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GOVT. OF  
BIHAR & ORISSA.

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1913.

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MUNICIPAL  
DEPT.

SANITATION.

FEBRUARY.

A Proceedings—Nos. 3 to 18.

Measures adopted for stamping out plague during the year 1912-13.

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# NOTES. 3

SANITATION—A, FEBRUARY 1913.

Nos. 3—18.

MEASURES ADOPTED FOR STAMPING OUT PLAGUE DURING THE YEAR 1912-13. File No. S. 103  
of 1912.

FROM THE SANITARY COMMISSIONER, BIHAR AND ORISSA, NO. 1846, DATED THE 15TH AUGUST 1912. [No. 3]

(1) The cost of Sanitary Commissioner's proposals should be worked out, and the budget provision noted : also any proposed departure from the existing arrangements for sharing such expenditure between Government and Local bodies.

(2) What is meant by the statement that the cost of plague prophylactic (other than transit charges) is a book debit?

G. F. SMITH,—21-8-1912.

Under Secretary—

(1) The cost of the entertainment of the Assistant Surgeons would amount to Rs. 7,281 or roughly to Rs. 7,300. The budget provision is Rs. 17,150, out of which Rs. 3,611 have been expended up to the end of June 1912. The present policy of Government is that all plague expenditure is a direct charge upon the local bodies concerned. I could not trace out any papers showing the entertainment of a special establishment of Assistant Surgeons for plague measures in Bengal though a Civil Surgeon or an Assistant Surgeon on the regular establishment was sometimes deputed for plague measures.

(2) With reference to paragraph 2 of Under Secretary's notes, dated 21st August 1912, please see the rules for the issue of plague prophylactic from the Laboratory at Parel on page xxx, appendix 10 of the Punjab Plague Manual, 1911. Perhaps it is meant that no\* cash payment for the prophylactic is made by those who indent for it.

\*The debit will still lie against this province.

G. F. SMITH,—23-8-1912.

HEMANTA,—26-8-1912.

J. GUPTA,—26-8-1912.

Secretary—

Sanitary Commissioner's proposed plague measures for 1912-13 are for orders. The cost of the proposed establishment for inoculation work in the current year would be about Rs. 4,500. It is proposed to make a vigorous attempt to encourage inoculation. The office cannot find that anything on this scale was attempted in Bengal, and the danger of entrusting this kind of work to any but specially selected officers must be borne in mind. Apart from this, the number of Assistant Surgeons proposed to be employed, etc., appear suitable. Sanitary Commissioner proposes a division of expenditure between the Local Government and the Local bodies concerned. It is doubtful whether this should be accepted, and we may

† Except that for prophylactic and inoculating apparatus, which are charges which Government has, apparently, usually borne.

G. F. SMITH.

Special plague officers have always been paid by Government.

E. L. TANNER.

‡San. B, Dec. 1912, Nos. 229-30 (S-70).

The proposal to place Captain Cook on special duty may be accepted, the cost being borne by the Local Government—also the proposed inoculation depots. It is not possible to estimate what the plague prophylactic and equipment required will cost, as the quantity required is not known. We shall have to find whatever money is required if the budget provision for plague measures proves inadequate.

G. F. SMITH,—28-8-12.

Hon'ble Mr. Gait—

Sanitary Commissioner's note may be read, and I would ask that preliminary orders be passed as to the posting of Captain Cook with an Assistant Surgeon to help him as proposed. Captain Cook arrives in Bombay next Friday, and Inspector-General of Civil Hospitals, wishes to get the order there to meet him. There are one or two points, namely, the entrusting of



inoculation to Sub-Assistant Surgeons and the pay proposed for the Assistant Surgeons which require more looking into. This will be done when orders are passed on the above point.

E. L. TANNER,—30-8-1912.

I agree.

E. A. GAIT,—31-8-1912.

- [No. 4] NOTIFICATION No. 3582-M., DATED THE 3RD SEPTEMBER 1912.
- [No. 5] ENDORSEMENT TO THE SANITARY COMMISSIONER, BIHAR AND ORISSA, AND INSPECTOR-GENERAL OF CIVIL HOSPITALS, No. 3583-84-M., DATED THE 3RD SEPTEMBER 1912.
- [No. 6] LETTER TO THE SANITARY COMMISSIONER, BIHAR AND ORISSA, No. 3585-M., DATED THE 3RD SEPTEMBER 1912.
- [No. 7] ENDORSEMENT TO THE INSPECTOR-GENERAL OF CIVIL HOSPITALS, BIHAR AND ORISSA, No. 3586-M., DATED THE 3RD SEPTEMBER 1912.
- [No. 8] ENDORSEMENT TO THE ACCOUNTANT-GENERAL, BIHAR AND ORISSA, No. 3587-M., DATED THE 3RD SEPTEMBER 1912.
- [No. 9] FROM THE INSPECTOR-GENERAL OF CIVIL HOSPITALS, No. 2845, DATED THE 6TH SEPTEMBER 1912.

