

Brief notes on the outbreak of plague in the Jammu province, Kashmir State, during 1901 / by B. R. Sawhney.

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Andrew Duncan
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Stoke
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BRIEF NOTES
ON THE
OUTBREAK OF PLAGUE,

IN THE
JAMMU PROVINCE,
KASHMIR STATE,
DURING 1901,

—* BY *—

B. R. SAWHNEY,

M.B., B.S. (Durham), M.R.C.S. (England), L.R.C.P.

(London), & L.M. & S. (P.B.)

Chief Medical Officer, Jammu Province,

JULY 1901.



JAMMU :

Printed under the supervision of Diwan Alim Chand, G.O., Suptt. "Ranbir Prakash Press."

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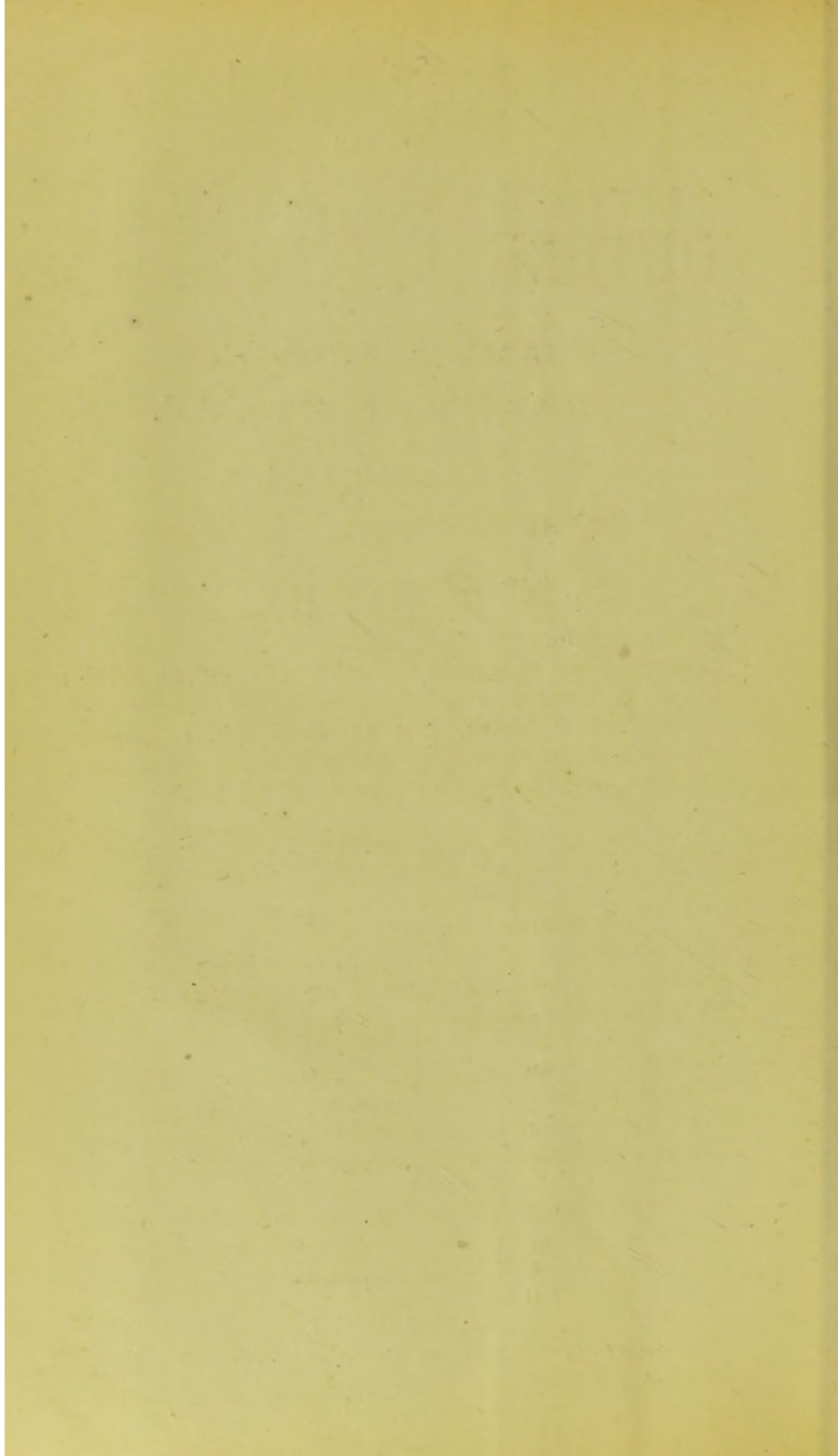
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BRIEF NOTES
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INTRODUCTORY REMARKS.

