XXIII.

THIRD YEAR OBSERVATIONS OF CLINICAL OZENA AND ITS VACCINE TREATMENT.

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INTRODUCTION.

In the past year our investigations relative to fetid ozena have been chiefly clinical. Our work has been considerably enhanced by virtue of the prize award of the Pacific Coast Oto-Ophthalmological Society, whereby we were enabled to procure suitable cageings for the animals used in these studies. We have enjoyed, also, the cooperation of many rhinologists throughout the country, and take this means of thanking them for the submission of material for bacteriologic study, for clinical data of cases under observation, and for many valuable suggestions pertaining to our work. In order to acquire a broader expression of the clinical aspects of atrophic rhinitis, and to determine what general value has been attained through vaccine therapy in this condition, a comprehensive questionnaire has been submitted to all interested in this subject.

In our previous bacteriologic studies we were impressed by the striking resemblance of the coccobacillus fetidus ozenæ of Perez to *B. bronchosepticus*, the specific organism of canine distemper. To facilitate the bacteriologic nomenclature we had deemed it advisable to group the coccobacillus of Perez with *B. bronchosepticus*, and proposed its designation as *B. rhinosepticus* as a more fitting appellation. This change in name we have followed in our recent contributions upon this subject.

It was our purpose to limit our investigations along certain specific lines and to determine:

(1) The existence of different types of ozena upon a bacteriologic basis, and to establish the relationship of atrophic rhinitis to accessory sinus disease.

(2) The clinical relationship of *B. rhinosepticus* and the *B. Friedlander* group to ozena.

(3) The value of specific vaccine therapy in the various types of atrophic rhinitis.

We have tabulated these results, and note a considerable degree of similarity in expressions of the clinical aspects of ozena as well as results attained through vaccine administration. The brevity of questionnaire answers cannot fully allow individual expression, and we are therefore incorporating in this report such personal communications as are pertinent and more illuminating to the subject in hand.

CLINICAL DIFFERENTIATION OF TYPES.

It is apparent that the inclination to group all the types of atrophic rhinitis with crusting and odor as fetid ozena, and to consider them from the same etiologic viewpoint, or apply to them the same therapeutic measures, is obviously incorrect. In our previous communication on this subject we laid stress upon accessory sinus involvement as complicating fetid atrophic rhinitis, and presented such bacteriologic studies to demonstrate the constant presence of *B. rhinosepticus* or some type of the *B. mucosus capsulatus* group in all cases of fetid atrophic rhinitis. We are convinced that in these cases the accessory sinuses are too frequently disregarded, and that turbinal atrophy is at times a secondary process. Mechanical intranasal distortion, allowing accumulation and organization of secretions, might create a favorable environment for bacterial lodgment, especially for the *Friedlander* organisms. Permanent escape of the accessory sinuses from infection from a chronically infected contiguous membrane seems hardly possible. In more than fifty per cent of cases of fetid atrophic rhinitis under study was there definite accessory sinus involvement, especially of the sphenoidal and ethmoidal cells. Whatever the nasal pathology may be, its importance seems distinctly subordinate to the condition of the contributal nasal chambers, and demands a different consideration from fetid atrophic rhinitis simplex.

Whilst a certain conflict of bacterial entities, namely, *B. rhinosepticus* and the Friedlander group organisms, still prevails in culture findings, the constant presence of one of these types in all cases of true atrophic rhinitis (*fetidus*) lends encouragement to the establishment of a bacterial cause.

There is still a third group, presenting some odor, a thickened dirty mucoid secretion rather than crusting, and turbinate hypertrophy rather than atrophy. Sinus involvement may or may not coexist. The organism *rhinosepticus* is never recovered from these cases, although the Friedlander bacillus is not infrequently isolated in luxuriance. There appears to be neither clinical nor bacteriologic foundation for grouping such cases with fetid atrophic rhinitides.

CLINICAL RELATIONSHIP OF *B. RHINOSEPTICUS* AND *B. FRIEDLANDER* GROUP TO OZENA.

In our previous communication on this subject we were inclined to ascribe, from the bacteriologic viewpoint, to *B. rhinosepticus* the sole etiologic rôle in clinical ozena. *B. Friedlander* was looked upon as a secondary invader. Although the coisolation of *B. rhinosepticus* was noted in a few instances of Friedlander cases, the latter organism seemed destined to dominate the entire bacterial stage—an end-reaction of immutual symbiosis. There have arisen as yet no impressions to indicate a recession from such assumption. The final solution of this problem, however, must rest upon bacteriologic experimentation. These have not as yet been sufficiently advanced to warrant definite conclusions.

Certain clinical results, also, tend to emphasize the etiologic importance of *B. rhinosepticus*, in that improvement usually occurs in cases of fetid ozena from which both organisms are isolated, under *rhinosepticus* vaccine treatment, but no results have ever been obtained with even an autogenous Friedlander vaccine. Even frank Friedlander infection cases at times respond gratifyingly to *rhinosepticus* vaccine, although the marked failures and most discouraging results have always been in cases of seemingly pure *B. Friedlander* infection with extensive accessory sinus disease. Again, in a considerable number of instances, initially giving plate colonies of *B. Friedlander* and absence of *B. rhinosepticus*, the *rhinosepticus* or-

ganism was isolated after several injections of this vaccine. We offer in explanation of this occurrence the theory of focal activation of a deeper or higher seat of infection.

Reference has been made to the common existence of Friedlander bacilli in rhinitis when associated with accessory sinus involvement. This organism often appears to persist in pure culture under such conditions. We are, though, mindful of the probable prior sinus invasion by rhinosepticus, or that secretions are mechanically arrested through atrophy and enlargement of the nasal chambers, creating an ultimate Friedlander habitat.

Persistent absence of *B. rhinosepticus* findings in nonfetid atrophic rhinitis, chronic hypertrophic rhinitis, sinuitis without odor and normal individuals, is one of the strongest arguments presenting itself in determining the etiologic relationship of this organism. In the past year a consistent endeavor has been made in determining, from a clinical standpoint, whether or not this organism might be but a simple saprophytic entity. Bacteriologic findings have been uniformly negative. Of interest also is the paucity of bacteria noted in nonfetid nasal affections and in the nasal cavities of normal individuals.

