13-8-35 13 III

Local & Munl. (1897) Department.

PRINTED.

G.O., No. 887 M

DATED 13-4-97

DESPATCHED

[Despatch Abstract.]

Bubonic Plague

Recording with remarks Surgr-~~Major~~ Major Bannerman's report of his deputation to Bombay in connection with the treatment of the ——, & ordering that a telegram be despatched to the Secy. of State for twenty pravaz Screw Syringes of ten cubic centimetres capacity.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

Read—the following paper:—

From the Surgeon-General with the Government of Madras, dated 2nd April 1897, No. 191.

With reference to G.O., Nos. 427 and 428 M., dated 8th March 1897, I have the honour to state that Surgeon-Major Bannerman returned from Bombay on the 30th March, and to submit an interesting and instructive report on his investigations regarding the bubonic plague.

2. Surgeon-Major Bannerman informs me that Professor Haffkine will be able to supply the serum for inoculation from Bombay, if it is required in this Presidency.

3. I would suggest that a telegram should be sent to the Right Honourable the Secretary of State for India to send out at once twelve of pravaz serum syringes, each of 10 cubic centimetres capacity, with leather pistons and graduated stems. These syringes are best obtained from M. Charriere Collin, Scientific Instrument Maker, Paris.

Enclosure.

From the Inspector of Vaccination and Deputy Sanitary Commissioner for Madras, on Special Plague Duty, Bombay, to the Surgeon-General with the Government of Madras, dated 27th March 1897.

In accordance with G.O., No. 427–28 M., of 8th March 1897, I have the honour to submit herewith my report on the treatment of the bubonic plague both generally and with special reference to the methods of treatment adopted by M. Haffkine and Dr. Yersin.

2. For this purpose it is necessary that a medical officer should be able to recognise at the earliest possible date the occurrence of a case of plague, both for the sake of the patient himself, and for the prevention of the spread of the infection. In cases presenting the classical signs there can be little difficulty in arriving at a correct diagnosis, but when the glandular swellings are absent, as they often are, it may be necessary to keep a patient under observation for some days before a decision can be arrived at.

3. The following signs and symptoms may be regarded as typical:—A rise of temperature on the first day of the disease, of a very pronounced character, 106° or more being common, accompanied by severe shivering and frequently vomiting. In 95 per cent. of the cases the conjunctivæ are found to be injected on the second day of the disease. The tongue may be described as being like wash-leather, or of a rusty brown "typhoid" appearance, with red or even inflamed edges. When spoken to, the person answers in a slow hesitating indistinct manner, the syllables being separated from one another, and the impression conveyed being that the individual is under the influence of alcohol. The gait is also in many cases suggestive, being like that of a drunken man. Some cases, on the other hand, may present violent maniacal symptoms, or the man may answer in an irritable manner as if resenting being questioned. But the typical appearance is the stupid dazed look of one newly wakened from a deep sleep, and there is evident difficulty in realizing new surroundings, and understanding what is going on around. Vomiting or diarrhœa or both, may be present or not. Buboes should of course be carefully looked for in the groins, armpits, sub-maxillary regions, and in fact in all places where glands are known normally to exist, as they are sometimes found in most unexpected spots.

4. The bacteria characteristic of plague are found in the fæces, sputum, blood and lymphatic glands. They are easily detected in fluid withdrawn from the glands both by the microscope and by cultivation in agar tubes. As far as the Bombay epidemic shows, it is often impossible to detect them in the blood, and if they are detected it is generally of evil omen for the patient. The fæces and sputum contain so many bacteria in the normal state that it is a matter of difficulty to separate the plague bacillus from the more robust forms already present, and though they may be detected by the microscope, it is impossible to tell for certain without cultivation, whether the forms seen are really the specific bacillus or not. For ordinary diagnostic purposes, then, it is best to rely on matter withdrawn from the affected glands, and the following is the method recommended by M. Haffkine as the easiest and best. The apparatus required is, a supply of Pasteur's pipettes, microscopic slides, carbol-fuchsin stain, a spirit lamp, turpentine and absolute alcohol. Pasteur's pipettes are prepared as follows, from ordinary glass-tubing. The tubing being heated to redness in the flame of a Bunsen burner is removed from the flame and immediately drawn out, so that a pipette with very fine tapering point is formed. The tapering end is about 6 inches long and in diameter a little stouter than a hypodermic needle. The point is closed by melting in the flame, and the other end of the tube being closed with a plug of cotton wool inserted a quarter of an inch within the orifice; the whole is sterilised by being rotated in the flame until the cotton is stained of a uniform brown colour. The skin over the gland must be carefully disinfected by washing with soap and warm water, and the application of turpentine and alcohol. Then the pipette having been sterilised by passing several times through the flame of the spirit lamp, the sealed point is broken off leaving a sharp edge which easily penetrates the skin. The skin over the gland is now put on the stretch by the finger and thumb of the left hand, while the pipette is given a final heat in the flame, and by means of rotary motion imparted by the thumb and forefinger of the right hand is made to penetrate the skin and tissues till it is felt to enter the gland. The capsule of the gland offers some resistance to the point of the pipette, and when it is pierced the sudden cessation of resistance intimates the fact at once. In most cases the contents of the gland will ascend the capillary tube of the pipette at once, but if not the mouth may be applied to the end and suction employed as the mouth will be effectually protected by the cotton plug. The pipette is now withdrawn, and agar tubes inoculated in the ordinary way, after which smear preparations may be made on the slides, which should be allowed to dry, when they can be stained and examined. The stain may be left to act for two minutes or so.

5. To study the appearance of the bacterium, a one-twelfth immersion lens is required. The characteristic appearance is that of a bacterium rounded at the ends and joined together in pairs, so as to form what M. Haffkine calls a "diplo-bacterium." The division may appear complete or only an indication of it may be seen, and the poles staining more easily than the rest of the organism, a most characteristic appearance is obtained by which it may be easily diagnosed. The appearance of a cultivation in agar, is also very characteristic. Almost no growth is seen for two days, then a peculiar dotted or ground-glass appearance is to be noticed spreading out from the inoculated spot, which once seen is easily recognised. It has been compared to the appearance of the back of a mirror when the growth is viewed from behind, and when looked at from the side with the light reflected from its surface it has a peculiar varnished look, not easily mistaken. Specimens taken from cultures in agar and broth present many and various appearances under the microscope; thus, in the early days of agar culture threads of varying diameter and without divisions may be seen, and in broth cultures, chaplets or chains may be found. In the tissues involution forms are found which it is difficult to recognise, unless a careful study of the transition forms is made.

6. The treatment pursued in Bombay differs little from that laid down by Dr. Cantlie in his paper in the British Medical Journal of 30th January 1897, *i.e.*, stimulants, good nursing and the treatment of symptoms as they arise, special care being taken of the heart, which is so apt to fail suddenly even during convalescence. At the Parel Hospital, Surgeon-Captain Thomson appears to have achieved a considerable amount of success by treating his patients with large doses of perchloride of mercury

with the object of acting on the bacteria in the intestines. He gives two drachms of the liq. hydrarg. perchlor. on admission and a drachm every two hours thereafter for the first 24 hours, and then every three hours till convalescence sets in. His death-rate in cases that survive for 24 hours after admission is 36·27 per cent., and as no salivation is produced, the plan seems worth trying. The glands at this hospital are treated with glycerine and belladonna and hot fomentations when inflamed, with the result that only about 2 per cent. suppurate, which is a great matter as when opened the incisions take a very long time to heal. At the Arthur Road Hospital under the care of Dr. Chowksey, no perchloride is used, but injections of liquor iodi are made into the affected glands, with the result that nearly all the glands suppurate and tedious sores remain open for weeks, retarding convalescence. Dr. Chowksey maintains that the temperature falls after the injection, and that the practice is an endeavour to imitate Nature's mode of cure which he alleges is brought about by suppuration, but this contention is not borne out by the experience of the Parel Hospital noted above. The cases admitted here are probably of a more acute type than those sent to Parel, for the mortality up to the end of February was 54·71 per cent. of the admissions.

