THESIS FOR M. D. EXAMINATION

of the

UNIVERSITY OF GLASGOW.

Submitted by

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F U S O - S P I R O C H A E T A L A F F E C T I O N S
O F T H E M O U T H A N D P H A R Y N X.
IN ADULTS.

Prior to the end of last century most of these affections, from their clinical appearance, were doubtless classed with Diphtheria and Croup. Since Klebs in 1882 investigated the specific cause of diphtheria, these fuso-spirochætal affections, owing to the advances in bacteriology, have gradually become differentiated and now form well defined clinical entities, Although their early history is so recent, it is not quite clear to whom the honour belongs of first describing the organisms with which they are associated.

By some it is ascribed to Babes[1] (1884) while others award the distinction to Miller[2], an American practising dentistry in Germany, who mentioned organisms similar if not identical to those found as early as 1882. Plaut[3] certainly described and pictured the organisms in 1894 and his name is often coupled and applied with that of Vincent to the associated bacillus as the Plaut-Vincent organism. Vincent[4] in 1896 described the spindle-shaped bacillus in hospital gangrene and gave it the name Fusiform bacillus.

In 1898 and 1899 Vincent further elaborated and published his researches on the organisms and their associated affections of the mouth and tonsils, and the affection of the latter has since been known as Vincent's angina, and the organisms found are frequently spoken of as Vincent's organisms or Bacillus Vincenti and Spirochæta Vincenti.

Vincent's publications appear to have attracted considerable attention and possibly stimulated research, for since their appearance many diseases have been recorded associated with the fuso-spirochætal organisms, and many papers dealing with the bacteriological properties of the organisms have appeared in the medical literature of Europe and America.

In England fuso-spirochætal affections of the mouth and tonsils appear to have scarcely received the attention they deserve, for few contributions on them are to be found in our journals and in some of our recently published text-books they have not yet secured a place, while in others they are dismissed as if clinical rarities. In fact as far as my enquiries go, the English literature of these affections is almost exclusively devoted to Vincent's Angina, while the affections of the gums, the fons et origo of Vincent's Angina and allied ulcerations of the palate, cheek, etc., have scarcely been mentioned.

That the affections are very prevalent among soldiers the number of cases met with at Queen Alexandra Military Hospital proves and there are reasons to doubt that the civil population is as free from the affections as our literature on the subject leads us to believe. Out of two hundred and thirty healthy recruits - men who had not yet left their homes for military service-I found fusiform bacilli and spirochætes in the mouths of ninety-five, and of the remaining one hundred and thirty-five spirochaetes in one hundred and thirty

GEOGRAPHICAL DISTRIBUTION.

Fuso-spirochætal affections of the mouth and tonsils appear to be distributed over a wide area of the globe both North and South of the equator. They have been recognised in all European countries, Canada, United States, Australia, New Zealand and I am informed by officers of the Indian Medical Service that ulceration of the gums due to these organisms is prevalent in India, particularly among the European section of the community.

SEASONAL VARIATION.

Acute tonsillar affections in this country usually show a seasonal variation, occurring most frequently in Spring and Autumn. Dr. J. D. Rolleston[5] published

a paper on thirty-two cases of Vincent's Angina observed in children, and therein stated he found Vincent's Angina commonest in Spring and rarest in Autumn.

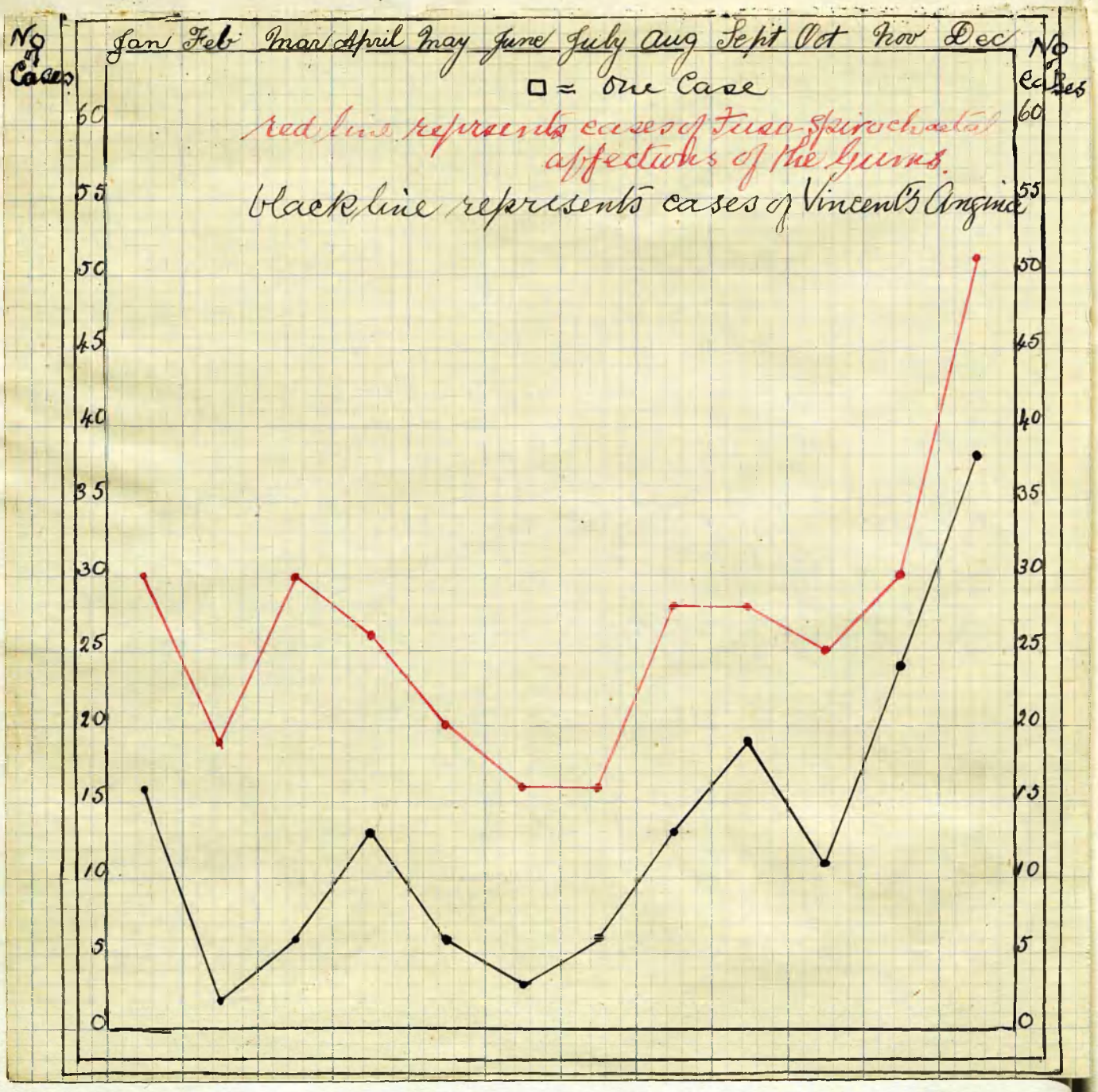
Below are monthly tables of the numbers of cases of Vincent's Angina and fuso-spirochætal ulcerations of the gums met with at Queen Alexandra Military Hospital during the year 1916.

Table of cases of Vincent's Angina.

January	16	July	6
February	2	August	13
March	6	September	19
April	13	October	11
May	6	November	24
June	3	December	38.

Table of cases of Fuso-spirochætal Ulceration of the Gums.

January	30	July	16
February	19	August	28
March	30	September	28
April	26	October	25
May	20	November	30
June	16	December	51


No of Cases
Jan Feb Mar April May June July Aug Sept Oct Nov Dec
□ = one Case
red line represents cases of Fuso-Spirochætal affections of the Gums.
black line represents cases of Vincent's Angina
60
55
50
45
40
35
30
25
20
15
10
5
0

From the above tables it will be observed the diseases are commonest during the winter months, and the numbers of cases of Vincent's Angina rise and fall with the cases of fuso-spirochætal ulceration of the gums. These facts are well brought out in the accompanying graph. (Page Opposite)

But it is to be remembered that the conditions of life have so materially changed in the present state of stress, it is obviously unsafe to draw any general conclusion of seasonal variation from the above tables.

OCCUPATION AND AGE.

Nearly all my cases occurred in soldiers; the only exceptions were three nurses and three wives of officers.

The ages of those affected varied between sixteen and sixty.

PREDISPOSING CAUSES.

Vincent laid special stress on general ill health and oral sepsis.

Cold, damp and insanitary surroundings have also been mentioned as contributing causes. Bruce[6], Halsted[7] and others have reported cases in diseased and debilitated

subjects running on to fatal endings.

Nearly all my cases occurred in young, robust, healthy looking men.

Overcrowding and its concomitants may be a predisposing cause, as many cases came from barracks possibly overcrowded as a result of the war.

On the other hand a large proportion of cases were officers living in billets or at their own homes. There can be no doubt that oral sepsis plays a very important part, about 30 per cent of the cases seen by me showed decayed teeth, and a larger proportion want of oral cleanliness. In a large number of the latter the mouth toilet had been discarded on account of the pain and the bleeding excited.

Drs. Harwood-Yarred and Panton[8] found carious teeth in seven cases out of ten children examined by them.

Rolleston[5] found carious teeth in his cases (all children), but not to a greater extent than in other children.

Many of my cases occurred in officers and men who scrupulously attended to their teeth in fact the frequency with which the gums were affected where the teeth had been well looked after was surprising.

Irregular teeth, badly filled, capped and bridged teeth were most frequently attacked, but one never met the

badly neglected mouth so frequently seen in the out-patient department of a general hospital.

A few cases (twelve) occurred after having teeth extracted or scaled by dentists, the gums of these patients may have been injured and thus allowed the organisms to gain a foothold and excite ulceration.

INFECTIVITY.

The affections do not appear to be highly infectious.

Many cases of severely affected gums and Vincent's Angina were treated in the general medical wards without any of the nursing staff or any of the other patients becoming affected.

Cases of direct infection have been reported by Peters(9), such as the hand becoming infected after striking a person in the mouth.

Hultgens(10)reports the case of a girl who infected her left index finger through biting her nails.

Small epidemics in children's homes have also been reported. Several of my cases prove the disease can be conveyed from one person to another - the following is a good example.

Mrs. P. wife of Captain P. R.N. was referred to me

for treatment for pyorrhœa. She said her gums had bled for three months. She consulted a dentist who told her she had pyorrhœa and advised her to have her teeth extracted. To this her father who was a Colonel in the I.M.S. objected. Her teeth were in perfect condition, but small ulcers could be seen at the tops of the papillæ between the teeth of the lower jaw and between the incisors of the upper jaw. The gums about these parts were separated from the teeth and bled when touched with a platinum loop. There were no pus pockets, no looseness of the teeth nor ~~no traceable~~ noticeable fœtor of breath. Smears from the gums examined microscopically showed many fuso-spirochætal organisms. Her father, who was present during the examination, suggested she might have caught the disease from a toy terrier she was in the habit of kissing and fondling; smears from the dog's gums however proved negative. While treating Mrs. P. she asked if I would examine her husband's gums as he was suffering from the same affection. He attended next day and I found his gums about the lower incisors ulcerated, tender, and bled from the lightest touch - smears from his gums examined microscopically showed many fusiform bacilli and spirochætæ. He said he had been on leave from his ship for a month and his gums had bled for three weeks, he was quite sure he had caught the disease from his wife as he had never been troubled before with his gums.

Case ii. Sgt. B., invalided from France - wounded in the thigh, was sent to me on account of a sore throat which had troubled him for a week. I found his left tonsil ulcerated, his breath fœtid and his gums ulcerated and easily excited to bleed. He never complained of his gums, but when questioned about them, he said "they had bled for about six months and now his wife was troubled in the same way." Smears from his gums and throat showed many fusiform bacilli and spirochætæ.

As already stated many cases came from barracks and billets where they lived in close contact and liable to infect one another in several ways. Pte. S. Australian Post Service, living in billets with sixteen other men, three of whom were already under treatment for fuso-spirochætal ulceration of the gums, said he thought he caught his complaint a month ago through using by mistake a tooth brush of one of the men under treatment.

I found a deep ulcer on his right tonsil which had pained him for three days, and his gums had been bleeding for three weeks. His disease was verified by the microscope. I also examined the tooth brushes of the four affected men and found fusiform bacilli in all.

There can be no doubt that the disease can also be conveyed by the mouth pieces of pipes, cigarette holders,

gas masks, and other articles coming in contact with the mouth, and I have found fusiform bacilli in smears taken from the inside of mouth pieces of pipes and cigarette holders. These modes of infection however account for only a few of the cases seen. Many of the cases came from their homes or billets removed from overcrowding and insanitary conditions from whom no evidence of infection could be obtained.

The origin of the affections in these cases seems to find the best explanation in the frequency with which the exciting organisms are found leading a saprophytic life in what appear to be healthy mouths.

I microscopically examined smears from the throats of one thousand three hundred and twenty healthy soldiers and found fuso-spirochætal organisms in thirty two.

I also examined smears from the gums of two hundred and thirty healthy men who had not yet started military life and found no less than ninety five positive i.e. with fuso-spirochaetes present. It thus looks as if these saprophytic organisms can under certain conditions become pathogenic.(21)

The proportion of "healthy carriers" is highly significant.

What the conditions in the life of the soldier are which stimulate these organisms into pathogenic activity

I can offer no explanation. Neither can I see any explanation for the presumed greater prevalence of the affections among soldiers than among the civil population. The disease certainly is not allied to scurvy nor can it be attributed to any want of fresh vegetables or fruit or dietetic errors. Tobacco smoking, mentioned by some as a contributing cause, does not offer any solution as several cases occurred in non-smokers - rarae aves in the army.

EXCITING CAUSE.

"The affection is caused by an apparent association of a bacillus and spirochæte."[11] The bacillus first called by Vincent the Fusiform bacillus is straight or slightly curved and tapering at both ends. It is about 4-12 μ in length and about 1 μ in thickness.

Vincent, Weaver and Tunnicliff,[12] state it to be non motile, while others including Abel[13] and Bernheim[14] assert it to be motile. My observations made in hanging drops of warm normal saline lead me to the conclusion that it is non motile. The small amount of motility I've occasionally observed appeared to be due to small currents in the fluid.

According to Beitzke[15] flagella have been demonstrated by Graupner and this observation has been confirmed by Muhlens.

I Microphotograph of a smear from a case of Vincent's Angina. Showing Fusiform bacilli and Spirochaetae.

I

I

II

II

II Microphotograph showing Fusiform bacilli & Spirochaetae from a case of Fuso-Spirochaetal ulceration of the gums.

The Bacillus fusiformis is easily stained by the basic aniline dyes particularly weak carbolfuchsin. It is gram negative and anærobic. In stained preparations vacuoles are often seen and frequently spore-like bodies can be made out if a film is stained by warm carbolfuchsin and decolorised in 1 % sulphuric acid. Tunnicliff[31], states that "spores can be seen in the first days of a growth situated at one end or near the centre of the bacillus, and the development from the spore into the very short plump bacillus may be observed in a hanging drop."