On Plague having been reported in village Darman, Gurdaspur District, by the Commissioner of Lahore, to the Resident in Kashmir, and by him to the Jammu Durbar, the Chief Medical Officer, Jammu, Dr. B. R. Sawhney, accompanied by two State officials, a Hospital Assistant and a Compounder, proceeded, on 4th November 1900, to Nanga, a State village opposite Darman, and some 4 miles from it.

Here Dr. Sawhney made careful enquiries, but failed to discover any Plague in the Jammu border.

After putting a Hospital Assistant at Nanga with instructions to carefully observe all near villages, and placing observation posts on certain parts of the border, he returned to Jammu.

These posts although in themselves of not much intrinsic value, proved of good moral effect in preventing people from the infected villages going over to healthy villages in any material number.

On his returning from Kashmir, the Superintending Surgeon, Kashmir Hospitals, Lt.-Col. Joshua Duke, I.M.S., Residency Surgeon, Kashmir, visited Nanga, on November 23rd, with the same object.

After his return to Jammu, on 28th November, the Superintending Surgeon called a Special Committee

to be attributed in main the success attained in keeping Plague out of the Jammu District, during the months of November, December, January, and the first-half of February 1901, as well as the comparatively much limited spread of the disease in the Province after its importation.

It must, however, be mentioned that our efforts in thus educating the people by means of printed tracts and personal communications were a good deal supplemented by the knowledge, the people themselves acquired of the distress, the various troubles, and inconveniences which they saw befall the inhabitants of infected villages within their sight.

Besides these border Observation posts, the Plague inspection at the Tawi Railway Station, already in existence, was kept up throughout for the protection of Jammu city.

Observation Camps equipped with necessities.

As further precautionary measures, M. Haffkine's Serum was forthwith procured, as well as the disinfectants and other necessary drugs; and the implements required for disinfection. Tents were at the same time purchased to accommodate at least 600 persons and all these things were got ready for immediate use. Full Camp equipment and Hospital necessities of all kinds were provided.

THE OUTBREAK.

Village Rara.

On 15th February 1901, two Plague cases were detected in the village of Rara, population 397, eight miles due north of Nanga, and 18 miles south of Jammu. The patients were two women, resident of the village, near relations of each other, and belonging to the same household, who had gone across to British village Bhoi Brahmanan whence they returned (after a fortnight's stay) after the latter village had become infected.

Of these, one developed the disease on 9th February, two days after their return, and died on the 14th, while the other manifested symptoms of Plague on the 14th, and died on the 17th. Both these were cases of Pneumonic Plague. On the 18th, the infected house with an adjoining one and all infected and suspected

property was burnt, and the owners liberally compensated for their loss. A section only of the village adjoining the infected house was turned out into camp.

Three more cases occurred in the same household, within the next 6 days, and all proved fatal. These 3 were also of the Pneumonic type. After this no more cases occurred in this village, and the outbreak ended.

Village Jhajwal.

Here the first case of Bubonic Plague (Right axillary bubo) was discovered on 2nd March, in the person of a boy named Dil Mohammed, aged 6 years.

On 5th March, a woman in the same house aborted and died the following morning. The master of this house Thana by name was employed among the Levees on the British side.

On the 5th March, in the house of one Moula Bakhsh employed as a Jamadar of Levees in British Plague Camp, at Suraj Chak, a woman named Mehran developed Plague (Right Ing. Bubo) and died in Plague Camp, on 12th March.

In a third house, a death from Plague took place, on 18th March. The owner of this house was also employed as a Levee in the British Camp.

It will thus be seen that the first infected houses were those to which men from the British Plague Camp frequently repaired and probably served as carriers of infection.

From these houses the disease spread to several others in the neighbourhood.

Town of Samba.

Samba is a small town population 2,618. On the evening of 2nd April, 4 Plague patients in the house of a Mahajan were seen all of whom died the same nights. These were cases of septicæmic form of the disease.

In this house, and in an adjoining one, 3 death had previously taken place, on 31st March and 1st

April, in all likelihood from Plague. The next 5 or 6 days, the disease remained confined to the neighbourhood of the first infected houses and it afterwards spread to other parts of the town.