Under-Secretary—

We may perhaps sanction the employment of a temporary Assistant Surgeon on \* Rs. 100 a month with an allowance of Rs. 2 per diem from the date of actual entertainment. But it is not clear whether he should be entertained up to the end of October 1912 only or till April 1913, probably the latter.

HEMANTA,—9-9-1912.

J. GUPTA,—9-9-1912.

Secretary—

G. F. SMITH,—10-9-1912.

Please examine the question of allowances a little further. Is there not a definite scale of epidemic allowances for Assistant Surgeons?

E. L. TANNER,—10-9-1912.

Under Secretary—

No orders could be traced as to a definite scale of epidemic allowance for Assistant Surgeons. In their circular No. <sup>11-Sany.</sup> 1154-60, dated the 29th March 1897, the Government of India sanctioned the grant of a deputation allowance at the rate of Rs. 2 a day to Assistant Surgeons employed on plague duty. From Bengal Government letter No. 99-T. M., † dated the 5th May 1897, it will be seen that Assistant Surgeons on famine duty also get the same rate of allowance. In September 1911 §, the Government of Bengal recommended the grant of a deputation allowance to civil assistant surgeons employed on cholera or small-pox duty on the analogy of the allowance sanctioned for such officers deputed to plague duty, but in their letter No. 1147 ||, dated the 17th November 1911, the Government of India rejected this proposal.

2. In the present case, the question of a deputation allowance does not arise as we are not going to depute any Assistant Surgeon but to entertain a temporary Assistant Surgeon for special duty. In Bengal Government Memorandum No. 721-Medl.-P.¶, dated the 17th December 1907, the salary of a temporary Assistant Surgeon was fixed at Rs. 133-8 plus the usual travelling allowance. On page 98 (Appendix B) of Bengal Plague Manual, the salary of temporary Assistant Surgeons recruited by the Inspector-General of Civil Hospitals, for plague duty is also shown as Rs. 100 + Rs. 33-8. (Subject to the modifications sanctioned in Government Order No. 721-Medl.-P., dated the 17th December 1907, and the concessions granted in Home Department letter No. 1367\*\*, dated the 9th December 1903, the rules embodied in Appendix B of the Bengal Plague Manual regarding allowance and leave of officers on plague duty, appear to be still in force ††.)

\*\* Bengal Medl. A, Decr. 1903, Nos. 44-46. (File No. 2-P.—147.)

†† Bengal Medl. B, May 1908, Nos. 356-357. (File No. 2-P.—66.)

HEMANTA,—11-9-1912.

J. GUPTA,—11-9-1912.



Secretary—

G. F. SMITH,—12-9-1912.

Reply to Inspector-General of Civil Hospitals, referring to the orders of 1907\*, and  
 \* Medl. A, Decr. 1907, Nos. 65—67. (File No. 2- saying that a temporary Assistant Surgeon can be  
 P—94). employed on Rs. 133-8 + usual travelling  
 allowance.

E. L. TANNER,—15-9-1912.

TO THE INSPECTOR-GENERAL OF CIVIL HOSPITALS, BIHAR AND ORISSA, No. 3973-M., DATED [No. 10]  
 THE 17TH SEPTEMBER 1912.

TO THE SANITARY COMMISSIONER, BIHAR AND ORISSA, No. 3974-M., DATED THE 17TH [No. 11]  
 SEPTEMBER 1912.

TO THE ACCOUNTANT-GENERAL, BIHAR AND ORISSA, No. 3975-M., DATED THE 17TH SEP- [No. 12]  
 TEMBER 1912.

Hon'ble Mr. Gait—

Please see my note of the 30th August and your orders thereon. I now submit the case  
 for final orders.

2. The points on which orders are required are summarised in the paragraph in the  
 Sanitary Commissioner's note headed "measures proposed for 1912-13." Of these proposals  
 one, *viz.*, the deputation of an Indian Medical Service officer and an Assistant Surgeon to  
 help him for the general supervision of plague has already been sanctioned and we now  
 have to consider the following proposals :—

- (i) Appointment of six temporary Assistant Surgeons for carrying out inoculation in  
 the endemic centres on a pay of Rs. 100 *plus* Rs. 2 a day special allowance from  
 the 15th October till the end of April 1913.
- (ii) To provide permanent Civil Assistant Surgeons stationed within the affected area  
 with inoculation apparatus and instructions to offer inoculation and to encourage  
 people to take it as far as possible.
- (iii) To employ Sub-Assistant Surgeons in charge of Hospitals in the same way, provided  
 that they have a certificate signed by the Civil Surgeon that they are competent  
 to perform the work.