7. The plan of treatment adopted by Dr. Yersin is the frequent injection of large quantities of antitoxic serum derived from the blood of horses treated with injections of plague bacilli until they have acquired immunity. He reports that the serum with which he has hitherto operated in Bombay is too weak, and in consequence, not only have very large injections to be made, but the effect produced is not what it ought to be. In most cases the immediate effect of an injection is to lower the temperature a degree or more, but the effect seems soon to pass off unless another dose is given. The following statistics have been obtained from the Parel Hospital through the kindness of Surgeon-Captain Thomson, the medical officer in charge. These comprise most of the cases done by Dr. Yersin in public in Bombay up to date. The cases were chosen by Dr. Yersin himself, and were presumably selected as those most likely to be benefited by the injections; they may therefore be fairly enough compared with the statistics of the whole hospital, when treated in the same way, *i.e.*, by excluding moribund cases dying within 24 hours of admission.

Twenty-two cases in all were injected, but from these we must deduct two cases which turned out not to be plague; this leaves twenty cases for consideration. Of these, two died within 24 hours and may therefore be excluded as noted above. Of the eighteen cases left, nine died and nine recovered, which gives a death-rate of 50 per cent. I therefore think that the method is still too much in the experimental stage to come within the sphere of practical therapeutics. I may mention that a supply of this serum of a more matured kind is now on its way out from Paris, and it will be interesting to watch whether better results follow its use.

8. The methods employed by M. Haffkine are of two kinds, viz., prophylactic and curative. The former agent is prepared by inoculating broth with a pure culture of the plague microbe and allowing it to elaborate its toxin for a period of a month, or until the nutrient material in the broth is exhausted. The broth is then sterilised by being heated to 70 degrees centigrade for the space of one hour, and it is then ready to be decanted into sterilised test tubes for distribution. It will be seen that this preparation differs from the anticholera vaccine, in that it contains no living microbes as the latter does. It is administered in doses varying from one to three cubic centimetres by means of a pravaz syringe inserted into the subcutaneous tissue of the arm or flank. Considerable reaction and discomfort is usually felt for two or three days after, but most people are able to continue their ordinary avocations during the treatment. The statistics collected up to date are decidedly favourable and point to this as a means of protecting a population against the plague, but time alone will show whether this is really so or not. The first opportunity of testing the efficacy of the prophylactic was afforded by an outbreak in the Byculla Jail, which occurred at the end of January last. Between the 23rd and 29th of January nine attacks took place with five deaths. On the forenoon of the 30th, there were six cases with three fatalities; in the afternoon inoculation of 148 of the jail population was effected. That evening three of those inoculated died, two of them having had buboes at the time of injection. The table below shows the subsequent course of the outbreak—

Date of event.	Among 173 not inoculated	Among 148 inoculated.
30th January 1897 after inoculation ..	*Nil.*	3 cases, 3 fatal.
31st " "	2 cases, 1 fatal	1 case, recovered.
1st February "	1 case 1 "	*Nil.*
2nd " "	1 " 1 "	*Nil.*
4th " "	1 " 1 "	*Nil.*
5th " "	2 cases, 1 "	*Nil.*
6th " "	5 " 1 "	1 case, recovered.
Total after day of inoculation ..	12 cases, 6 fatal	2 cases all recovered.

From the above it would appear that the protective power of the vaccine is established after 12 hours only, an astonishingly short time when compared with the seven days required for vaccination against small-pox.

Various other statistics have now been obtained pointing in the same direction; *e.g.*, in the house of Mr. Allan Turner, three persons were inoculated and 14 were not; amongst these 14, two cases occurred, both ending fatally. Six of those left were then inoculated, none of these were attacked; but one case occurred amongst the uninoculated. Again at Worli cemetery, 21 people were inhabiting one house, nine were inoculated, out of the remainder three have been attacked. A clerk near the same place was inoculated, but did not get his family done; of these (a son and two daughters) one has been attacked. A Mr. Prior living at 36 Marine Lines had his family and servants inoculated, about 14 in all; cases have occurred in all the surrounding houses, but none in No. 36 nor amongst the inoculated living in these neighbouring houses.

The total number inoculated up to the 26th is 4,966, and of these five have been attacked. Three of those were attacked four days after inoculation, and all have recovered. Two were attacked within twelve hours and died, but there is evidence to show that both of these cases had the disease in them at the time.

From the above figures it will, I think, be manifest that the inoculations are in themselves harmless, and I would therefore recommend that if the disease should appear in the Madras Presidency, an endeavour be made to protect the population of the place by this means.

The curative serum used by M. Haffkine is obtained in a similar manner to that employed by Mr. Yersin, but as it has not as yet been used in public, it is impossible to pronounce an opinion as to its merits.

ORDER—No. 887 M., dated 13th April 1897.

Recorded.

2. His Excellency the Governor in Council is much indebted to Surgeon-Major Bannerman for his interesting and instructive report of his deputation to Bombay in connection with the treatment of the bubonic plague.

3. As Dr. Yersin's mode of treatment has not been so successful as for the present to warrant its exclusive adoption, the proposal to establish in Madras horse inoculation for the production of the serum will be dropped for the present.

4. The following telegram will be despatched to the Secretary of State for India:—

"Please send twenty pravaz serum syringes (of) ten cubic centimetres capacity (with) leather pistons (and) graduated stems, obtainable Charriere Collin, Paris."

(True Extract.)

G. S. FORBES,
Secretary to Government.

To the Surgeon-General, with spare copies for distribution to District and Medical Sanitary officers.
" the Sanitary Commissioner.
" all Collectors.
" the President, Municipal Commission, Madras.

Exd. Shaik Karim.

BACK PAPERS.

URGENT.

NOTE FOR THE

This G.O is sent to the Madras Office as the number of copies to be struck off will have to be altered.

Sd.
30/4/97

A.C.

2601

Proof

Government (1897) of Madras.

LOCAL AND MUNICIPAL.

Proof for approval

Print off very early & distribute

Press

Strike off please

Secy to Govt.
29/4/97

Recd.	1897.	*Enclosures*
Regd.		*Spare copies*

G.O., No. 887 M., 13th April 1897.

APRIL.

Bubonic Plague.

Recording, with remarks, Surgeon-Major Bannerman's report of his deputation to Bombay in connection with the treatment of the —, and ordering that a telegram be despatched to the Secretary of State for twenty pravaz serum syringes of ten cubic centimetres capacity.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following paper:—

From the Surgeon-General with the Government of Madras, dated 2nd April 1897, No. 191.

With reference to G.O., Nos. 427 and 428 M., dated 8th March 1897, I have the honour to state that Surgeon-Major Bannerman returned from Bombay on the 30th March and to submit an interesting and instructive report on his investigations regarding the bubonic plague.