Prompt measures were in the beginning adopted to limit the spread of the disease, but the inhabitants having afterwards determinedly opposed these measures all official interference had to be suspended and the Plague management of the town was placed by the people entirely in the hands of a Panchait of their own.

The outbreak in this town is interesting in this respect that, although practically no proper sanitary measures to stamp out the disease were allowed to be adopted officially, the disease died out here just the same as elsewhere.

The people themselves, however, cleansed their premises; partially evacuated the infected and certain healthy houses leaped them with clay, and made holes in the walls and roofs here and there.

In the house that furnished the first few cases of Plague, silk and other clothing were said to have been received from Zafarwal after the latter place had become infected.

This story is suggestive of the possibility of the germs of Plague being carried over long distances in clothing.

Further dissemination of the disease.

The disease next appeared in a village called Majrá, on 10th April 1901. One of the first two victims, died on 13th April. This case occurred in a house, in which sojourned a barbar, who now and again went stealthily over to a British infected village Nakhnál where his parents lived. On the occurrence of these two cases and seeing rats dying in two houses in the village, the inhabitants turned out of their own accord and made their own Chhappars.

The next village affected was Jagatpur, declared on 18th April. Here also, the infection was imported from Nakhnál by a Muhammedan priest who sometimes visited the latter village, on the quiet, to receive alms.

During the latter half of April, the villages of Fatwal and Dhopsari became affected. Between 1st and 15th May, two more villages were attacked, *viz.*, Nanga and Jhanda Chak. During the 3rd week of May, Plowta and Shaikhoopura followed, and in the last week of May, the disease spread to three more villages Ramgarh, Chhanni and Babral.

The last village affected was Jasso Chak, in which the disease appeared on 6th June. No fresh villages have since been attacked. This comparatively rapid spread of the disease in the last mentioned 11 villages took place as an inevitable result of the free inter-communication that took place between the infected villages, and the healthy ones in their near neighbourhood.

This laxity of control resulted from the leniency with which the refractory people of Samba were dealt, and the general ebullition of feeling that arose amongst the people in consequence of the murder, and the rioting that took place about that time in the neighbouring disaffected villages in the Zaffarwal Tahsil.

Having so far, had occasion to study Plague during the months of spring and summer only, we have still to learn the relation, if there be any, between the rainy weather and Plague.

Personal infection from man to man.

The infection was generally observed to pass readily from patients to their attendants and sometimes visitors, so long as the former remained in their dark and ill-ventilated houses, but after their removal into Tents or Chhappars in the open, the number of attendants who took the disease from their sick charges was strikingly insignificant. In fact, cases came to our knowledge where an infant suckled for days together by its Plague stricken mother, accommodated in a tent in the open, escaped catching the infection and where a devoted parent slept for nights in the same Chhappar with his sick child without taking the disease.

Instances of such close association between patients and their friends where the latter escaped catching the infection while out in Camp kept repeating themselves, and made a very strong impression on our minds.

The escape of these attendants and friends may be explained by the hypothesis that the wind in blowing acts on the Plague virus clearing and dispersing the pathogenic germs in the atmosphere.

On the other hand a very erroneous and deep-seated general belief in the uncultivated Indian mind that too much of fresh air is bad for a fever patient, was found to be blamable for a large number of seizures and deaths. Plague stricken patients in places where official interference was opposed to, were generally found to be kept in dark ill-ventilated back-rooms in which there was the least renewal of air. The friends and near relations unscrupulously visited the sick, often sat and smoked and sometimes ate and drank in the sick room, frequently touching the patient and his clothes and afterwards unwarily their own lips, mouth or nose. Under such circumstances it is not difficult to imagine that, more than one person should suffer from the disease in the same house, and that the germs be readily carried from one house to another in the persons or clothes of these well meaning, but misguided and ignorant sympathisers. An instance came to our knowledge where no less than eight numbers in a family died of Plague, one after the other. Instances, where three or four members in the same household died, were by no means very few in villages of which the people took the Plague management in their own hands.

The removal of the sick to Chhappars or Tents in localities where there was a free circulation of air, was found to reduce to a minimum the chance of personal infection from man to man. It is difficult to believe that all those that thus escaped, were naturally immune from Plague.

If there be such a thing as congenital immunity from Plague why should it not exert itself irrespective of surroundings?

PROPHYLAXIS.

