrophied rhinitis beginning. Ethmoiditis right and left, chronic pharyngitis.

Treatment - nose treated twice a day with Ichthyol and glycerine(aa). Ten percent silver nitrate to pharynx and five percent to larynx.

Jan. 11, 1913, Ulcer found between epiglottis and tongue. This is to be treated with ten percent silver nitrate.

Feb. 12, 1913- Diagnosis made of tuberculous laryngitis.

Feb. 15, 1913- Patient had a laryngeal cautery.

March 6, 1913- Marked pharyngitis is present. Larynx is to be treated with lactic acid.

March 14, 1913- Laryngeal cautery.
March 19, 1913- A little ulcer found on inter
artenoid space.

Mrs. W. Copel, age 28, Oakdale, Ia., Patient at
sanatorium. Referred by Dr. Scarborough.

Entrance complaint. - Discharge from nose.

History - As long as she can remember has had much
mucous discharge from nose. This dries and causes crust
and scab formation. Has never noticed any odor. Has
considerable droppings back into throat causing her to
hackle and spit which is much worse in the mornings.
Throat often feels as if it were filled up and feels
dry all the time. Lid itch, burn and feel rough. Some
photophobia and lachrymation.

Examination- many scales at bases of cilia of lids
of both eyes. Conjunctivae of lids is hyperemic and rough.
Pupils round, equal react to light and accomodation. Ro­
tations are all right. No nystagmus.

Ears - External auditory canals contain some soft
wax. Drum membranes a bright pearly color, not bulging
or retracted are movable with Siegle's otoscope. Air
conduction better than bone. High and low notes not impaired.
Hearing with alarm, right and left ears, spoken voice 40 feet, whispered voice 15 feet.

Nose - septum is thickened and contains small spur
one each side low down. Inferior turbinates are atrophied.
Mucous membrane is a pale red color and covered with crusts and mucus. Mucopurulent secretion, white color found in middle meatus on each side. Middle turbinates are enlarged and touch septum. Posterior ends of inferior turbinates are small atrophied and mucus membrane covering them is a pale color. Nasopharynx contains considerable mucopurulent discharge.

Pharyngeal mucous membrane is rough, dry, and pale red in color.

Tonsils are small and fibrous.

Larynx - mucous membrane is a pale red color. Cords are white shiny, move all right. There is a small inter-arytenoid infiltration.

Miss Jane Tobin, age 19, Oakdale, Ia. Occupation dress-maker. Referred by Dr. Scarborough.

Entrance complaint - mucus droppings back into throat.

History - has dropping back into her throat which caused her to hack and spit ever since she was a small girl. Formerly she was so troubled only when she had a cold but for the last three years has had it constantly. Has had considerable mucopurulent discharge from nose for some time, also a discharge of crusts. Is not troubled breathing through her nose. No history of eye or ear trouble.
Past medical history - measles and chicken pox, when a small child. Pulmonary tuberculosis diagnosed four months ago. Family history negative.

Examination -

Eyes - conjunctiva of all lids is hyperemic and rough. Pupils round and equal react to light and accommodation. Rotations are all right and no nystagmus present. Fundi are apparently normal. ODV = 6/5 OSV = 6/5

Examination of ears - shows them to be normal.

Nose - septum is thickened and deviated to the left. Both inferior turbinates are very small. Mucous membrane is a pale red color. Considerable mucopurulent secretion found in both middle and superior fossae. Nasopharynx contains some mucopurulent discharge. Chronic pharyngitis is present.

Tonsils are small, fibrous and diseased.

Larynx - mucous membrane is hyperemic, otherwise it is normal.

Dr. Dean's diagnosis - spheno-ethmoiditis, both sides with resulting atrophic rhinitis.

Operation - middle turbinate right removed and ethmoids and sphenooid curetted.

Treatment -nose sprayed with adrenalin in 1 part, Dobell's solution 5 parts every two hours during first night. Then nose was irrigated every two hours with normal salt solution. The following day, nose cleansed with cotton on a
probe and patient put on Branley's suction apparatus twice a day.

October 31, 1911, much crusting in right side of nose.

Is to go back to Oakdale and continue above treatment.

November 24, 1911, patient returns. Right side of nose is clear and all healed. Left side of nose contains considerable mucopurulent secretions and many crusts.

Operation - left middle turbinate removed, ethmoids and sphenoid curetted. Treatment same as that described above.

November 27, 1911, patient is in good condition. Nose is fairly clean, is to return to Oakdale and continue treatment.

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Miss Bessie Newlon, age 21, Oakdale, Ia. Patient at Sanatorium. Referred by Dr. Scarborough.

Entrance complaint - hoarseness.