We have as yet pursued no definite lines of investigation in determining the modus and means of infection. We are, though, inclined to support the original contention of Perez, in that the disease is acquired from dogs. This hypothesis is apparently negated in the clinical charts herewith presented; nevertheless, we feel that the question of animal pets has been too closely answered in that through the general domestication of the dog a much more liberal contact has been indulged in. An interesting case in point of contact and possible bacterial communication has come to our attention. A mother and child presented themselves with definite clinical ozena. On interrogation it was found that a pet dog was afflicted with a chronic nasal catarrh, which condition preceded that of the humans. Bacteriologic examinations revealed a *B. rhinosepticus* infection in the mother and child, and a *B. bronchosepticus* infection in the dog—apparently a distemper carrier. We are as yet compelled to reserve comment upon these findings.

We do not find the isolation of *B. rhinosepticus* encumbered

with any difficulties, and are becoming more and more rigid in our demand for the demonstration of this organism in sustaining the diagnosis of true ozena. During the year, three hundred and forty-three specimens were submitted for bacteriologic study. These cases embrace the entire gamut of intrarhinal pathology as well as a certain group of individuals with normal nasal mucous membranes. Of this number the cultures from one hundred and twenty-six cases showed *B. rhinosepticus*—all clinically true ozenas—and seventy-six cases, a portion of which were apparently true ozena, gave exclusive *B. Friedlander* cultures. Of twenty-two of the *B. rhinosepticus* culture cases were cultures mixed with *B. Friedlander*. *B. pyocyaneus* was present in four instances. The presence of this organism makes the isolation of other organisms difficult and often impossible. One hundred and thirty-seven cases were negative to either *B. rhinosepticus* or *B. Friedlander*, and were often sterile.

TABLE I.

BACTERIOLOGIC SUMMARY OF NASAL SECRETIONS EXAMINED DURING THE PAST YEAR, INCLUDING CASES OF TRUE ATROPHIC RHINITIS, NONATROPHIC RHINITIS, AND NORMAL INDIVIDUALS.

B. Rhinosepticus:	
Alone	104
With B. Friedlander	22
	—
Total	126
B. Friedlander:	
Alone	76
With rhinosepticus.....	22
	—
Total	98
B. pyocyaneus.....	4
Negative to B. rhinosepticus, or B. Friedlander, or sterile cases.....	137
	—
Total	343

VACCINE THERAPY.

We deem it a far cry to attempt to establish the etiologic relationship of a microorganism to a certain disease through clinical results obtained by injections of suspensions of the killed organism in question. The fundamental purport of our investigation has been one of etiology. On the other hand, whilst appreciating the caution necessary in attempting to establish the causal relationship of a certain microorganism to a definite morbid process, we have inclined to vaccine therapy in the hope of finding some more potent weapon of combat against this obnoxious disease, to strengthen our heretofore limited and unpromising measures of relief.

Whether or not the rhinosepticus vaccine is specific, or through the parenteral digestion of a foreign protein the colloidal dispersion renders a mobilization of ferments, thereby elevating the titre of infection resistance, is a moot point in biology still to be determined. We are dealing with a focal infection, distinctly insidious and chronic. Intravenous vaccine injections have produced a transient leucocytosis and constitutional reaction, without in any way influencing the intranasal conditions. Subcutaneous injections have, on the contrary, afforded us promise of amelioration of the manifestations of a heretofore hopeless condition. Clinical improvement is the common response. Clinical cures have been rare in that relapse after discontinuance of treatment is not infrequent. Bacteriologic cures, except in one or two instances, have never been obtained. Ample drainage in conjunction with vaccine administration appears to be the most fruitful method of treatment, where there is accessory sinus involvement.

Incident to a scattered and dissociated therapeutic investigation, and with an aim at uniformity, a certain empiricism must of necessity obtain. In supplying a vaccine quite generally throughout the country for the treatment of ozena, we have prescribed such outlines of administration, in reference to dosage and injection interim, as were suggested by our own experience. We have advised as an initial injection about 200,000,000 killed organisms, increasing this and subsequent doses by 200,000,000 every fourth day. Such dose first preceding that inductive of constitutional reaction is termed the

dose of tolerance. This usually occurs between the administration of the 600,000,000 to 1,000,000,000 dose. The interim of injection is now lengthened to seven days and the doses increased about 250,000,000.

In the main, the treatment of our own cases has followed this outline. We have found it necessary, though, to exercise a considerable watchfulness of the patients' individual variation in regard to idiosyncrasy, susceptibility and toleration. Some patients seem unable to tolerate small doses of vaccine, but after a persistent endeavor take relatively large doses without discomfort. Some show no improvement through this method of therapy until excessively large doses are reached, whilst we have noted an occasional patient respond clinically only to small doses and with marked and discomforting nasal manifestations on large doses. In other words, it is our impression that the vaccine treatment of ozena parallels that of most other insidious and relatively benign infections. We have not as yet a suitable measure or index of immologic response other than our clinical sense. The vaccine therapy of ozena is encumbered, and the negative results encountered, like unto the chronic infections in general.

ABSTRACT OF CASE REPORTS.

The response to a questionnaire submitted by us to those having used the vaccine prepared by us during the past year were on the whole very satisfactory. About thirty-five records were filled out with sufficient detail upon which reliable conclusions could be based.

It would appear from these answers that ozena is a widespread disease, prevalent in all parts of the United States, afflicting rich and poor, children and the middle aged, those in urban and rural communities, and showing no choice or disregard to occupation and vocation. Nor does it appear that the disease has a predilection for those living in a questionable hygienic environment.

From various sources we gather the impression that many cases of ozena have been neglected owing to unpromising measures for relief at disposal, and that the ozena patient was rather

looked upon as an unwelcome visitor. Latterly there appears to be a distinct revival of interest in this subject, as well as a keener appreciation of the importance of associant accessory sinus involvement. Liberally discounting our own zeal in advancing a vaccine for the treatment of these cases and the general enthusiasm engendered by any new therapeutic measure, it nevertheless appears that the results of treatment by means of vaccine have been on the whole satisfactory and in some instances brilliant.

A general survey of the clinical comments of other observers and their vaccine results check remarkably well with our own experience. Clinical cures have been claimed with reservation and many relapses have been noted. In Table II are shown the end-results of vaccine treatment of cases reported by us in our previous communication. We have had opportunity of studying twenty-six additional cases, and these are charted in Table III. In Table IV are shown the reports of clinical aspects of ozena as noted by other observers, with comments on vaccine therapy.