The Spirochæte is a delicate organism about 12 μ - 30 μ in length. It usually has five or six undulations of wide amplitude. It is quite distinct from the Treponema pallidum which is finer with eight, ten or more undulations.

The Spirochæte Vincenti as it is frequently called is motile and takes the stains like the fusiform bacillus.

It is gram negative and anærobic.

The fusiform bacillus and spirochæte may be easily displayed by the following simple procedure.

A smear is made from a fuso-spirochætal ulcer, dried, fixed, stained for a few minutes in diluted carbol-fuchsin, dried and examined under the oil immersion lens, when fusiform bacilli and spirochætæ will be seen usually

in great profusion mixed up with cocci, bacilli, leptothrices, and other organisms.

Sometimes in severe cases almost pure cultures of fusiform bacilli and spirochætæ will be found, but these will gradually decrease in numbers as the process of recovery advances.

It should also be mentioned that some smears from a healthy mouth fixed, stained and examined microscopically, show quite a different picture from smears from a fuso-spirochætal ulcer of the gums, throat or mouth. In the former the fusiform bacilli if present are few and far between while in the latter they are numerous.

CULTIVATIONS.

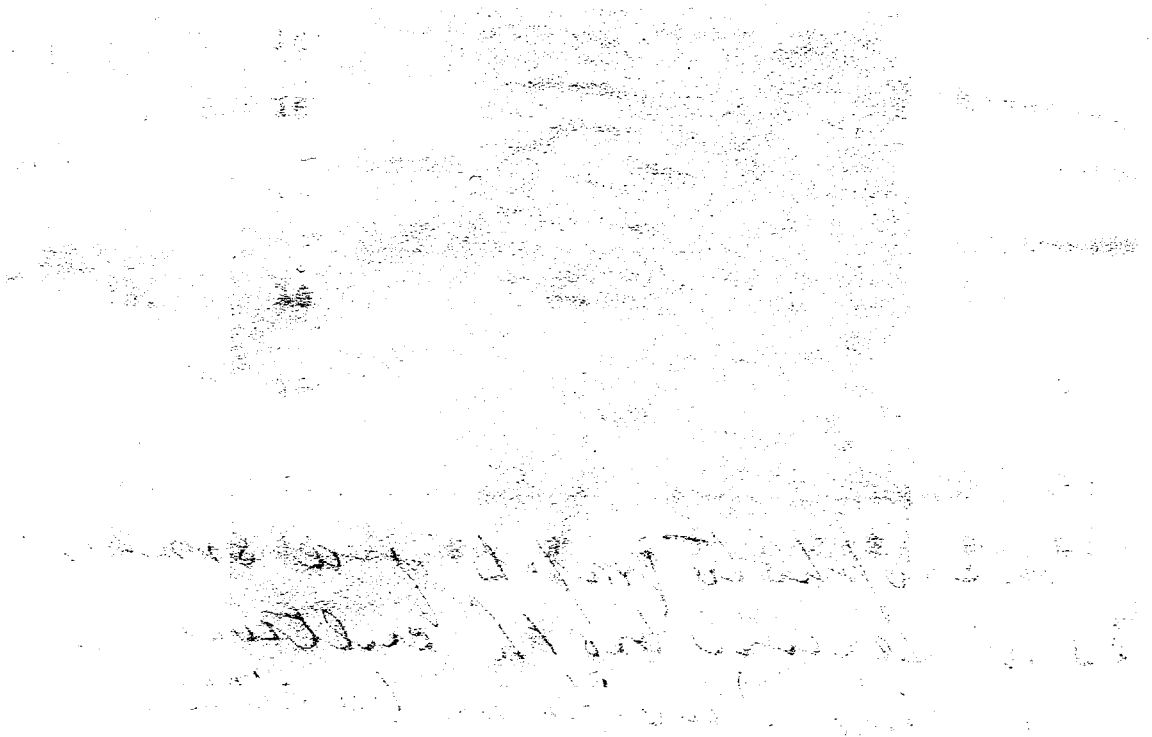
From the throats or gums of patients affected with fuso-spirochætal ulcerations the undermentioned culture media were inoculated; Serum agar (1 in 3), serum broth, broth, agar, Noguchi's kidney and broth medium, ordinary serum, nasgar and trypsin agar.

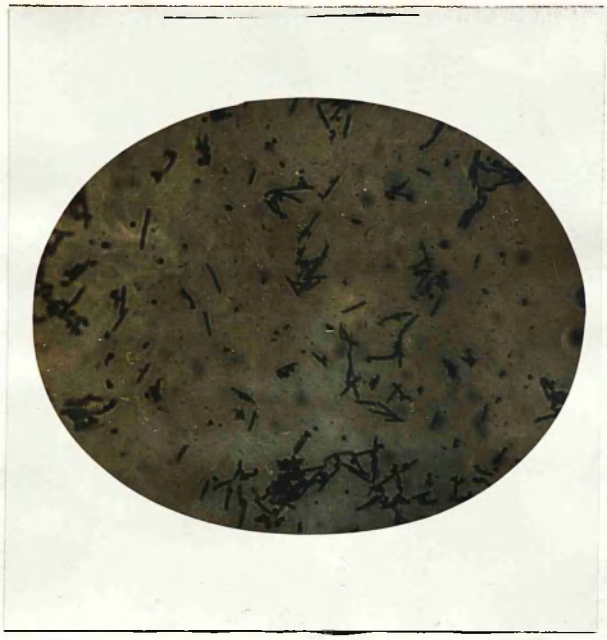
The following simple method was usually adopted. The test tube containing the medium was inoculated, the wool stopper pushed down the tube, on the top of this pyrogallic acid and liquor potassii were added and a well-fitting india rubber cap slipped over the mouth of the

test tube, melted wax was then added over and around the cap and the test tube incubated at 37° C. for two, three, four or five days.

In some cases Buchner's tubes were used, but never more successfully.

My results are shown in the following table:-





A microphotograph of a smear from serum broth culture showing fusiform bacilli.

		Serum Agar	Broth	Serum Broth	Agar	Noguchi's Kidney Medium Serum	Nasgar	Trypsin Agar	
t	5. 6. 16	2	2	4	2	4	2	2	No growth
il	14. 6. 16.	2	2	4	2	4			" "
arker	24. 6. 16	4	2	4		2 2	4	2	" "
ix	3. 7. 16	4	2	4[X]		2 2	6	2	[X]Growth
r.	18. 7. 16	2	2	2		2 2	6		No growth
us	18. 7. 16	4	2	4		2 2	6		" "
in	19. 7. 16	4	2	2[X]		4 2	2[X]		Growth
or	1. 8. 16	2	2	2		2 2	2		No growth
on	8. 8. 16	4	2	2		4 4	4		" "
hap	16. 8. 16	2		4		4 4	6		" "
as	21. 8. 16	[X]4		4		2[X] 2	4	2	Growth
Bin	30. 9. 16	2	2	4		2 4	4	2	No growth
Mon	30. 10. 16	2	2	2		2 2	2	2	" "
Gr	1. XI. 16	2		4[X]		2 4	2		Growth
Hit	XII. XI. 16	2		2		2 2	2		No growth
Br	3.XII. 16	4[X]		4		4 4	4		Growth
Dot	5.XII. 16	4[X]		4		4 4	4		Growth
Ful	XIV.XII. 16	4[X]		4		4 4	4		Growth
King	XIV.XII. 16	4[X]		4		4 4	4		Growth
Neil	26.XII. 16	2		2		2 2	2		No growth
Man	10. 1. 17	4		4		4 4	2		" "
Sp	14. 1. 17	[X]4		4[X]		2 2			Growth
New	22. 1. 17	2		2		2 2			No growth
Sch	24. 1. 17	2		2		2 2			" "

By the above method I obtained the best results from growing the bacillus fusiformis in serum broth and serum agar. The growths were always contaminated with cocci or streptococci or both and all attempts to obtain a sub-culture failed. The colonies obtained on serum agar were small streptococcal looking but white. The media giving a growth of fusiform bacilli always had a very foul smell. Ellermann,(16) Tunnicliff and Weaver(12) and others claim to have obtained pure growths of the fusiform bacillus on serum agar. In one tube of serum broth inoculated from a case of Vincent's angina I found two or three spirochætæ still active after four days incubation at 37° C., but I was unable to decide whether there was a true growth. Muhlens and Hartmann(17) claim to have grown the spirochæte in pure culture, while Tunnicliff(30) states she has grown the spirochæte from the fusiform bacillus. Most observers however maintain they are entirely distinct organisms.

Helen P. Goodrich, D.Sc. and M. Moseley(31) in a paper recently published by them describe a fusiform bacillus growing from a leptothrix forming what they call "bottle brush branches". These branches were only found on extracted teeth from advanced cases of pyorrhœa. It remains to be proved whether they are identical with the fusiform bacillus of Vincent's angina and allied affections. I find the above form of leptothrix was described as early as 1908 by Theo. von Beust.(17)

INOCULATIONS.

Ellermann[19] injected pure cultures into rabbits, and produced small abscesses. Hultgens[10] reports inoculations of pure growths into the peritoneal cavity of guinea-pigs, white rats and wild rats with negative results. The fusiform bacilli were ~~received~~ recovered from the peritoneal fluid thirty days after inoculation but there was no sign of growth and no pathological conditions were visible in these animals.

Inoculations of the false membrane from cases of Vincent's angina beneath the skin or into the muscles of laboratory animals usually produce abscesses and ulcerating foci of necrosis in which the bacillus fusiformis with many other organisms are found.[20]

Inoculations of Fusiform bacilli and at the same time of 1 in 5 solution of lactic acid stimulate the formation of lesions and the growth of the bacillus.[20]

Possibly the bacillus fusiformis requires ancillary organisms or damaged tissues like the bacillus tetanus before it produces its pathological effects, for inoculations of pure cultures of fusiform bacilli from whatever source are generally followed by negative results. Here it is interesting to recall the fact that twelve of my cases occurred after having teeth extracted or scaled by dentists.

PATHOLOGY.

Fuso-spirochætal affections of the mouth and throat are characterised by the formation of membranous ulcers which Vincent classified into two types, both of which he fully described. I shall briefly mention their chief characteristics.

(A) The ulcero-membranous or deep type is by far the more frequent and is found on the gums, tonsils, cheek, hard and soft palate and pillars of the fauces. It is usually covered by a thick, soft, creamy, membranous substance easily removed by a throat swab or any blunt instrument.

The edges of the ulcer may be irregular or punched out and the ulcer may extend deeply into the tissues or remain superficial. It has a red angry look and bleeds under the slightest provocation such as a light touch with a platinum loop.

Examined microscopically the membranous exudate is seen to be composed chiefly of granular material in which may be seen a few leucocytes and many fusiform bacilli and spirochætæ and other organisms as cocci, bacilli and leptothrices in more or less abundance. Sometimes it presents an appearance of a pure culture of fusiform bacilli and spirochætæ.

(B) The superficial or diphtheroid type of ulcer - so-called from its close resemblance to diphtheria-is characterised by the membrane covering the part being thin, white or greyish white in colour and very difficult to remove. If removed a red bleeding surface is left.

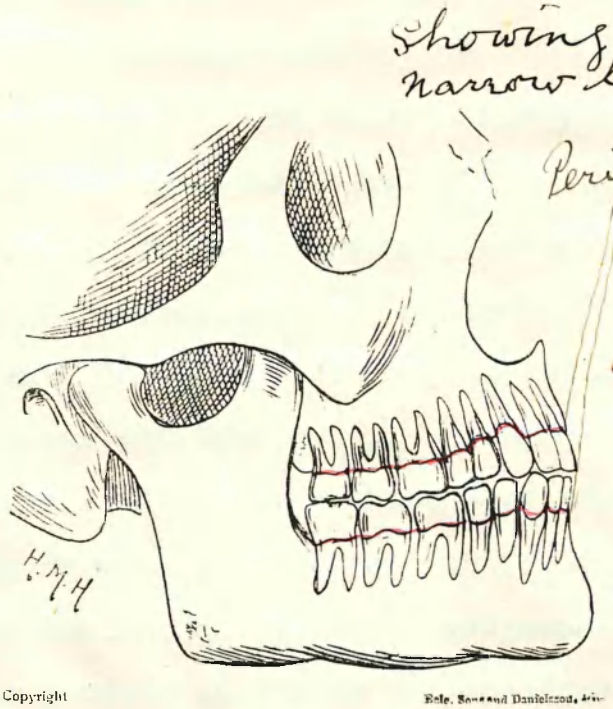
A smear from the membrane dried, fixed, stained with weak carbolfuchsin and microscopically examined will be found to consist chiefly of fibrin, many fusiform bacilli and spirochætæ. If the membrane is hardened, sections cut, stained with carbolfuchsin and examined microscopically it will be found to consist of a network of fibrin entangling a few leucocytes and fusiform bacilli often in closely packed clusters and sometimes forming a dense stratum through the section.

I shall describe the fuso-spirochætal affections of the buccal cavity and throat in the following order, taking Affections of the the Gums first because these are by far the most frequent and as far as my experience goes always accompany and precede the other parts invaded.

I. Affections of the Gums.

II. Affections of the Tonsils (Vincent's Angina).

III. Affections of the Mucous Membrane of the buccal cavity.



I

I microphotograph of Smear from the Gums. Shows fusiform bacilli and many spirochaetae.

FUSO-SPIROCHAETAL AFFECTIONS OF THE GUMS.

The gums are affected nearly three times more frequently than the tonsils. During the last twelve months I have attended over three hundred and fifty cases.

In all cases the ulcers conformed to the deep type - the soft membranous ~~substance~~ exudate was easily removed leaving a bleeding surface. The form of ulceration most frequently met with is confined just to the tops of the gums as a thin narrow line around the necks of the teeth. The gums around one or many teeth may be involved. To this variety the name "Peridental ulcerative Gingivitis"(28) has been given.

Sometimes the ulceration may affect only the tops of the papillæ between the teeth, at other times it may involve the surface of the gums to the extent of a quarter of an inch (a typical ulcero-membranous type), or it may eat deeply into the gums and form deep excavations usually filled with a soft creamy exudate. The last form is common behind the lower molars and occurred in forty-five of my cases. This form of ulceration frequently extends laterally involving the cheek.

The gums are usually swollen, retracted and separated from the teeth and bleed under the slightest provocation. Sometimes the ulceration is so small as in the peridental

type, it is very difficult to detect; its presence however can easily be revealed by lightly rubbing over the tops of the gums a small pledget of cotton wool, when small bleeding points will indicate the denuded parts.

Pain, bleeding, foul breath and nasty taste in the morning are usually complained of. There is as a rule no rise of temperature or constitutional disturbance.

The pain may be so severe as to prevent mastication.

The bleeding is most noticeable when the teeth are brushed. In ~~most~~ many of the cases the patients were compelled to discard the tooth brush on account of the pain and bleeding excited.

The foul breath is somewhat characteristic but not always noticeable. When the ulceration is confined to the tops of the gums about the necks of the teeth (peridental type) the submaxillary lymphatic glands are not affected, but when the ulcers are deep and extensive I have always found the lymphatic glands enlarged and tender.