(A)—*Preventive Inoculations by Professor Haffkine's Serum.*

In all, 946 persons were inoculated. Of these 5 developed Plague within 10 days of the date of inoculation and died: when inoculated they appeared to be in perfect health. These deaths after inoculations, however, occurred only in villages, where inoculations

were done after the outbreak of the disease and not in those where the disease did not exist at the time of inoculation but the villages were seriously threatened. It is, therefore, possible that the victims may have been either incubating the malady at the time of inoculation, or, they took the infection before the protective effects of the inoculations had begun. In very very few instances could people be persuaded to submit to inoculations before the disease had actually invaded their villages. The number of preventive inoculations done was, however, small, and our opportunities of making observations regarding inoculations were so limited, that we are hardly in a position to say what amount of protection the inoculations afforded against Plague. It must, however, be mentioned, that the villages of Rajpore and Bullar of which almost the entire populations were inoculated, completely and wonderfully escaped catching Plague which prevailed within only 3 to 4 hundred yards of them. How far this immunity is due to the protection afforded by inoculation and how far to the fact that the inhabitants of these villages strictly cut off, under repeated medical advice, all communication with infected villages, it is difficult to say ; but believing, as we do, that Plague like Merchandise comes chiefly, as an import, we are inclined to attribute their escape, as much to their completely stopping all communication with infected villages, as to the inoculations. It remains to be seen how the 941 persons now protected by inoculations will fare, should they unfortunately be exposed to the contagion later on.

SANITARY MEASURES.

The other measures adopted in the prevention and suppression of the Plague were those that have been described in detail in my leaflet on prevention of Bubonic Plague, and in my Circular No. 1, of 1901, to the Medical Officers serving in my Province. The disinfection of dwellings was throughout carried out by means of dessiccation by strong artificial heat instead of by chemical disinfectants.

The advantages claimed for disinfection of premises by means of fire are :—

- (1) The extreme simplicity of the operation, and its comparative cheapness because a large band of disinfectors is not necessary.

- (2) The ease with which the fuel can be obtained everywhere and at all times; and,
- (3) The agreeableness of the method to the people of India, three-fourths of whom (the Hindoos) are already more or less familiar with it in the shape of the Hindoo institutions of 'Hawan' and 'Cremation.'

We intend extending the application of this process also to furniture, clothing, &c., by safely placing the same in the room it is sought to dessiccate.

CLINICAL FORMS OF THE DISEASE THAT WERE DIAGNOSED.

1. Fulminant Cases.—A few fulminant cases were met with where patients suddenly died after a slight indisposition.

At Jajhwal, an old man, named Jarra, aged 65, ha^s a copious liquid motion one morning and drops down dead while walking out of his tent in order to make water.

At Majra, a girl, 11 years old, goes out in the morning to graze cattle in the fields apparently in perfect health, and repairs home in the evening still shewing no signs of indisposition. Complains of thirst and general restlessness in the course of that night and dies the next morning.

Such cases were seen or reported as a rule in the commencement of an outbreak in a village.

2. Septicæmic Plague.—The first four cases seen at Samba, and already mentioned, were all of the Septicæmic type. The chief features of these cases were, extreme prostration, thickness of speech, dulled sensibility, incoordination of movements, more or less obscured intellect, and an extremely distressed and anxious look. There was no cough and the bubos were absent except in one case in which there was some tumefaction over the right Femoral region without, however, a perceptible swelling of the glands. With the exception of one patient a man of 50, all were adolescents. They all died within 3 days of the commencement of the symptoms.

3. The Nervous Type.—Head symptoms were present in a large number of bubonic cases, but now and again patients were met with in whom the cerebral symptoms predominated.

At Jajhwal, a girl, named Lachhmi, aged twelve, complained of giddiness, severe headache and an intense pain in both ears. Temperature 102·8 F, pulse weak and frequent, and look drowsy. Taken ill on the 3rd March, she died on the 6th. Bubo and chest symptoms were absent.

At Jajhwal, Bibi a female child, aged 6 years, was inoculated with M. Haffkine's Serum, on 10th March at 4 P.M. She took her evening meal as usual, and went to bed apparently healthy. About midnight fever crept on her, and she asked for a drink of water three or four times. By 4 o'clock the next morning convulsions had supervened, and when seen at 8 A.M., she was deeply comatose, with severe convulsive fits occurring in rapid succession. Death ended the scene a quarter of an hour afterwards,

While witnessing the above painful scene, a little brother of the girl, *Ismail*, aged four years, was seen, seized, all of a sudden, with a convulsive fit which, however, soon passed off, nevertheless making us anxious regarding the issue of the case. The same afternoon his temperature went up to 102·8 F; the fever continuing throughout the illness which terminated in death on the 5th day of the illness, and 6 days after the preventive inoculation. No bubos formed, and there were no head symptoms beyond the single convulsive fit which ushered in the disease.