Briefly summarizing the salient features of clinical ozena, we may conclude as follows:

FAMILY HISTORY.—There is an apparent negation to the claim of the frequent infection of other members of the same family.

INFECTION FROM ANIMALS.—As charted, it appears that the possibility of infection from lower animals, especially dogs, is decidedly remote. We feel, however, that too strict an interpretation of animal contact and animal pets has been indulged in that the domestication of the dog is a most common custom in this country. We feel that, upon a bacteriologic basis at any rate, the original contention of Perez will ultimately be proven to be the truth.

ODOR DETECTED BY PATIENTS.—The previously held belief that patients with ozena of long standing ultimately lose the ability of detecting their own odor is apparently incorrect.

CHARACTERISTIC ODOR.—The odor from the ozena patient is so variously described that it appears impossible to correctly qualify it. We have at times been inclined to note an odor as "not characteristic" and be supported by negative bacteriologic findings. On the other hand, the organism of Perez

has been isolated when no odor whatsoever existed. The inclination is to ascribe the odor, both in character and degree, to the extent of atrophy and possibilities of drainage, rather than to the products of the activities of the causal micro-organism.

CHARACTERISTIC CRUSTS.—There are no characteristic crusts in ozena. The type depends upon the age, extent of the process, and the mechanics of the intranasal condition. In the very old, highly atrophic cases, the flaky white crusts simply represent the normal condition for a given amount of atrophy.

ATROPHY.—In old cases atrophy is almost invariably bilateral. We have, however, every reason to believe that a unilateral ozena can exist.

ACCESSORY SINUSES.—In eighty-five per cent of our cases was involvement of the accessory sinus more than probable. This point has been discussed elsewhere in this paper. We think it highly probable that in every case the sinuses are invaded by the offending organism, and no form of treatment can be considered which does not give proper weight to this fact. The frontals, because of the difficulty of examination, we know nothing about; the other sinuses seem about equally involved.

CLINICAL PROBABILITIES BEFORE BACTERIOLOGIC EXAMINATION.—It would seem that there is a certain clinical complex characteristic of bacillus rhinosepticus ozena. In our twenty-six cases, judged before the bacteriologic study, only three mistakes were made as to the true bacteriologic nature of the complaint. This would seem to indicate that the ozena due to bacillus rhinosepticus and Friedlander group are clinical entities, and should be classed as such in contradistinction to marked atrophic rhinitis with odor and crusts due to syphilis, tuberculosis, and other constitutional diseases.

VACCINE INJECTION.—The average number of injections used ranges around fifteen. The improvement was usually noted by the fourth injection, and continued up to the twelfth or fifteenth. From then on it seems to settle itself down into a long process of supplying the patient with enough antibodies to keep the disease well under control, and in some cases can be continued indefinitely with good results.

CHARACTER OF REACTION.—With proper vaccines, given in proper doses, the reaction is never severe. Marked symptoms are to be avoided. The best results are obtained where one remains just under the reaction point. The seven day interval, after the proper dose has been reached, seems to be the most convenient and most useful.

RESULTS.—Although our main interest in the study of ozena during the last three years has been largely confined to the question of etiology and clinical pathology, general interest seems to be in the results. The beneficial result of vaccine treatment was marked in the great majority of cases. End results or the permanency of clinical cure have been difficult to establish, owing to the fact that certain cases were lost from observation when crusting and odor disappeared. Thus in twenty-three cases treated in Chart II of our last year's report, thirteen noted as clinical cures did not return for treatment.

SUMMARY OF 1916 RESULTS, STILL UNDER OBSERVATION.—Case 1, the priest, who was obliged to douche his nose every few hours in order to carry on his confessional work, has had no return of symptoms as far as crusting and headaches, but from time to time notices a slight odor, easily controlled by an occasional douche.

Case 2 remains a clinical cure, without crusts and odor, and never has to douche the nose. The *B. rhinosepticus* can always be demonstrated.

Case 3, one of the most evil smelling of this series, remains clinically cured without any local treatment. This person could not be admitted to the reception room on account of the foulness of odor.

Cases 10, 11 and 12, mother and two children, remain about the same. The treatment has been almost continuous throughout the year. Because of positive complement fixation test for tuberculosis, it is possible we are dealing with a latent tuberculosis, which may account for the poor results.

Case 14, a young woman whose engagement was broken on account of the odor, has remained a remarkable clinical but not a bacteriologic cure. The girl married her former affianced and considers herself cured.

Case 21, Sister P., three years under treatment for pansinitis, remains clinically but not bacteriologically cured. She has had no vaccine treatment for the past year.

Case 22, dentist, who was obliged to limit his practice on account of the odor, remains a permanent clinical cure. He has had one or two short vaccine treatments throughout the year, and still gives a positive *B. rhinosepticus*.

Thus it will be seen that every case in Chart II reported as clinical cures have remained so, a very satisfactory record. The constant presence of the *B. rhinosepticus* shows that these cures are not permanent, but that antibodies must be supplied indefinitely in the form of small doses of vaccines, repeated at intervals, for an indeterminate period.

Chart III contained nine cases, eight Friedlander ozena, treated with our vaccine. Seven of the nine noted as clinical cures did not return for further treatment. The other two have remained entirely well without vaccine or local treatment during the year. The Friedlander is still present in cultures.

ANALYSIS OF RESULTS OF NEW CASES TREATED SINCE LAST REPORT.—Twenty-six cases are reported in our new series (Table III). Six were untreated. Five did not improve. Six cases were improved as the results of operative drainage on the sinuses, and no credit was given to the vaccine. In the nine remaining cases great improvement or clinical cures are noted.

Of the five cases showing no improvement, only one was a true *B. rhinosepticus* ozena. This case received but three injections and did not return.

The remaining nine cases form a happy paragraph in the therapy of this disease. The improvement was marked, in some cases very striking, the crusts and odor rapidly disappeared. The frontal headaches invariably cleared up after the third or fourth injection. Weight and general condition improved. These and the last year's series have been carefully and fairly studied. We see no reason to change our conclusion of last year (No. 5), that "at present mixed vaccines made from various strains of the Perez bacillus (*B. rhinosepticus*) is the most practical method of treatment which is now available."