2. Surgeon-Major Bannerman informs me that Professor Haffkine will be able to supply the serum for inoculation from Bombay, if it is required in this Presidency.

3. I would suggest that a telegram should be sent to the Right Honourable the Secretary of State for India to send out at once twelve of pravatz serum syringes, each of 10 cubic centimetres capacity, with leather pistons and graduated stems. These syringes are best obtained from M. Charriere Collin, Scientific Instrument Maker, Paris.

ENCLOSURE.

From the Inspector of Vaccination and Deputy Sanitary Commissioner for Madras, on Special Plague Duty, Bombay, to the Surgeon-General with the Government of Madras, dated 27th March 1897.

In accordance with G.O., No. 427–28 M., of 8th March 1897, I have the honour to submit herewith my report on the treatment of the bubonic plague both generally and with special reference to the methods of treatment adopted by M. Haffkine and Dr. Yersin.

2. For this purpose it is necessary that a medical officer should be able to recognise at the earliest possible date the occurrence of a case of plague, both for the sake of the patient himself, and for the prevention of the spread of the infection. In cases presenting the classical signs there can be little difficulty in arriving at a correct diagnosis, but when the glandular swellings are absent, as they often are, it may be necessary to keep a patient under observation for some days before a decision can be arrived at.

3. The following signs and symptoms may be regarded as typical:—A rise of temperature on the first day of the disease, of a very pronounced character; 106° or more being common, accompanied by severe shivering and frequently vomiting. In 95 per cent. of the cases the conjunctivæ are found to be injected on the second day of the disease. The tongue may be described as being like wash-leather, or of a rusty brown "typhoid" appearance, with red or even inflamed edges. When spoken to, the person answers in a slow hesitating indistinct manner, the syllables being separated from one another, and the impression conveyed being that the individual is under the influence of alcohol. The gait is also in many cases suggestive, being like that of a drunken man. Some cases, on the other hand, may present violent maniacal symptoms, or the man may answer in an irritable manner as if resenting being questioned. But the typical appearance is the stupid dazed look of one newly wakened from a deep sleep, and there is evident difficulty in realizing new surroundings, and understanding what is going on around. Vomiting or diarrhœa or both, may be present or not. Buboes should of course be carefully looked for in the groins, armpits, sub-maxillary regions, and in fact in all places where glands are known normally to exist, as they are sometimes found in most unexpected spots.

4. The bacteria characteristic of plague are found in the fæces, sputum, blood and lymphatic glands. They are easily detected in fluid withdrawn from the glands both by the microscope and by cultivation in agar tubes. As far as the Bombay epidemic shows, it is often impossible to detect them in the blood, and if they are detected it is generally of evil omen for the patient. The fæces and sputum contain so many bacteria in the normal state that it is a matter of difficulty to separate the plague bacillus from the more robust forms already present, and though they may be detected by the microscope, it is impossible to tell for certain without cultivation whether the forms seen are really the specific bacillus or not. For ordinary diagnostic purposes, then, it is best to rely on matter withdrawn from the affected glands, and the following is the method recommended by M. Haffkine as the easiest and best. The apparatus required is, a supply of Pasteur's pipettes, microscopic slides, carbol-fuchsin stain, a spirit lamp, turpentine and absolute alcohol. Pasteur's pipettes are prepared as follows, from ordinary glass-tubing. The tubing being heated to redness in the flame of a Bunsen burner is removed from the flame and immediately drawn out, so that a pipette with very fine tapering point is formed. The tapering end is about 6 inches long and in diameter a little stouter than a hypodermic needle. The point is closed by melting in the flame, and the other end of the tube being closed with a plug of cotton wool inserted a quarter of an inch within the orifice; the whole is sterilised by being rotated in the flame until the cotton is stained of a uniform brown colour. The skin over the gland must be carefully disinfected by washing with soap and warm water, and the application of turpentine and alcohol. Then the pipette having been sterilised by passing several times through the flame of the spirit lamp, the sealed point is broken off leaving a sharp edge which easily penetrates the skin. The skin over the gland is now put on the stretch by the finger and thumb of the left hand, while the pipette is given a final heat in the flame, and by means of rotary motion imparted by the thumb and forefinger of the right hand is made to penetrate the skin and tissues till it is felt to enter the gland. The capsule of the gland offers some resistance to the point of the pipette, and when it is pierced the sudden cessation of resistance intimates the fact at once. In most cases the contents of the gland will ascend the capillary tube of the pipette at once, but if not the mouth may be applied to the end and suction employed as the mouth will be effectually protected by the cotton plug. The pipette is now withdrawn, and agar tubes inoculated in the ordinary way, after which smear preparations may be made on the slides, which should be allowed to dry, when they can be stained and examined. The stain may be left to act for two minutes or so.

5. To study the appearance of the bacterium, a one-twelfth immersion lens is required. The characteristic appearance is that of a bacterium rounded at the ends and joined together in pairs, so as to form what M. Haffkine calls a "diplo-bacterium." The division may appear complete or only an indication of it may be seen, and the poles staining more easily than the rest of the organism, a most characteristic appearance is obtained by which it may be easily diagnosed. The appearance of a cultivation in agar, is also very characteristic. Almost no growth is seen for two days, then a peculiar dotted or ground-glass appearance is to be noticed spreading out from the inoculated spot, which once seen is easily recognised. It has been compared to the appearance of the back of a mirror when the growth is viewed from behind, and when looked at from the side with the light reflected from its surface it has a peculiar varnished look, not easily mistaken. Specimens taken from cultures in agar and broth present many and various appearances under the microscope; thus, in the early days of agar culture threads of varying diameter and without divisions may be seen, and in broth cultures chaplets or chains may be found. In the tissues involution forms are found which it is difficult to recognise, unless a careful study of the transition forms is made.

6. The treatment pursued in Bombay differs little from that laid down by Dr. Cantlie in his paper in the British Medical Journal of 30th January 1897, *i.e.*, stimulants, good nursing and the treatment of symptoms as they arise, special care being taken of the heart, which is so apt to fail suddenly even during convalescence. At the Parel Hospital, Surgeon-Captain Thomson appears to have achieved a considerable amount of success by treating his patients with large doses of perchloride of mercury

BACK PAPERS

with the object of acting on the bacteria in the intestines. He gives two drachms of the liq. hydrarg. perchlor. on admission and a drachm every two hours thereafter for the first 24 hours, and then every three hours till convalescence sets in. His death-rate in cases that survive for 24 hours after admission is 36·27 per cent., and as no salivation is produced, the plan seems worth trying. The glands at this hospital are treated with glycerine and belladonna and hot fomentations when inflamed, with the result that only about 2 per cent. suppurate, which is a great matter as when opened the incisions take a very long time to heal. At the Arthur Road Hospital under the care of Dr. Chowksey, no perchloride is used, but injections of liquor iodi are made into the affected glands, with the result that nearly all the glands suppurate and tedious sores remain open for weeks, retarding convalescence. Dr. Chowksey maintains that the temperature falls after the injection, and that the practice is an endeavour to imitate Nature's mode of cure which he alleges is brought about by suppuration, but this contention is not borne out by the experience of the Parel Hospital noted above. The cases admitted here are probably of a more acute type than those sent to Parel, for the mortality up to the end of February was 54·71 per cent. of the admissions.

