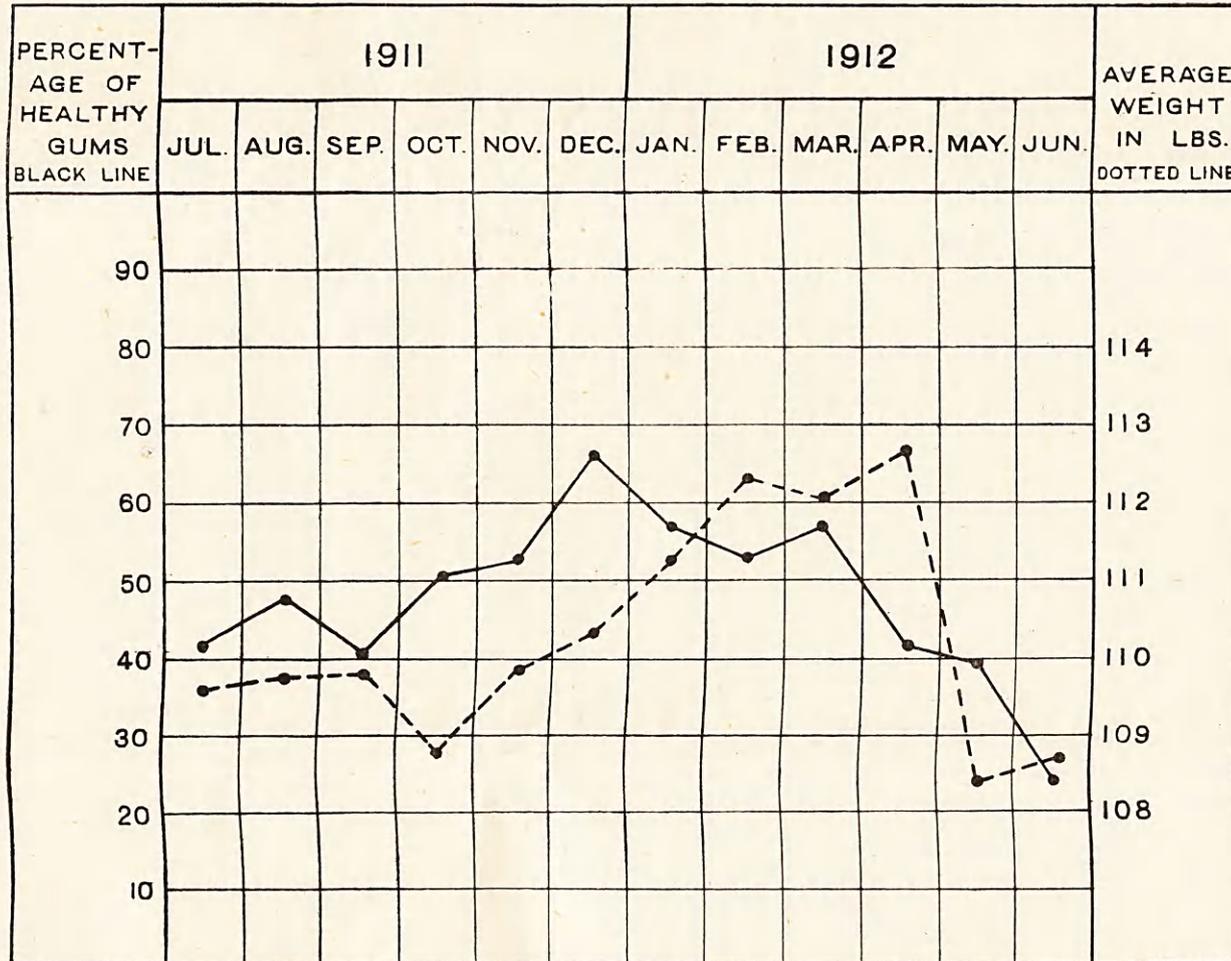


PYORRHŒA ALVEOLARIS IN SYLHET JAIL.

By L. BODLEY SCOTT, B.A., M.D. (CAM.), D.P.H. (OX.), CAPT., I.M.S.

CHART 1.



The black curve shows the monthly percentages of healthy gums among prisoners on admission with Pyorrhœa absent or in an early stage, excluding those in the old stage.

The dotted curve shows the monthly average weight of all prisoners on admission to jail.

Both curves were corrected for variations in the monthly mean ages.

all the inmates of the jail. Each person in the jail passed his stool into a receptacle filled with a solution of cyllin of suitable strength, in this way the stool was rapidly disinfected and the access of flies during the process of disinfection was prevented, the fæces being submerged in the solution. Cases of cholera were occurring in the jail, but 4 days after (13th August), the commencement of the systematic cyllination of fresh night-soil (9th August), the outbreak ceased.

Encouraged by this observation the same plan of disinfection of fresh night-soil was extended to the town of Puri itself, but for the purpose a solution of fresh chlorinated lime was used, because (1) it is cheap, (2) it is a very good bactericide, (3) its pungent odour effectually keeps the flies away. The difficulties in carrying out the systematic disinfection of fresh night-soil in the town were very great owing to the extremely defective state of the private latrines and the absence of proper access to them. But in spite of these difficulties it was followed by a marked drop in the number of attacks and deaths from cholera. Thus on the 13th August, 3 days before systematic chlorination was commenced, there were 39 deaths from cholera. On 20th August, 4 days after it was begun, the deaths were 18. On 24th August, 4 deaths; and by the end of August the epidemic ceased entirely.

A Mirror of Hospital Practice.

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PYORRHŒA ALVEOLARIS is well known to be an extremely common complaint among the natives of Bengal and Assam and probably of other parts of India also.