3. As to the first proposal the Sanitary Commissioner proposes five Assistant Surgeons  
 for five centres and one for relief in case of sickness. I doubt if the last one is required and  
 I think that we should sanction five only. As they are temporary men it should be easy to  
 replace any one by another man temporarily appointed in case of sickness. As to the pay  
 this is already governed by the orders of the Bengal Government, No. 720-Medl.-P., dated  
 the 17th December 1907. The pay has been fixed at Rs. 133-8 *plus* the usual travelling  
 allowance. As the lowest pay of a permanent Assistant Surgeon, *viz.*, Rs. 100, has not been  
 altered by the recent introduction of the time scale there is no need I think to revise these  
 orders.

4. As regards the second point we may sanction the Sanitary Commissioner's proposal  
 to supply Civil Assistant Surgeons in the affected area with inoculation apparatus. As regards  
 the third proposal I am more doubtful. It is necessary to be exceedingly careful that no  
 accident should happen in connection with inoculation. The experiment of employing  
 selected Sub-Assistant Surgeons has however proved successful in the United Provinces, and  
 Colonel Hare tells me that provided the Sub-Assistant Surgeons are carefully selected there  
 should be no risk of any danger. In these circumstances the proposal might perhaps be  
 accepted.

5. As regards the cost of these proposals, I think they should be met as usual by Govern-  
 ment, as we have always borne the cost of inoculation charges and special medical officers  
 deputed for general plague purposes.

E. L. TANNER,—20-9-1912.

Thanks. I agree throughout.

E. A. GAIT,—21-9-1912.

TO THE SANITARY COMMISSIONER, BIHAR AND ORISSA, No. 4504-M., DATED THE 30TH SEP- [No. 13]  
 TEMBER 1912.

TO THE ACCOUNTANT-GENERAL, BIHAR AND ORISSA, No. 4505-M., DATED THE 30TH SEPTEMBER [No. 14]  
 1912.

TO THE INSPECTOR-GENERAL OF CIVIL HOSPITALS, No. 4506-M., DATED THE 30TH SEPTEMBER [No. 15]  
 1912.



[No. 16] FROM THE INSPECTOR-GENERAL OF CIVIL HOSPITALS, No. 4123, DATED THE 21ST NOVEMBER 1912.

Under Secretary—

The Sanitary Commissioner in the paragraph of his note headed "Measures proposed for 1912-13" suggested that the temporary assistant surgeons on plague duty should be entertained till the end of April 1913. In paragraph 2 of our letter No. 4504-M., dated 30th September 1912, sanction was conveyed to the entertainment of 5 Assistant Surgeons up to 30th April 1913. We may say that the Assistant Surgeon employed to assist Captain Cook should also be retained till the end of April 1913. Draft put up for approval.

HEMANTA,—28-11-1912.

J. SAHAI,—28-11-1912.

Secretary—

As proposed.

S. B. DHAVLE,—29-11-1912.

L. J. KERSHAW,—29-11-1912.

[No. 17] TO THE INSPECTOR-GENERAL OF CIVIL HOSPITALS, No. 6306-M., DATED THE 29TH NOVEMBER 1912.

[No. 18] TO THE SANITARY COMMISSIONER AND THE ACCOUNTANT-GENERAL, BIHAR AND ORISSA, Nos. 6307—08-M., DATED THE 29TH NOVEMBER 1912.

बिहार सरकार

मंत्रिमंडल सचिवालय विभाग

(बिहार राज्य अभिलेखांगार निदेशालय)



MEASURES ADOPTED FOR STAMPING OUT PLAGUE DURING THE YEAR  
1912-13.

File No.  $\frac{S.}{103}$   
of 1912.

[No. 3]

No. 1846, dated Ranchi, the 15th August 1912.

From—Lieutenant-Colonel E. C. HARE, I.M.S., Sanitary Commissioner in Bihar and Orissa,

To—The Secretary to the Government of Bihar and Orissa, Municipal Department.

I have the honour to forward, for the consideration of Government, a report on the present condition of plague in this Province, and my proposals for dealing with it during the ensuing cold weather.

2. May I request the favour of orders on the subject at an early date, as some delay will occur in recruiting the officers and making the arrangements to commence work as soon as the plague season begins.

[A.—Enclosure to No. 3.]