7. The plan of treatment adopted by Dr. Yersin is the frequent injection of large quantities of antitoxic serum derived from the blood of horses treated with injections of plague bacilli until they have acquired immunity. He reports that the serum with which he has hitherto operated in Bombay is too weak, and in consequence, not only have very large injections to be made, but the effect produced is not what it ought to be. In most cases the immediate effect of an injection is to lower the temperature a degree or more, but the effect seems soon to pass off unless another dose is given. The following statistics have been obtained from the Parel Hospital through the kindness of Surgeon-Captain Thomson, the medical officer in charge. These comprise most of the cases done by Dr. Yersin in public in Bombay up to date. The cases were chosen by Dr. Yersin himself, and were presumably selected as those most likely to be benefited by the injections; they may therefore be fairly enough compared with the statistics of the whole hospital, when treated in the same way, *i.e.*, by excluding moribund cases dying within 24 hours of admission.

Twenty-two cases in all were injected, but from these we must deduct two cases which turned out not to be plague; this leaves twenty cases for consideration. Of these, two died within 24 hours and may therefore be excluded as noted above. Of the eighteen cases left, nine died and nine discovered, which gives a death-rate of 50 per cent. I therefore think that the method is still too much in the experimental stage to come within the sphere of practical therapeutics. I may mention that a supply of this serum of a more matured kind is now on its way out from Paris, and it will be interesting to watch whether better results follow its use.

8. The methods employed by M. Haffkine are of two kinds, viz., prophylactic and curative. The former agent is prepared by inoculating broth with a pure culture of the plague microbe and allowing it to elaborate its toxin for a period of a month, or until the nutrient material in the broth is exhausted. The broth is then sterilised by being heated to 70 degree centigrade for the space of one hour, and it is then ready to be decanted into sterilised test tubes for distribution. It will be seen that this preparation differs from the anticholera vaccine, in that it contains no living microbes as the latter does. It is administered in doses varying from one to three cubic centimetres by means of a pravatz syringe inserted into the subcutaneous tissue of the arm or flank. Considerable reaction and discomfort is usually felt for two or three days after, but most people are able to continue their ordinary avocations during the treatment. The statistics collected up to date are decidedly favourable and point to this as a means of protecting a population against the plague, but time alone will show whether this is really so or not. The first opportunity of testing the efficacy of the prophylactic was afforded by an outbreak in the Byculla Jail, which occurred at the end of January last. Between the 23rd and 29th of January nine attacks took place with five deaths. On the forenoon of the 30th, there were six cases with three fatalities; in the afternoon inoculation of 148 of the jail population was effected. That evening three of those inoculated died, two of them having had buboes at the time of injection. The table below shows the subsequent course of the outbreak—

Date of event.	Among 173 not inoculated.	Among 148 inoculated.
30th January 1897 after inoculation ..	*Nil.*	3 cases, 3 fatal.
31st " "	2 cases, 1 fatal	1 case, recovered.
1st February "	1 case 1 "	*Nil.*
2nd " "	1 " 1 "	*Nil.*
4th " "	1 " 1 "	*Nil.*
5th " "	2 cases, 1 "	*Nil.*
6th " "	5 " 1 "	1 case, recovered.
Total after day of inoculation ..	12 cases, 6 fatal	2 cases all recovered.

From the above it would appear that the protective power of the vaccine is established after 12 hours only, an astonishingly short time when compared with the seven days required for vaccination against small-pox.

Various other statistics have now been obtained pointing in the same direction; *e.g.*, in the house of Mr. Allan Turner, three persons were inoculated and 14 were not; amongst these 14, two cases occurred, both ending fatally. Six of those left were then inoculated, none of these were attacked; but one case occurred amongst the uninoculated. Again at Worli cemetery, 21 people were inhabiting one house, nine were inoculated, out of the remainder three have been attacked. A clerk near the same place was inoculated, but did not get his family done; of these (a son and two daughters) one has been attacked. A Mr. Prior living at 36 Marine Lines had his family and servants inoculated, about 14 in all; cases have occurred in all the surrounding houses, but none in No. 36 nor amongst the inoculated living in these neighbouring houses.

The total number inoculated up to the 26th is 4,966, and of these five have been attacked. Three of those were attacked four days after inoculation, and all have recovered. Two were attacked within twelve hours and died, but there is evidence to show that both of these cases had the disease in them at the time.

From the above figures it will, I think, be manifest that the inoculations are in themselves harmless, and I would therefore recommend that if the disease should appear in the Madras Presidency, an endeavour be made to protect the population of the place by this means.

The curative serum used by M. Haffkine is obtained in a similar manner to that employed by Mr. Yersin, but as it has not as yet been used in public, it is impossible to pronounce an opinion as to its merits.

Order—No. 887 M., dated 13th April 1897.

Recorded.

2. His Excellency the Governor in Council is much indebted to Surgeon-Major Bannerman for his interesting and instructive report of his deputation to Bombay in connection with the treatment of the bubonic plague.

3. As Dr. Yersin's mode of treatment has not been so successful as for the present to warrant its exclusive adoption, the proposal to establish in Madras horse inoculation for the production of the serum will be dropped for the present.

4. The following telegram will be despatched to the Secretary of State for India:—

"Please send twenty pravatz serum syringes (of) ten cubic centimetres capacity (with) leather pistons (and) graduated stems, obtainable Charriere Collin, Paris."

(True Extract.)

Secretary to Government.

To the Surgeon-General. with spare copies for distribution to Dist. & Med. Officers
" Sanitary Commissioner.
" all Collectors
Exd. Shaik Kharim.
" the Regr., Hon. Court, Madras

BACK PAPERS

[5]
700—6-4-96.

LOCAL AND MUNICIPAL DEPARTMENT.

Papers to be read in Proceedings:—

Again G.O., dated 189 , No.

Current No. 1487 m of 1897, dated 2 · 4 · 97 from the Surg. Genl.

Current No. of 189 , dated from the

Bell

Order. No. 887 mdl 13/4/97

Recorded ~~with the following remarks:~~

3 ~~(1)~~ As Dr. Yersin's mode of treatment has not been so successful as for the present to warrant its exclusive adoption the proposal to establish in Madras horse inoculation for the production of the serum ~~in Madras~~, will ~~must~~ be dropped for the present.

2 ~~H.E. the Govr. in Council is much indebted (2)~~ ~~The thanks of Government are due~~ to Surg. Major Bannerman for ~~this~~ interesting and instructive report of his deputation ~~to Bombay in connection~~ ~~with investigations regarding~~ the treatment of the bubonic plague.

Desp. 12/4/97

4 ~~(3)~~ The following telegram will be despatched to the Secretary of State for India:—

"Please send twenty Pravatz Serum Syringes."

BACK PAPERS

(each) (of) ten cubic centimetres capacity (with) leather pistons & (and) graduated stems, obtainable Charriere Collin Paris

Telegram of 16 words as Hon reckons.

(Hon orders)

[initials]
12/4/97

To
The Surg. Genl ✓
" Sand. Commr ✓
Ordered in G.O.
14/4/97

Local & Munl. (1897) Department.

CURRENT No. 1487 M.

Urgent

H.M. [signature]

Seen. I agree with the Hon. Mr. Bliss. [initials] 10/4/97

LOCAL & MUNICIPAL DEPARTMENT * 5-APR-1897 * TO GOVERNMENT

From
Surgeon-Major-General C. Sibthorpe,
F.R.C.P.I.
Surgeon-General with the
Government of Madras.