TABLE II

SUMMARY OF CASES REPORTED BY US IN 1916, WITH COMMENT ON CONDITION A YEAR LATER

No.	Pid No.	Name	Age	Sex	Nationality	Referred By	Clinical Diagnosis	Bacteriologic Findings	Agglutination	Number Injec.	Crusts	Odor	Results, 1916	Results, 1917
1	1	Adolphus....	28	M.	German.....	Dr. Victors..	Ozena.....	Perez.....	+	20	.....	.....	No crusts, no odor. Clinical cure. Under treatment.....	No vaccine treatment for months. No crusts. Slight odor at times, easily controlled by salt water douch. Sinuses not investigated. Clinical cure.
2	2	Alpert.....	22	M.	Russian Jew.	Dr. Richards.	Ozena.....	Perez.....	+	10	.....	.....	No crusts, no odor. Clinical cure.....	Results very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
3	10	Miranda, Mrs	37	F.	Spanish.....	Poly.....	Ozena.....	Perez.....	+	9	.....	.....	No crusts, no odor. Under treatment..	Results very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
4	11	Miranda, J....	11	M.	Spanish.....	Poly.....	Ozena.....	Perez.....	.....	9	.....	.....	No crusts, no odor. Under treatment..	Result very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
5	12	Miranda, H..	12	M.	Spanish.....	Poly.....	Ozena.....	Perez.....	.....	9	.....	.....	No crusts, no odor. Under treatment..	Results very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
6	14	Plant.....	20	F.	American.....	Office.....	Ozena.....	Perez.....	+	19	.....	.....	No crusts, no odor. Clinical cure.....	Results very unsatisfactory, constant treatment during year. Odor decidedly improved, but still marked at times. No local treatment.
7	20	Sponner.....	35	M.	American.....	Office.....	Atr. rhin.....	Perez.....	—	5	0	0	Ozena larynx. Great improvement.....	Remains clinical cure. See detailed report in body paper.
8	21	Prescilla.....	22	F.	German.....	Office.....	Pansinitis...	Perez.....	—	19	+	+	No crusts, no odor. Clinical cure.....	Remains clinical cure. See detailed report in body paper.
9	22	Weber.....	27	M.	American.....	Office.....	Ozena.....	Perez.....	+	14	+	+	No crusts, no odor. Clinical cure.....	Remains clinical cure. See detailed report in body paper.
10	8	Kalleher.....	17	F.	German.....	Dr. Victors..	Ozena.....	Perez.....	+	20	+	+	No crusts, no odor. Clinical cure. Under treatment.....	Persisting slight odor. No crusts as long as occasional vaccine.

TABLE III

CLINICAL SUMMARY OF OZENA CASES OBSERVED BY US SINCE LAST REPORT, WITH COMMENT ON EFFECT OF RHINOSEPTICUS VACCINE

No.	Initials	Age	Sex	Social Condition	Nationality	Occupation	Service	Duration	Other Members	Played with Dogs	Change in Odor	Patient Detects Odor	Character of Odor	Character of Crusts	Atrophy	Accessory Sinuses	Clinical Probabilities Before Bacterial Examination
1	M. J.	30	F.	S.	American...	Housewife.	U. of C....	Childhood...	No	No	Some....	No	Slight.....	Slight, whitish..	Marked, bilat.	Ethmoids ?	Not B. rhinosepticus ozena....
2	A. S.	16	F.	S.	Italian....	Schoolgirl..	U. of C....	Childhood...	No	No	Some....	Yes	Slight, not characteristic.	Blackish.....	Marked, bilat.	Ethmoids ?	Not B. rhinosepticus ozena....
3	J. P.	22	M.	S.	Spanish....	Student....	U. of C....	Childhood...	No	No	Some....	No	None.....	Whitish.....	Marked, bilat.	Ethmoids rt ?	Not typical true ozena....
4	A. M.	68	M.	M.	Norwegian..	.....	U. of C....	Several years discharge...	No	No	Some....	Yes	Not characteristic, strong.	Whitish.....	Marked, bilat.	Ant. lat.....	Not true typical ozena....
5	C. E.	58	F.	M.	German....	Housewife.	U. of C....	Many years..	No	.....	Some....	No	Foul, characteristic.	Blackish.....	Marked, bilat.	Ethmoids.....	Typical of true B. rhin. ozena....
6	R. B.	37	F.	.....	Jewish....	Housewife.	U. of C....	Many years..	No	.....	Some....	.....	Very bad.....	Har, black.....	Medium, bilat.	Ethmoids.....	Not typical of true B. rhin. ozena....
7	F. D.	34	M.	M.	Bulgarian..	.....	U. of C....	Many years..	No	.....	None....	No	None.....	None.....	Marked, bilat.	None.....	Not typical of true B. rhin. ozena....
8	R. P.	15	F.	S.	American...	Schoolgirl..	U. of C....	Many years..	No	.....	None....	Yes	Slight, not characteristic.	Blackish.....	Slight, bilat....	L. antrum.....	Not typical of true B. rhin. ozena....
9	E. L.	46	M.	M.	American...	.....	Polyclinic..	Many years..	No	.....	None....	No	Very slight.....	Slight.....	Marked, bilat.	Probable.....	Not typical of true B. rhin. ozena....
10	J. S.	55	M.	M.	American...	Business...	Private....	30 years....	No	.....	Getting worse.	No	Marked, characteristic.	Greenish.....	Marked, bilat.	Sphenoids, antra..	Typical true ozena
11	E. H.	35	F.	M.	American...	Housewife.	Private....	Several years.	No	.....	Getting worse.	Yes	No.....	Slight.....	Marked, bilat.	L. antrum.....	Not typical true ozena....
12	H. I.	23	M.	S.	Japanese..	Servant....	Private....	5 years....	No	.....	Getting worse.	Yes	Foul, typical.....	Large, greenish	Marked, bilat.	None ?	Typical true ozena