These two children though inoculated at the same time were done from different bottles of Haffkine's lymph.

4. The Puerperal Type.—Only one case of this type was met with. Chuhuran, aged 30 years, in the last fortnight of her pregnancy and previously in sound health, was suddenly seized with fever on the morning of the 5th March 1901. The fever continued and on

the night of the 6th, she gave birth to a living female child, the delivery being easy and uneventful. She died early next morning. No bubos formed.

The baby, when last seen a month afterwards was alive and in good health.

5. The Intestinal Type.—Bachitroo, a male child, aged two years and six months, vomitted three times on the early morning of the 12th March, and was dead by 11 A.M. If it were not, for the prevalence of Plague in the village, and the absence of Cholera there or in the neighbourhood, this case would have easily been returned as one of Asiatic Cholera, to which disease, in fact the death was ascribed by the parents.

Feroz Din, a five months baby whose mother was laid up with Plague, sickened, bringing up milk, and died in the course of two hours.

6. Pestis Ambulans.—Not a few cases were met with in which bubos were present, without much constitutional disturbance, and if it were not for this outbreak these would easily have been regarded as cases of simple sub-acute adenitis,

7. Pneumonic Plague.—Several cases of this form were seen, the most typical of which were the four fatal cases that occurred in the village of Rara, and the very first ones in the Province.

The symptoms were, a diffused pain over the chest, and in the right hypochondrium, moderate cough, sputum watery and blood stained, temperature ranging between 101° F and 103° F pulse very frequent and small, and the appearance anxious. Headache was a prominent symptom, and there was vomiting in one case. The onset of the disease in the two cases that were watched from the first was gradual, and all died within 70 hours of the pronouncement of symptoms.

In one case death occurred from cardiac failure, intellect remaining clear to the last ; and in two by coma preceded by delerium and a gradually increasing difficulty of respiration.

8. Babonic Plague.—The vast majority of cases were of the bubonic variety. Generally speaking, the most frequent seats of the bubos were the femoral and the inguinal regions, then the cervical and last of all the axillary. Only one case of post-aural and one of parotid bubo were seen. The bubos were as a rule single, but occasionally double. The average size of a bubo was that of a large hen's egg.

Prognosis.

Extreme prostration, delirium, and absence of bubos were always of an unfavorable augury. The pneumonic and the septicæmic forms were invariably fatal.

The chief features of the cases that ended in recovery were, the presence of bubos especially suppurating, the mildness of head symptoms, and the protraction of the case to the 7th or 8th day.

The women suffered nearly in the proportion of 2 to 1 of males. This greater liability of the female sex. I am inclined to attribute to the women remaining much more at home than the men who are generally out at work in the fields and to the habit of squatting in which Indian women have more occasions to indulge than men. To this habit and to that of going about bare-footed may be ascribed the somewhat greater frequency of femoral bubos observed in women.

REMARKS ON TREATMENT IN HOSPITAL.

The general line of treatment adopted throughout was of a tonic and stimulating nature. Strychnia, Digitalis and Quinine were the drugs chiefly used, with alcohol and with preparations of ammonia as diffusible stimulants.

A combination of Quinine and Iron in a few cases, and sometimes, Carbolic Acid were employed with a view to counteract the effects of Septic infection of blood. The treatment, however, was mainly Symptomatic. It is difficult to say whether any of these drugs, singly, or in combination had any effect, in modifying the severity of the disease or in largely mitigating such distressing symptoms, as extreme asthenia, high fever, severe headache, giddiness, &c., &c.

In two cases with high fever and headache; followed by unconsciousness, consciousness was restored after an uninterrupted application of cold water to the head for several hours. Constipation was common and for its relief Empson Salt was chiefly used. Appetite was observed to be generally good and the patients unless delirious readily took their food which generally consisted of milk, soup, rice and other easily digestible articles of diet. Bubos were always opened when ripe and in several cases the use of the lancet was followed by a distinct fall in the pyrexia and a general relief of symptoms. Death in most cases took place from cardiac failure and in some from coma.

Curative Human Serum.