It appears to take the place in this country of dental caries in England. Caries is comparatively rarely seen in Bengal but Pyorrhœa is universal and is even more effective in causing loss of teeth in those of advanced age.

It is the exception to meet a man past middle life with healthy gums, and old men almost invariably have the disease in an advanced stage with recession of gums and loosening or loss of teeth. Even below the age of twenty the disease is extremely common.

I think it may be said that beyond these generalities very little is known about the disease in Bengal. Its exact distribution and prevalence, its causes, effects on general health, relation to other diseases and amenity to treatment all need investigation.

This paper will throw no light on the most important question of all, namely, the cause of Pyorrhœa. So far as I know we are entirely ignorant of this. Much valuable work has been done in Europe and America on its pathology, bacteriology, etc., but as to its cause, or the reason why one person gets the disease and another does not, we are still, I believe, quite in the dark.

As regards the other questions much useful information could be collected by observations on prisoners in jail. I started to record observations in Sylhet jail about a year ago, and this paper gives the results of a year's records.

If similar statistics of all the jails in these provinces could be collected, I think our knowledge of Pyorrhœa in Bengal and Assam could be made very much more definite than it is.

The ideas prevalent among jail medical officers regarding the relations between Pyorrhœa and Dysentery, Pyorrhœa and Scurvy and other diseases such as beri-beri, epidemic dropsy, etc., are extremely vague and divergent. One man will say that jail dysentery depends entirely on the condition of prisoners' gums. Another will deny that there is any connection.

The condition used to be, and still is, often erroneously talked of as "spongy gums," and almost every jail disease has at one time or another been put down to "spongy gums." A great deal of loose talk and many dogmatic theories have been the result of this confusion of terms and the supposed connection between Pyorrhœa and Scurvy.

As a matter of fact the gums in Pyorrhœa are never spongy and bear no resemblance to the fungoid hæmorrhagic gums of Scurvy.

All this confusion could soon be cleared up by the collection of a few years' statistics in the jails, and the connection between Pyorrhœa and Dysentery, Scurvy, and other complaints definitely settled.

The first question which arises is whether the disease so common in Bengal is the same as the Pyorrhœa Alveolaris of European writers. There seems to be no reason to think otherwise. Its symptoms on the whole correspond very closely with the English descriptions. The following are the characteristics of the disease as seen here.

CHARACTERS OF THE DISEASE.

In the earliest cases the gums on inspection often appear normal, or they may have a rather deeper colour than natural, a purplish hue instead of a light pink. They are never swollen, but the margins may be slightly thickened and do not lie so flatly in contact with the teeth as they should do. On pressure a little blood wells up between the gums and teeth, but no pus. In this stage in fact the disease is not a Pyorrhœa.

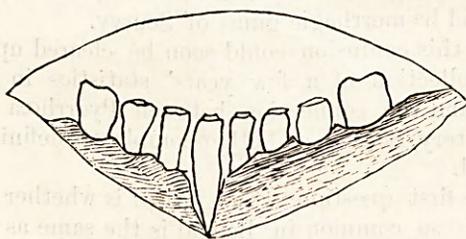
In older cases the gums may or may not be swollen. The edges are markedly thickened and loosened from contact with the teeth. On pressure pus alone or pus and blood well up between the gums and teeth.

In a still more advanced stage there is a thick deposit of more or less inspissated pus along the edges of the gums which are beginning to recede and leave the necks of the teeth exposed. The mouth is very foul and the breath smells. On brushing away the deposit of pus, visible ulceration of the gum margins is often evident.

Later still the gums recede extensively and the bony alveolar margins atrophy with them, leaving a large part of the roots of the teeth exposed. The teeth then become loose and finally drop out.

At any stage after the first tartar may be deposited on the teeth at the gum margins. Sometimes an enormous amount collects and serves as a splint to keep the loose teeth in position. Mastication may be carried on efficiently by masses of tartar burying or replacing some of the teeth. Beneath the deposit of tartar the gums invariably recede and discharge pus and are usually ulcerated.

The first teeth to be affected by the disease are usually the lower incisors and canines, and it is generally, though not always, to be seen here in a more advanced stage than elsewhere. The upper incisors follow and then the premolars and molars. The buccal gums are affected more obviously than the lingual. Often one lower incisor is laid bare almost to the end of its root before other teeth are seriously affected. The gum margin then has a remarkable irregular notched appearance as in the diagram below.



In my experience, when once the disease has advanced to the stage of recession, it can never be cured until all the teeth have dropped out. It never even becomes quiescent. Pus is always to be found on pressing the gums and steady progress takes place with periodical exacerbations until all the teeth are gone. Not till then will the patient ever again have a healthy mouth.

Further than this, I am very doubtful whether the disease is ever cured once the early purulent stage has set in.

A patient with Pyorrhœa may come for treatment during the periodical exacerbations. At this time his gums become more swollen and ulcerated. Perhaps his teeth get looser and eat-

ing becomes painful and difficult. At other times he is not seriously inconvenienced. These acuter manifestations of the disease subside under treatment, and probably without treatment, but only to this extent, after the earliest stage is past, have I found the disease amenable to remedies. The acuter symptoms may be relieved, but the chronic state remains.

During the earliest stage, when the gums have not receded, are not markedly thickened and are fairly healthy in colour and appearance, when only blood or a little pus are visible on pressing them, recovery may no doubt take place; the gums may become quite healthy again. But even this I have not often seen. In Sylhet jail it was only found to occur in 1.2% of prisoners who were examined on admission and re-examined on release, and this in spite of the fact that an improvement of general health usually takes place in jail, and cleanliness of teeth and the use of tooth sticks and powder are enforced.

METHOD OF OBSERVATIONS.