History - her voice has been husky for the past three years. This came on following an attack of diphtheria. For the last two years this has been worse and is aggravated by damp and chilly weather. Has had a mucopurulent discharge, thick greyish yellow color as long as she can remember. Has mucus droppings back into the throat causing her to hack and spit. Some crust formation in nose. Nose bleeds easily at times. Throat feels dry and is sore at
times. Eyes burn and smart. Considerable lachrymation and some photophobia present. Eyes ache whenever she does any close work. Has frontal headaches, these come on most often in the evening.

Examination - eyes, right and left. Conjunctivae of all lids are hyperemic and rough. Pupils react to light and accomodation. Rotations are all right. No nystagmus present. Fundi are apparently normal. ODV = 6/6. OSV = 6/6.

Nose - septum is thickened has a spur left. All the turbinates are markedly atrophied. Considerable muco-purulent present in all the nasal fossae. Some crust formation on the septum and turbinates. A very foul odor being present in discharge from the nose. Antrum puncture showed old pus in each. Transillumination showed ethmoids and antri cloudy. Pharynx is dry and chronically inflamed. Larynx shows a chronic laryngitis present.

Dr. Dean's Diagnosis - spur right, atrophic rhinitis, chronic pharyngitis and laryngitis. Chronic catarrhal conjunctivitis, chronic empyema of each antrum of highmore with involvement of all the other sinuses. Treatment advised, curettement of the ethmoids and sphenoid with each nasal frontal duct opened, and radical antrum operation (Denker's) on each side.

Jan. 13, 1913, condition about the same, advised to have nose operations next spring. Larynx looks better.

Jan. 15, 1913, Refraction of eyes gone over. Lids
treated with one percent silver nitrate.

February 12, 1913, treat lids once a day with silver nitrate and use zinc sulphate (grtT to ounce) continue nose and throat treatments.

Mr. Fred Marsh, age 34- Davenport, Ia.. Painter.

Referred by Dr. Van Epps.

Entrance complaint - discharge from nose.

History - has had a discharge from nose for the last six years when several small pieces of bone sloughed out. Has much crust formation in nose with very foul odor. Has droppings back into throat causing him to hack and spit. Has not been able to smell for some time. Has a continual headache all the time in frontal region. Has considerable roaring in ears, this first started 17 years ago. Nose stops up easily. Does not take cold easily. No history of throat trouble. When using eyes with artificial light they always water and smart. Seven years ago neck began to swell. Had pain in right side of neck. A tumor began to grow on right clavical in spring of 1911.

Past medical history - had gonorrhoea six times since the age of eighteen. Denies lues but had venereal warts and used mercury to platysm.

Family history - father died after operation for kidney trouble. Mother died from poisoning by a dog-bite. One brother and three sisters are living and well.
Wife died by accident. No children.

Examination-

Eyes right and left.

Chronic catarrhal conjunctivitis present. Pupils are round, equal, react to light and accomodation. Tension is normal. Rotations are all right. No nystagmus present. Fundi are apparently normal. ODV = 6/5 OSV = 6/5.

Nose - there are many crusts on the septum and turbinates. There is a small perforation of the valves. Very foul odor coming from the nose. All the turbinates are atrophied, the inferior being more so than the middle. Mucous membranes are a pale color.

Pharynx is chronically inflamed, the larynx is also. Tonsils are submerged and fibrous.

Ears - right and left. Drum membranes are apparently normal. Air conduction is better than bone. High and low notes not cut down. Hearing with Barany's apparatus. Spoken voice - 45 feet, whispered voice, 18 feet.

Dr. Dean's Diagnosis - syphilis of nose, chronic pharyngitis and laryngitis.

Patient is well developed, well nourished and healthy looking. Face is flushed. Venules dilated. Tongue is clean, moist and straight. Teeth are nearly all missing in upper jaw. Gums are swollen. Over right clavical is a tumor extending throughout clavical.

Examination of heart, lungs, abdomen, and urine was negative.
Blood count -

Haemoglobin 61% (Sahli)

Red Blood corpuscles 4,790,000, whites 5,600.

Differential count - polys - 62%, lymphocytes 34%
large mononuclears 2%, transitional 1%.

March 16, 1913, Wasserman was positive.

March 22, 1912, Salvarsan .06 gram given.

Treatment-

Nose cleansed with cotton on a probe followed by
local application of tincture iodine twice a day. Irri-
gation of nose every 2 hours when awake with normal salt
solution.

William Cummings - Age 42, Clermont, Ia., Laborer,
Referred by Dr. Van Epps.

Entrance complaint - bad odor from nose, nervousness.