*Note on plague in the Province of Bihar and Orissa.*

Statement No. 1 shows the rates of mortality per thousand in each district of the province between the years 1902—11 calculated upon the district population. It will be noted that the disease is practically absent from the Chota Nagpur and Orissa Divisions, and that it is confined to certain portions of the Tirhoot, Patna, and Bhagalpur Divisions which lie in the valley of the Ganges. The ratio is highest in the Patna District, the average of the decade being 8.21; next in order come Saran 7.71 and Shahabad 3.88, Gaya 2.21 and Monghyr 2.18. The percentage mortality in the other districts of the province is fractional.

A reference to the sketch map\* shows that the disease attains its highest development in the towns and in the portions of the districts which lie adjacent to them on either side of the Ganges and its larger tributaries, and that generally speaking those thanas and portions of districts which lie near the hills on either side of the valley and away from the rivers are less liable to infection and suffer less severely when they are affected. The most important centres of infection are (1) in the neighbourhood of Patna, Bankipur, Chapra and Arrah, and (2) in the neighbourhood of Gaya; (3) Monghyr and Bhagalpur are also centres of local importance; but they are quite subsidiary when compared with Patna and Gaya.

The districts and thanas around these centres are affected more or less in proportion to their proximity to them. *Saran* is severely affected throughout, probably because it lies next to Ballia, which is one of the most stricken districts in the United Provinces, but the infection is most intense on the banks of the Gogra and least so in the thanas bordering Champaran. Again in *Shahabad*, the thanas most severely affected are those inhabited by the Rajputs in the Gangetic valley. The disease usually first appears in this quarter of the district each successive season, and spreads gradually southward to the more hilly and jungly thanas, some of which are only slightly affected. The same may be said of the incidence of the disease in the *Muzaffarpur*, *Darbhanga* and *Bhagalpur Districts*; those portions which lie nearest the towns and the valley of the Ganges being the most extensively affected. The very heavy infection of the *Patna District* is due to the presence of Patna and Bankipur cities which lie at the junction of the four great rivers, the Gondak, the Gogra, the Ganges and the Sone, and which are pre-eminently a centre into which and from which the disease is continually being carried; the towns and the district naturally reacting upon each other. The severe infection of *Gaya* and the neighbourhood is no doubt largely due to its being a great centre of pilgrim traffic.



It is not altogether evident why the disease should be confined to this area. Why, for instance, Gaya should be seriously affected and places like Deogarh and Puri into which the disease must also have often been imported by pilgrims should escape. To outward appearance, the conditions at Puri, in which the houses are intensely congested and are built of much the same materials as those of Patna and Gaya, seem just as favourable to harbouring rats and yet the town has never been infected.

No doubt the intense congestion of the areas lying in and around the confluence of the Ganges and its tributaries is responsible to a certain extent, and also the proximity of the area to the infected districts of the United Provinces; but there must be other factors, one of which is possibly the presence or absence of the black rat and of the rat fleas. Captain Kunhardt, I. M. S., in his report to the plague commission on the freedom of the Eastern Bengal Districts from the disease, compared the conditions prevailing in Purnea where the plague has never found a footing with Bhagalpur which has at times suffered severely, and he showed that while he caught 34.4 specimens of the black rat per hundred traps set in Bhagalpur, he was only able to catch 5.1 in Purnea, and that while the average number of fleas per rat in those caught at Bhagalpur was 8.1 in Purnea, it was only 4.9. It may be that the same conditions prevail among the rats in other parts of the Province, and the observation suggests that there is some critical point above which it is necessary for the proportion of black rats and of fleas per rat to rise before bubonic plague can become endemic. It would be a very interesting problem to investigate, and a very desirable one towards understanding the geographical distribution of the disease in this province. Another interesting point which requires investigation, is the apparent absence of epidemic pneumonic plague which was so marked a feature of the outbreaks in Eastern Bengal; one does not hear anything of it even in the districts which are free from the bubonic type of the disease.

If one may draw any conclusions from these observations, it seems—

- (1) that the disease is confined to certain well defined endemic areas, beyond which it has hitherto shown little or no tendency to spread, even though epidemics may have appeared outside of it from time to time;
- (2) that the disease is most manifest in the large towns and centres of trade along the river banks, and that the surrounding country suffers in proportion to its proximity to these centres of infection. Our efforts to control the disease ought therefore to be concentrated on these spots.

The diagram\* (statement II) shows in a graphic manner the course which the disease has run in the three districts of the province which are chiefly involved, viz., Patna, Saran and Shahabad. The curve is a typical one and is followed by somewhat similar curves in other districts. The fall which occurred in the years 1908-09 is remarkable and I can offer no explanation of the meaning.

\* (Not printed.)

#### *Measures adopted by Local Bodies to control the disease.*

The statement below gives some idea of the expenditure which Local bodies have incurred during the last three years. It has been chiefly in connection with rat-catching establishment and medical and sanitary contingencies.