The ulceration may attack any part of the gums and extend along the whole of the upper and lower. The ulceration however is most frequently found about the necks of the lower incisors, the back molars, stopped or capped teeth and at the tops of papillæ between irregular teeth.

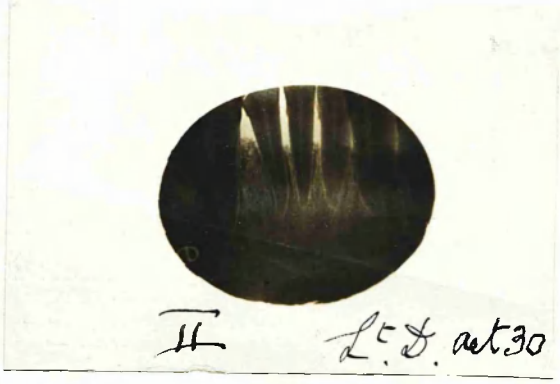
Some cases develop in a few days and may involve the whole of the upper and lower gums (Acute cases). The pain and bleeding in these are severe and call for early treatment.

I

Cpl. P. aged 28.

X Ray photograph of Healthy gums & lower incisors Cpl. P. aged 28.

II



II Lt. D. act 30

II

X Ray photograph Lower incisors

II From a case of chronic fuso-spirochaetal ulceration about lower incisors shows alveolar absorption. No pyorrhoea.

III

III

Lieut C. act 26. Lower incisors.

III X Ray photograph of a severe case of fuso-spirochaetal ulceration of the gums. - showing great absorption of bone. No pyorrhoea.

Most cases are chronic and have been running for weeks, months or even years; in these the pain and bleeding are not so severe, but looseness of the teeth has been found & complained of. The periodontal membrane was certainly affected in some of the chronic cases as radiographs showed considerable alveolar absorption.[1] In one case of deep ulceration the dentist extracted a tooth and smears from the apex of its root fixed, stained and microscopically examined showed fusiform bacilli. The root may however have become infected during extraction.

(see page opposite.)

From my investigations there is every reason to believe that the so-called "Trench Gum" occurring among the soldiers in France is identical with this affection.

Several cases invalided home and diagnosed at the front as "Trench Gum" have been examined by me and found to present the typical clinical appearances and the microscopic findings have always revealed the presence of the fusiform bacilli and spirochætæ in abundance.

Lieut. D. invalided home two weeks ago, came for treatment on account of a sore throat of three days' duration. He said during the last six months he was in France his gums were painful and bleeding and he was told he had "Trench Gum". I found a deep ulcer on his left tonsil and along the lower gums typical fuso-spirochætal

ulceration. The submaxillary lymphatic glands about the left angle of the lower jaw were enlarged and painful.

Smears from the throat and gums showed microscopically many fusiform bacilli and spirochætæ. Many similar histories of cases might be recorded but as they are practically reflections of the one given their repetition would be too tedious.

DIAGNOSIS.

The only condition this disease is likely to be mistaken for is Pyorrhœa Alveolaris, and this diagnosis was made and the extraction of the teeth advised in many of my cases. The fuso-spirochætal affection is distinguished by the character of the ulceration - its liability to bleed - foul breath and pain. Moreover there are no pus pockets present as found in Pyorrhœa Alveolaris. Looseness of the teeth may be complained of and if an X ray photo of the gums of these cases is taken absorption and rarefaction of the alveolar border will most likely be found but pus can never be squeezed up between the tooth and gum unless pyorrhœa alveolaris is also present.

The above mentioned clinical findings corroborated microscopically by the finding of many fusiform bacilli and spirochætæ complete the diagnosis.

DURATION OF THE DISEASE.

Most of the cases under treatment get well in about three weeks, some in a shorter period, while a few particularly those with irregular teeth, those where the disease has been present for a long period, and those wearing a dental plate or where the disease cannot be regularly treated, run into months.

COMPLICATIONS.

The chief and most frequent complication is Vincent's Angina which was present in 157 cases out of 319. In three cases I have met with herpes labialis and in one case red blood cells in the urine.

RELAPSES.

These are frequent if every trace of the disease has not been thoroughly eradicated. In a few where smears from the gums have shown no trace of the fusiform bacillus the disease has reappeared. But in the large majority when the fusiform bacillus has been proved absent the gums have remained free from any recurrence.

TREATMENT.

It is of the greatest importance to have the teeth well attended to. If necessary these must be thoroughly scaled and polished. It may not be possible to carry this out at first owing to the extreme tenderness of the gums. In such cases it is best to treat the gums for a few days with some antiseptic, when the tenderness will gradually lessen and permit the dentist to carry out the operation. Two or three sittings may be necessary to completely remove all tartar. I always insist on the frequent use of a mouth wash such as Peroxide of Hydrogen or Carbolic acid and Chlorate of Potash, particularly after meals so as to wash away all particles of food.

A soft tooth brush should be used if possible with an antiseptic solution; the tooth brush should be kept in an antiseptic fluid when out of use so as to keep it soft and clean, and thus prevent injury to the new tissues. When the gums are healed a new tooth brush should be obtained.

All cases should be informed of the infectious nature of the disease and proper precautions taken to prevent it being transmitted to others by kissing, pipes, cigarette holders, etc.

I always swab the gums daily or twice daily with an

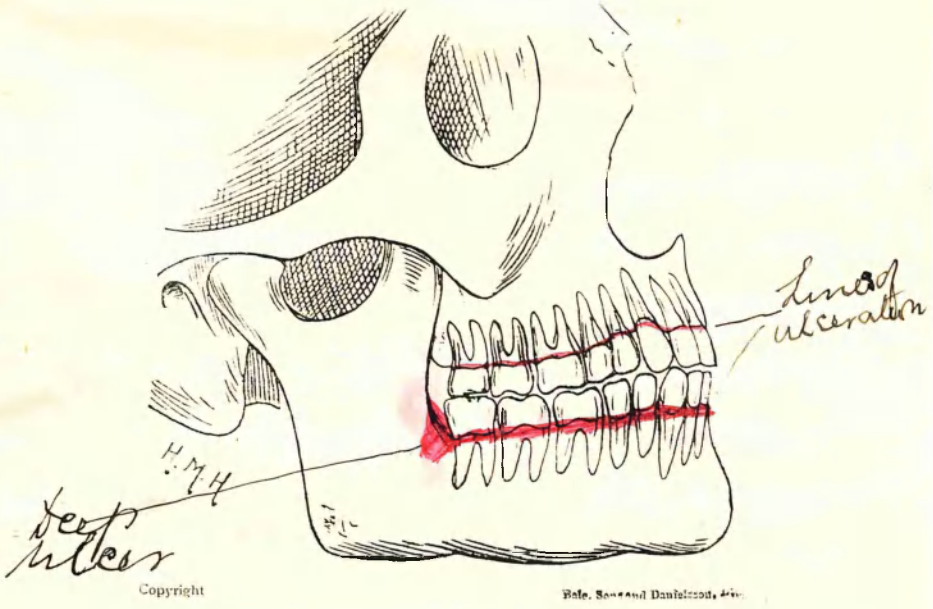
antiseptic. Among other things tried are Tincture of Iodine, Colloidal Iodine, Colloidal Silver, Bacterol, Flavine, and a mixture of Vinum Ipecacuanha ℥ß Glycerine ℥i Liquor Arsenicalis ad ℥i (33), but none gave such good results as an alkaline Salvarsan solution double the strength ordinarily used for intra venous injections.* This remedy was tried owing to the success attending its use in Vincent's Angina. In this affection the salvarsan powder was simply dusted on the part by some, others swabbed it on mixed with glycerine. Ehrlich(26) tried salvarsan intravenously, but Citrol(27) who used both the local and intravenous methods thought the former more efficacious. Before each swabbing I carefully dry the gums with cotton wool and pick out all extraneous matter from between the teeth with a dentist's probe.

The above treatment is continued daily or twice daily until smears from the gums show no fusiform bacilli and every niche and corner of the gums after careful examination shows no bleeding points. No case should be discharged as cured until all traces of the disease have been eradicated. In no case has it been found necessary to extract the teeth to attain this end. Loose teeth usually become firm as the disease declines.

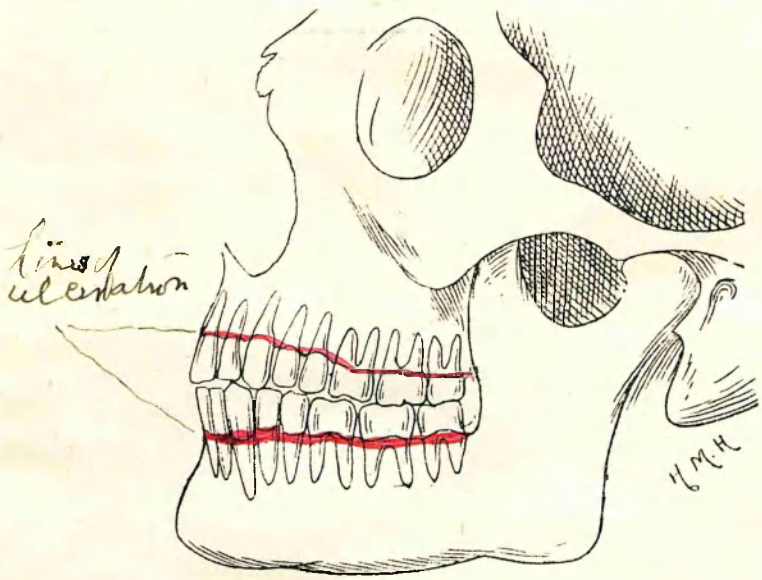
The following cases illustrate the characteristics of the affection:-

* This solution, if kept well corked, will retain its effectiveness for about five or six days.

Lieut C.R.F.B.
15.8.16



Lieut. C.R.F.B
15.8.16



15,8.16. Lieut. C.R.F.Br., was sent to me by Sir F. F. on account of sore gums. There was a deep ulcer involving the gum behind the right lower wisdom tooth and extending superficially over the gum and up the cheek over an area of the latter for about one square inch. The deep ulcer behind the molar was filled with a soft creamy exudation and the rest of the ulcerated patch covered with a thin greyish membrane. The tops of the upper and lower gums were also ulcerated and over these parts was a thin greyish exudate easily removed.

The teeth were complete and in good condition. He said his mouth had been sore and bleeding since the beginning of June 1916 and from that time up to the present he had been treated by ionization, paints, mouth washes, etc. The ionization gave him quick relief but when this was discontinued for a few days the soreness of the mouth returned.

The lymphatic glands at the angles of the jaw were enlarged and tender.

His breath was very offensive.

The ulcerated parts bled freely when lightly touched.

Smears from the cheek and gums fixed, stained with dilute carbol-fuchsin and microscopically examined showed fusiform bacilli and spirochætæ in abundance.

Urine - No albumen.

Few red blood cells.

TREATMENT.

Ulcerated parts were dried with cotton wool and then lightly swabbed over with salvarsan solution.

A mouth wash of Liq. Hydrarg. Perchlor, Rt. Chlor. Glycerine Aq. was prescribed to be used frequently. The swabbing caused great pain and bleeding.

16. 8. 16. The ulcerated parts were still covered with a greyish membrane but the patch on the cheek appeared smaller.

A small ulcer was now observed behind the left lower molar. The ulcerated parts were freely swabbed twice to-day.

17. 8. 16. Patient said his mouth was much more comfortable. The swabbing still caused much pain and bleeding.

18. 8. 16. Breath not so offensive.

The ulceration on the cheek decidedly smaller. Mouth not so tender when painted.

19. 8. 16. Mouth feels very much better. The ulcer on the cheek is now red and free from membrane and so

were several parts of the gums. The tenderness was much less when parts were swabbed.

20. 8. 16. Gums improving, but still bleed freely when swabbed.

24. 8. 16. Gums swabbed with 1 % solution of Flavine.

30. 8. 16. Gums have continued to improve. Flavine solution has been freely applied each day.

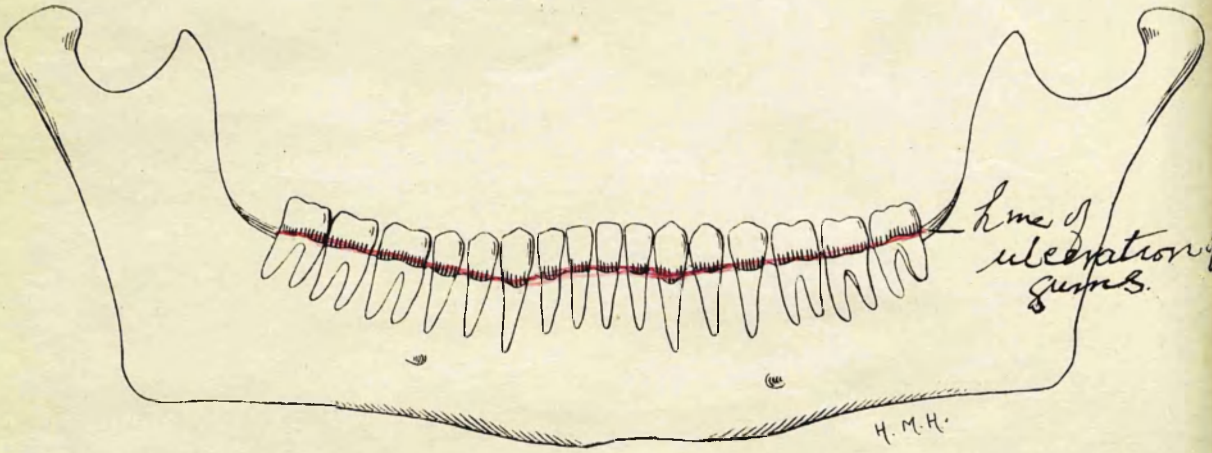
Most of the ulceration is healed but small tender, bleeding ulcers still remain in several spots between the upper molars and lower incisors; Urine free from red blood cells.

31. 8. 16. Gums to-day show no improvement so they were swabbed with a mixture of Arsenic, Vin Ipecac. and Glycerine. This treatment was continued daily till 2.10.16, when there still remained a small ulcer at the top of the gum between the lower canine and left 2nd incisor.

At this date the officer was ordered to rejoin his unit.

Smears were taken and examined on many occasions during his attendance and always found positive. On the date he was recalled very few fusiform bacilli could be found. The ulceration in this case was severe and intractable and the treatment not so successful as in most cases. I have no doubt, unless his gums are regularly treated the disease will quickly relapse.

Dent: C. 31. X. 1



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Case ii. 31.10. 16. Lieut. C. 2/2 London Regiment came for treatment on account of bleeding from the gums.

Eighteen months ago he had his first attack, about two months after returning from France. This attack was first treated with mouth washes which failed to do any good. Then ionization was tried which appeared to cure him.

Ten months ago when stationed at Ipswich he had another attack which was treated with sulphate of copper applications for three months without any success, so ionization was again tried and again proved successful.

The present attack started six weeks ago.

The gums along the lower teeth were ulcerated and bled easily when touched.