Sylhet jail has an average population of nearly 700 prisoners. The observations were confined to convicted prisoners. About 1,200 convicts are admitted during the year with sentences varying from one week to ten years and a few "lifers."

The population may be taken as affording a fair sample of the male inhabitants of the surrounding country and, provided the figures are large enough, may be expected to furnish reliable statistics of the condition of these people as regards—

- (1) The general prevalence of Pyorrhœa.
- (2) Its relation to season.
- (3) " " " age
- (4) " " " religion and corresponding habits.
- (5) " " " occupation.

Observation of the prisoners may also be expected to enlighten us as to—

- (6) Whether Pyorrhœa is connected with poor general health either as cause or effect.
- (7) Whether it has any connection with dysentery, scurvy or any other particular disease.
- (8) Its amenity to treatment.

The condition of the gums of convicts on admission and release has now been recorded for rather over one year. The observations were all made by myself. Every convict comes before me soon after admission to be examined as to his health and fitness for labour. This opportunity was taken to record the condition of the gums in the admission register. Details of 1,139 convicts on admission are now available.

The majority of the convicts again come before me, as superintendent, on release, but unfortunately not all. Many are released during my absence on tour, or on release orders received late in the day after my morning visit. Details of

all convicts released by me have been entered in a special register showing for each man: his prison number, age, period spent in jail, the condition of gums on admission and release, amount of weight gained or lost, diseases and number of admissions to hospital and general health in jail. This book now contains details of 444 prisoners.

No females have been included in any of the records.

The condition of the gums has been registered in all observations under the three headings:—

Pyorrhœa absent, including gums with no blood, pus, swelling or recession.

Pyorrhœa early, including cases showing blood or pus without decided recession.

Pyorrhœa old, including cases with marked recession, loosening or loss of teeth.

THE RESULTS OF OBSERVATIONS.

(1) GENERAL PREVALENCE OF PYORRHŒA.

Out of a total of 1,410 male prisoners of all ages examined:—

525 or 37·2 per cent. had healthy gums.
646 or 45·8 „ had early Pyorrhœa.
239 or 17·0 „ had old Pyorrhœa.

(2) SEASONAL PREVALENCE.

This is shown by Chart (1) in which the black curve presents the monthly percentage of healthy gums found among prisoners on admission in whom Pyorrhœa was either absent or in the early stage.

Those presenting old Pyorrhœa were excluded from the figures, because their condition is permanent and cannot show any noticeable seasonable changes. Even among the early cases of Pyorrhœa included in the figures there were probably a large number whose condition was past being cured by seasonal or other influences, but it was expected that a certain proportion of those in the earliest stages would have gums in a state fluctuating between the healthy and the unhealthy, and would affect the monthly proportions of healthy to unhealthy gums, if season has any influence on the prevalence of Pyorrhœa.

Table (A) gives the figures from which the curve of healthy gums was constructed. It may be noted that the total admissions in some months were so small as to admit of considerable statistical error. This error was reduced to some extent by applying a correction for age. The average age of each month's admissions varied from 31·5 to 35·5, and a correction calculated on Chart (2) was added to or deducted from the percentage of healthy gums according as the monthly average age exceeded or fell short of the mean average age (33·0) for the whole year.

TABLE (A).

1911-12.	Total admissions with Pyorrhœa absent or early.	Average age of monthly admissions.	Percentage with healthy gums.	Corrected percentage of healthy gums.
July ...	60	35·5	38·3	41·8
August ...	101	32·5	49·0	48·0
September .	79	35·0	38·0	40·8
October ...	38	33·5	50·0	50·7
November ...	69	33·5	52·2	52·8
December ...	83	32·0	67·5	66·4
January ...	81	33·5	55·5	57·0
February ...	101	32·0	54·4	53·3
March ...	95	34·0	55·8	57·1
April ...	62	32·5	41·9	41·4
May ...	57	35·0	36·8	39·6
June ...	148	31·5	25·0	24·0

Showing the monthly percentage of healthy gums found among prisoners admitted with gums healthy or in the early Pyorrhœic stage, with a correction applied for variations of monthly mean age.

Chart (1) shows plainly that season has a marked influence. The percentage of healthy gums remained below 50 during the six hot months of the year, April to September, and above 50 during the months October to March. The lowest point was reached in June when the proportion of healthy to early Pyorrhœic gums was 25 : 75, and the highest point in December when the proportion was 66 : 34.

As an indication of the seasonal fluctuations in the general health of the population, I have also prepared a curve showing the average weight of prisoners admitted during each month of the year. For comparison with the curve of healthy gums it is shown on the same Chart (1).

In estimating the mean weights every precaution was taken to reduce the "probable error" as far as possible. Prisoners under 20 and over 60 years of age were excluded. All weights, which diverged from the mean by more than 20 lbs., were eliminated, and a correction was made for the number of ages below 30, since it was found that the proportion of young prisoners admitted from month to month varied considerably, and the average weight in the decade 20—30 was 5·4 lbs. below the average between 30 and 60.

It will be seen that the curve of average weight corresponds roughly with the curve of healthy gums. The average weight was below 110 lbs. for the seven months May to November, and above for the five months December to April. The lowest points of the two curves occurred at the same season, but the highest average weight was found in April, and the highest percentage of healthy gums in December. There was a remarkably abrupt fall in average weight in the month of May, followed by a similar fall in the percentage of healthy gums in June.

It seems, therefore, that the prevalence of Pyorrhœa is connected with the state of general health of the population as indicated by

fluctuations in average weight. Probably any cause which lowers the general standard of health also decreases the proportion of healthy gums.