At the suggestion of Lieutenant-Colonel Joshua Duke, I.M.S., then Superintending Surgeon, Kashmir Hospitals, acting on the hypothesis of antitoxins in the serum, we bled two individuals convalescent from Plague, took the serum of their blood, and inoculated it with the most suitable antiseptic precautions in five Plague patients after the appearance of buboes, in them. The particulars of these cases with results are given below as well as the directions followed in the preparation and use of serum. No decisive conclusions can be drawn from this limited trial, but the results seem to be somewhat hopeful, and encouraging. For a more extended trial the opportunities have unfortunately not yet offered themselves.

Particulars of 5 cases in which Duke's Plague Curative Serum was tried at Jagatpur, Majra, Jammu Province, Kashmir State.

Case 1, *Husaini*, daughter of *Phuman*, aged 9 years, taken ill with fever, on 18th April 1901, at 12 noon.

19TH APRIL.—Temperature 102, Rt. Cervical Bubo found, no cough. 6 P.M., 3 c.c. of Serum inoculated under the skin of arm.

20TH APRIL.—Temperature rose to 103 F, glandular swelling (bubo) lessened. 6 P.M., 3 more c.c. of Serum inoculated as before.

21ST APRIL.—Temperature 101·8; further lessening of glandular swelling; patient looking better. 5 P.M., 3 more c.c. of curative serum inoculated.

22ND APRIL.—Temperature 100, Bubo disappearing further improvement in the patient's appearance.

23RD APRIL.—Temperature 100·6, conjunctivitis appeared in both eyes.

24TH APRIL.—Temperature Normal took some solid food.

25TH APRIL.—No fever, but left eye very red and painful.

26TH APRIL.—No fever.

27TH APRIL.—No fever, general health improving day by day.

29TH APRIL.—A fresh lymphatic gland became swollen behind the right ear, conjunctivitis better; Poultices applied over the swollen gland.

2ND APRIL.—Conjunctivitis almost gone, no fever.

3RD APRIL.—Suppuration set in the gland.

4TH AND 5TH APRIL.—No fever patient convalescent, eventually discharged *cured*.

Gauhrie, wife of Deyàn, aged 30 years, taken ill with fever, on 16th April, but when seen on 18th April, for the first time had Temperature 103 with Rt. Femoral Bubo.

Case 2.

19TH APRIL.—Temperature 103, slight cough bowels costive much headache, and delirium. 5 c. c. of Serum inoculated at 6 P.M.

20TH APRIL.—Temperature 102·4, patient still delirious; inoculated 5 more c. c. of Serum at 6 P.M.

21ST APRIL.—Temperature 102·4; pulse 128 soft and small; blood oozing from the gums; the bubo still much swollen, and the patient unconscious. 5 c.c. of serum inoculated.

22ND APRIL.—Unconsciousness continues unabated and the glands are still painful and swollen; Temperature 102·2, Pulse 120, slight cough present.

23RD APRIL.—8 A.M., Temperature 102·8, patient still unconscious, *died* at 3 P.M.

case 5. *Ganeshi*, wife of Nathoo, aged 35 years, taken ill with fever on the night of 22nd April.

23RD APRIL.—Temperature 101·6, Lt. Inguinal gland swollen, no cough, no headache, 5 P.M., Temperature 102·8, 5 c.c. of Serum inoculated.

24TH APRIL.—Temperature 101·2.

25TH APRIL.—Bubo subsiding and less painful; Temperature 103·2; 5 more c.c. of Serum given.

26TH APRIL.—Morning—No fever very little pain in the bubo, 5 P.M., Temperature 100·2 with much thirst.

27TH APRIL.—Temperature Normal, bubo disappearing 5 c.c. of Serum inoculated again.

28TH APRIL.—Temperature Normal.

29TH APRIL TO 5TH MAY.—Temperature Normal, patient convalescent discharged *cured* on 5th May.

case 4. *Mussan*, wife of Sohnnoo, aged 35 years, seen on 24th April with Temperature 102·4 and Right Femoral bubo, but said to be suffering from fever since the last four days.

25TH APRIL.—Temperature 101·8, 5 c.c. of Serum given.

26TH APRIL.—Morning Temperature Normal, 5 P.M. Temperature 101.

27TH APRIL.—Temperature 103, 5 more c.c. of Serum inoculated at 5 P.M., Temperature 99.2.

28TH APRIL.—No fever, but very weak.

29TH APRIL.—Temperature 99.

30TH APRIL.—Temperature 102.

1ST TO 4TH MAY.—Temperature Normal taking increasing quantities of nourishment and gaining strength.