					1909-10.	1910-11.	1911-12.
					Rs.	Rs.	Rs.
<i>District Boards.</i>							
Saran	...	...	...	...	6,615	15,491	7,828
Shahabad	...	...	...	...	3,448	2,014	1,087
Gaya	...	...	...	...	1,878	168	845
Monghyr	...	...	...	...	5,078	1,434	1,257
Muzaffarpur	...	...	...	...	2,593	2,090	1,043



					1909-10.	1910-11.	1911-12.
<i>Municipalities.</i>					Rs.	Rs.	Rs.
Chapra	...	...	...	...	1,420	1,399	2,825
Patna	...	...	...	...	3,324	2,176	2,312
Arrah	...	...	...	...	1,768	700	96
Gaya	...	...	...	...	1,243	1,184	1,392
Monghyr	...	...	...	...	2,765	2,359	2,528
Muzaffarpur	...	...	...	...	2,145	1,989	1,046

In addition small sums have also been spent on disinfection and inoculation. In previous years from time to time much larger sums were spent in some localities,—for example Rs. 7,400 was spent by the Gaya District Board in 1908-09 on the erection of ratproof grain golas, and Rs. 13,600 was spent in 1906 by the District Board of Shahabad on rat-catching in Sasaram and Jagdeshpur.

(a) *Rats and rat-catching.*—As Captain Kunhardt showed, in his report to the Plague Commission on the absence of the disease in the Eastern Bengal Districts, one of the reasons why these Bihar Districts are seriously affected, is because the conditions under which the people are living are in a high degree favourable to the harbouring of rats. Instead of living in homesteads widely separated from each other in their *baris* and in houses made of *ekra* plastered over with a thin covering of mud in which the rats cannot burrow, the huts are closely packed together with high dividing mud walls of considerable thickness which afford them an ideal shelter and from which it is impossible to exterminate them.

Most of the plague-infected districts have spent much time and money in their attempts to get rid of the pests and in some of them there is still a strong feeling in favour of continuing the measures. For instance in the *Shahabad* District during 1905 and 1906, rat-catching was carried on in the towns of Jagdeshpur and Sassaram with great vigour under the direction of Captain Stevens, I.M.S., the then Civil Surgeon, and the operations were only abandoned for want of funds. I am informed that over 5,00,000 rats were killed in one season at a cost of Rs. 8,433 and in the following year 45,000 more were destroyed. Local opinion seems to have been decidedly impressed with the utility of the work, and of its great value in reducing the mortality from plague. This opinion was confirmed by the local statistics of mortality which fell from over 8 per mille in 1905 at the commencement of the operations to .8 in 1908; but a comparison of these figures with those of the other districts during the same period (Statement\* II)

\* (Not printed.)

shows that the decrease in the mortality was not confined to Shahabad and the neighbourhood of the operations; but was part of a general fall in the ratios of the surrounding districts which probably had no connection with the destruction of rats. The work is now practically in abeyance for want of funds.

In the *Chapra* and *Gaya Municipalities* rat-catching has also been carried on with some perseverance. In the latter town it is practically the only attempt which has been made to check the course of the disease. On an average about 50,000 rats are said to have been caught annually since 1908 and a special gang is employed for the purpose which has cost the Municipality over Rs. 3,500. The operations have had no material effect. In *Chapra* Major Delany, I.M.S., the Civil Surgeon, has taken a great personal interest in the work, and has also been making some very interesting and important experiments on the destruction of rat fleas by smoking them with fresh *neem* leaves. This will be mentioned again later.

The *Patna*, *Monghyr* and *Bhagalpur Municipalities* have also spent considerable sums on rat-catching in the course of the last few years.

On the whole these operations have not proved satisfactory and the tendency on the part of most Municipalities is to spend less and less money upon them. They are expensive, involving the maintenance of a special establishment and a constant renewal of the traps and bait, and the work is for the most part carried out in a perfunctory and unscientific manner without



adequate supervision. There is a popular belief, supported by evidence of a not very definite nature, to show that the catching of rats, if it is carried out systematically and is limited to a definite area, does control the disease; but the arrangements at present in vogue are futile, and I am not in favour of continuing them on an extensive scale. The rats reproduce themselves very rapidly, and when the trapping is discontinued whatever beneficial effect the operations may have had will in all probability be quickly annulled.

(b) *Disinfection*.—In most Municipalities a certain amount is spent annually on "disinfection." I have seen the operation performed in Patna and elsewhere. It usually consists of squirting a mixture of soap and water and kerosine oil over the walls and floor of an infected house with a minute syringe, and it is mere waste of money. The men who are employed to do the work are quite uneducated in its purport and they are supervised by officers whose qualifications are scarcely better. Fortunately the money spent on disinfection does not amount to more than a few hundred rupees a year.