No other causes than pure seasonal influences can be found to account for the fluctuations shown in the curves of Chart (1). The year under consideration was a healthy one throughout and remarkably free from malaria. I do not remember to have found more than half a dozen enlarged spleens among some 1,200 prisoners admitted. Extensive observations in the district during a special investigation into the prevalence of Kala-azar showed that the splenic index among 1,842 village children was only 1.3 per cent. during the season, December 1911 to April 1912. There was certainly no epidemic of malaria in April or May to account for the rapid fall in the curves.

Nor was there any seasonal scarcity during the year or deficiency of any essential article of diet. Fish and vegetables are always available in the villages throughout the year and there was no shortage of rice.

It would appear that the onset of the hot damp weather causes a rapid decline of general health, while a steady improvement takes place during the cold season, and the prevalence of Pyorrhœa is markedly affected by these fluctuations.

(3) THE INFLUENCE OF AGE.

Chart (2) shows the age incidence of Pyorrhœa in five age-periods. It is based on 1,139 observations of prisoners on admission and 271 on release.

The figures in each age period except the last were large enough to avoid any great statistical error. The main error to be considered is that incident to the estimation of age. The ages of prisoners can be only approximately fixed, as few of them can say with accuracy how old they are.

The chart shows that at the age of about 25 the numbers of men presenting healthy and unhealthy gums are about equal. As age advances from this point a steadily diminishing minority is found with healthy gums, until beyond the age of 55 it is only 6.0 per cent.

(4) THE INFLUENCE OF RELIGION AND RACE.

This is shown by Chart (3) which is based on observations of prisoners on admission.

The chart also shows the proportions in which the different classes were admitted. Roughly one-quarter of all admissions were Hindus and three-quarters were Mohamedans.

It will be seen that the Hindus were decidedly more unhealthy as regards the condition of their gums than the Mohamedans. The reason of this is obscure. Differences in diet will not account for it, since in this district the diet of the two classes is practically identical. All classes eat

fish daily, while pulses are used to a small extent only. Fish is always plentiful while *dals* are not grown in the district and have to be imported. The immigrant coolie class, which formed about one-third of the Hindu admissions, is to some extent an exception. Retaining the habits of their country they eat a considerable amount of *dals*, but by no means to the exclusion of fish. The Mohamedans, though occasionally eating fowl, seldom touch any form of flesh besides fish.

The Hindu admissions can be divided into three classes, *viz.*:—

(1) The Hindu natives of the district mostly of the lowest castes.

(2) The Hindu immigrant coolies of whom most are semi-permanently settled in the tea gardens of the district.

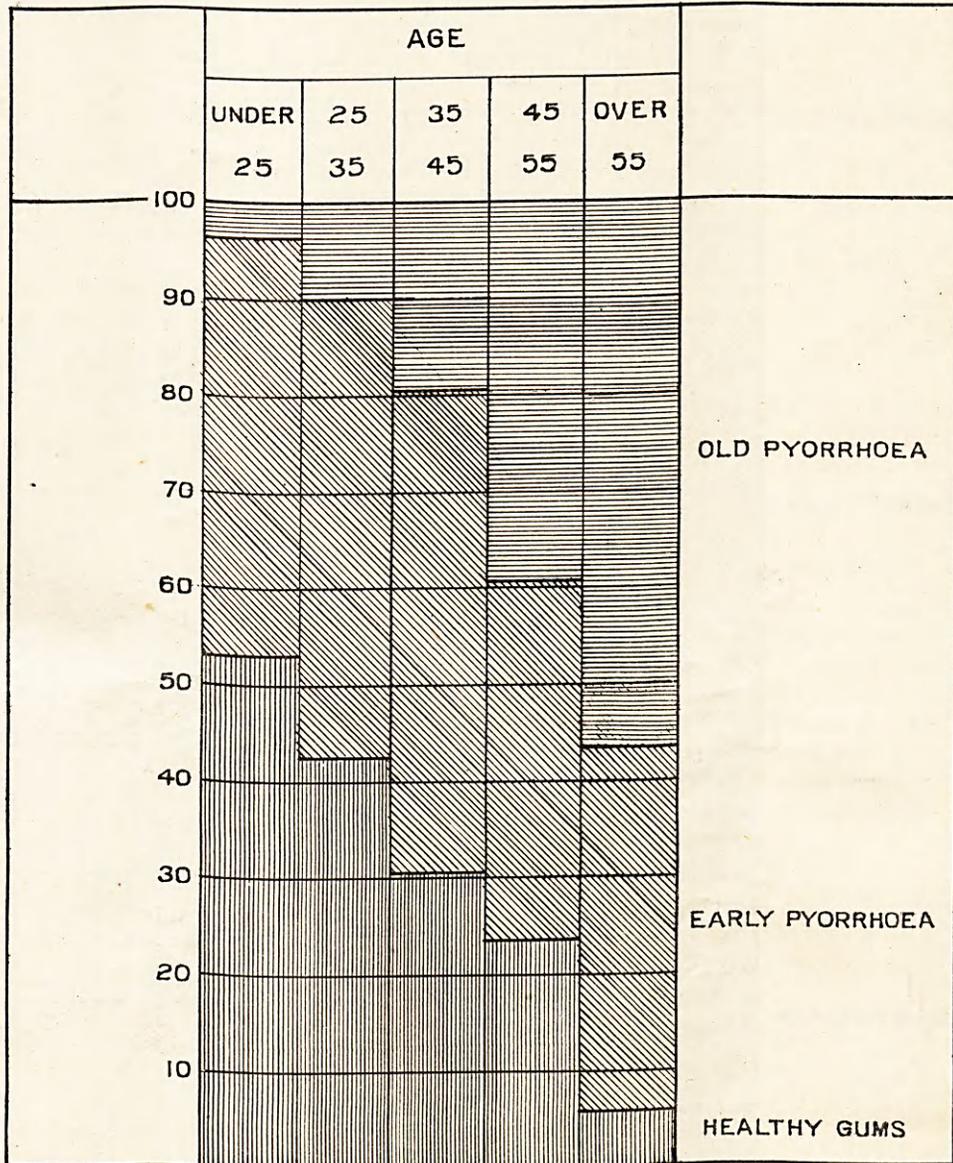
(3) The Manipuris who are Mongolian colonists from the Manipur Hills and have formed many permanent settlements in Cachar and Sylhet.