No. 191

Dated the 2nd April 1897.

Received 5-4-1897

Registered 5-4-1897

Enclosures One.

Spare copies

SUBJECT.

Submitting Surgeon-Major Bannerman's interesting and instructive report on his investigations regarding Bubonic Plague.

For **Orders**

The Surgeon General submits Dr. Bannerman's report on his deputation to Bombay in connection with the treatment of the bubonic plague.

The report is as the S.G. says interesting & instructive & Surg. Maj. Bannerman may be thanked. [initials]

It will be seen that Yersin's mode of treatment has not been so successful for the present [initials] as to warrant its exclusive [initials] adoption. The proposal therefore to establish horse inoculation in Madras may be allowed to drop.

Yes. Besides, it appears that it takes 4 months of training before an operator can make a certain job of the production of the serum. We shall have to rely, if Yersin's method ultimately is established, on what we can obtain from B'bay & Calcutta. [initials]

The S.G. asks us to send for a dozen Pravaz Serum syringes for use in Haffkine's treatment. This may be done. I sh^d however have thought a dozen too few. Dr King (vide his d.o. below) whom I consulted about the price, w^d like over 2 dozen: but we might order 20.

[initials] 6/4/97

We may as well get 20. I should say. I should wire for them. The letter can be got into 16 words, I reckon. [initials] 7/4/97

I agree. A.H. 10.4.97

BACK PAPERS.

G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.

Bombay, 27th, March 1897.

From

Surgeon-Major W.B.Bannerman M.D.,
Inspector of Vaccination & Deputy Sanitary
Commissioner for Madras,
On special plague duty, Bombay.

To

The Surgeon-General with the
Government of Madras.

SIR,

In accordance with G.O.Nos,427,428-M., of 8th March 1897, I have the honour to submit herewith my report on "the treatment of the bubonic plague, both generally and with special reference to the methods of treatment adopted by M.Haffkine and Dr Yersin".

2. For this purpose it is necessary that a medical officer should be able to recognise at the earliest possible date the occurence of a case of plague, both for the sake of the patient himself, and for the prevention of the spread of the infection. In cases presenting the classical signs there can be little difficulty in arriving at a correct diagnosis, but when the glandular swellings are absent, as they often are, it may be necessary to keep a patient under observation for some days before a decision can be arrived at.

3. The following signs and symptoms may be regarded as --- typical:-

A rise of temperature on the first day of the disease, of a very pronounced character; 106 or more being common, accompanied by severe shivering and frequently vomiting. In 95% of the cases the ~~conjuctivae~~ conjunctivae are found to be injected on the second day of the disease. The tongue may be described as being like wash-leather, or of a rusty brown --- "typhoid" appearance, with red or even inflamed edges. When spoken to, the person answers in a slow hesitating indisti manner, the syllables being separated from one another, an the impression conveyed being that the individual is under the influence of alcohol. The gait is also in many cases suggestive, being like that of a drunken man. Some cases on the

other

BACK PAPERS

other hand may present violent maniacal symptoms, or the man may answer in an irritable manner as if resenting being questioned. But the typical appearance ~~is~~ the stupid dazed look of one newly wakened from a deep sleep, and there is evident difficulty in realising new surroundings, and understandings what is going on around. Vomiting or diarrhoea, or both may be present, or not. Buboes should of course be carefully looked for in the groins, armpits, submaxillary regions and in fact in all places where glands are known normally to exist, as they are sometimes found in most unexpected spots.

4. The bacteria characteristic of plague are found in the faeces, sputum, blood and lymphatic glands. They are easily detected in fluid withdrawn from the glands, both by the microscope and by cultivation in agar tubes. As far as the Bombay epidemic shows, it is often impossible to detect them in the blood, and if they are detected it is generally of evil omen for the patient. The faeces and sputum contain so many bacteria in the normal state that it is a matter of difficulty to separate the plague bacillus from the more robust forms already present, and though they may be detected by the microscope it is impossible to tell for certain without cultivation whether the forms seen are really the --- specific bacillus or not. For ordinary diagnostic purposes then it is best to rely on matter withdrawn from the affected glands, and the following is the method recommended by M.Haffkine as the easiest and best. The apparatus required is, a supply of -- - Pasteur's pipettes, microscopic slides, carbol-fuchsin stain, a ~~spirit~~ spirit lamp, turpentine and absolute alcohol. Pasteur's pipettes are prepared as follows, from ordinary glass tubing. The tubing being heated to redness in the flame of a Bunsen burner is removed from the flame and immediately drawn out, so that a pipette with very fine tapering point is formed. The tapering end is about six inches long and in diameter a little stouter than a hypodermic needle. The point is closed by melting in the flame, and the other end of the tube being closed with a plug of cotton wool inserted a quarter of an inch within the orifice; the whole is sterilised by being rotated in the flame until --

the

the cotton is stained of a uniform brown colour. The skin over the gland must be carefully disinfected by washing with soap and warm water, and the application of turpentine and alcohol. Then the pipettes having been sterilised by passing several times through the flame of the spirit lamp, the sealed point is broken off leaving a sharp edge which easily penetrates the skin. The skin over the gland is now put on the stretch by the finger and thumb of the left hand, while the pipette is given a final heat in the flame, and by means of a rotary motion imparted by the thumb and fore finger of the right hand is made to penetrate the skin and tissues till it is felt to enter the gland. The capsule of the gland offers some resistance to the point of the pipette, and when it is pierced the sudden cessation of resistance intimates the fact at once. In most cases the contents of the gland will ascend the capillary tube of the pipette at once, but if not the mouth may be applied to the end and suction employed as the mouth will be effectually protected by the cotton plug. The pipette is now withdrawn, and agar tubes inoculated in the ordinary way, after which smear preparations may be made on the slides, which should be allowed to dry, when they can be stained and examined. The stain may be left to act for 2 --- minutes or so.

5. To study the appearance of the bacterium, a 1/12th. immersion lens is required. The characteristic appearance is that of a bacterium rounded at the ends and joined together in pairs, so as to form what M.Haffkine calls a "diplobacterium". The division may appear complete or only an indication of it may be seen, and the poles staining more easily than the rest of the organism, a most characteristic appearance is obtained by which it may be easily diagnosed. The appearance of a cultivation in agar, is also very characteristic. Almost no growth is seen for two days, then a peculiar dotted or ground-glass appearance is to be noticed --- spreading out from the inoculated spot, which once seen is easily recognised. It has been compared to the appearance of the back of a mirror when the growth is viewed from behind, and when looked at from the side with the light reflected --

from

from its surface it has a peculiar varnished look, not easily ~~mista~~ mistaken. Specimens taken from cultures in agar and broth present --------- many and various appearances under the microscope; thus --------- in the early days of agar culture threads of varying diameter and without divisions may be seen, and in broth cultures chaplets or chains may be found. In the tissues involution forms are found which it is difficult to recognise, unless a careful study of the transition forms is made.