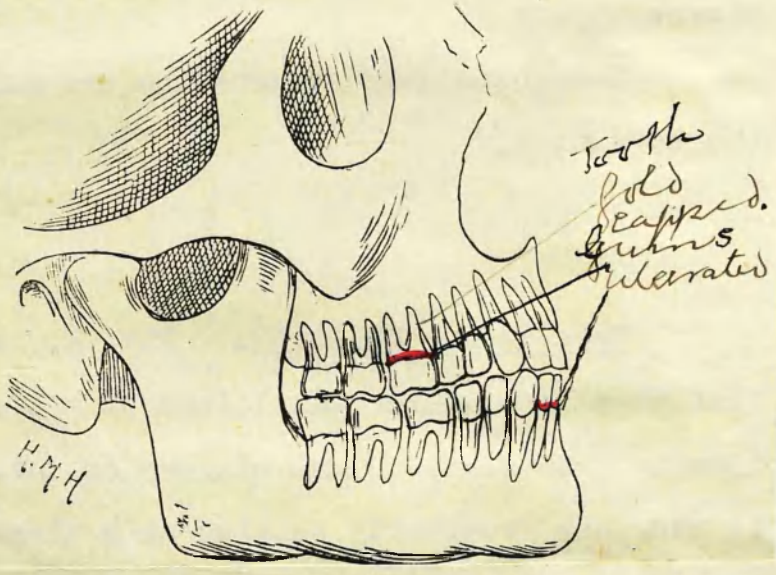
The teeth were in good condition and free from tartar.

His urine was normal.

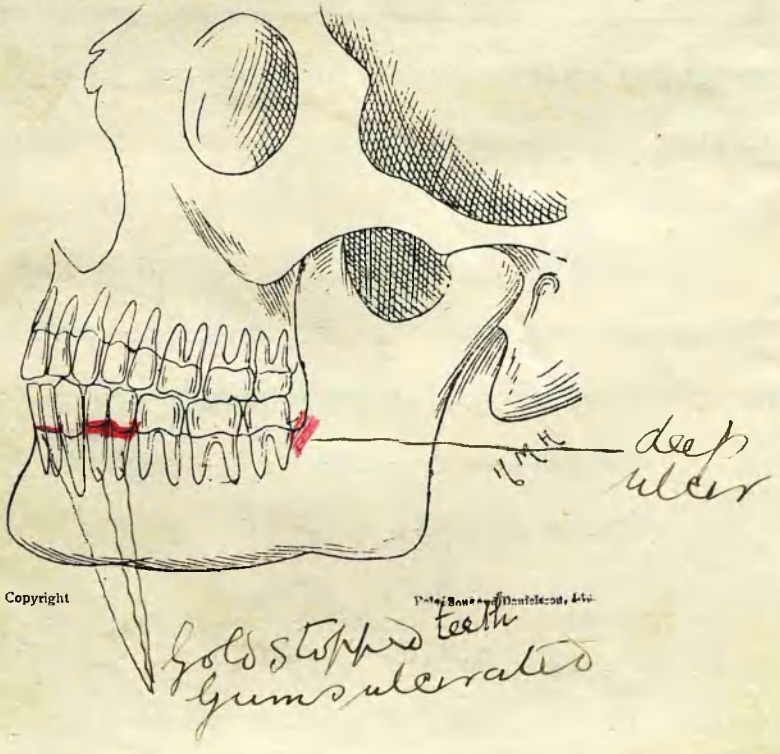
Smears from the gums showed many fuso-spirochætal organisms.

The gums were dried and freely swabbed twice daily with a solution of Arsenic, Vin Ipecac. c̄ Glycerin and made great improvement after the first day's treatment. A peroxide of hydrogen mouth wash was ordered to be freely used and directions given about the use of the tooth brush.

Capt. H. 4.11.16



Capt. H. 4.11.16



The treatment was continued till Nov. 14, 1916 when no bleeding points could be detected and smears from the gums showed no fusiform bacilli when stained and examined microscopically.

The above case illustrates the relapsing character of the affection.

Case iii. 30.10.16. Pte. M., Aust. Post Corps, stationed in billets, complained of a sore mouth which had troubled him for the last six months during which period it had been frequently painted with tincture of iodine.

The submaxillary lymphatic glands about the left angle of the jaw were enlarged and tender and his mouth could only be opened to a small extent. There was a deep ulcer in the gum behind the left lower wisdom tooth which extended up the cheek for half an inch. The ulcer was filled with a soft creamy membranous substance easily removed, the removal excited bleeding.

He had no decayed teeth but three upper molars in the right jaw were filled with gold and the gums around the necks of these teeth were ulcerated.

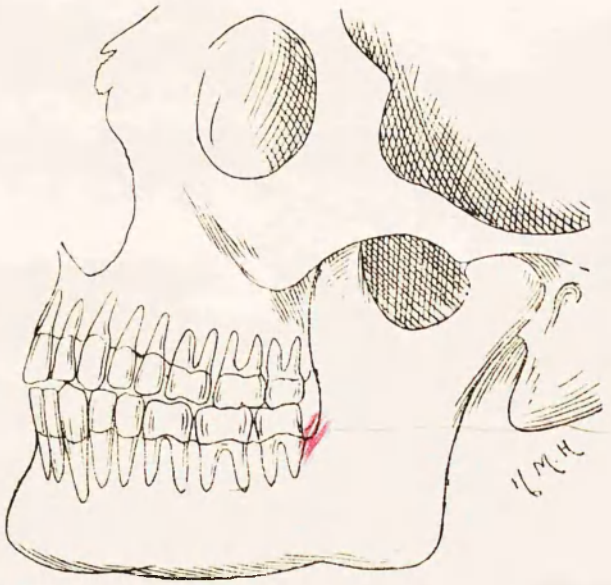
Temperature normal. Pulse 67.

Urine normal.

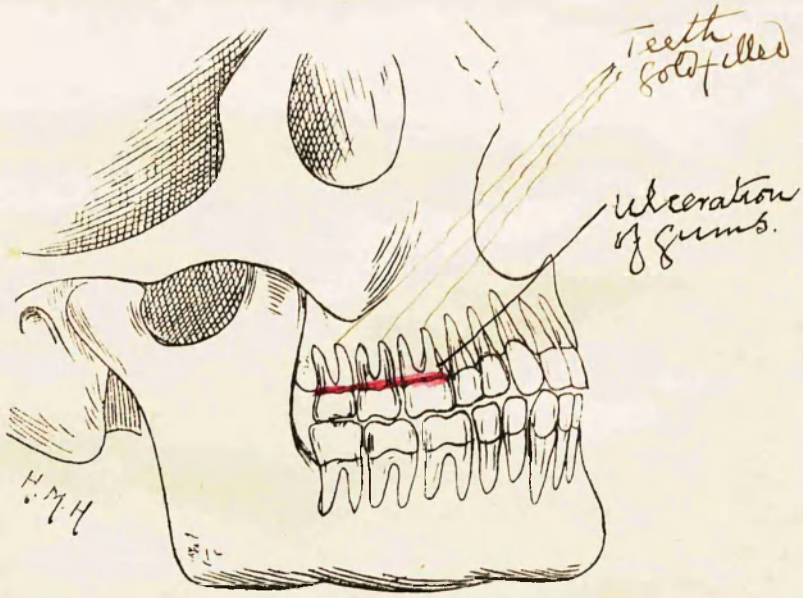
Blood - W.B.C. 4575.

R.B.C. 4,800,000.

Pte. M. 30.x.16



Pte. M. 30.x.16



Smears from the gums, dried, fixed, stained with weak carbol-fuchsin and microscopically examined showed many fusiform bacilli and spirochætes.

The gums were carefully dried with cotton wool and then freely swabbed with salvarsan solution. This treatment together with the free use of a mouth wash of peroxide of hydrogen was carried out till Nov. 7. 1916 when owing to the improvement the swabbing was dropped to once a day and by the 14th Nov. 1916 his mouth had healed and no fusiform bacilli were found in smears.

Nov. 4th 1916. Capt. H., came for treatment, he said he had been troubled with sore and bleeding gums for eight weeks. A dentist he consulted told him he had pyorrhœa and he must have his teeth extracted. To this he objected so the dentist tried treating his gums with Carbolic Acid and Tincture of Iodine. After the effects of these applications had passed off he found his gums as bad as ever.

His teeth were in good condition. The two left lower bicuspids were stopped with gold and the first upper right molar gold capped. The tops of the gums about these teeth were ulcerated and there was a deep ulcer filled with a soft creamy exudate behind the left lower wisdom tooth and there was peridental gingivitis about the necks of the

lower central incisors. The lymphatic glands about the left angle of the jaw were enlarged and tender. Smears from the ulcerated parts examined microscopically showed many fusiform bacilli and spirochætæ.

Urine normal.

A mouth wash of peroxide of hydrogen was ordered to be used frequently. The usual instructions given concerning the use of the tooth brush, and the gums dried and then swabbed with salvarsan solution.

20. XI. 16. Ulcer behind lower wisdom tooth quite healed, only a small bleeding spot on the top of the papilla between the lower central incisors to be found.

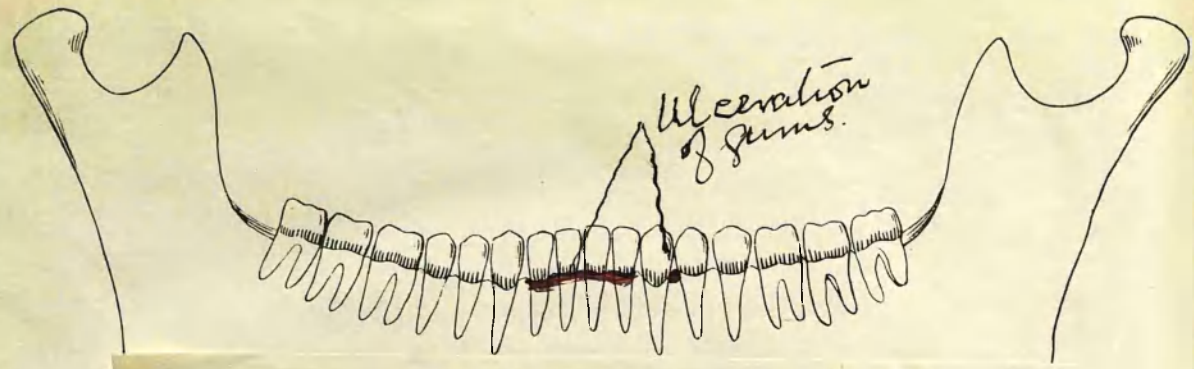
24. XI. 16. Treatment carried on till to-day when gums were quite healed and no fusiform bacilli could be found microscopically.

This case and the preceding are examples of the common forms of the disease usually met with.

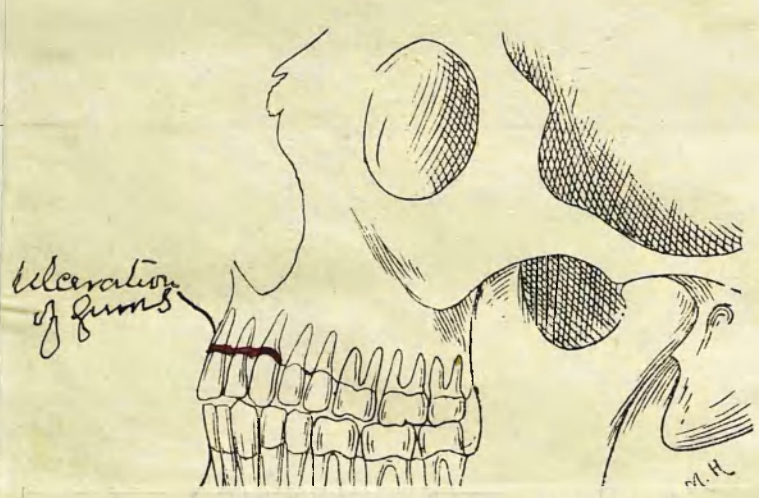
XII. XII. 16. Captain S. S., brought the following note with him from his Regimental Medical Officer.

"Capt. S. S., is suffering from a microbic infection of his gums. He has been under treatment for two months with various mouth washes with little improvement. I

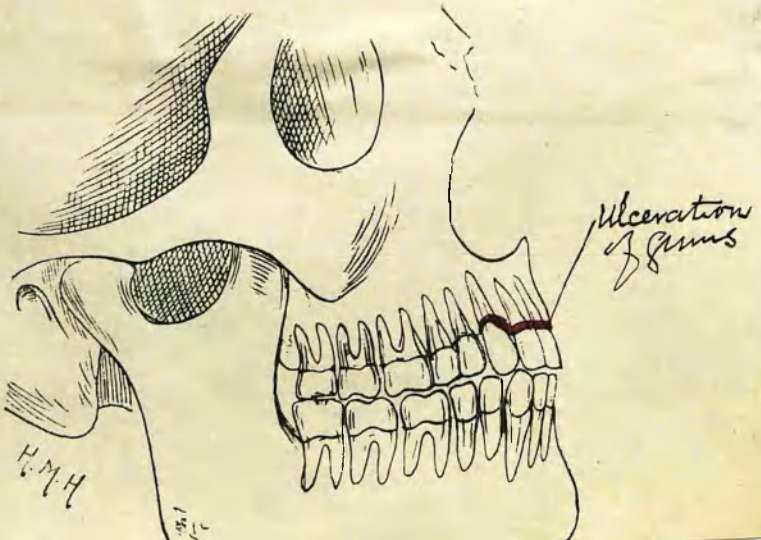
Capt. S. S.
XII. XII. 16



Capt. S. S.
XII. XII. 16



Capt. S. S.
XII. - XII. 16.



should be glad if he could be given vaccine treatment for the condition."

The officer said he had returned from the front with his gums in this condition and was told he had "Trench gum."

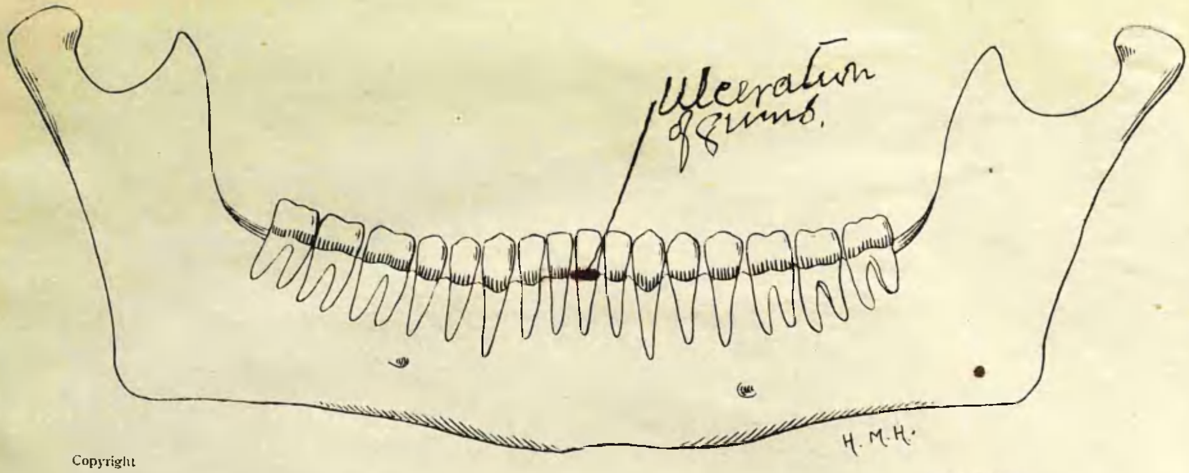
The gums about the lower incisors were swollen, retracted and ulcerated and there was ulceration at the top of the papilla between the left canine and bicuspid and also along the gum margin around the upper incisors and canines.