13	H. F.	55	F.	M.	American...	Housewife.	Private.	15 years.	No	Getting worse.	No	No	None.	None.	Marked, bilat.	.....	Typical old ozena process self limited.
14	A. B.	.....	M.	.....	American...	.....	Private.	Several years.	No	Getting worse.	No	Yes	Foul, typical.	Whitish.	.....	Probable.	Typical old ozena process self limited.
15	G. O.	16	M.	S.	American...	Schoolboy.	Private.	Several years.	Yes	Getting worse.	Yes	Yes	Foul, typical.	Typical ozena.	Marked, bilat.	No evidence.	Typical ozena.
16	R. S.	26	F.	S.	American...	Teacher.	Private.	Childhood.	Yes	Getting worse.	Yes	No	Slight, not typical.	Light, whitish.	Marked, bilat.	Sphenoid rt.	Not typical of true ozena.
17	E. B.	30	F.	S.	American...	.....	Private.	Childhood.	No	Some.	No	No	Slight.	Slight.	Marked, bilat.	No evidence.	Typical old ozena.
18	S. H.	30	F.	S.	German	Teacher.	Private.	Childhood.	No	Some.	No	Yes	Slight, typical.	Slight, whitish.	Marked, bilat.	Probable.	Typical old ozena.
19	A. R.	22	F.	S.	American...	.....	Private.	Childhood.	No	Some.	No	Yes	Marked, typical.	Thick, greenish.	Marked, bilat.	Sphenoids.	Typical old ozena.
20	W. M.	50	M.	M.	American...	Machinist.	Private.	Childhood.	No	Some.	No	Yes	Foul, typical.	Thick, greenish.	Marked, bilat.	Antra, sphenoids.	Typical old ozena
21	G. B.	18	F.	S.	Italian.	Stenog'r.	Private.	Childhood.	No	Getting worse.	No	Yes	Foul, not typical.	Thick, whitish.	Marked, bilat.	Both antra.	Not typical of ozena.
22	K. B.	30	F.	M.	Italian.	Housewife.	Private.	Childhood.	No	Getting worse.	No	No	None.	Thin, whitish.	Marked, bilat.	No evidence.	Not typical of ozena.
23	L. W.	42	F.	M.	American...	Housewife.	Private.	Childhood.	No	Getting worse.	No	Yes	Foul, not typical.	Thick, black.	Marked, bilat.	L. sphenoid.	Not typical of ozena.
24	E. D.	20	F.	S.	American...	Schoolgirl.	Private.	Years.	No	Getting worse.	No	Yes	Foul, not typical.	Thick, black.	Marked, bilat.	Probable.	True ozena.
25	M. L.	26	F.	S.	American...	Clerk.	Private.	Years.	No	Getting worse.	No	Yes	Foul, not typical.	Thin, whitish.	Marked, bilat.	Pan sinusitis.	True ozena.
26	L. D.	27	M.	S.	American...	Clerk.	Private.	Years.	No	Getting worse.	No	Yes	Foul, not typical.	Thick, whitish.	Marked, bilat.	Pan sinusitis.	True ozena.

TABLE III—Continued

CLINICAL SUMMARY OF OZENA CASES OBSERVED BY US SINCE LAST REPORT, WITH COMMENT ON EFFECT OF RHINOSEPTICUS VACCINE

No.	Bacterial Examination	Clinical Diagnosis	Date First Injection	Date Last Injection	Total No. Injec.	Character of Reaction	Disposition of Case	Results	Patient's Statement	Result Last Bac. Exam.	Remarks
1	B. rhin. negative.	Atr. rhin., non-fet. not true ozena.	10/2/16	3/6/17	9	Insomnia, marked local.	Under treatment.	No marked result.	Sleep better, headache better.		
2	B. rhin. negative.	Not true ozena.	1/30/16	3/20/17	4	Marked local.	Under treatment.	No marked result.	No improvement.		
3	B. rhin. present.	True ozena.	3/5/17	3/13/17	3	Marked local.	Under treatment.	No marked result.	No improvement.		
4	B. mucosus	Atr. rhin., non-fet. (access. sin.)	10/2/16	3/16/17	13	Marked local and general.	Under treatment.	Entirely cured, vaccines only partly responsible.	General condition very much improved.		
5	B. rhin. present.	True ozena.					Under treatment.	Vaccine treatment not begun.			
6	B. of Abels.	At. rhin. fet.					Under treatment.	Vaccine treatment not begun.			
7	B. rhin. negative.	(access. sin.)					Under treatment.	Vaccine treatment not begun.			
8	Staphy. pyo. aureus.	Atroph. rhin.					Under treatment.	Vaccine treatment not begun.			
9	B. Friedlander.	Atroph. rhin. (access. sin.)					Under treatment.	Vaccine treatment not begun.			
10	Staphy. pyo. aureus.	Atroph. rhin. (access. sin.)	10/24/17	3/29/17	5	Slight.	Discharged.	No results from vaccine.	No improvement.		
11	B. rhinosepticus.	True ozena.	7/15/17	9/15/17	9	Slight.	Discharged.	Clinical and bacteriological cure.	Vast improvement	B. rhin. no longer present.	
12	B. rhinosepticus.	True ozena.	1/16/17	1/15/17	6	Slight.	Discharged.	Complete cure of crusts due to operation on antrum.	Cured	B. rhin. still present.	
13	B. rhinosepticus.	True ozena.	2/13/17	2/22/17	7	Slight.	Under treatment.	Marked improvement, no odor, no crusts.	Marked improvement.	B. rhin. still present.	

13	B. rhinosepticus.	True ozena.	.....	.....	.....	No treatment.	.....	.....
14	B. rhinosepticus.	True ozena.	.....	.....	.....	No treatment.	.....	.....
15	B. rhinosepticus.	True ozena.	11/16/17	3/16/17	17	Slight.	Under treatment.	Decided improvement, no odor, no crusts.
16	B. mucosus.	Atroph. rhin. (access. sin.)	9/30/16	3/10/17	25	Severe, general.	Under treatment.	Decided improvement, due to work on sinuses.
17	B. rhinosepticus.	True ozena.	8/8/16	2/9/17	24	Slight, general.	Under treatment.	Decided general improvement.
18	B. rhinosepticus.	True ozena.	9/22/16	3/21/17	20	Slight, general.	Under treatment.	Decided general improvement.
19	B. rhinosepticus.	True ozena.	7/7/16	8/17/16	12	Slight, general.	Refuses treatment.	No crusts or odor, improvement.
20	B. rhinosepticus.	True ozena.	1/2/17	3/23/17	15	Slight, general.	Under treatment.	No crusts or odor, great improvement.
21	B. Friedlander.	Not true ozena.	10/20/16	3/23/17	20	Severe, general.	Under treatment.	Improvement slow, due to condition of antra.
22	B. Friedlander.	Not true ozena.	10/2/16	3/14/17	13	Slight, general.	Under treatment.	No improvement.
23	B. Friedlander.	Not true ozena.	9/2/16	3/14/17	5	Severe, general.	Under treatment.	Improvement due to opening sphenoïd.
24	B. Friedlander.	Not true ozena.	7/2/16	11/10/16	22	Slight, general.	Under treatment.	Marked improvement, clinical cure.
25	B. Friedlander.	Not true ozena.	11/15/16	3/16/17	8	Severe, general.	Under treatment.	Clinical cure.
26	B. pyocyaneus.	True ozena.	10/15/16	3/23/17	17	Severe, general.	Under treatment.	Greatly improved, no crusts or odor, antrum not cured.