6. The treatment pursued in Bombay differs little from that laid down by Dr.Cantlie in his paper in the British Medical Journal of 30th January 1897; i.e. stimulants, good nursing and the treatment of symptoms as they arise, special care being taken of the heart, which is so apt to fail suddenly even during convalescence. At the Parel Hospital, Surgeon-Captain Thomson appears to have achieved a considerable amount of success by treating his patients with large doses of perchloride of mercury with the object of acting on the bacteria in the intestines. He gives two drachms of the Liq.Hydrarg.Perchlor. on ~~the~~ admission and a drachm every two hours thereafter for the first 24 hours, and then every three hours till convalescence sets in. His death rate in cases that survive for 24 hours after admission, is 36.27%, and as no salivation is produced the plan seems worth trying. The glands at this hospital are treated with glycerine and belladonna and hot fomentations when inflamed, with the result that only about 2% suppurate, which is a grat matter, as when opened the incisions take a ~~verly~~ very long time to heal. At the Arthur Road hospital under the care of Dr.Chowksey, no perchloride is used, but injections of Liquor Iodi are made into the affected glands, with the result that nearly all the glands suppurate and tedious sores remain open for weeks, retarding convalescence. Dr.Chowksey maintains that the temperature falls after the injection, and that the practice is an endeavour to imitate Natures' mode of cure which he alleges is brought about by suppuration, but this contention is not borne out by the experience of the Parel Hospital noted above. The cases admitted here are probably of a more acute type than those sent to Parel, for the mortality up to the end of February was 54.71% of the admissions.

7. The plan of treatment adopted by Dr.Yerson, is the frequent injection of large quantities of antitoxic serum derived from the blood of horses treated with injections of plague bacilli until they have acquired immunity. He reports that the serum with which he has hitherto operated in Bombay is too weak, and in consequence, not only have very large injections to be made, but the effect produced is not what it ought to be. In most cases the immediate effect of an injection is to lower the temperature a degree or more, but the effect seems soon to pass off unless another dose is given. The following statistics have been obtained from the Parel hospital, through the kindness of Surgeon-Captain Thomson, the medical officer in charge. These comprise most of the cases done by Dr.Yerson in public in Bombay up to date. The cases were chosen by Dr. Yerson himself, and were presumably selected as those most likely to be benefited by the injections, they may therefore be fairly enough compared with the statistics of the whole hospital, when treated in the same way, i.e. by excluding moribund cases dying within 24 hours of admission.
Twenty-two cases in all were injected, but from these we must deduct 2 cases which turned out not to be plague; this leaves 20 cases for consideration. Of these 2 died within 24 hours and may therefore be excluded as noted above. Of the 18 cases left 9 died and 9 recovered, which gives a death rate of 50%. I therefore think that the method is still too much in the experimental stage to come within the sphere of practical therapeutics. I may mention that a supply of this serum of a more matured kind is now on its way out from Paris, and it will be interesting to watch whether better results follow its use.

8. The methods employed by Mons.Haffkine are of two kinds viz.,prophylactic and curative. The former agent is prepared by inoculating broth with a pure culture of the plague microb and allowing it to elaborate its toxin for a period of a --- month, or until the nutrient material in the broth is exhaust ed. The broth is then sterilised by being heated to 70 degree centigrade for the space of one hour, and it is then ready t

be

be decanted into sterilised test tubes for distribution. It will be seen that this preparation differs from the anti-cholera vaccine, in that it contains no living microbes as the latter does. It is administered in doses varying from one to three cubic centimetres, by means of a Pravatz syringe inserted into the subcutaneous tissue of the arm or flank. Considerable reaction and discomfort is usually felt for two or three days after, but most people are able to continue their ordinary avocations during the treatment. The statistics collected up to date are decidedly favourable and point to this as a means of protecting a population against the plague, but time alone will show whether this is really so or not. The first opportunity of testing the efficacy of the prophylactic was afforded by an outbreak in the Byculla jail, which occurred at the end of January last. Between the 25rd and 29th of January 9 attacks took place with 5 deaths. On the forenoon of the 30th there were six cases with three fatalities; in the afternoon inoculation of 148 of the jail population was effected. That evening three of those inoculated died, two of them ~~died~~ having had buboes at the time of injection. The table below shows the subsequent course of the outbreak.

Date of event.	Among 175 not inoculated.	Among 148 inoculated.
30-1-97. after inoculation.	Nil	3 cases...3 fatal.
31-1-97	2 cases..1 fatal.	1 case ...recovered.
1-2-97	1 " ..1 "	Nil.
2-2-97	1 " ..1 "	Nil.
~~4~~3-97	1 " ..1 "	Nil.
5-2-97	2 " ..1 "	Nil.
6-2-97.	5 " ..1 "	1 case...recovered.
Total after day of inoculation.	12 cases-6 fatal.	2 cases all recovered.

From the above it would appear that the protective power of the vaccine is established after 12 hours only, an astonishingly short time when compared with the 7 days required for vaccination against smallpox.

Various

Various other statistics have now been obtained pointing in the same direction; e.g., in the house of Mr. Allan Turner 3 persons were inoculated and 14 were not; amongst these 14, 2 cases occurred, both ending fatally. Six of those left were then inoculated none of these were attacked but one case occurred amongst the uninoculated. Again at Worli cemetry 21 people were inhabiting one house, 9 were inoculated, out of the ~~reminder~~ remainder 3 have been attacked. A clerk near the same place was inoculated but did not get his family done; of these (a son and 2 daughters) one has been attacked. A Mr.Prior living at 36 Marine Lines had his family and servants inoculated, about 14 in all; cases have occurred in all the surrounding houses but none in No.36 nor amongst the inoculated living in these neighbouring houses.

The total number inoculated up to the 26th is 4,966, and of these 5 have been attacked. Three of those were attacked four days after inoculation, and all have recovered. Two were attacked within twelve hours and died, but there is evidence to show that both of these cases had the disease in them at the time.

From the above figures it will I think be manifest that the inoculations are in themselves harmless, and I would therefore recommend that if the disease should appear in the Madras Presidency, an endeavour be made to protect the population of the place by this means.

(b) The curative serum used by M.Haffkine is obtained in a similar manner to that employed by Dr.Yersin, but as it has not as yet been used in public it is impossible to pronounce an opinion as to its merits.

I have &c,

(Signed) W.B. Bannerman, M.D.,

Surgeon-Major, I.M.S.

Inspector of Vaccination & Dy. Sanitary Commissioner

"True Copy"

D Simpson Surgeon-Captain,

Surgeon-General with the Govt. of Madras.

Office of Sanitary Commissioner,

No. ______

Madras, 6/4 1897.

Dear Mr. Forbes,

The Pravaz syringes although now found of special utility for inoculation has long been [illegible] generally in use; it is not procurable in this country, nor in the Presidency [illegible] is Charriere the [illegible] [illegible] make the syringes locally – the glass cylinders at least would have to be imported.

Yours very truly,

[signature]

P.S. I see you spell Pravaz with a "t": usually it is spelt without it – though it is never safe to assume English spelling of a foreign name. [illegible] with regard to your telegraphing.

1/1487 M of 1897

---

[1]

No. 191

OFFICE OF SURGEON-GENERAL
WITH THE GOVERNMENT OF MADRAS,

Madras, the 2nd ~~April~~ 1896.

LOCAL & MUNICIPAL DEPT. No. 1487 M

From

SURGEON-MAJOR-GENERAL C. SIBTHORPE, F.R.C.P.I.,
SURGEON-GENERAL WITH THE
GOVERNMENT OF MADRAS,

To

THE HON'BLE THE CHIEF SECRETARY TO GOVERNMENT,
Local and Municipal DEPARTMENT.