History - for as long as he can remember he has had
a bad discharge from nose which formed many crusts in nose.
Friends noticed a bad odor from his nose for last 15 years.
His power of smelling has been lost for 20 years. At times
has considerable droppings back into throat. Does not
catch cold easily. Has lots of frontal headaches. Can
breathe through nose after he cleans out the dryed crusts.
Print blurs occasionally, eyes water a great deal. No
photophobia. Fifteen years ago when husking corn caught
a cold and then had an abscess in left lachrymal sack which
broke. Had duct in left lower lid opened but did not stay open. Had earache 12 years in left ear followed by a discharge for a few days. Can hear as good as ever. Throat feels dry at times. Tonsils have never bothered him any. Patient said nose was always flat.

Past medical history - mumps when small. Measles when a child. Erysipelas twice, 14 years and 6 years ago. Lost hair in last ten years. Denies all venereal history.

Family history - one sister has considerable discharge from nose. Father dead, age 54, cause unknown. Mother alive and well age 86. Two brothers alive and well. Three sisters alive and well, one brother dead at 1 year, cause unknown, nothing known regarding grandparents. One uncle has been insane for last eight years. No history of epilepsy, tuberculosis, Bright's disease, diabetes or carcinoma in family.

Social history - white male age 48, single, laborer, lived in Iowa all his life. Chews and smokes moderately. Beer and whisky occasionally. Had drank to excess.

In March 1906, had first attack of epilepsy. When he became dizzy, swooned and fell to the floor, was unconscious for 15 or 20 minutes. The only premonitory symptom was numbness. Had second attack in August 1906 similar to first. During years 1906, 1907 and 1908 had about six attacks in all, but had no attacks from 1908 until June 1912. Had last attack three weeks ago. Except first attack all occur at nig.
after retiring and before going asleep. The prodromes of all attacks except the first are the same, numbness starting in lower abdomen. Has bruised head several times during attacks.

Physical examination -

Circumference of head is 55 cm.

Tongue is moist, straight, light brown coat, no tremor. Neck is normal.

Pulse rate is sixty regular, wave is slow, leathery walls. Blood pressure 190. Chest is well developed, expansion free and equal, spine straight flexible.

Heart - point of maximum impulse 5th interspace, 11 cm from mid line. Dullness extends from third rib two cm to left and thirteen cm to left in 6th interspace. Slight systolic shock at apex. At apex the first sound is loud, both the muscular and valvular elements being accentuated. At times there is a faint systolic murmur. Both second sounds at apex are distinct $R^2 7 A^2$.

Lungs are negative.

Abdomen - contour is all right - no enlarged glands, no hernia.

Extremities - arms strong, muscular, grip 110, no tremor, no ataxia.

Legs - strong, muscular, no edema.

Reflexes - Right Left. (* means plus)

Arbilularis *

Jaw -
Reflexes - Right, Left - continued.

Bicepts *  *
Tricepts *  *
Abdominal ***  ***
Crematuric **  **
Knee jerk **  **
Planter -  -
Ankle jerk **  **

Sensations -
Polasthena - pain -
Station and gait O.K.

Blood examination
Haemoglobin 78% (Sahli)-
Red corpuscles, 4,950,000.
White 9,600

Differential
Polymorphonuclears 63%
Small lymphocytes 33%
Large 1%
Eosinophile 1%
Transitional 2%

Cerebro-spinal fluid -
7 cc obtained - low pressure, clear.
Globulin test(?)
Fehlings reduced.
No cellular increase.
Examination—

Eyes - right and left - pupils round, equal, about 4 mm in size, react sluggishly to light and accommodation. Rotations are all right. No nystagmus. ODV = 6/4 pt PSV = 6/4 pt.

Conjunctiva are pale, white color and slightly rough. Left lachrymal duct in inferior lid cut open.

Ears right -

External auditory canal contains some soft wax. Drum membrane retracted some is a dull grey color and contains an area of calcification in anterior inferior quadrant. Drum membrane is only slightly movable with Siegle's otoscope. Air conduction better than bone. High and low notes not impaired. Spoken voice 30 feet, whispered voice 10 feet with alarm.

Left - External auditory canal full of dry hard wax. Drum membrane is retracted in a dull grey color is atrophied and only slightly movable. Air conduction better than bone. High and low notes not impaired. Spoken voice 30 feet, whispered voice 10 feet, with alarm.

Nose - septum contains an oval perforation two-thirds of an mm in diameter opposite middle meatus which is one and one-half cm from anterior nares, part of which is in the cartilate and part in the Volmer. Edges of perforation is covered with a crust and it bleeds easily. Septum is thickened back of perforation running into a spur on the
right side opposite middle meatus.

Both inferior and middle turbinates are atrophied and very small.

Right middle turbinate is one-half cm from septum.
Right inferior turbinate is one-half cm from septum.
Left middle turbinate is one and one-half cm from septum.
Left inferior turbinate is one cm from septum.