His gums were exquisitely tender, so for the first four days they were gently dried and swabbed with salvarsan solution and a peroxide of hydrogen mouth wash ordered to be freely used.

At the end of this period he was referred to the dentist who partly scaled and polished his teeth, and the treatment was resumed till Dec. 29, 1916, when he again visited the dentist for him to complete his work which he was now able to do as the tenderness of the gums had almost disappeared. Treatment was continued till Jan. 10. 1917 when his gums were healed and smears showed no fusiform bacilli.

21 X. 16. Nurse M. complained of bleeding gums and pain in the gums when masticating her food. She had consulted a dentist who said she had pyorrhœa and must have all her teeth extracted.

Nurse M
21. X. 16



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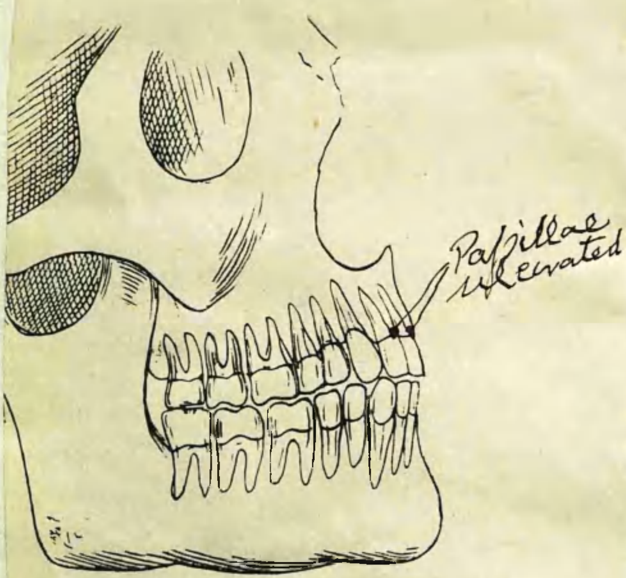
Nurse M
21. X. 16.



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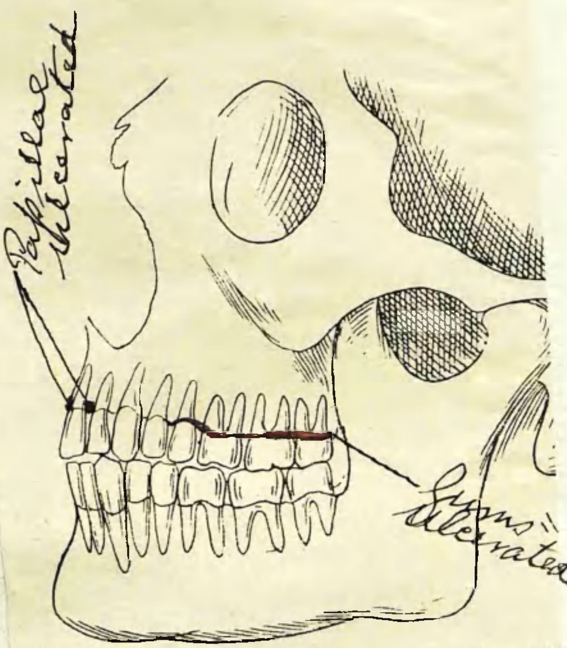
Nur



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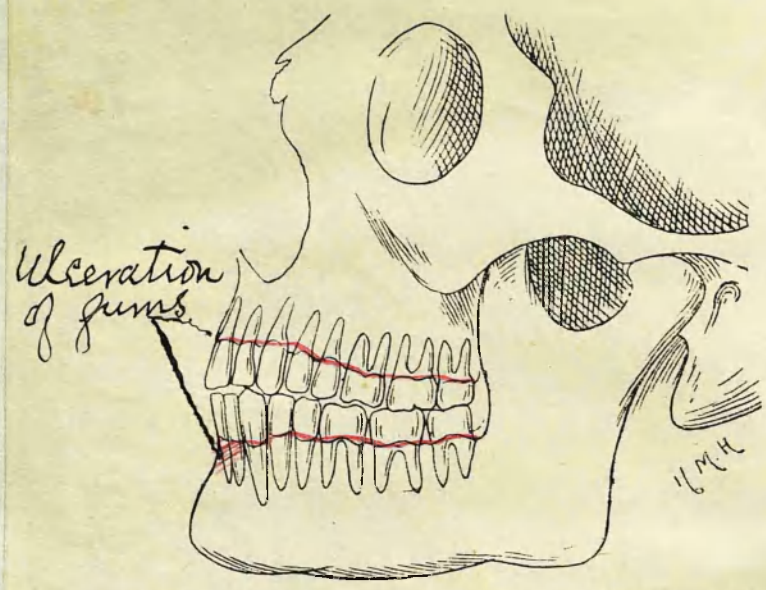
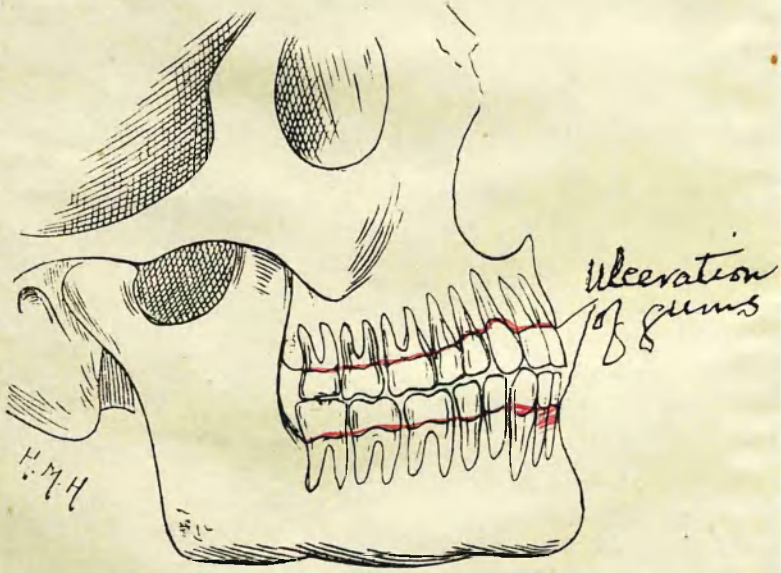
The lower gum about the incisors was swollen and separated from the teeth and the part of the gum about the neck of the middle left incisor ulcerated. There were also ulcers on the tops of the papillæ between the upper incisor teeth. All these parts bled freely when lightly brushed with a swab. On brushing the other parts of the gums bleeding points were observed about the upper left molars and second left bicuspid. The teeth were clean, free from tartar and in good condition. A little of the exudate covering the ulcers was taken up with a platinum loop and films made, fixed, stained with carbol fuchsin and examined microscopically showed many fusiform bacilli and spirochætæ together with cocci, bacilli and leptothrices. Her gums were treated in the usual way by drying, swabbing with salvarsan solution and the free and frequent use of a peroxide of hydrogen mouth wash; by Nov. 10. 1916 the gums were healed and smears from the parts examined microscopically showed no fusiform bacilli.

30. 9. 16. Lt. B., came for treatment for pain and bleeding of the gums. The pain was increased by mastication - the bleeding from the gums often occurred during the night and stained the pillow. He said his gums had troubled him for two months and he had attended a

Lieut-B. 30.9.16



Lieut-B. 30.9.16



dentist privately without any benefit. He had always been healthy - there was no history of any nervous disease and he came of a healthy family.

His teeth were in good condition and he said he had been in the habit of cleaning them twice daily.

The gums of the upper and lower jaws about the necks of the teeth were found ulcerated, the ulceration was deeper and more extensive about the lower incisors. All the ulcerated parts were covered with a soft creamy exudate easily removed with a swab, the slightest touch caused the gums to bleed.

His breath was fœtid.

The submaxillary lymphatic glands were not enlarged or tender.

Appetite good - Bowels regular.

Urine normal.

Smears from the gums showed many fusiform bacilli mixed up with cocci, bacilli and leptothrices.

A mouth wash of peroxide of hydrogen was ordered to be used frequently.

The gums were carefully dried and freely swabbed with salvarsan solution twice daily till Oct. 5th 1916, and from that date to Oct. 11th 1916 once a day when the gums were healed and smears found free from fusiform bacilli.

Some of the quoted cases illustrate the relapsing nature of the affection and the chief error in diagnosis. The first case is a good example of a type occasionally met with which run a chronic and refractory course and this case moreover is the only one in which I met with red blood cells in the urine.

FUSO-SPIROCHAETAL AFFECTIONS OF THE TONSILS SO-CALLED VINCENT'S ANGINA.

Vincent's Angina in my series of 157 cases was always accompanied with fuso-spirochætal ulceration of the gums. In the majority of cases the form of ulceration affecting the gums was of the peridental type, in the remainder the ulceration was more extensive (typical ulcero-membranous).

In not a single case of Vincent's Angina have I failed to find the gums affected and what is more, almost every case on enquiry disclosed the fact that the gums were affected prior to the tonsils, and it certainly

Charts showing usual range of temperature met with in Vincent's Angina.

NICAL CHART.

attached to Case Sheet.)

Army Form B. 181.

Military Hospital_____

_____ Age_____ Service_____

_____ Date of discharge_____ Result_____

ne	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.

Signature_____ In charge of case

CLINICAL CHART.

(To be attached to Case Sheet.)

Army Form B. 181.

Corps_____ Military Hospital_____

No._____ Rank and Name Lieut C. Age_____ Service_____

Disease Vincent's Angina Date of admission 30. 8. 16 Date of discharge_____ Result_____

Dates of Observation	30	31	1	2	3	4	5	6	7	8	9	10
Days of Disease												

Temperature Fahrenheit — Time A.M. P.M. (repeated)

107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97°

Pulse per Minute	72	72	64	60	50	64	56	72	56	52	52	68	60	56	60	64
Respirations per Minute																
Motions per 24 hours						1	1	1	1	1		1	1			

(6201) Wt. W. 11421/M1165 2,000,000 12/16 McA & W Ltd. A.F.B. 181 (E. 735)

Signature_____ In charge of case.

CLINICAL CHART.

(To be attached to Case Sheet.)

Army Form

Military Hospital

Corps

No.

Rank and Name Lt D.

Age

Service

Disease Vincent's Angina

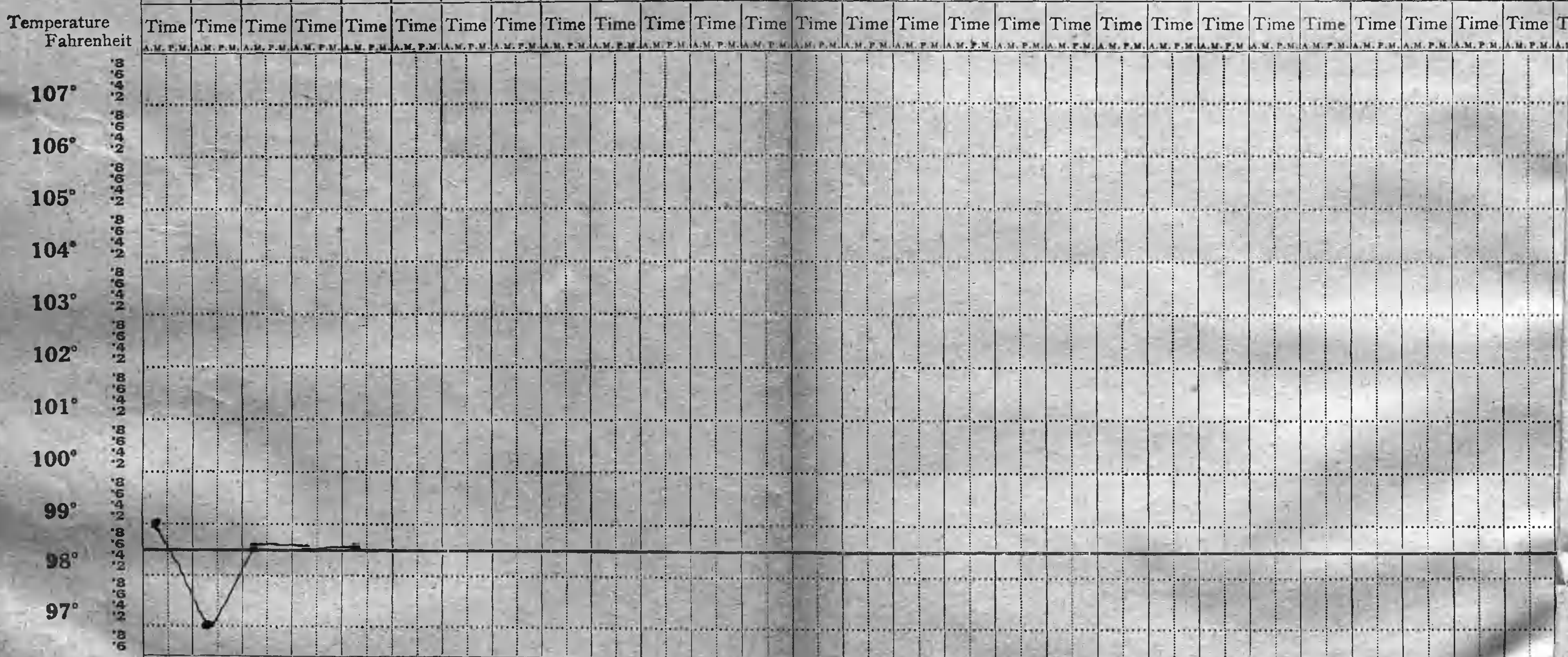
Date of admission 3 . 7 . 16

Date of discharge

Result

Dates of Observation	3	4	5	6	7
Days of Disease					
Pulse per Minute	80	72	70	70	70
Respirations per Minute					
Motions per 24 hours	1	1	1	1	1

Temperature Fahrenheit



(6201) Wt. W. 11421/M1165 2,000,000 12/16 McA & W Ltd. A.F.B. 181 (E. 735)

Signature In charge

CLINICAL CHART.

(To be attached to Case Sheet.)