The Hindu natives and the Hindu coolie class showed much the same percentage of healthy gums. The Manipuris approximated more to the Mohamedans, but the number examined was too small to warrant any conclusions.

There were in addition 8 prisoners admitted belonging to other Hill Tribes, of whom 7 had healthy gums. This number is too small to be of any value, but I may state that from observations both in and outside the jail I have formed the opinion that Pyorrhœa is very much less prevalent among the Hill Tribes living in the hills than among the plain's population. The plains-dwelling Manipuris do not show this difference, so that it may be a matter of environment rather than race.

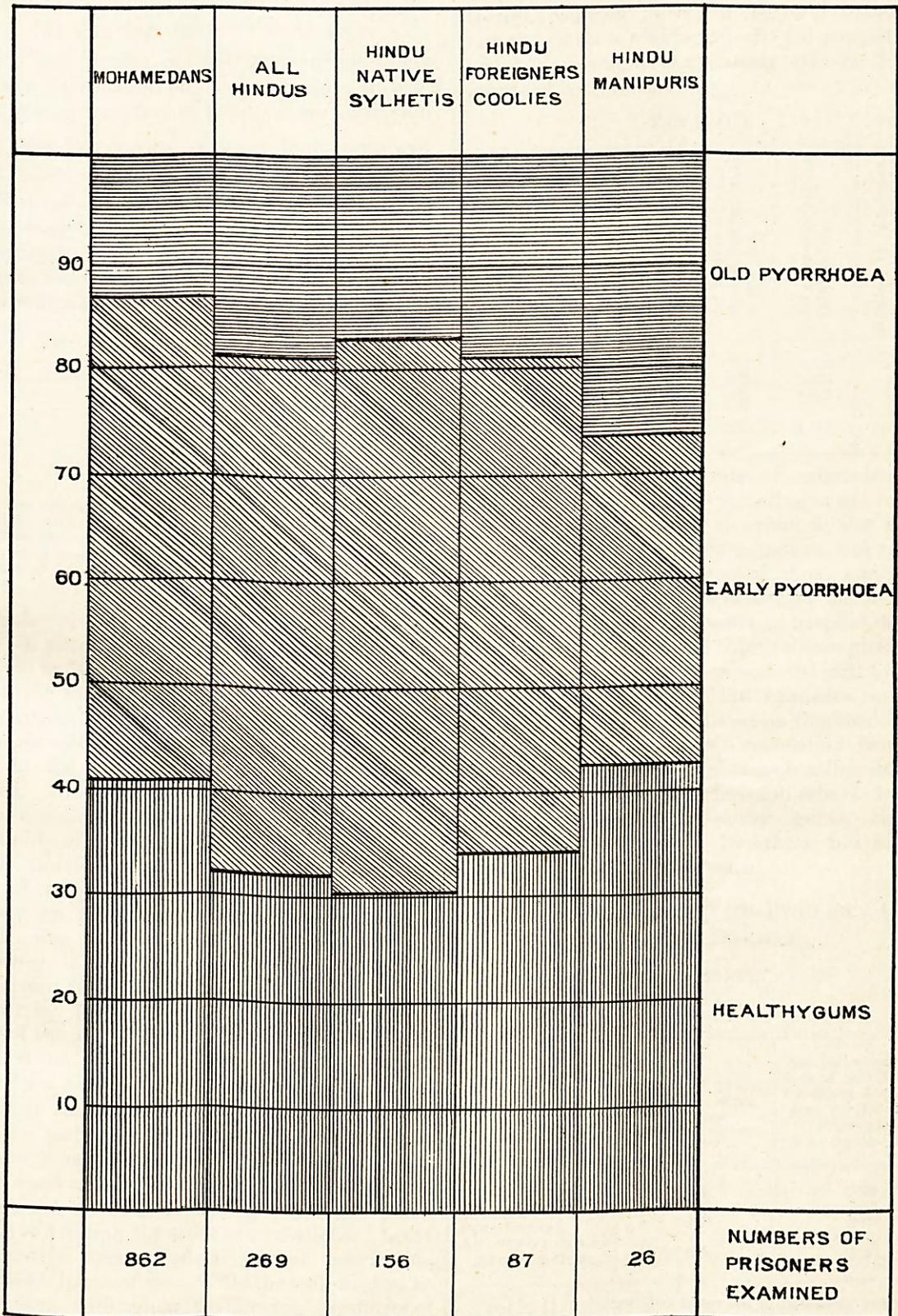
It may be remarked here that the standard of living of all classes in this district is high and, because of the large amount of fish consumed, their diet has a high nitrogenous value. Fish is available in all parts at all times of the year, and Sylhet is probably the chief fish producing district of Bengal and Assam. The health of prisoners on admission to jail is correspondingly good. Those who lose weight during residence in jail are nearly equal in number to those who gain. The excess of weights gained over weights lost averages only one pound per head of all released prisoners. The average for Hindu coolies is 1.7lbs., indicating that this class is more unhealthy than the natives of the district. There are several reasons for this which need not be gone into here, and the conclusion is borne out by experience. In most parts of India figures would probably show a higher average gain of weight in jail, indicating a lower standard of health among the general population. Whereas in most parts of India the jail dietary is very much better than that of the outside population, this cannot be said to the same extent of Sylhet

CHART (2)



Showing the percentages of prisoners in five age periods with healthy, early pyorrhœic, and old pyorrhœic gums.