Both sides of nose almost occluded with a mucopurulent material of a whitish greenish color, with many dried crusts. Mucous membrane was red color under crusts and white color on top of turbinates and on part of septum. A very foul ozenic odor present all the time. Sensation of smell gone. Tactile sensation very much diminished. Anterior posterior diameter of septum along inferior fossa is seven cm.

External appearance of nose:-

Typical saddle back nose. Skin over nose and face a dusty hue.

Tonsils are small submerged and fibrous.
Pharynx is white, grey color and very dry.
Larynx - the mucous membrane is a pale red color; cords white shiny and move all right.

Mrs. L. R. Boss, age 28, West Liberty, Ia., Referred by Dr. J. E. Kimball.

Entrance complaint - nose stops up easily.
History - trouble commenced about one year ago with
difficulty in breathing through nose. Has had a bad discharge from nose for several years with a very foul odor. Has many hard crusts coming from nose. Has droppings back into her throat causing hacking. Often coughs up lumps of material. Has had nose operated on twice. Has a headache in temporal and frontal regions most all the time. No history of eye or ear trouble. General health has not been good and has no appetite at all. Had a rash over chest a twenty years.

Examination-

Eyes, right and left. Conjunctivae of lids are normal. Pupils are round, equal react to light and accommodation. Rotations are all right. No nystagmus present. Fundi are apparently normal ODV = 6/5  OSV = 6/5.

Nose - septum is nearly all gone only the anterior and lower ridge remaining. A large white polyp is seen hanging down into the posterior nares. Right inferior turbinate has been trimmed. Right middle turbinate has been removed. There is an adhesion of the anterior left nares obstructing the view into the same. A portion of the left inferior turbinate can be seen through right nares. Many crusts are found in nose with considerable mucopurulent discharge in all fossae. Posterior rhinoscopy show atrophy of the inferior turbinates.

Has a chronic pharyngitis and laryngitis. A string of mucopurulent discharge is seen hanging down into pharynx from posterior nares.
Ears - right and left - from membranes are a clear pearly color - apparently normal, are movable. Air conduction better than bone. High and low notes are not impaired. Hearing with Barany's apparatus - spoken voice 40 feet, whispered voice 18 feet.

Dr. Howard reports - History of a rash over chest. Pigmented scars, no pregnancies, palpable superficial glands all very suggestive. Dr. Walker reports Wasserman positive. Diagnosis - tertiary lues.

Dr. Dean's Diagnosis - syphilis of the nose.

Treatment - operation - adhesion left cut. Ethmoidal and sphenoid cells curetted. Lots of polypoid and necrotic material was curetted out. Turbinates found necrotic. Post operative - nose cleaned twice daily with cotton on a probe and treated with tincture iodine. Mercury inunctions and potassium iodide was used. Patient left hospital without permission before much improvement could take place.

- 30 -

Mr. Ben Smith, age 24, Referred by Dr. Meyers, occupation laborer, Belmond, Ia.

Entrance complaint - discharge from nose.

History - last spring nose began to discharge freely and patient noticed that at times there would be pieces of bone coming from nose. The discharge has been thick, yellowish color and had a very foul odor. Patient cannot smell
at all. Four weeks ago noticed an opening in the hard palate and when eating and drinking food and water would go into the nasal cavity.

Past medical history– Primary sore on penis four years ago. Measles when a child.

Family history is negative.

Examination –

Eyes – right and left – the Conjunctivae and sclerae are not injected. Pupils are round, equal, react to light and accomodation. Rotations are normal. No nystagmus. Fundi are apparently normal. ODV = 6/6 OSV = 6/6.

Ears – right and left – canals are clean.

Drums – membranes are normal. Air conduction is better than bone. High and low notes are not impaired.

Nose – the septum is gone completely. Hole in the Volmer two inches long and an inch wide. Turbinates are extremely atrophied and covered by hard crusts and mucopurulent discharge. Very foul odor coming from nose. There is a hole in hard palate one-inch across in lateral diameter of skull. In the hard palate is a sequestrum of bone.

Tonsils are small and submerged.

Dhronic pharyngitis and laryngitis present.

Dr. Boiler's examination – syphilitic perforation of the septum and hard palate.

Sequestrum of bone removed from hard palate.
Treatment - Nose to be cleansed twice daily with cotton on a probe. Tincture iodine to remains of septum and perforation of hard palate. Ichthyol and glycerine to lateral walls of nasal cavity.

Potassium iodide gr X, after meals increasing one grain daily. Mercury inunctions daily. Magnesium sulphate one-half ounces daily. Thymentoline mouth wash frequently during day.
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