A disinfecting and cleansing gang is, I consider, necessary in every town of importance which is infected by plague. Some provision ought to be made so that when people evacuate their houses they can have them disinfected and cleaned out (especially the larger and more *pucca* of them) before they are re-inhabited, and I think it should take the form of a well trained skeleton gang which is kept in employment throughout the year and is capable of increase or decrease according to local requirements; but to be of practical use they must be much better trained and better equipped than they are at present. I also think that some charge might be made on householders in support of the gang, based upon the rateable value of their holdings.

Major Delany, the Civil Surgeon of Saran, is carrying out some very interesting experiments to ascertain the action of *neem* leaves as a disinfectant. The special object to be aimed at in disinfecting a house infected with plague-stricken rats is the destruction of the infected fleas which have made their escape from the dead rats and are seeking another host. Major Delany finds that by burning fresh *neem* leaves in a room in which cages containing rats have been placed, he can in one or two hours with fair certainty destroy all the fleas which are living upon them. He is continuing his experiments and he has also put himself in communication with the authorities in charge of the Plague Laboratory at Parel, to ascertain if his observations are confirmed under more stringent conditions than he can provide in the Mufassil. Hitherto the only method of destroying fleas has been by kerosine oil emulsion or some other similar disinfectant which is not applicable outside the larger towns; this however is a method of disinfection which is capable of being carried out anywhere by the villagers themselves without expense or skilled assistance and which can be repeated by them as frequently as they think necessary. The tree is to be found in nearly every village, and the remedy is one with which the people are already familiar and which they are in the habit of using in the destruction of other insect pests. If Major Delany's observations are confirmed, he will have made a very great addition to our armament. I have drawn the attention of some of the other Civil Surgeons in the province to the procedure, and the results of their trials will be watched with great interest. I attach a copy of Major Delany's report.

(c) *Evacuation*.—Evacuation is a measure of undoubted utility, and it seems to be practised by the poorer classes in the Mufassil to a considerable extent in some of the districts. But the wealthier classes, and those who have property to care for or whose families live *pardahnashin*, adopt it with great reluctance.

A copy of a letter from the Chief Plague Medical Officer of the United Provinces is appended to this note, from the last paragraph of which it will be seen that evacuation from the large towns is discouraged because of the risk of spreading the disease broadcast over the country. The tendency to fly from the disease when it first breaks out in the large towns of this province is considerable, especially in Patna, Gaya, Bhagalpur and Monghyr; but I doubt whether we can adopt any measures which would control the movements of the people or even whether it is advisable to do so.

(d) *Inoculation*.—Inoculation with Haffkine's plague prophylactic has never been extensively practised in this province.



In and around *Bhagalpur* last year between November and April over 5,000 operations were performed by Colonel Vaughan and Captain Mackworth, and the results were favourable. The percentage of attacks and deaths among the inoculated was .46 and .21 and among the uninoculated living in the same houses 1.91 and 1.38. Colonel Vaughan also speaks favourably of the way in which the inoculations were accepted by the people. He is drawing up a note on the subject for local circulation and recommends a further and more extended trial during the ensuing year. In Sasaram in the *Shahabad* District Captain Dutton performed about 1,000 inoculations during the last season and Major Thornely, the Civil Surgeon, has also reported very favourably on the result, and states that a large proportion of the people now recognise the value of the operation and are ready to avail themselves of it in future. In Monghyr 477 inoculations were done by Colonel Jordan, the Civil Surgeon, and he also considers that an effort should be made to continue them. In *Chapra*, *Patna*, and *Gaya* the Civil Surgeons and the Assistant Surgeons at the sadr hospitals were prepared to inoculate those who desired it; but no attempt was made to induce the people to accept on a large scale. The operation was not popular and was only resorted to by the people when the disease became virulent. The number of operations performed last year was nominal.

The great experience of prophylactic inoculation which has been gained all over India since the vaccine was discovered in 1896 amply proves its value as a protective against plague, and in the face of an outbreak it is the only precaution which can be taken by an individual to protect himself and his family apart from evacuation and disinfection. For this reason, I consider, it ought to be made available everywhere for those who desire it, wherever there is any hope of its being accepted.

*Measures proposed for 1912-13.*—As I have said above, inoculation is, I consider, the only effective method by which the individual can protect himself and his family from plague, and I think that the practice ought to be encouraged in this Province to a much greater extent than it has been hitherto. I think that our efforts to cope with the disease ought to be chiefly in this direction, and in the same way as we rely on vaccination for protection against small-pox, so we ought to rely on inoculation for protection against plague. With this end in view, I propose to appoint temporary men of the Civil Assistant Surgeon class for duty during the plague season in very important towns within the "endemic" area as noted in the margin.