CHART (3)



Comparing the percentages of healthy, early pyorrhoeic, and old pyorrhoeic gums found in prisoners on admission among different races and religions, and showing the proportions in which Mohamedans, Hindus, and three different classes of Hindus are admitted to jail

Though $\frac{1}{3}$ chittack of fish is issued daily, this is much less than the people are accustomed to take in their homes, and they do not as a rule appreciate either the quality or the quantity of the jail diet.

(5) THE INFLUENCE OF OCCUPATION.

The jail figures are not large enough to give us any information on this point, since all but a very small percentage of prisoners are cultivators.

(6) THE CONNECTION BETWEEN PYORRHŒA AND THE STATE OF GENERAL HEALTH.

We have seen an indication in Chart (1) that a lowering of general health increases the tendency to Pyorrhœa. Further evidence of the connection is obtained by studying the weights of prisoners and their admissions to hospital while in jail.

TABLE (B).

	Average Weight in Age-periods (lbs.).			
	20-30	30-40	40-50	50-60
Pyorrhœa absent...	109.5	114.0	114.0	107.2
Pyorrhœa early ...	106.2	113.0	114.8	111.7
Pyorrhœa old ...	104.0	107.4	113.0	113.6
Totals of prisoners examined ...	323	456	204	69

Table (B) shows the average weight on admission of prisoners with Pyorrhœa absent, early, and old in four age-periods. It will be seen that below the age of 40 there is a marked correlation between unhealthy gums and deficient weight, while over 40 this correlation seems to disappear, and in the last decade actually becomes reversed. Only 69 men in this decade, however, were examined, too small a number to avoid the possibility of a large statistical error.

The question arises whether Pyorrhœa causes loss of weight or whether loss of weight is merely an indication of a depressed state of health due to other causes which increases the tendency to Pyorrhœa. The latter is probably the main factor in producing the variations displayed by Table (B), and we may infer that beyond the age of 40 all but a resistant few have reached an established and incurable stage of Pyorrhœa, and the influence of depressed general health in starting an early Pyorrhœa, or converting an early into an old stage, is less evident than in younger men.

To some extent, however, Pyorrhœa must itself cause loss of weight, especially in its advanced stages and during the acute exacerbations. Loose and painful teeth produce deficient mastication and assimilation of food, while the foul mouths, so often seen with gums discharging quantities of pus, must re-act on the general health and weight.

It may be remarked that in the prisoners of this and most other Indian jails loss of weight may be taken as a direct indication of loss of health. A condition of unhealthy obesity, due to too much food and too little bodily work, though common in certain classes of Indians, is rare among those who furnish the jail populations, and loss of weight can scarcely ever be due to improved conditions.

TABLE (C).

	Number of prisoners examined on release.	Total number of admissions to hospital while in jail.	Total number of months spent in jail.	Number of admissions to hospital per 100 prisoners per month.
Pyorrhœa absent	116	78	1,218	6.46
Pyorrhœa early ..	212	139	1,953	7.12
Pyorrhœa old ...	116	107	1,165	9.2
All Pyorrhœic gums combined	328	246	3,118	8.0

Table (C) shows the rate of admission to hospital for all diseases according to the condition of gums on release. It refers to the whole period spent in jail by each convict, and not to the past year only. Some of them may have been in jail for 5 years and others for one month, but in both cases all admissions to hospital, while in jail, are included. The third column gives the total number of months spent in jail by all prisoners combined, and the admission rate in the fourth column is calculated on this total.

This table again displays a correlation between diseased gums and poor general health. It will be seen that the hospital admission rate is lowest among prisoners with healthy gums, higher among those with early Pyorrhœa and higher still among the old Pyorrhœics.

(7) THE RELATION BETWEEN PYORRHŒA AND PARTICULAR DISEASES.

(a) *Dysentery.*

TABLE (D).

	Number of prisoners examined on release.	Number of admissions to hospital for dysentery & diarrhœa per 100 prisoners per month.
Pyorrhœa absent ...	116	2.54
Pyorrhœa early ...	212	3.53
Pyorrhœa old ...	116	2.83
All Pyorrhœic gums combined...	328	3.20

Table (D) shows the hospital admission rate for dysentery and diarrhœa calculated in the same way as the general hospital admission rate in

Table (C). The figures for these two diseases have been combined because it is certain that the majority if the diarrhoea cases were really mild attacks or slight relapses of dysentery, not severe enough to show mucus or blood. A few cases diagnosed, for reasons unknown, as Colitis are also included.

The table shows that there were decidedly more admissions for dysentery among the unhealthy gums than among the healthy, but for some reason the admission rate is highest among the early Pyorrhœics, while it is very little higher among the old cases than among the healthy gums. This can be explained by supposing that Dysentery is a cause of Pyorrhœa rather than the reverse, that it rapidly brings all cases which are on the brink between the healthy and the early Pyorrhœic state into the latter category, but the corresponding effect in converting early into old Pyorrhœa is not so evident because this is a result which requires time, and is not brought about within the usual short sojourn of the average prisoners in jail. If, on the other hand, Pyorrhœa were to any extent a cause of Dysentery, we should expect this disease to be most frequent among the old Pyorrhœics who have the most septic mouths.

On comparing Tables (C) and (D) it will be seen that the admission rate of the healthy gums bears exactly the same ratio to that of the unhealthy in the two tables, thus:—

$$6.4 : 8 = 4 : 5 = 2.5 : 3.2$$

The relation between Pyorrhœa and Dysentery appears to be exactly the same, therefore, as that between Pyorrhœa and all causes of admission to hospital combined, and Dysentery must be considered to have the same, and no closer connection with diseased gums as other complaints which are associated with a state of depressed general health.