TABLE IV

CLINICAL SUMMARY OF OZENA CASES BY OTHER OBSERVERS WITH COMMENT ON RESULTS OBTAINED UNDER B. RHINOSEPTICUS VACCINE TREATMENT

No.	Initials	Age	Sex	Social Condition	Nationality	Occupation	Service of Dr.	Duration	Other Members Same Family	Played with Dogs	Changes in Odor	Detects Odor	Character of Odor	Character of Crusts	Atrophy	Accessory Sinuses	Bacterial Examination
1	E. V.	18	M.	S.	Mexican...	Waiter...	C. E. Ide, Los Angeles, Cal.	Childhood...	No	No	Increased...	Yes	Strong, characteristic.	Dry, thin, whitish.	Slight, m. swollen.	Not evident.	B. rhinosepticus
2	M. E.	13	F.	S.	American...	Schoolgirl.	P. A. Jordan, San Jose, Cal.	Babyhood...	...	...	Increased...	No	Weak.	Greenish.	Medium bilat.	Yes ?	B. rhinosepticus
3	B. B.	18	F.	S.	American...	Student...	Geo. C. Albright, Iowa City, Iowa	Childhood...	No	S'me	Increased...	Yes	Strong, heavy, fetid. Always characteristic.	Greenish, dry, hard.	Slight bilat.	Both antra & ethmoids.	B. rhinosepticus
4	A. C.	21	M.	S.	A. m. negro	Teacher	W. T. Patton, New Orleans, La.	6 years.	No	No	Increased...	Yes	Weak.	Greenish yellow	Slight unilat.	Ethmoids.	B. rhinosepticus
5	J. T.	25	M.	S.	American...	Salesman.	W. T. Patton, New Orleans, La.	10 years.	No	No	Diminished	No	Weak.	Moist greenish yellow.	Slight bilat.	No.	B. rhinosepticus
6	A. W.	22	F.	S.	American...	Housewife.	W. T. Patton, New Orleans, La.	5 years.	No	No	Increased...	No	Weak, characteristic.	Dry greenish yellow.	Slight bilat.	No ?	B. rhinosepticus
7	C. H. T.	24	F.	M.	American...	Clerk.	F. W. Bassett, Los Angeles, Cal.	10 years.	No	No	Diminished	No	At first strong, now none.	Hard, dark.	Slight unilat.	Ethmoids R.	B. rhinosepticus
8	T. W.	59	M.	M.	Jewish...	Manufacturer.	W. T. Patton, New Orleans, La.	40 years.	No	...	Slight, diminished	No	Weak, characteristic.	Dry, green.	Extreme bilat.	No.	B. rhinosepticus
9	L. B.	27	F.	S.	...	Nurse	C. E. Ide, Los Angeles, Cal.	Childhood	No	No	Remains same.	Yes	Musty, foul.	Dry, yellowish green, profuse.	Extreme bilat.	?	...
10	L. S.	35	F.	S.	American...	Teacher	F. C. Hardy, Spokane, Wash.	Childhood	No	No	Remains same.	Yes	Strong, but varies.	Greenish.	Moderate bilat.	Yes.	...
11	A. M. A.	18	M.	S.	Irish...	Student...	G. Ainslee, Portland, Or.	Childhood	No	No	Cannot tell	No	Weak, characteristic.	Thick, green.	High grade bilat	Yes ?	None.
12	A. C.	43	M.	M.	...	Restaurant	C. T. Chambers, Portland, Or.	10 years.	No	No	Same.	No	Weak.	Thick, green.	Bilateral.	Yes.	...
13	E. B.	...	F.	M.	American...	Bookkeeper	D. H. Trowbridge, Fresno, Cal.	16 years.	No	Yes	Diminished	Yes	Strong.	...	High grade bilat	None.	...
14	W. G.	11	M.	S.	American...	Schoolboy	Dunbar Roy, Atlanta, Ga.	7 Years.	No	...	Increased...	No	Strong.	Dry	High grade bilat	None.	None.
15	L. M.	24	M.	S.	American...	Med. stud.	G. M. Coates, Philadelphia, Pa.	Childhood	No	...	Increased...	No	Very foul, characteristic.	Very large, green moist.	High grade bilat	Yes.	None.
16	G. K.	18	M.	S.	American...	Garage.	J. W. Calhoun, Oakland, Cal.	Years.	No	?	Diminished	No	None.	Dark.	Moderate bilat.	Mod. bilat.	Rod shaped B.