- 1 for Patna and Bankipur.
- 1 for Arrah, Sasaram and Buxar.
- 1 for Chapra, Revelganj and Siwan.
- 1 for Gaya and Tikari.
- 1 for Monghyr.
- 1 for relief in case of sickness.

At *Bhagalpur*, the only other town of importance within the area, the District Board already have at their disposal a competent medical officer Babu Bidhan Pershad Mazumdar, L. M. S. He carried on inoculation last year with considerable success, and he has the confidence of the people. I have agreed to the proposal to employ him again during the next season, and I do not consider it necessary to appoint an additional Assistant Surgeon there at present.

I propose that these men should be temporary Government servants; their rate of pay being Rs. 100 a month *plus* 2 a day special allowance, which is the same rate as is given in the Punjab. They should be entertained from 15th October 1912 till the end of April 1913 with the exception of one man whom I wish to entertain from the beginning of September and whom I will refer to again below.

I have ascertained from the District Magistrates that the Local bodies are nearly all willing, if necessary, to pay a proportion of the salaries of these temporary officers; but as I have said, I think it preferable that they should be recruited and paid by Government, the money being afterwards recovered from the Local bodies if it is considered necessary to do so. But I also think it would be a fair arrangement, if Government provided the Assistant Surgeons the prophylactic and the apparatus free of cost on the condition that the Local bodies paid all other expenses, peons, travelling expenses, disinfecting and rat-catching gangs, etc., from their own funds.

At *Bankipur* and *Patna*, which is the stronghold of the disease, I consider the importance of the inoculation work so great, that I propose to appoint an Indian Medical Service officer in charge of it under the orders of the Civil Surgeon. I understand that Captain Cook, I. M. S., is due to return from furlough early in September, and the Inspector-General of Civil Hospitals



proposes to place him at my disposal for plague duty from the date of his arrival. As plague does not usually break out till the beginning of November, I propose, until he is required for inoculation work, to set him to investigate the conditions of life among the black, rats and their fleas, to ascertain whether the conditions which Captain Kunhardt found to exist in Purnea and Bhagalpur also exist in Champaran and Saran; and I also propose to appoint one of the Assistant Surgeons who will be afterwards employed on plague inoculation to assist him.

If a second Indian Medical Service officer is available later on (as I understand is likely) I propose to appoint him to inoculate either in Gaya or in Shahabad.

In addition to the special inoculation I propose that inoculation depots should be opened within the affected area wherever Civil Assistant Surgeons are stationed, and that they should all be provided with the apparatus and should be instructed to offer inoculation and to encourage people to take it as far as they possibly can. I also propose that certain Sub-Assistant Surgeons in charge of hospitals or dispensaries should be employed in the same way; but as these men have not, as a rule, had the necessary training, they should only be employed when a special certificate signed by the Civil Surgeon has been given to them stating that they are in his opinion competent to perform inoculation and to be entrusted with the work.

At Gaya and at Patna I understand there are female practitioners of the Assistant Surgeon class. These should also be employed for work in the zenanas.

The *plague prophylactic* is supplied to Civil Surgeons on indent direct from the Laboratory at Parel, Bombay, at a cost of 6 pies a dose in addition to the cost of packing and freight, and the cost of each set of equipment containing syringes and sterilizing apparatus is Rs. 65. I am ascertaining from Civil Surgeons how much vaccine and how many serviceable sets of equipment they already have in stock (some districts are, I understand, already well provided) and will instruct them to order whatever is required in addition. I am informed that all charges with the exception of transit charges under this heading are adjusted by book transfer.

The question of appointing *travelling dispensaries* is also under consideration, and I propose in the course of the season to appoint two selected Sub-Assistant Surgeons to the Saran District; but my proposals for these will be submitted later when I have gained further local experience.

The above measures will I consider be sufficient to enable me to start work when plague appears in the month of November, and I propose gradually to develop them along the lines I have mentioned according as local circumstances demand.

E. C. HARE.

The 15th August, 1912.