(b) Scurvy.

A possible connection between Scurvy and Pyorrhœa needs careful consideration. There are two possible relationships between the two diseases.

(1) It might be supposed that Pyorrhœa is a form of mild chronic scorbutus, or at least the residue of frequent epidemics of Scurvy among the population. Such epidemics are said to be common in parts of Russia and are there thought to be infectious. I think this theory may be dismissed at once. There is absolutely no evidence that Scurvy exists among the population. I have never heard of an epidemic and never seen cases in the hospitals, though Scurvy undoubtedly occurs sometimes in the jails. The diet of the people is sufficient in quantity and contains plenty of antiscorbutic elements at all seasons. Moreover, there is no resemblance between the condition of the gums in the two

complaints except during the occasional acute exacerbations of Pyorrhœa when the gums swell up to some extent. Even then they have not the deep purple colour and fungoid appearance of scorbutic gums and are not infiltrated with hæmorrhagic effusions. The earliest and commonest cases of Pyorrhœa show no signs that the gums have ever been spongy, and none of the constitutional or hæmorrhagic symptoms of Scurvy are to be seen even in the worst cases of Pyorrhœa.

(2) It is possible and even probable that Scurvy might increase the liability to Pyorrhœa. In a country where so many are on the verge of this complaint an attack of Scurvy would be very likely by its effect on the gums to precipitate its onset or accelerate its progress if already present.

It so happens that an outbreak of Scurvy occurred in Sylhet Jail about September 1911. About 60 cases were admitted to hospital, and many more had slight signs of the disease not requiring admission. The symptoms were great swelling of the gums which in some cases formed enormous fungoid hæmorrhagic masses almost concealing the teeth, with weakness and pains in the legs. The typical brawny infiltration of the subcutaneous tissues of the legs below the knees was a marked feature in all the cases admitted to hospital, but hæmorrhages, besides those of the gums, were seen in only one or two cases. The causes of this outbreak were obscure. The supply of vegetables was not so good at that time of year as at others. The jail garden being low is flooded through most of the rains, and only a few kinds of vegetables will grow. Still, a sufficiency of green vegetables, mostly Kochu, was issued daily as well as a ration of preserved tamarind and a small quantity of fresh fish with a little potato and the usual allowances of rice, *dal*, onions and spices. The diet was certainly not one which would produce Scurvy under ordinary circumstances, but the causation of Scurvy is far from being completely known. Other influences, besides deprivation of fresh vegetables, are certainly concerned. Among these confinement and overcrowding are recognised, and the jail at that time was decidedly overcrowded.

When the outbreak began the condition of gums of only a few prisoners had been recorded. Information as to the previous presence of Pyorrhœa in the Scurvy cases was not, therefore, available. Thirty-seven of the severer cases admitted hospital have, however, been recently examined most of them about eight or nine months after recovery, with the following results:—

19.4%	had healthy gums.
66.6%	had early Pyorrhœa.
14.0%	had old Pyorrhœa.

The average age of these 37 prisoners was 34, and a reference to Chart (2) will show that for this age the percentage of old Pyorrhœa was about normal, but the percentage of healthy gums was considerably lower than normal. The figures are small to warrant conclusions, but so far as they go they indicate that an attack of Scurvy may increase the liability to Pyorrhœa.

If, therefore, it could be shown that Scurvy existed to any extent among the general population, it might account for the great prevalence of Pyorrhœa. But there is absolutely no evidence of any such scorbutic tendency. As for the possibility that Pyorrhœa is itself a manifestation of Scurvy, and due to similar causes, I have shown that this is extremely unlikely.

As regards other diseases and their relations with Pyorrhœa, the figures of one jail for one year are insufficient to furnish any information. Valuable knowledge might very possibly be gained from the combined statistics of several jails for several years. I may briefly mention some of the main diseases to be considered; and something may be learnt from their general prevalence among a population so afflicted with Pyorrhœa.

(c) *Respiratory Diseases—Particularly
Bronchitis & Pneumonia.*

In order to eliminate the factor of age the hospital admission rates must be calculated for several separate age-periods, and statistics of a very large number of prisoners would be required to furnish sufficient figures.

(d) *Digestive Diseases.*

Dyspepsia and various disorders of digestion are extremely common among Indians of all classes, but jail statistics are not likely to give us much information as to their connection with Pyorrhœa, because prisoners are rarely admitted to hospital for these comparatively slight ailments.

It may be remarked that compared with English hospitals cases of gastric and duodenal ulcer are extremely rare in the hospitals of Bengal and Assam, while chlorosis with its gastric complications is, in my experience, neither seen nor heard of. Appendicitis is by no means rare, but is certainly not nearly so common in the hospitals as it is in England.

The universal presence of intestinal parasites is a possible factor in the causation of Pyorrhœa.

(e) *Rheumatic Complaints.*

Rheumatoid arthritis (Arthritis deformans) which has been connected by English writers with "oral sepsis" is, I believe, very rare in this country. I cannot remember to have seen a case. Acute rheumatism is also comparatively

rare. I have seen cases with all the arthritic symptoms and at least one with endocarditis, and cases of valvular heart disease with a history of rheumatic fever occasionally appear in hospital, but acute rheumatism and heart disease are undoubtedly very much rarer than in England.

Chronic rheumatism of all kinds, on the other hand, is extremely common, though I should not like to say more common than in England. Here, again, jail statistics will not help us in elucidating its possible connection with "oral sepsis," as it is not a disease for which prisoners are admitted to hospital.

In conclusion, it may be remarked that though this investigation is far from being a complete one and leaves us almost as much in the dark as ever regarding the etiology of Pyorrhœa Alveolaris, yet it might have been expected to afford some evidence in support of the theories which have attributed such dire results to "oral sepsis."