B.F.	11	F.	S.	American...	Schoolgirl...	A. E. Owen, Lansing, Mich.	7 years...	No	No	Diminished	No	Strong, charac- teristic...	Moist, greenish	Marked bilat.	Yes	.....
L.P.	35	M.	S.	.....	Elevator operator	W. E. Waddell, Los Angeles, Cal.	Several years...	.....	.....	Increased...	Yes	Characteristic...	Heavy, greenish	Medium bilat.	Ethmoids...	Mixed pus...
R.H.	10	F.	S.	American...	Schoolgirl...	W. E. Waddell, Los Angeles, Cal.	2 years	Fa'r & Sis	No	Increased...	Yes	Weak, charac- teristic...	Heavy, greenish	Medium bilat.	None	Mixed pus...
H.B.	27	F.	S.	American...	Nurse...	C. E. Ide, Los Angeles, Cal.	Childhood	No	No	Same...	Yes	Strong, musty...	Profuse, yellow green...	Extreme bilat.	?	Friedlander...
E.G.	18	M.	S.	American...	Student...	P. A. Jordan, San Jose, Cal.	Childhood	.....	.....	Same...	No	Strong...	Green dark...	Medium bilat.	Ethmoids...	B. rhinosepticus negative
L.B.	22	F.	S.	Cuban...	Business...	E. F. Soto, Havana, Cuba.	4 years	No	No	Same...	Yes	Weak...	Green dark...	Medium bilat.	No	.....
G.C.	35	M.	M.	American...	Tinsmith...	G. L. Richards, Fall River...	Many years...	No	.....	Same...	Yes	Weak...	Few...	Marked unilat.	No	Coarse stout & bac. scaph.
C.K.	14	M.	S.	American...	Newsboy...	E. Massey, Boise, Idaho	Several years	No	Yes	Increased...	Yes	Moderate, char- acteristic...	Dirty yellow...	Moderate bilat.	Ethmoids...	Staph (1916)...
L.H.	20	F.	S.	American...	None...	J. H. Allen, Portland, Ore.	15 years	No	Yes	Diminished	No	Weak...	Moderate gray...	Advanced bilat	Ethmoids...	B. rhinosepticus
B.W.	12	M.	S.	American...	Schoolboy...	C. H. Brooks, Santa Ana, Cal.	11 years	No	Yes	Diminished	No	Characteristic...	Complete block- ing of nose,	Bilateral...	Yes	B. rhinosepticus
J.W.	24	F.	S.	American...	Clerk...	E. Israel, Houston, Tex.	Childhood	Ent. fam. 5 m. & M.	No	Increased...	Yes	Strong, charac- teristic...	Heavy, green...	Marked bilat.	Yes	B. rhinosepticus
M.M.G.	20	F.	M.	American...	Stenogr...	E. Israel, Houston, Tex.	1 year...	No	Yes	Increased...	Yes	Characteristic...	Greenish...	Mild bilat.	Pansuitis...	B. rhinosepticus
E.B.	35	F.	S.	American...	Stenogr...	E. Israel, Houston, Tex.	2 years	No	Yes	Increased...	No	Weak, alkaline...	Greenish brown	No atrophy	Yes	B. rhinosepticus
B.	14	F.	S.	American...	Schoolgirl...	Dr. Wessels, San Diego, Cal.	3 years	Sis.	Yes	Increased...	Yes	Very strong...	Thick creamy pus	Severe bilat	Ethmoids...	.....
M.S.	43	M.	M.	American...	Seamstress	Dr. Wessels, San Diego, Cal.	20 years	No	?	Increased...	Yes	Characteristic,	Dry dark gray...	Bilateral...	Ethmoids...	.....
B.	12	F.	S.	American...	Schoolgirl...	Dr. Wessels, San Diego, Cal.	5 years	No	?	Increased...	Yes	Very strong...	Dark and hard...	Medium unilat.	?	.....
A.	18	F.	S.	American...	Schoolgirl...	Dr. Wessels, San Diego, Cal.	4 years	No	No	Increased...	No	Weak, charac- teristic...	Small amount...	Small amount.	?	.....
L.	39	F.	M.	American...	.....	Dr. Wessels, San Diego, Cal.	2 years	No	No	.....	.....	.....	.....	.....	.....	.....
A.S.	16	M.	S.	American...	Schoolgirl...	F. E. Emerson, Boston, Mass.	8 years	No	Yes	Diminished	Yes	None...	Small, thin, flakey	Bilateral...	.....	B. mucosus cap.
H.D.	14	F.	S.	Italian...	Violinist...	F. E. Emerson, Boston, Mass.	2 years	No	Yes	Remains same...	Yes	Moderate...	.....	Mod. bilat.	Negative...	.....
J.J.	21	M.	S.	Italian...	.....	F. E. Emerson, Boston, Mass.	8 years	Bro.	Yes	Increased...	Yes	Strong...	Greenish...	Marked unilat.	.....	B. rhinosepticus
O.H.	20	F.	S.	American...	Laundry worker...	E. F. Cannon, Mart, Tex.	8 years	3 oth.	Yes	Better...	Yes	Strong, charac- teristic...	Grayish...	Bilateral...	?	.....
E.B.	.....	F.	S.	American...	Bookkeeper	E. H. Trowbridge, Fresno, Cal.	15 years	No	Yes	Diminished	Yes	Strong...	.....	Marked bilat.	.....	B. rhinosepticus

TABLE IV—Continued

CLINICAL SUMMARY OF OZENA CASES BY OTHER OBSERVERS WITH COMMENT ON RESULTS OBTAINED UNDER B. RHINOSEPTICUS VACCINE TREATMENT