5TH APRIL.—*Cured*, Temperature Normal and bubo disappeared.

Rahimi, daughter of Jalla, aged 20 years, said to have been taken ill with fever, on 23rd April. When seen on 25th April.

Temperature 103 much headache Rt. axillary bubo, frequent vomiting.

26TH APRIL.—Temperature 101.6, 5 c.c. of Serum inoculated at 5 P.M.

27TH APRIL.—8 A.M., Temperature 100.4 pulse weak bubo increasing in size and several loose motions; delirium supervened.

28TH APRIL.—No fever, but unconscious, 5 more c.c. of Serum inoculated.

29TH APRIL.—Coma deepened; Temperature 103.

30TH APRIL.—Temperature 103, deeply comatose. died at 3 P.M.

The following were the directions given by Colonel Duke, I.M.S., for the preparation and use of the Serum:—

1. All aseptic precautions must be most carefully carried out—

(a) On the patient from whose arm blood is drawn when convalescent.

The doses used in all cases were too small - 5 cc being used instead of 8 cc as ordered. I hope the full doses were shortly given.

19. 7. 1

Calcutta

Dear Sir

I thank you for the
the papers on Human Plague serum
which you kindly lent me.

The cases are interesting as
being the only cases probably which
have been so treated but as
they are few & the results
not very conclusive the
experiment is not of much
Scientific Value.

The doses given seem to
me very small & are.

10. 5. 19

Chloris

Dear Sir

I thank you for the

to papers for the American Museum of Natural History

which you kindly sent me. The cases are interesting in

being the only cases I have met with which

have been so treated but no

the are fine to the result

not very conclusive the

efficiency is not of course

This account probably
to treatment should no
no special advantage.

There is no information as to
where or how the serum
was taken or as to
how injected. Whether into
the veins or subcutaneously.

It would be very
interesting if these experiments
could be continued.

Yours truly
A. P. P.
Andrews Pearce.

than when we
to treatment of these
no other who were

there is no information as to
whether or how the
were taken so as to

have suggested whether the
the virus in the treatment

It would be very
interesting if these experiments
could be continued

Yours sincerely
T. W. H. P. H. H.

(b) On the fever patient.

(c) A special syringe should be kept for this purpose.

2. The principle is simply to use Human Serum derived from a patient with a normal temperature of—

(a) 8 days
(b) 14 „
(c) 21 „ } or convalescent for this period.

3. The blood drawn by arm venesection should flow into a clean glass measure and then be poured into a glass stoppered bottle and kept in a cool place.

4. After 12, or 18 or 24 hours, the clear Serum should be drawn off with a calmette syringe.

5. And passed into a prepared Haffkine Serum bottle adding Boracic Acid gr. v. to every 100 minims as a preservative.

6. Typical cases of Plague should be selected and 8 c.c. injected subcutaneously daily for 2 or 3 doses.

7. After watching the effect, upto 16 c.c. might be used in a bad case on two occasions.

8. No other Medicines except strychnia and stimulants should be given.

9. The operator must always be inoculated previous to any experiments.

He alone must gauge the value of serum and he must regulate the dose.

CAMP TRET: } (Sd). J. DUKE,
SRINAGAR—KASHMIR, } Residency and Supdg. Surgeon,
24th March 1900. } KASHMIR.

I sent this note to Fraser the
Plague Commr. but they
took no notice

STATEMENT No. I.

Showing Plague infected villages with the number of cases and deaths in each.

Serial No.	Name of villages.	Population.	Date of declared infected.	Total cases upto date.	Total deaths upto date.	Total discharged upto date.	Under treatment.	Date of last new case.
1	Rara ...	397	15-2-1901	5	5	27-2-1901
2	Jhajwal ...	348	2-3-1901	37	26	11	...	21-3-1901
3	Samba ...	2,618	2-4-1901	193	151	42	...	27-5-1901
4	Majra ...	181	13-4-1901	11	7	4	...	6-5-1901
5	Jagatpur ...	336	18-4-1901	9	6	3	...	29-4-1901
6	Fatwal ...	456	24-4-1901	41	24	15	2	22-6-1901
7	Dhopsari ...	48	27-4-1901	6	5	1	...	30-4-1901
8	Nanga ...	954	3-5-1901	72	49	21	2	22-6-1901
9	Jhanda Chak	54	3-5-1901	3	3	3-5-1901
10	Samdoo ...	234	16-5-1901	34	20	12	2	27-6-1901
11	Plauta ...	231	16-5-1901	20	9	11	...	27-5-1901
12	Shekhoopura	152	16-5-1901	8	1	6	1	16-6-1901
13	Ramgarh ...	1,001	29-5-1901	18	12	5	1	9-7-1901
14	Chani ...	150	29-5-1901	12	2	10	...	15-6-1901
15	Babral ...	225	30-5-1901	16	8	8	...	22-6-1901
16	Jasso Chak	235	6-6-1901	4	1	3	...	11-6-1901
Total ...				489	329	152	8

*Small - 5 cc bag used instead of
ordered. I hope the full dose used shortly.*

STATEMENT No. II.