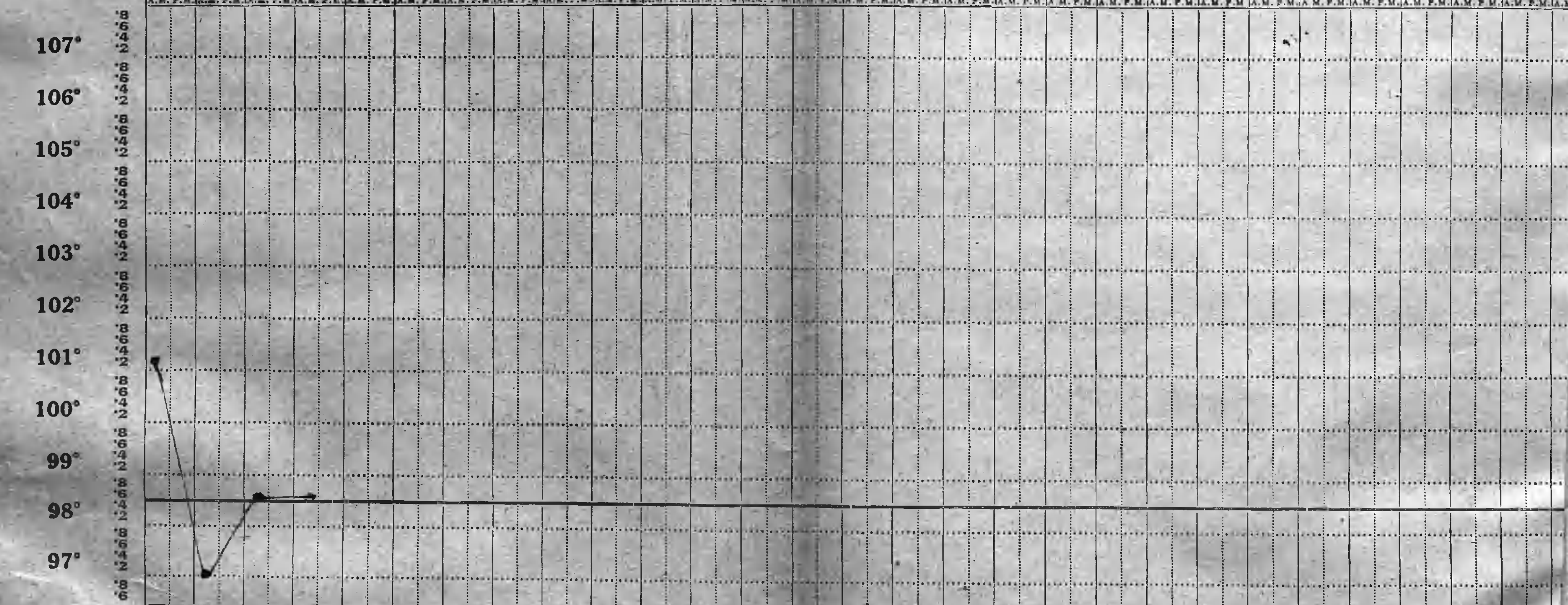
Army Form B.

Corps ______ Military Hospital ______

No. ______ Rank and Name Pte T ______ Age ______ Service ______

Disease Vincents Angina Date of admission 10 6 . 16 Date of discharge ______ Result ______

Dates of Observation	10	11	12	13	14
Days of Disease					
Temperature Fahrenheit	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.



Pulse per Minute	89	68	70	70	
Respirations per Minute					
Motions per 24 hours	1	1	1	1	

(6201) Wt. W. 11421/M1165 2,000,000 12/16 McA & W Ltd. A.F.B. 181 (E. 735)

Signature ______ In charge of

CLINICAL CHART.

(To be attached to Case Sheet.)

Army Form B.

Corps_____ Military Hospital_____

No._____ Rank and Name 96 13. _____ Age_____ Service_____

Disease Vincents Angina Date of admission 24. 6. 16 Date of discharge_____ Result_____

Dates of Observation	24	25	26	27
Days of Disease				

Temperature Fahrenheit — Time A.M. P.M. (8 6 4 2 12 2 4 6 8 10 12)

107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97°

Pulse per Minute

Respirations per Minute

Motions per 24 hours

(6201) Wt. W. 11421/M1165 2,000,000 12/16 McA & W Ltd. A.F.B. 181 (E. 735)

Signature_____ In charge

appeared as if the tonsils became infected from the gums. Moreover this sequence of events is supported by many cases (20) where the gums remained unhealed and the tonsils became re-infected and ulcerated.

Further it is interesting to recall that the rise and fall of the numbers of cases of Vincent's Angina met with during the year 1916 were synchronous with those of the gums.

SYMPTOMS.

The patient rarely looks or feels ill. He usually complains of pain or discomfort in the throat increased on swallowing, occasionally darting up to the ears. He may have headache and indefinite pains in the limbs.

The temperature very rarely exceeds 100° F., and when raised usually subsides in a day or two. The pulse rate simply shows the usual relationship of fluctuations to temperature. The small amount of constitutional disturbance found is surprising, and forms a strong point in the diagnosis of the affection.

The lymphatic glands about the affected region are enlarged and tender.

When the hard and soft palate will often be seen red and infected

As a rule the mouth can be easily opened. If the

tonsils are examined one of two conditions will usually be found.

A. On the surface of one or both tonsils will be seen a soft whitish creamy looking membrane which can easily be removed with a swab leaving behind a deep ragged or punched out ulcer with a bleeding base. This is the deep type of ulcer.

B. Or you will find a thin whitish membrane covering part or both tonsils very difficult or impossible to remove by gentle brushing but if removed leaving a bleeding ulcer. This is the Diphtheroid or superficial type of ulcer.

In 150 cases I found the Right tonsil affected in 66 cases.
Left tonsil affected in 36 cases.
Both tonsils " " 48 "

In 150 cases I found;
120 cases the ulcers were of the deep type.
30 " " " " " Diphtheroid type.

The membrane if removed is found to have a very foul smell and the same fœtor is noticeable about the breath of the patient.

Some ulcers are very acute and may extend rapidly in surface and depth. I have seen an ulcer increase half an inch in depth in twenty-four hours.

The diphtheroid or superficial ulcer may cover both tonsils, pillars of fauces ~~as~~ and soft palate presenting an appearance very like diphtheria and frequently mistaken for it. The deep ulcer may similarly encroach on the parts adjoining the tonsils.

The Urine is usually normal.

In six of my cases albuminuria was present, and in eleven, including the above six, red blood cells were found. Renal tube Casts were found in one case.

The Blood. In a few cases particularly where the temperature was raised there was an increase in polymorphonuclears. In about 10% of the cases examined I found an increase of Hyalines, occasionally reaching 21% in a differential count, which fact is interesting considering the protozoon present in the infection.

DURATION OF DISEASE.

Most of the cases recover in ten or eleven days. The average duration of one hundred and fifty cases was fifteen days. Ulcers of the deep or ulcero-membranous

type tend to recover more quickly than the diphtheroid or superficial type.

The affections of the throat and soft parts of buccal cavity nearly always recover more quickly than the gums.

COMPLICATIONS.

The chief and most important is ulceration of the gums.

This as already stated was found in every case and as the tonsil most likely becomes infected from the gums the importance of recognising the connection must always be borne in mind in carrying out treatment. For unless the disease is thoroughly eradicated from the gums the affection is likely to reappear in the tonsil. Many of the cases attended gave histories of recurrent sore throat and the tonsils of some of the cases presented a pitted ragged appearance bearing testimony to their statements.

As already mentioned albumen, red blood cells and tube casts have been found in the urine.

Klebs-Löffler bacillus was found coexisting in eleven cases, syphilis in two - both cases corroborated by positive Wassermann reactions.

Microphotograph of a smear from a case of Vincents angina. showing Fusiform bacilli & Spirochaetae.

SEQUELAE.

The only sequela met with following the disease was slight general weakness.

RECURRENCE.

The affection recurred in twenty cases and there were reasons to believe the re-infection of the throat in every case was due to fuso-spirochætal ulceration of the gums. The gum ulceration usually met with in these relapsing cases is of the peridental type, which, owing to the small amount of the gum affected, is liable to be easily overlooked.

DIAGNOSIS.

In the majority of cases the diagnosis can be made with reasonable care from the clinical appearances alone, but to be on the safe side a direct smear should be fixed, stained with weak carbol-fuchsin or methylene blue and examined under the high power ($\frac{1}{12}$th) for fusiform bacilli and spirochætes. The presence of co-existing diphtheria and syphilis must never be lost sight of. From every one of my cases cultures were made on ox serum slopes and incubated at 37° C. for twenty-four hours and then examined for the Klebs-Löffler bacillus.

The chief clinical features of Vincent's Angina are:-

I. Slight constitutional disturbance.

II. Temperature rarely over 100° F.

III. Pain on swallowing.

IV. Submaxillary lymphatic glands enlarged and tender.

V. Disease often unilateral.

VI. The membranous exudate is usually easily removed leaving a raw bleeding surface.

VII. Urine rarely albuminous.

VIII. Presence of Fusiform bacilli and Spirochætæ.

In diphtheria we have a membranous formation accompanied by:-

I. Severe constitutional symptoms.

II. Both sides of the throat usually affected.

III. Pain on swallowing not great.

IV. Submaxillary lymphatic glands not so tender.

V. Membrane difficult to remove.

VI. Albumin frequently present in the urine.

VII. Klebs-Löffler bacillus present in culture.

Fusiform bacilli and spirochætæ may be found in syphilitic ulcers, but the ulcer has not the clinical features of the true Vincent's Angina. The lymphatic glands

are not enlarged and tender and a Wassermann reaction of the blood will settle the question.

The presence of positive Wassermann reactions apart from concomitant syphilis has been reported by Gerber[22], Much[23], Saverio[24], and Sobernheim.[32]

In the case reported by Much the blood gave a positive reaction during the febrile period of the disease, but a fortnight later when the angina was cured the reaction was negative.

Sir St. Clair Thompson[25] writes: "From syphilis the diagnosis is more difficult as both fusiform bacilli and spirilla may be found in a cover-glass preparation from a tertiary ulcer and also because apart from concomitant syphilis the Wassermann reaction may be positive."

The Wassermann reaction of the blood was taken in thirty unpicked cases from my series and was negative in all but two, both of whom admitted to having had chancres ten years ago.

From my uniform negative findings, I can only conclude, that latent syphilis must have been overlooked in those recorded cases giving a positive reaction or the technique of the reaction was faulty. It is to be remembered the findings reported by Gerber, Much, Saverio and

Sobernheim were made in the early days of the Wassermann reaction.

Here the following case, one of the two in which syphilis co-existed with Vincent's Angina, is worth recording.

Dec. 14. 1916. Pte. G., an Australian attended the hospital suffering from a typical superficial ulceration of the right tonsil of one week's duration.

His temperature was normal.

His right submaxillary lymphatic glands were swollen, his breath fœtid, and his teeth dirty and tartrated.

The gum lines along the upper and lower teeth were ulcerated and covered with a soft creamy exudate.

Smears from the tonsil and gums suitably prepared and microscopically examined showed many fusiform bacilli and spirochætæ. He was first referred to the dentist to have his teeth scaled and polished. The ulcers were then treated and the tonsil healed in six days. He still continued to attend for treatment for his gums.

Dec. 24. 1916. An indolent looking ulcer was noticed on his left tonsil, and smears prepared from this and microscopically examined showed a typical picture of Vincent's organisms. It was noticed however that the left submaxillary lymphatic glands were not enlarged or tender

and that the ulcer when touched did not bleed. On enquiry he admitted to a chancre ten years ago and his blood gave a strong positive Wassermann reaction. The other case of the series which gave a positive Wassermann reaction was the following:-

Nov. 28. 1916. Pte. J. attended for an ulcer on his left tonsil which had pained him for about one month. The ulcer was deep and filled with a yellowish white exudate and bled when lightly touched. His gums about the lower incisors were swollen and ulcerated. His breath was fœtid.

The lymphatic glands at the left angle of the jaw were enlarged and tender.

Urine normal.

Smears from the tonsil and gums showed many fusiform bacilli and spirochætes.

Blood taken for Wassermann reaction gave a positive result.

His gums and throat were treated by swabbing with salvarsan solution and a mouth wash.

Dec. 8th 1916. His throat was quite healed and his gums had recovered by Dec. 20th 1916.

This patient's blood was taken for the Wassermann reaction simply for the purpose of a serological investigation of Vincent's Angina, there was no reason to suspect

syphilis. When the result of the test was communicated and explained to the patient he admitted to a chancre ten years ago while in Australia for which he received three months' medicinal treatment.

This case from the clinical and microscopic findings was obviously one of Vincent's Angina and fuso-spirillary gingivitis in a person with latent syphilis.

The diagnosis of Vincent's Angina from the ordinary acute tonsillitis can usually be easily made from the severe constitutional symptoms accompanying the latter.

TREATMENT.

The local treatment applied to Vincent's Angina is the same as that for the fuso-spirochætal affections of the gums and as they are always co-existent this is easily carried out. There are, however, one or two obvious facts to be borne in mind, if there is a rise of temperature or albumin present in the urine the patient should be put to bed and a light milk diet ordered.

The precautions already laid down in "Treatment of the Gums" respecting the use of the tooth brush and the infectious nature of the disease must be carried out.

The following histories represent the types of cases met with.

Nov. 1st 1916. Pte. G., complained of sore throat of twenty-four hours duration.

Temperature normal. Pulse 70.

The lymphatic glands at the left angle of the jaw were enlarged and tender and there was pain on swallowing.

The left tonsil was covered with a thin greyish membrane easily removed, and there was a peridental ulceration along the tops of the gums about the necks of the lower incisors.

His teeth were sound and in good condition, but he volunteered the statement "his gums had bled badly for the last week when brushed."

Touching the tonsil and gums with a platinum loop caused them to bleed. Smears from the tonsil and gums were fixed, stained and microscopically examined and many fusiform bacilli and spirochætæ found.

Urine normal.

Blood.	R.B.C.	6,200 ,000
	W.B.C.	7125
	Polymorphs.	75 %
	Small lymphocytes.	21 %
	Large "	4 %

Wassermann reaction of the blood gave a negative result.

Treatment was carried out on the lines already laid down and a salvarsan solution applied to the throat and gums.

6. XI. 16. Throat and gums have been treated daily up to date - both are much better - the tonsil almost well. A deep ulcer has appeared at the top of the left anterior pillar of the fauces. The sides of the ulcer are irregular and the tissues around are red and swollen. The ulcer was about half an inch deep, and filled with a soft creamy exudate. Smears from this showed many Vincent organisms.

The same treatment was continued to all three ulcers and the throat and deep ulcer on pillar of fauces were healed by 6. XI. 16. The gums however were not healed and free from fusiform bacilli till Dec. 5. 1916.

July 3rd 1916. Lt. D., complained of sore throat increased on swallowing and headache.

His face was flushed.

Temperature 99° F. Pulse 80.

The lymphatic glands about the right angle of the jaw were enlarged and tender. He opened his mouth without any difficulty and on the top of the right tonsil a whitish

patch could be seen which was easily removed by a platinum loop leaving a deep ragged bleeding ulcer.

The teeth were in good condition but the tops of the gums about the lower incisors and right upper molars were ulcerated.

Blood. White blood cells.. 4,575. in 1 c. mm.

Differential count.	Polymorphs.	73 %
	Hyaline.	11 %
	Lymphocytes.	16 %

The urine contained a trace of albumen and a few red blood cells.

Smears from the right tonsil and gums contained many Vincent organisms.

A gargle and mouth wash of peroxide of hydrogen was ordered to be used frequently and the gums gently dried and swabbed over with salvarsan solution.

4.VII. 16. Pain on swallowing less.
Flushed appearance gone.
Temperature 97° F. Pulse 72.
Exudate over the tonsil had reformed.
Treatment continued.