No.	By Whom Made	Clinical Diagnosis	Date First Inject'n	Date Last Inject'n	Total Injections	Make of Vaccine	Character of Reaction Following Max. Dose	Results—Quotations Attending Physicians	Condition at End of Treatment	Disposition of Case	Personal Communication by Letter
1	Bram, Zeiler, Hill.	Ozena.	12/29/16	3/15/17	24	Bram, Zeiler, Hill.	Loss of lute 1 bil.	Swelling reduced, breathing better.	Still slight scabbing and odor.	Still under treatment.	Vaccine produces results unobtainable by older methods.
2	Horn & Vectors.	Ozena.	5/5/16	3/15/17	24	Horn & Vectors	Slight rise temp.	Decided improvement, odor disappearing during time of treat.	Not completed.	Patient disappeared.	
3	Horn & Vectors.	Ozena.	2/5/16	3/6/17	8	Horn & Vectors	Marked general and local.	Patient greatly improved, not entirely cured.		Still under treatment.	Experience lim. to 3 cases very satisfactory. All cases improved markedly, cured from patient's standpoint.
4	Landford.		1/3/17	3/2/17	14	P. D. & Co.	Mostly local.			Still under treatment.	Experience lim. to 3 cases very satisfactory. All cases improved markedly, cured from patient's standpoint.
5	Landford.		2/1/17	3/15/17	17	P. D. & Co.	Mostly local.	Greatly improved.		Still under treatment.	Experience lim. to 3 cases very satisfactory. All cases improved markedly, cured from patient's standpoint.
6	Landford.		1/14/17	3/15/17	15	P. D. & Co.	Mostly local.	Greatly Improved.		Still under treatment.	Experience lim. to 3 cases very satisfactory. All cases improved markedly, cured from patient's standpoint.
7	Horn & Vectors.	Atrophic rhin.	1/26/17	3/5/17	14	Horn & Vectors.	Mostly local. in nose and larynx.	Marked improvement.	Crusts and odor recur.	Still under treatment.	Some doubt as to diag. Probable sinus trouble. Not a fair test. I believe atrophic condition is less marked.
8	Landford.	Ozena.	1/25/17	3/15/17	6	Horn & Vectors	Mostly local.	Greatly improved.	Patient so far better, does not want further treatment.	Still under treatment.	
9		Ozena.	1/20/17	3/16/17	19			Less scabbing.	Nose feels better, less scabbing.	Still under treatment.	
10		At. rhin. abscess, involvement.	10/29/16	3/19/17	12	Horn & Vectors.	Violent chill.	No change.	Odor seems less.		
11		Ozena.	1/6/17	3/10/17	16	Horn & Vectors.	Slight general.	Clinically cured.	Pat. clinically well, no crusts, no odor, m. m. look better.	Still under treatment.	
12		Ozena.	11/20/16	3/—/17	22	Horn & Vectors.		Odor same, crusting reduced 2/3.	Still under treatment.		
13	Horn & Vectors.		5/15/16					No change, inj. do not produce better results than ordinary treat.	Odor and scabs a little better.	Still under treatment.	
14			2/6/17	2/13/17	10	Horn & Vectors.		Greatly improved, no odor.	Small soft crusts but no odor.	Cured.	Gets equally good results with Ag. No locally.
15			12/27/16	2/23/17	8	Horn & Vectors.					Certainly wonderfully improved, is not entirely cured. Subsequent relapse after long free from crusts. Delighted with the results, hope improvement is permanent.
16	Calkins.		1/11/17	3/19/17	20	Horn & Vectors	Local.	No odor, atrophy improving, crusts better.		Discharged.	

7	Owen.....	Ozena.....	1/13/17	3/17/17	15	Horn & Victors.	Marked local and gen.....	No odor, crusts less atrophy decidedly less	No crusts, no odor....	Discharged.....	Am pleased with present nasal condition. Not as satisfactory as first case.
8	Simpson.....	Ozena.....	10/4/16	.....	12	Horn & Victors.	Slight local, no gen.....	No improvement.....	.....	.....	.....
9	Simpson.....	Ozena.....	7/8/16	2/27/17	14	Tuberculin.....	Marked local.....	Improvement not marked, but decidedly better. Note increased moisture.....	.....	.....	.....
10	Horn & Victors.	Ozena.....	1/30/17	.....	10	Horn & Victors.	.....	No improvement.....	.....	.....	.....
11	Horn & Victors.	Ozena.....	12/10/16	3/10/17	15	Horn & Victors.	.....	P. free from headaches after first inj. Less crusts after second, no local treatment.....	.....	Still under treatment.....	.....
12	Horn & Victors.	Ozena.....	2/16/17	3/19/17	11	Horn & Victors.	Local, mild.....	.....	.....	.....	.....
13	J. M. Sheff. and ozena.....	Atro. rhin. and ozena.....	4/8/16	5/30/17	13	?	Rather severe.....	.....	.....	Refused further treatment.....	.....
14	Horn & Victors.	Ozena.....	7/15/15	8/27/15	12	Horn & Victors autogenous.....	2 X.....	Almost free from crusts, no odor.....	Practically well for a year.....	No treatment for a year.....	Very much better, not entirely cured.
15	Horn & Victors.	Atro. rhin.....	3/17/17	.....	6	Horn & Victors.	Mild.....	Already considerably improved.....	Improved.....	Still under treatment.....	.....
16	Horn & Victors.	Ozena.....	12/16/16	.....	26	Horn & Victors.	Intense reaction..	Marked improvement.	Marked improvement.	.....	.....
17	Horn & Victors.	Ozena.....	7/22/16	9/14/16	12	Horn & Victors.	Slight.....	Great improvement....	.....	.....	.....
18	Horn & Victors.	Ozena.....	9/26/16	1/31/17	21	Horn & Victors	Moderate.....	Discharge and odor less. Headache better, crusts more fluid. Much improved, seems entirely relieved.	.....	.....	.....
19	Horn & Victors.	Ozena.....	10/18/16	1/9/17	18	Horn & Victors.	No reaction.....	Improvement.....	.....	.....	.....
20	Horn & Victors.	Ozena.....	.....	.....	4	Horn & Victors.	.....	90% better.....	.....	Patient left town....	.....
21	Horn & Victors.	Ozena.....	.....	.....	.....	Horn & Victors.	Slight.....	About cured.....	.....	.....	.....
22	Horn & Victors.	Ozena.....	.....	.....	.....	Horn & Victors.	Slight.....	Less crusts and odor	.....	Still under treatment.....	.....
23	Horn & Victors.	Ozena.....	.....	.....	4	Horn & Victors.	Slight.....	Slight improvement...	.....	Still under treatment.....	.....
24	Horn & Victors.	Ozena.....	.....	.....	8	Horn & Victors.	Slight.....	Patient improved.....	.....	.....	.....
25	Horn & Victors.	Atro. rhin. with ozena.....	9/20/16	2/20/17	18	Horn & Victors.	Slight headache..	Improvement slight..	General improvement..	Still under treatment.....	Improvement probably due to operation.....
26	Horn & Victors.	Ozena.....	9/26/16	12/1/16	10	Horn & Victors.	Slight.....	Marked improvement since operation on antrum.....	.....	.....	.....
27	Horn & Victors.	Ozena.....	8/30/16	12/1/16	15	Horn & Victors.	Slight.....	Case under treatment, no conclusion.....	.....	.....	.....
28	Horn & Victors.	Ozena.....	3/31/17	Under-treatment	12	Horn & Victors.	Slight local.....	Very marked improvement.	.....	No crusts, odor or headaches.....	.....
29	Horn & Victors.	Ozena.....	5/15/16	Under-treatment	30?	Horn & Victors.	Slight.....	.....	.....	.....	.....