SIR,

With reference to G.O.Nos427 & 428-M, dated 8th March 1897, I have the honour to state that Surgeon-Major Bannerman returned from Bombay on the 30th March, and to submit an interesting and instructive report on his investigations regarding the Bubonic Plague.

2. Surgeon-Major Bannerman informs me that Professor Haffkine will be able to supply the Serum for inoculation from Bombay if it is required in this Presidency.

3. I would suggest that a telegram should be sent to the Right Hon'ble the Secretary of State for India to send out at once twelve of Pravatz Serum Syringes each of 10 cubic centimetres capacity with leather pistons and graduated stems. These Syringes are best obtained from M.Charriere Collin, Scientific Instrument Maker, Paris.

I have the honour to be,

Sir,

Your most obedient Servant,

C. Sibthorpe

Surgeon-Major-General,
Surgeon-General with the
Government of Madras.

dated the occurence of a case of plague, both for the sake

BACK PAPERS

glands,and the following is the method recommended by M.Haff-
-kine as the easiest and best.The apparatus required is,a sup
-ply of Pasteur's pipettes,microscopic slides,carbol-fuchesin

25]
1-11-96.

Local and Municipal Department,

PROCEEDINGS OF THE MADRAS GOVERNMENT.

READ the following paper:—

From the Surgeon-General with the Government of Madras, No. 191,dated 2" April 1897.

With reference to G.O.Nos.427 and 428 M,dated 8" March 1897, I have the honour to state that Surgeon-Major Bannerman returned from Bombay on the 30" March and to submit an interesting and instructive report on his investigations regarding the Bubonic plague.

2. Surgeon-Major Bannerman informs me that Professor Haffkine will be able to supply the serum for inoculation from Bombay if it is required in this Presidency.

3. I would suggest that a telegram should be sent to the Right Honourable the Secretary of State for India to send out at once twelve of Pravatz Serum Syringes each of 10 cubic centimetres capacity with leather pistons and graduated stems These syringes are best obtained from M. Charriere Collin, Scientific Instrument Maker,Paris.

(Enclosure)

From the Inspector of vaccination and Deputy Sanitary Commis
-sioner for Madras,on special plague duty,Bombay,to the Surgeon-Gene
-ral with the Government of Madras,dated 27" March 1897.

In accordance with G.O.Nos.427,428 M,of 8" March 1897,I have the honour to submit herewith my report on the treatment of the Bubonic plague both generally and with special reference to the methods of treatment adopted by M. Haffkine and Dr.Yer
-sin".

2. For this purpose it is necessary that a medical ~~offic~~ officer should be able to recognise at the earliest possible date the occurence of a case of plague,both for the sak[illegible]

the infection.In cases presenting the classical signs there can be little difficulty in arriving at a correct diagnosis,but when the glandular swellings are absent,as they often are,it may be necessary to keep a patient under observation for some days before a decision can be arrived at.

3. The following signs and symtoms may be regarded as typical:-

A rise of temperature on the first day of the disease,of a very pronounced character;106 or more being common,accompanied by severe shivering and frequently vomiting.In 95 % of the cases the conjunctivae are found to be injected on the second day of the disease. The tongue may be described as being like wash-leather,or of a rusty brown "typhoid" appearance,with red or even inflamed edges.When spoken to,the person answers in a slow hesitating indistinct manner the syllables being separated from one another,and the impression conveyed being that the individual is under the influence of alcohol. The gait is also in many cases suggestive being like that of a drunken man, Some cases on the other hand may present violent maniacal symptoms,or the man may answer in an irritable manner as if resenting being questioned.But the typical appearance is the stupid dazed look of one newly wakened from a deep sleep,and there is evident difficulty in realising new surroundings,and understanding what is going on around.Vomiting or diarrhoea,or both may be present,or not.Buboes should of course be carefully looked for in the groins,armpits,submaxillary regions and in fact in all places where glands are known normally to exist ,as they are sometimes found in most unexpected spots.

4. The bacteria characteristic of plague are found in the faeces, sputum,blood and lymphatic glands.They are easily detected in fluid withdrawn from the glands both by the microscope and by cultivation in agar tubes.As far as Bombay the epidemic shows it is often impossible to detect them in the blood and if they are detected it is generally of evil omen for the patient.The faeces and sputum contain so many bacteria in the normal state that it is a matter of difficulty to separate the plague bacillus from the more robust forms already present and though they may be detected by the microscope it is impossible to tell for certain without cultivation whether the forms seen are real-

glands,and the following is the method recommended by M.Haffkine as the easiest and best.The apparatus required is,a supply of Pasteur's pipettes,microscopic slides,carbol-fuchesin stain, a spirit lamp,turpentine and absolute alcohol.Pasteur's pipettes are prepared as follows,from ordinary glass tubing. The tubing being heated to redness in the flame of a Bunsen burner is removed from the flame and immediately drawn out, so that a pipette with very fine tapering point is formed.The tapering end is about 6 inches long and in diameter a little stouter than a hypodermic needle. The point is closed by melting in the flame,and the other end of the tube being closed with a plug of cotton wool inserted a quarter of an inch within the orifice; the whole is sterilised by being rotated in the flame until the cotton is stained of a uniform brown colour.The skin over the gland must carefully be disinfected by washing with soap and warm water,and the application of turpentine and alcohol.Then the pipette having been sterilised by passing several times through the flame of the spirit lamp the sealed point is broken off leaving a sharp edge which easily penetrates the skin. The skin over the gland is now put on the stretch by the finger and thumb of the left hand, while the pipette is given a final heat in the flame, and by means of rotary motion imparted by the thumb and fore finger of the right hand is made to penetrate the skin and tissues till it is felt to enter the gland.The capsule of the gland offers some resistance to the point of the pipette,and when it is pierced the sudden cessation of resistance intimates the fact at once.In most cases the contents of the gland will ascend the capillary tube of the pipette at once,but if not the mouth may be applied to the end and suction employed as the mouth will be effectually protected by the cotton plug. The pipette is now withdrawn,and agar tubes inoculated in the ordinary way,after which smear preparations may be made on the slides,which should be allowed to dry,when they can be stained and examined .The stain may be left to act for 2 minutes or so.

5. To study the appearance of the bacterium, a 1/12th. immersion lens is required. The characteristic appearance is that of a bacterium rounded at the ends and joined together in pairs, so as to form what M. Haffkine calls a " diplo-bacterium". The division may appear complete or only an indication of it may be seen, and the poles staining more easily than the rest of the organism, a most characteristic appearance is obtained by which it may be easily diagnosed. The appearance of a cultivation in agar, is also very characteristic. Almost no growth is seen for two days, then a peculiar dotted or ground-glass appearance is to be noticed spreading out from the inoculated spot, which once seen is easily recognised. It has been compared to the appearance of the back of a mirror when the growth is viewed from behind, and when looked at from the side with the light reflected from its surface it has a peculiar varnished look, not easily mistaken. Specimens taken from cultures in agar and broth present ------ many and various appearances under the microscope; thus -------- in the early days of agar culture threads of varying diameter and without divisions may be seen, and in broth cultures chaplets or chains may be found. In the tissues involution forms are found which it is difficult to recognise, unless a careful study of the transition forms is made.