5.VII.16. Pain in throat gone.
Submaxillary glands almost painless to

touch. Exudate over ulcer of tonsil reformed but was much smaller.

Smears showed fewer fusiform bacilli and spirochætæ.

Urine. Albumen 0.2 %. Few red blood cells and few hyaline casts.

6.VII.16. Patient says he feels well.

Temperature 98.6° F. Pulse 70.

Patch on right tonsil smaller.

Urine. No albumen - No casts.

Few red blood cells.

7.VII.16. Temperature 98.6° F. Ulcer on tonsil almost healed - no white patch to be seen. Lymphatic glands about angle of jaw can only be felt with difficulty.

Urine. 0.5 % albumen - no casts - few red blood cells.

8.VII.16. Ulcer on tonsil healed.

Urine. No albumen. No casts, few red blood cells.

9.VII.16. The gums had been treated daily and were now much better.

Urine. No albumen - no casts. No red blood cells.

The progress continued and the gums were treated till 16. VII. 16, when smears from them showed when examined microscopically no fusiform bacilli.

10th June 1916. Pte. Thompson complained of sore throat and headache of two days duration.

Temperature 101.2° F. Pulse 89.

The submaxillary lymphatic glands on both sides of the jaw were enlarged and tender. His breath was fœtid.

His teeth in good condition.

Both tonsils were enlarged and inflamed and on the top of each was a small white patch easily removed and exposing deep bleeding ulcers.

The gums about the lower central incisors were ulcerated.

Fusiform bacilli and spirochætæ were easily displayed in smears from the tonsils and gums.

Urine. Sp. gr. 1018. Clear.
Amphoteric. Albumen present.
Few red blood cells found.

White blood cells 8,432. in 1 c.mm.

Polymorph.	88%	Differential count.
Hyaline.	8%	
Small lymphocytes.	4%	

Throat and gums treated with peroxide of hydrogen gargle and salvarsan solution swabbed on parts.

11.VI.16. Temperature 97° F. Pulse 68.

Feels much better.

Urine still albuminous and contains few red blood cells.

12.VI.16. Temperature 98.6° F. Pulse 70.

Throat very much better.

Smears from throat showed few bacilli.

13.VI.16. Throat free from exudate but bled when swabbed.

No fuso-spirochætal organisms found in smears from the tonsils.

The lymphatic glands at the angles of the jaw were very much smaller and almost painless.

Urine - No albumen - few red blood cells.

14.VI.16. Throat healed.

No fusiform bacilli found in smears from the tonsils but plenty in smears from the gums.

Submaxillary lymphatic glands scarcely perceptible.

Urine - Free from albumen.

No red blood cells.

The gums were treated daily till 24.VI.16 when they were healed and no fusiform bacilli found in smears microscopically.

The following case is quoted to illustrate reinfection of the tonsil from the gums.

Lieut. M. on 5.XII.16 complained of sore throat and sore gums.

Sept. 1916. He was treated at Queen Alexandra Military Hospital for Vincent's Angina of left tonsil and fuso-spirillary ulceration of the gums. After two weeks treatment the throat was healed but the gums about the lower incisors were still ulcerated and bleeding. Smears from the gums examined microscopically showed fusiform bacilli and spirochætæ. He was now recalled to his unit.

5.XII.16, he returned to Hospital for treatment. He said his gums had continued to bleed up to present date.

About the middle of November his right tonsil became sore and painful, for this he was treated by his Regimental doctor by painting with Tincture of Iodine, Boro. Glycerine and other solutions without relief so he was sent again to Queen Alexandra Hospital.

On the right tonsil was seen a deep ulcer filled

with a creamy exudate which was easily removed and showed when examined by the microscope many fusiform bacilli and spirilla.

The gums about the lower incisors were ulcerated and bled when touched and smears showed when microscopically examined many fuso-spirillary organisms.

The lymphatic glands at right angle of jaw were very tender.

The teeth were sound and in good condition and they had recently been scaled and polished by a dentist.

His temperature was normal and his urine showed nothing abnormal.

He was detained in Hospital and his throat and gums treated at first twice daily and afterwards daily by swabbing with salvarsan solution ; by December 26th his throat was quite healed and on January 15th he was discharged. No fusiform bacilli could be found in smears from the gums: when examined microscopically.

Dec. 11. 1916. Lt. G., while on leave from France came to Hospital suffering from a sore throat of three days' duration.

Temperature. Normal. Pulse 69.

Urine. Normal. Submaxillary lymphatic glands enlarged and tender.

There was a typical deep Vincent's ulcer on the right

tonsil and peridental ulceration of the gums about the lower incisors and canines - both confirmed by microscopic examination.

He said his gums had bled for last six months and he was told in France he had Trench gum. He was put under treatment and by

Jan. 1st 1917. Throat well - gums still ulcerated.
Jan. 19th 1917. Typical Vincent's ulcer on left tonsil - gums still affected.
Jan. 23rd 1917. Throat well - gums better.
Jan. 30th 1917. Gums well - smears negative.

Oct. 20th 1916. Pte. N., came for treatment for sore throat of two days' duration.

When asked if his gums also troubled him he said "two months ago he had two decayed teeth extracted by a dentist and since then his gums had been painful and bleeding."

Temperature 99. Pulse 70.

Submaxillary glands at both angles of jaw were enlarged and tender.

Urine - No albumen or sugar: Few red blood cells.

His breath was foul and both tonsils were covered with a greyish exudate easily removed, leaving bleeding ulcers.

The tops of the gums about the right upper and lower

molars were ulcerated and bled when touched with a platinum loop. The right upper and lower wisdom teeth had been extracted.

The diagnosis of the ulcers was verified microscopically by finding many fuso-spirillary organisms in smears from the gums and tonsils.

The usual treatment was pursued and he was discharged cured November 25th 1916.

The above recorded cases reflect, except in a few minor and unimportant details, the rest of the cases met with. The same sequence of events is repeated time after time, first the sore and ulcerated gums followed by ulceration of the tonsils.

To some the ulceration of their gums was unknown and had to be sought, others knew of the pain and bleeding but thought them not worth mentioning, while in many the ulceration was too painful and inconvenient to be ignored. So far I have not met a single case of Vincent's Angina where the gums have been found free from fuso-spirochætal ulceration.

FUSO-SPIROCHAETAL AFFECTIONS OF THE MUCOUS MEMBRANE OF THE BUCCAL OR MOUTH CAVITY.

Fuso-spirillary ulcerations of the mucous membrane of the mouth cavity are rare compared with the frequency they affect the tonsils and gums. During the year 1916 I only met with seven cases where the ulceration was not continuous with a similar ulceration of the tonsils or gums.

In every one of those cases there co-existed ulceration of the gums, and the histories when obtainable repeated the sequence found in Vincent's Angina namely, that the gums were affected prior to the mucous membrane. The parts of the mucous membrane mostly affected were, in the order of their frequency, soft and hard palate, anterior pillars of the fauces and cheek about the buccal space opposite the molars. I have never met with any fuso-spirochætal ulceration of the tongue.

The ulcers may be deep or diphtheroid, the former variety is certainly the more common, but ulcerations of the diphtheroid type occur more frequently than on the tonsil. In my seven cases two were diphtheroid and five of the deep or ulcero-membranous type.

Sometimes the ulcers remain small and deep and tend to perforate the part, or they may extend over large areas

and involve the hard and soft palate or an extensive part of the cheek. The signs and symptoms of the affection in these parts are as characteristic as when the tonsils are affected.

There is very little constitutional disturbance, fœtor of breath, pain, great tenderness and membranous formation over an area easily excited to bleed are found.

The lymphatic glands are usually enlarged and tender.

The physical appearances of the affected part often suggest diphtheria or syphilis.

The course, duration, complications and sequelæ are the same as found in the tonsillar affection.

The histories of a few cases will make these points clear.

July 13th 1916. Capt. S., a Canadian complained of headache, sore-throat and feeling ill.

Temperature. 99.4. Pulse 60.

Lymphatic glands about the right angle of jaw were swollen and tender.

There was a thin greyish membrane about the size of a halfpenny over the right side of the soft and hard palate and the parts about the membrane were red, swollen and sodden looking. The membrane could not be removed by lightly brushing with a swab.

CLINICAL CHART.

(To be attached to Case Sheet.)

Army Form B. 181.

Corps_____ Military Hospital_____

No._____ Rank and Name Capt. S. _____ Age_____ Service_____

Disease Mouth Ulceration. Date of admission 13. 7. 16 Date of discharge July 20. 1916. Result_____

Dates of Observation	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Days of Disease																		
Temperature Fahrenheit	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
Pulse per Minute	56	66	68	64	62	60	64	72	66	84	82	76	76	60	76	96	96	96
Respirations per Minute																		
Motions per 24 hours		1		1			1				1	1			1	1	1	1

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Signature_____ In charge of case.

There was peridental ulceration of some weeks standing about the lower incisors.

The tonsils were not affected.

Smears from the membrane on the palate and from the gums, fixed, stained and microscopically examined showed many fusiform bacilli and spirochætæ.

Cultures were also made on ox serum and incubated at 37° C. for twenty-four hours.

The urine was free from albumen but contained a few red blood cells

A blood count showed nothing abnormal.

A mouth wash of peroxide of hydrogen was ordered to be used frequently and the palate and gums were freely swabbed with salvarsan solution.

14.VII.16. No K.L.B. found on ox serum growth.
Temperature 98.6.
Patient says he feels worse.
The palate looks much the same but the tissues around the membrane are not so swollen. A deep ulcer has now formed on the gum behind the right lower wisdom tooth.
Treatment continued.

15.VII.16. Patient complains of great pain in the mouth and will not allow any swabbing. The palate and gums appeared very much the same except a small black slough had formed over the soft palate. Temperature to-night rose to 101.2° F., and as he complained of pain and sleeplessness morphia ¼ gr. was given subcutaneously.

Urine - No albumen - a few red blood cells.

16.VII.16. The membrane on the palate is larger. Patient says he feels a little better. Temperature 99.2.

17.VII.16. Patient feels a little better. Mouth looks much the same - still too tender for swabbing.

18.VII.16. Patient feels very much worse so he was seen in consultation with Mr. Potter, laryngologist and Col. Pasteur, F.R.C.P., the former expressed the opinion that the mouth condition was most likely specific. Blood taken for Wassermann reaction, and he was afterwards given a mixture of Liq. Hydrarg. Perchlor. and Pot. Iod. and the Mouth Wash changed for one of Liq. Hydrarg. and Pot. Chlor.

19.VII.16. Wassermann reaction negative.

Patient much the same.

20.VII.16. The membrane on palate is separating.

Patient says he feels better. Swabbing the gums and palate with salvarsan solution resumed.

Smears from palate show many fusiform bacilli and spirilla.

21.VII.16. The palate is almost clear of membrane and ulcer is beginning to heal.

Patient very much better.

From this date he made a steady and rapid progress and was discharged on July 30th 1916 when no fusiform bacilli were found in smears from the gums. The gums were several days healing after the palate had recovered.

Case ii. 7.1.17. L/cp. S., came for treatment for what he called a sore-throat, which had troubled him for six days.

He had never been to the front and was employed as a clerk in a pay office.

For the last six months his gums had bled profusely

when brushed so that latterly he had discontinued its use.

Temperature was normal, and he said he felt "all right in himself."

The lymphatic glands about the right angle of the jaw were swollen and tender.

Urine. Normal.

The right side of his uvula and soft palate were covered with a whitish membrane which could not be brushed off and around the border of the membrane was a thin red line of ulceration. The uvula was enlarged and œdematous.

The gums about the lower incisors and canines were ulcerated.

Smears from the palate and gums showed many fusiform bacilli and spirochætæ.

His palate and gums were swabbed with salvarsan solution and a peroxide of hydrogen mouth wash prescribed.

Next day he was sent to the dentist to have his teeth scaled and polished.

The swabbing was resumed January 9th 1917 and the palate gradually healed without any membrane coming away en masse, and by the 15.1.17 was quite healed.

The gums were attended to daily for three weeks longer, before the smears were found negative, when he was discharged.

Finally I quote the following case although incomplete in many details because of its rarity, treatment and sequelæ and more particularly because it embodies a few points mentioned by previous writers on Vincent's Angina, but as yet untouched on by me.

Nurse A., was taken ill at King George's Hospital on August 7th 1916 and the following short report was sent by the medical officer of that institution, when she was transferred to an Auxillary Hospital of Queen Alexandra Military Hospital.

"Nurse A. complained of sore throat.

Temp. 101.4. Pulse 120.

Left tonsil inflamed and covered with a thick whitish-yellow membrane - Patient looked ill. Swab taken from the throat. She was put to bed, ordered calomel grs 2½ and mixture of Liq. Hydrarg. Perchlor: Gargles and foments.

10.30 A.M. 8.8.16. Throat looking much worse. Membrane extended and greyish dark in colour, uvula and tissue between uvula and left tonsil infiltrated. Swab-growth from serum showed few rods and cocci. No K.L.B.

Treatment continued.

Diphtheria antitoxin 12,000 units given as a precaution.

5 P.M. 8.8.16. Patient looking worse - Membrane darker in colour and more extensive. Condition regarded

as severe infection - probably septic - exact organism not known. Has been nursing patient with similar throat who died 6.8.16."

She was now transferred to Vincent Square Hospital where I was asked to see her and examine swabs from her throat.

On admission her throat was found as described - palate and uvula very swollen and infiltrated and covered with a large black looking slough. Her breath was very offensive and the submaxillary glands enlarged, painful and tender.

Temp. 103° F. Pulse 108.

Ordered antiseptic gargles and inhalations.

Aug. 9th. Passed a fair night and seems a little better. Direct swabs show a mixed infection of Vincent's organisms and many streptococci. Ox serum growths produced no K.L.B.

On the advice of Capt. ~~McKnostry~~ mckinstry, who examined the patient and swabs, a gargle of Liq. Hydrarg. Perchlor. and Pot. Chlor. c̄. glycerine; Mixture of Tinct. Ferri Perchlor., and a subcutaneous injection of 100 mills of Sensitized Streptococcal Vaccine were ordered.

CLINICAL CHART.

(To be attached to Case Sheet.)