Though the number of observations has been too small to throw light on many questions connected with the disease, still few European writers on Pyorrhœa are likely to have had the opportunity of seeing so many cases within so short a time. Moreover the circumstances of prisoners in jail are peculiarly favourable for observations of this sort. They are weighed every fortnight, their health is carefully watched and their fitness tested by enforced labour. 885 cases of Pyorrhœa have thus been kept under observation in Sylhet Jail for periods varying from a few weeks to a year. The great majority of these cases had septic mouths and very many had oral sepsis in its most extreme form, though not of the kind due to carious cavities and septic stumps.

Oral sepsis has, at one time or another, been suggested by European writers as the cause of a great many diseases, chief among which are perhaps rheumatoid arthritis, malignant endocarditis, appendicitis, gastric and duodenal ulcer.

Yet none of these have been seen in the jail and they are certainly very rare in the hospitals of the district, although the population is so generally afflicted with Pyorrhœa. Moreover little definite evidence has been found that this form of oral sepsis has any marked deleterious effect on health. Such evidence as we have found of a connection between poor health and an increased tendency to Pyorrhœa indicates that this tendency is more often the result than the cause of depressed general health.

There are two complaints, however, which stand out as being especially common among the general population and may possibly have some connection with the prevalence of Pyorrhœa, namely, many and various disorders of the digestion and chronic rheumatism.

(8) AMENITY TO TREATMENT.

As remarked above I believe Pyorrhœa Alveolaris to be incurable when once recession of the gums has started and probably even before this when pus has once made its appearance. By incurable I mean that a state of completely healthy gums free from pus and not bleeding on pressure can never be re-established. I do not mean that the symptoms of which patients mostly complain cannot be alleviated, namely, tender, swollen and easily bleeding gums and painful loose teeth. These are the symptoms of the periodical exacerbations. They certainly subside to a very large extent under treatment, and the loose teeth become tight again provided recession and bony atrophy have not advanced to such a degree as to remove all support for the roots of the teeth.

On the other hand, the early cases with no thickening and recession of the gums and showing only blood on pressure without pus certainly do recover. The fluctuations shown in Chart (1) prove this. If at one time of the year only 24 per cent. of gums are found healthy and at another time 66 per cent., among prisoners admitted without old Pyorrhœa, it is certain that many of those who have early Pyorrhœa in the unhealthy months lose it in the healthy season.

This has rarely been observed to happen in the jail however. Among 165 prisoners examined on admission and re-examined on release:—

- 2 or 1.2 % admitted with early Pyorrhœa had healthy gums on release.
- 21 or 12.7 % admitted with healthy gums had early Pyorrhœa on release.
- 7 or 4.2 % admitted with early Pyorrhœa had old Pyorrhœa on release.

Among those admitted with old Pyorrhœa none were found to have improved on release. These results occurred in spite of the fact that considerable attention is paid to prisoners' teeth in jail. On parades every man is made to pull down his lower lip and show his gums, and those found with dirty mouths are warned or punished. The regular use of tooth sticks and charcoal powder is enforced. Moreover a gain in weight and improvement in general health usually take place in the jail as the result of good food and sanitation, though not to the same extent perhaps as in other parts of India.

The worst cases of Pyorrhœa are admitted to hospital. The treatment which is found most successful for the acute cases is a thorough swabbing of the gum margins once a day with tincture of iodine and the hourly use of a weak iodine mouth wash, combined with good food, tonics and measures to improve the general health.

SUMMARY OF CONCLUSIONS.

(1) Pyorrhœa Alveolaris is so common among the natives of these parts as to be almost a natural condition.

Of those who live their full span of life very few escape it. Age is the chief factor in its development. Many develop the disease in youth and many not till advanced life, but the liability steadily increases with age.

About 25 is the age at which half the males are to be found with Pyorrhœa and half without.

(2) There are marked seasonal fluctuations of prevalence. More healthy gums are to be found in the cold dry season than in the hot damp weather.

This appears to be due to the effects of seasonal influences on the general health of the population.

(3) Hindus seem to be rather more subject to the disease than Mussalmans. The reason for this is not obvious.

(4) There is a decided correlation between unhealthy gums and a state of poor general health as indicated by deficient weight and by an increased hospital admission rate.

There is some evidence to show that Pyorrhœa is more often the result than the cause of depressed health.

(5) No definite evidence was found of any closer relation than this between Pyorrhœa and any particular disease, but possibly Scurvy, due solely to its local action in damaging the gums, may aggravate the Pyorrhœal state more than any other constitutional disease.

(6) There is evidence to show that Dysentery acts as a cause of Pyorrhœa, and not *vice versa* but only to the same extent as other diseases which depress the general health.

(7) Nothing was found to support the various theories which have attributed to oral sepsis, such diseases as rheumatoid arthritis, appendicitis, gastric and duodenal ulcer, etc., but it is possible that other less distinctive complaints, such as chronic dyspepsia, constipation and disorders of digestion, and chronic rheumatism may have some connection with oral sepsis. These complaints are certainly unduly prevalent throughout Bengal and Assam.

(8) Pyorrhœa is incurable once the earliest stages are past. The more troublesome symptoms, however, which occur during the exacerbations, are to some extent amenable to treatment.

I have to thank Sub-Assistant Surgeons Manindra Mohan Guha and Hari Charan Karmakar for valuable help in recording these observations.

AN EFFICIENT STERILIZER FOR USE IN SMALL TOWNS.

BY R. J. L. SLADEN, F.R.C.S.,

Surgeon, G. I. P. Ry.

WHEN I first came to India ten years ago, I had for the want of a sterilizer to boil dressings in water or steam them, and finding that it was