6. The treatment pursued in Bombay differs little from that laid down by Dr. Cantlie in his paper in the British Medical Journal of 30th January 1897; i.e. stimulants, good nursing and the treatment of symptoms as they arise special care being taken of the heart, which is so apt to fail suddenly even during convalescence. At the Parel Hospital, Surgeon Captain Thomsom appears to have achieved a considerable amount of success by treating his patients with large doses of perchloride of mercury with the object of acting on the bacteria in the intestines. He gives two drachms of the Liq. Hydrarg. Perchlor. on admission and a drachm every two hours thereafter for the first 24 hours, and then every three hours till convalescence sets in. His death rate in cases that survive for 24 hours after admission, is 36.27 %, and as no salivation is produced the plan seems worth trying. The glands at this hospital are treated with glycerine and belladonna and hot fomentations when inflamed, with the result that only about 2% suppurate, which is a grat matter as when opened the incisions take a very long time to heal. At the Arthur Road hospital under the care of Dr. Chowksey, no perchloride is used, but injections of Liquor Iodi are made into the affected glands, with the result that nearly all the glands suppurate and tedious sores remain open for weeks, retarding convalescence. Dr. Chowksey maintains that the temperature falls after the injection, and that the practice is an endeavour to imitate Nature's mode of cure which he alleges is brought about by suppuration, but this contention is not borne out by the experience of the Parel Hospital noted above. The cases admitted here are probably of a more acute type than those sent to Parel, for the mortality up to the end of February was 54.71% of the admissions.

7. The plan of treatment adopted by Dr. Yersin is the frequent injection of large quantities of antitoxic serum derived from the blood of horses treated with injections of plague bacilli until they have acquired immunity. He reports that the serum with which he has hitherto operated in Bombay is too weak, and in consequence, not only have very large injections to be made, but the effect produced is not what it ought to be. In most cases the immediate

immediate effect of an injection is to lower the temperature a degree or more, but the effect seems soon to pass off unless another dose is given. The following statistics have been obtained from the Parel hospital through the kindness of Surgeon-Captain Thomson, the medical officer in Charge. These comprise most of the cases done by Dr.Yersin in public in Bombay up to date. The cases were chosen by Dr.Yersin himself, and were presumably selected as those most likely to be benefited by the injections, they may therefore be fairly enough compared with the statistics of the whole hospital, when treated in the same way, i.e. by excluding moribund cases ~~in all were injected~~ dying within 24 hours of admission.

Twenty-two cases in all were injected, but from these we must deduct 2 cases which turned out not to be plague; this leaves 20 cases for consideration. Of these two died within 24 hours and may therefore be excluded as noted above. Of the 18 cases left 9 died and 9 discovered, which gives a death rate of 50%. I therefore think that the method is still too much in the experimental stage to come within the ghere of practical therapeutics. I may mention that a supply of this serum of a more matured kind is now on its way out from Paris, and it will be interesting to watch whether better results follow its use.

8. The methods employed by Mons.Haffkine are of two kinds viz., prophylactic and curative. The former agent is prepared by inoculating broth with a pure culture of the plague microbe and allowing it to elaborate its toxin for a period of a --- month, or until the nutrient material in the broth is exhausted. The broth is then sterilised by being heated to 70 degree centigrade for the space of one hour, and it is then ready to be decanted into sterilised test tubes for distribution. It will be seen that this preparation differs from the anti-cholera vaccine, in that it contains no living microbes as the latter does. It is administered in doses varying from one to three cubic centimetres by means of a Pravatz syringe inserted into the subcutaneous tissue of the arm or flank. Considerable reaction and discomfort is usually felt for two or three days after, but most people are able to continue their ordinary avocations during the treatment. The statistics collected up to date are decidedly favourable and point to this as a means of protecting a population against the plague, but time alone will show whether this is really so or not. The first opportunity

of

of testing the efficacy of the prophylactic was afforded by an outbreak in the Byculla jail, which occurred at the end of January last. Between the 23rd and 29th of January 9 attacks took place with 5 deaths On the forenoon of the 30th there were six cases with three fatalities; in the afternoon inoculation of 148 of the jail population was effected That evening three of those inoculated died, two of them having had buboes at the time of injection. The table below shows the subsequent course of the outbreak.

Date of event	Among 173 not inoculated.	Among 148 inoculated.
30-1-97 after inoculation	Nil	3 cases ... 3 fatal.
31-1-97 ..	2 cases 1 fatal	1 case ... recovered.
1-2-97 ..	1 " 1 "	Nil.
2-2-97 ..	1 " 1 "	Nil.
4-2-97 ..	1 " 1 "	Nil.
5-2-97 ..	2 " 1 "	Nil.
6-2-97 ..	5 " 1 "	1 case ... recovered.
Total after day of inoculation ..	12 cases-6 fatal	2 cases all recovered.

From the above it would appear that the protective power of the vaccine is established after 12 hours only, an astonishingly short time when compared with the 7 days required for vaccination against small-pox.

Various other statistics have now been obtained pointing in the same direction; e.g., in the house of Mr.Allan Turner 3 persons were inoculated and 14 were not; amongst these 14, 2 cases occurred, both ending fatally. Six of those left were then inoculated none of these were attacked but one case occurred amongst the inoculated. Again at Worli cemetry 21 people were inhabiting one house, 9 were inoculated , out of the remainder 3 have been attacked. A clerk near the same place was inoculated but did not get his family done; of these (a son and 2 daughters) one has been attacked. A Mr.Prior living at 36 Marine Lines had his family and servants inoculated, about 14 in all; cases have occurred in all the surrounding houses but none in No.36 nor amongst the inoculated living in these neighbouring houses.

The total number inoculated up to the 26th is 4,966, and of these 5

have

have been attacked. Three of those were attacked four days after inoculation, and all have recovered. Two were attacked within twelve hours and died, but there is evidence to show that both of these cases had the disease in them at the time.

From the above figures it will I think be manifest that the inoculations are in themselves harmless, and I would therefore recommend that if the disease should appear in the Madras Presidency, an endeavour be made to protect the population of the place by this means.

(b) The curative serum used by M. Haffkine is obtained in a similar manner to that employed by Mr. Yersin, but as it has not as yet been used in public it is impossible to pronounce an opinion as to its merits.

ORDER No. 887 M., dated 13th April 1897.

Recorded.

2. His Excellency the Governor in Council is much indebted to Surgeon Major Bannerman for his interesting and instructive report of his deputation to Bombay in connection with the treatment of the bubonic plague.

3. As Dr. Yersin's mode of treatment has not been so successful as for the present to warrant its exclusive adoption the proposal to establish in Madras horse inoculation for the production of the serum will be dropped for the present.

4. The following telegram will be despatched to the Secretary of State for India:-

"Please send twenty pravaz Serum Syringes (of) 10 cubic centimetres capacity (with) leather pistons (and) graduated stems, obtainable Charriere Collin, Paris".

(True Extract)

Secretary to Government.

To

The Surgeon General. ✓ 40 with spare copies for distribution to Dt. med. & San. Officers

" Sanitary Commissioner. ✓ 2

All collectors ✓ Oupd in Ms 14/4/97 Oupd 8/5/97

The Pub. med. Comm. Madras ✓ 6 Oupd 6/5/97

Returned for signature. 5-5-97

Despatched in print. 6-5-97 8-5-97

NUMBER OF COPIES REQUIRED. { Letter only. Order complete with Letter.

Against G.O., No. DATED 189

No.

... to C. No.

... of Government

... of Government.

... with ditto.

... not filled up being meant for despatch in original.

N.B.—

A = Print in full.
B = Not to be printed.
P = Print abstract only.
Q = Print heading only.

5

196
60
256