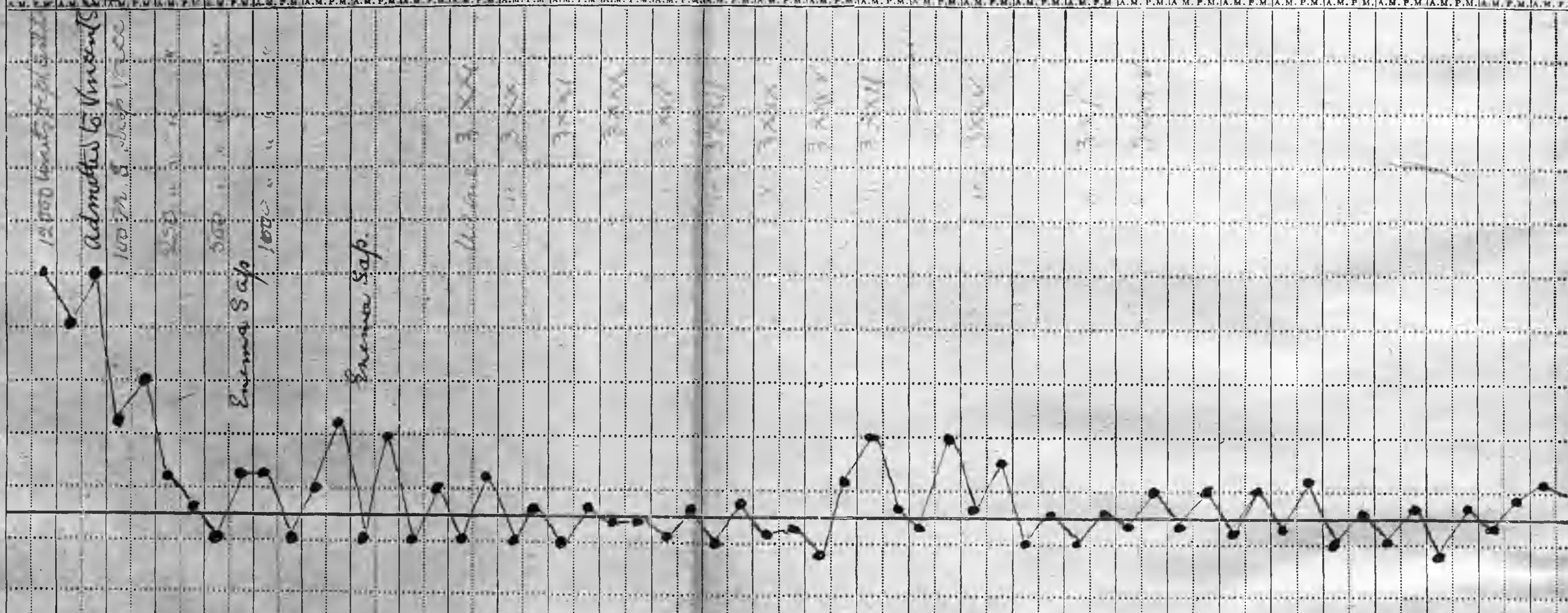
Army Form B. 181.

Corps __________ Military Hospital Vincent Sq.

No. __________ Rank and Name Miss J. A. Age 25 Service 7 wks

Disease Septic Throat Date of admission Aug 8th 1916 Date of discharge Dec 24/16 Result __________

Temperature Fahrenheit: Time A.M. P.M.



Dates of Observation	Pulse per Minute (A.M.)	Pulse per Minute (P.M.)	Respirations per Minute (A.M.)	Respirations per Minute (P.M.)	Motions per 24 hours
7	160	160			
8	112	108			1
9	162	116	24	24	1
10	100	100	20	22	·
11	100	104	20	24	1
12	104	96	24	24	·
13	96	108	20	24	·
14	100	104	22	22	1
15	88	84	20	18	·
16	92	88	18	20	1
17	82	80	20	18	·
18	80	84	20	22	1
19	80	80	20	20	1
20	80	72	20	18	·
21		104		24	·
22	84	100	20	18	11
23	100	104	20	21	·
24	100	104	22	22	11
25	100	116	24	24	
26	104	92	24	22	1 6
27	88	100	24		3
28	100	104	22	24	1
29	108	100	24	24	1
30	96		20		1
31	84	88	20	20	
Sept 1	92	92			1 8
2	88	92			·
3	88	96			2
4	92	92			1
5	92	92			·
6	92	92			1

Days of Disease: (blank)

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Signature __________ In charge of case.

CLINICAL CHART.

(To be attached to Case Sheet.)

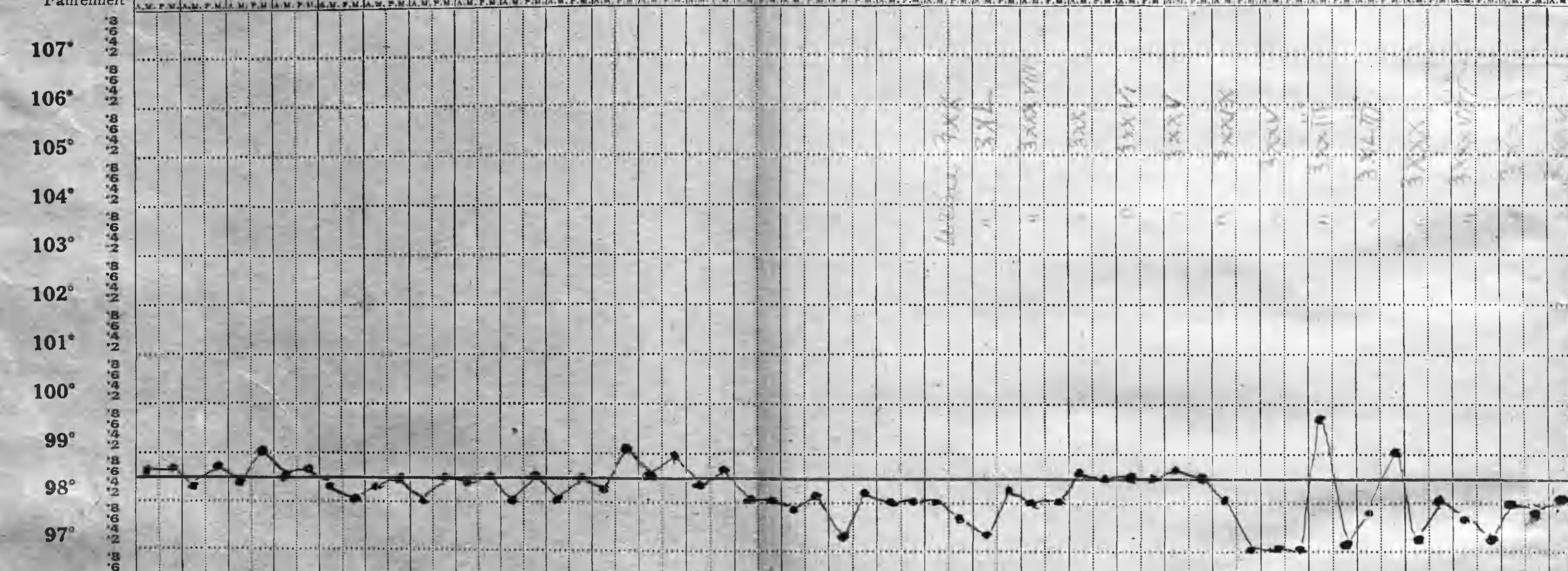
Army Form B. 181.

Corps ______ Military Hospital Vincent Sq

No. ______ Rank and Name Mrs J A Age 25 Service 7 wks

Disease Septic Throat Date of admission 8 8 16 Date of discharge Dec 24/16 Result ______

Dates of Observation	Sept 7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Oct 1	2	3	4	5	6	7
Days of Disease																															
Temperature Fahrenheit	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M.



	Sept 7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Oct 1	2	3	4	5	6	7
Pulse per Minute	88 92	88 92	92 96	92 92	92 96	88 92	88 92	88 96	84 84	92 88	92 88	96 88	88 96	88 88	80 88	80 88	80 88	80 80	80	100 96	100 96	100	100 112	120 122	100 116	100 112	120 100	108 88	100 104	100 72	104
Respirations per Minute																															
Motions per 24 hours	1	3	1	·	4	· ·	1 1	· 1	· 1	1	1	1 1	2 2	1 ·	· 2	· 2	1 1	· 2	· 2	1 1	· 2	2 1	1 3	· ·	· ·	3 ·	· ·	2 ·	1 ·	· ·	1

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Signature ______ In charge of case.

Army Form B. 181.

CLINICAL CHART.

(To be attached to Case Sheet.)

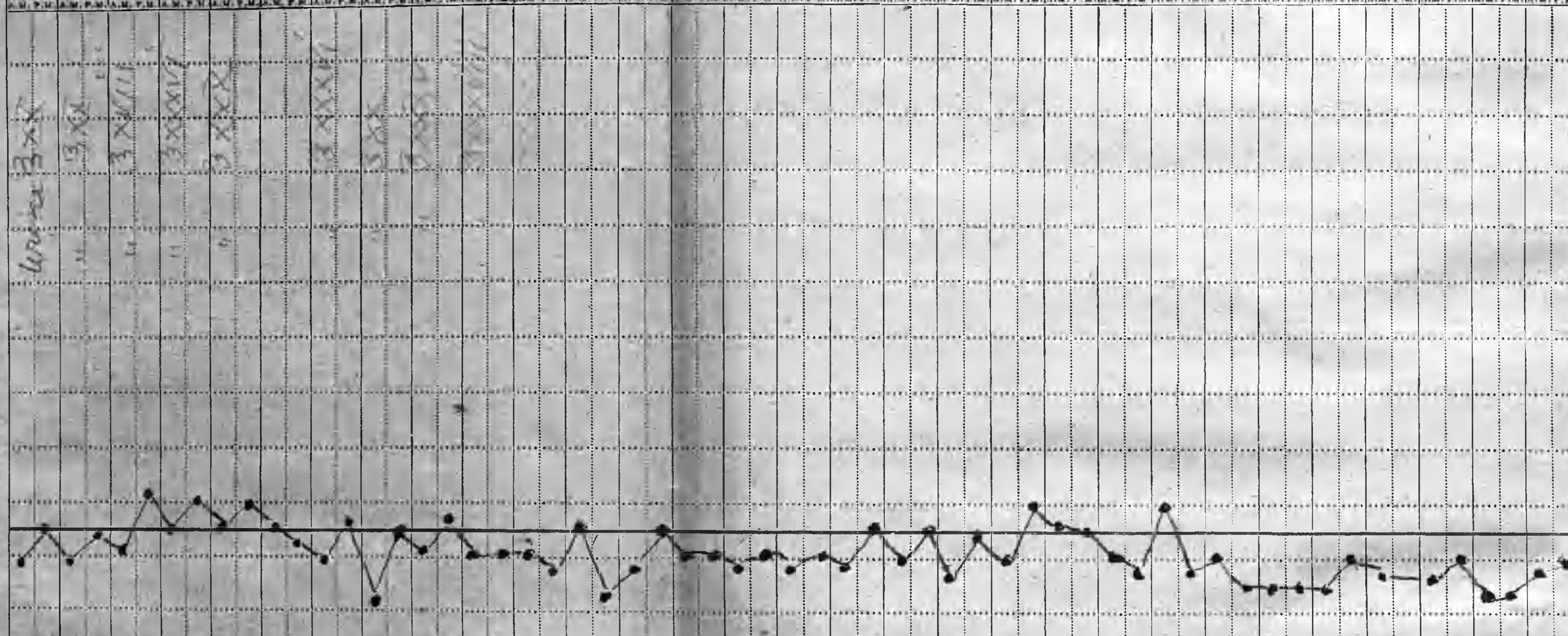
Military Hospital Vincent Sq.

Corps ____________

No. ____ Rank and Name Miss J. A ____ Age 25 Service 7 wks

Disease Septic Throat Date of admission 8. 8. 16 Date of discharge Dec 27/16 Result ____

Dates of Observation	Oct 8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Nov 1	2	3	4	5	6
Days of Disease																														
Temperature Fahrenheit	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.	Time A.M. P.M.



Dates of Observation	Oct 8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Nov 1	2	3	4	5	6
Pulse per Minute	88 104	80 100	80 100	88 84	90 90	76 88	76 86	76 80	72 92	72 100	88 76	76 80	80 80	76 80	80 80	80 84	80 62	88 80	80 70	72		80		76	80 52			80	80	64
Respirations per Minute																														
Motions per 24 hours	1	2	··	1 3	··	··	2	1	1 1	··	3	··	2	··	2	1	1 2	··	2	··	1 1	2	2	1	1	··	··	1	1	1

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Signature ____________ In charge of case.

Aug. 10th. Improved - much less œdema in throat. Slough separating.

250 mills of Sensitized Streptococcal Vaccine given subcutaneously.

Aug. 11th. Patient passed a good night and is much more comfortable.

Oedema and swelling greatly lessened, slough coming away.

5000 mills of Sensitized Streptococcal Vaccine given.

Aug. 12th. Patient much improved. 1000 mills Sensitized Streptococcal Vaccine given.

Aug. 13th. Patient very much improved and most of the slough has come away.

Urine - albuminous and shows microscopically Epithelial, Hyaline and Granular casts and red blood cells.

Sept. 8th. Patient continued to improve and was able to take short walks.

To-day she complained of difficulty of swallowing. Paralysis of the ciliary and palatal muscles was found.

Patient put back to bed.

Swabs again taken from the throat.

Smears were stained and microscopically examined - No Vincent's organisms found. Serum cultures were made and incubated at 37° C. for twenty-four hours. No K.L.B. found.

Sept. 25th. Palatal paralysis has gradually increased. Voice nasal and speech slurred.

There is now slight paresis of hands and feet - loss of sensation to touch and pain in both feet and numbness of fingers - Knee and plantar reflexes absent.

Sept. 26th. Seen to-day by Col. Pasteur F.R.C.P. who confirmed the above condition and ordered a mixture of Liq. Strych. Hydro. Ch. min v, Tinct. Bellad. min. x. every four hours.

Oct. 26th. Patient has slowly improved. There are still slight paresis of hands and feet and diminished tactile sensation of soles of feet.

Patient now gets up for a little each day and is commencing to walk with assistance.

Dec. 25th. Convalescence has been gradual and uninterrupted.

All paresis-motor and sensory is now gone.

Urine shows only a trace of albumen - no casts.

Patient sent to a convalescent Home.

The smears from this case in the early part of the disease showed Vincent's organisms, but the picture of the films was not the one usually obtained from Vincent's angina - the fusiform bacilli were few and far between, and the line of treatment pursued was suggested by the abundance of streptococci present.

Paralysis of the ciliary and palatal muscles, loss of knee jerks and ataxia have been recorded following infections of Vincent's organisms.

In the series of my cases I have not met with any nerve complication or nerve sequela. The paralyses following the acute course of the above case at once suggest diphtheria, but ox-serum smears were made, incubated and examined by me and others with negative results.

Osler[29] writes "Occasionally paralyses follow streptococcus tonsillitis which are identical with those of diphtheria"; and I think from the success which followed the administration of the sensitized streptococcal vaccine in the above case we are justified in concluding it a

streptococcal infection. The high temperature and severe constitutional disturbance were in themselves sufficient to separate it from Vincent's Angina. Moreover after reviewing all my cases I cannot help feeling sceptical concerning the recorded cases of paralyses following a true Vincent's Angina. The co-existence of diphtheria and Vincent's organisms, which has already been referred to, might be easily overlooked, but not more easily than associated streptococcal infection.

In conclusion I should like to state that the diagnoses of all my cases have been confirmed microscopically, and also the fact that ox serum inoculations were made, incubated for twenty-four hours and afterwards examined microscopically for Klebs Löffler's bacillus.

The points of originality I have attempted to bring out in this thesis may be epitomized under three heads.

I. The different varieties of fuso-spirochætal ulcerations of the gums.

II. The invariable association of Fuso-spirochætal ulceration of the gums with Vincent's Angina and allied affections of the mouth cavity.

III. Vincent's Angina and the allied ulcerations of the mouth cavity are always secondary to fuso-spirochætal ulceration of the gums.

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