Of Groups A and B comprising 3 villages each showing by contrast the effects of adoption and non-adoption of evacuation, disinfection and other Plague preventive measures.

Name of villages.	Population.	Total cases.	Deaths.	Mortality per cent of cases.	Duration of outbreak.	Months of outbreak.	Cases per cent. of population.	Protected by inoculation.	REMARKS.
Group A. { Jhajwal Rara Jagatpur-Majra Total	348	37	26	70.2	20 days	March	10.6	242	} Villages in which Plague preventive measures were adopted officially.
	397	5	5	100	13 "	February	1.2	...	
	517	20	13	65	24 "	Latter half of April and 1st week May.	3.8	224	
	...	62	44	70.9	57 "		15.6	466	
Group B. { Samba Nanga Samdoo Total	2,618	193	151	78.2	56 days	April and May.	7.3	...	} Villages in which people had to be left to themselves.
	954	72	49	68.05	51 "	May and June.	7.3	171	
	234	34	20	58.8	43 "	Latter half of May and June.	14.5	...	
	...	299	220	73.5	150 "		29.1	171	

N. B.—The reason why comparison has been held between 6 infected villages only, and not in all, is that the outbreaks in them have been more or less closely studied, and they form the two typical groups.

CONCLUSIONS DRAWN FROM THE FOREGOING OBSERVATIONS.

1. The best safeguard against the importation of Plague into a healthy locality is the training of the people themselves in the mode of self-preservation from the disease.

2. Such training is best imported by means of printed tracts, and by personal communications which have a charm of their own, if made in a more or less missionary spirit by men properly qualified to discharge such an important duty.

3. By early notification and employment of prompt scientific Sanitary measures it is not at all difficult to destroy the first focus or foci of the disease in a locality that has been invaded by it.

4. A determined concealment of Plague cases leads very often to the infection of rats, if there be any in the house, which gives the Plague germs a more or less firm hold on the soil and renders their destruction a matter of so much more difficulty.

5. Generally speaking, in an infected village, where Scientific precautionary measures are adopted, the seizures are nearly half of what occur in a village of which the people are left to their fate, and the average duration of the disease is less than half.

6. The germs of Plague are very intolerant of high degrees of heat, Natural or Artificial, and the disease has a natural tendency to gradually die out at all events for the time, with the increasing heat of the summer season.

7. As far as has been observed here, disinfection of the dwellings by means of strong artificial dry heat is an affectual method of destroying Plague germs. The ancient Hindu custom of performing the "Hawan" as inculcated by the Shastras was probably based on a recognition of this fact by the ancient Aryans.

8. So far a satisfactory cure for Plague, whether in the form of a curative serum, or of a drug or drugs.

*Small - 5 cc being used instead of
ordered. I hope the full doses used shortly.*

has not been discovered. The deleterious effects of the virus on the heart and the central nervous system are the chief elements of danger in the disease, and the issue of a particular case is determined more by the reserve of force in the patient, the result of his previous good feeding and sanitary surroundings supplemented by a careful nursing and good general management of the case during illness, than by any medicinal agents that we at present employ.

9. The Plague is essentially a disease of the ill housed and consequently the generally dirty and it greatly respects those who live a hygienic life.

Cardinal Conclusions.—We may state it, therefore, as cardinal conclusions in connection with the prevention and suppression of Plague, that this disease always comes into a healthy locality as an import; that the germs being provided from an already infected place, the soil of the dark ill-ventilated damp rooms affords a most suitable medium for their development and multiplication; that the germs are so acted upon by free currents of air and by light as to be largely divested of their power to do harm to human beings; and that exposure to high degrees of heat natural or artificial destroys the germs. The most effectual method of dealing with the Plague, where ignorant and superstitions masses are concerned is the training of the people themselves in these principles.

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Dated Jammu, 20th July 1901.