DISTRICT.	Plague deaths in Bihar and Orissa.										
	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average.
Patna ...	1.71	7.19	16.00	14.72	9.15	13.45	1.25	1.03	5.22	12.46	8.21
Gaya ...	.04	.48	3.36	8.83	2.30	3.71	.21	.06	.26	2.81	2.21
Shahabad ...	1.16	3.87	5.34	8.26	3.01	5.12	1.03	.51	3.65	6.89	3.88
Saran ...	5.68	10.61	7.21	14.79	6.44	12.45	.97	1.53	8.75	8.76	7.71
Champaran ...	...	.009	...	.01	.14	.05	...	.005	.11	.16	.04
Muzaffarpur ...	.38	1.06	1.06	1.51	.74	1.50	.70	.12	.22	.75	.80
Darbhanga ...	1.08	1.30	.41	1.29	2.27	.88	.65	.28	.58	1.17	.99
Monghyr ...	.87	1.90	1.62	5.35	2.39	1.31	1.22	.86	2.56	3.76	2.18
Bhagalpur ...	.002	.19	.89	1.42	.63	.06	.39	.06	.05	.37	.41
Purnea ...	...	.002	.004	...	.0005	...	...	.0005	...	...	.0007
Sonthal Parganas ...	.05	.004	.003	.02	.02	.004	.001	.0005	...	.006	.01
Cuttack ...	.06	.01	.01	.01	.003	.004	.0009	...	...	.002	.0009
Balasore ...	.0009	...	...	.001	.0009	.0009	...	...	.0009	...	.0004
Puri ...	...	...	...	...	...	...	...	...	...	...	...
Sambalpur ...	...	Not avail	able	...	...	...	...	...	...	.001	.0001
Hazaribagh ...	.31	.0008	.16	.26	.0009	.10	.03	...	...	.001	.08
Ranchi ...	...	...	...	...	...	.0008	...	.0008	...	...	.0001
Palamau ...	.001	...	.003	.51	.50	.74	.008	...	...	...	.17
Manbhum ...	...	.0007	.0007	.01	.006	.001	...	.0007	.0007	.01	.002
Singhbhum ...	...	.001	...	.003	...	.001	...	...	...	...	.0005



Dated Naini Tal, the 31st May 1912. 12

From—The Chief Plague Medical Officer of the United Provinces,

To—The Sanitary Commissioner, Bihar.

Your demi-official letter to the Sanitary Commissioner, United Provinces, dated 22nd April 1912, has been forwarded to me by him.

You ask me to forward you copies of the rules and regulations and Government Orders about plague; this would necessitate considerable work for my office which is just at present very hard pressed with work. May I suggest that you should address the Judicial Secretary to Government, United Provinces, asking him for copies of all plague Government Orders and rules and regulations issued say during the last three years by this Government.

Our present policy as regards plague is practically limited to (1) encouraging evacuation from villages on occurrence of rat-mortality, doing every thing possible to educate the people to adopt this measure at once. I consider evacuation is the best measure if the people can only be taught the advantage of it. We find, I am glad to say, that it is being very widely adopted now in these provinces.

Inoculation is offered to the people everywhere, but no pressure is used. If the people want it, it is available through the medium of civil hospitals, district dispensaries; in certain selected districts special inoculators (Assistant Surgeons) are appointed temporarily.

We have in addition 45 travelling dispensaries (which next month we are extending to 55) of which 42 will be plague travelling dispensaries. These travelling dispensaries are proving a great success; each is under the immediate charge of a selected Sub-Assistant Surgeon who is a trained inoculator; each Sub-Assistant Surgeon is equipped with a plague inoculation outfit. We also supply them with plague stimulant pills with which they treat patients suffering from plague.

As regards other plague measures, we have discontinued all disinfection and dissiccation, also rat-destruction measures on any large scale.

You would find the Punjab Plague Committee's report for 1910 most useful I think; this you should obtain from the Chief Plague Medical Officer, Punjab.

As regards destruction of rats modern teaching is, that up to this we have involved no method of killing off the rats by poison or traps, and it is, in my opinion, rather a waste of money to attempt to do so on any large scale; it is better to endeavour to keep the rat population down by reducing their food supply by measures to prevent easy access of rats to grain in markets and food-stuffs in houses.

It is a well-known fact that in this country the rat quickly breeds up to his food supply. Personally my views with regard to the best plague policy is that everything possible should be done to encourage the villager to evacuate his village on the first appearance of rat mortality.

I consider that this year's plague epidemic in the United Provinces would have been very much more severe were it not for the satisfactory manner in which the people evacuated.

One thing however to remember is that while everything possible should be done to get villagers to evacuate, free evacuation from towns should be discouraged;—in the case of villages the people do not go any distance from their villages, going into *chapparr* in the nearest grove of trees; in the case of towns however the wealthy relatives flee to other towns spreading plague in all directions.

Please let me know if there is any other information I can give you.

#### *Fumigation with burning neem leaves as a Plague disinfection.*

An efficient plague disinfectant would be one that breaks the chain of infection by the plague bacillus, through the rat and rat-flea to man. Large sums of money have been spent on rat-killers, but it is acknowledged now that efforts in this direction have proved almost futile.



Finding I was frequently asked by Europeans and Indians alike in this District (Saran) for a simple house disinfectant, I began a series of experiments in January 1912 with substances that would be likely to kill off rats in plague-affected houses. I sought a substance that could be so applied that it would search out all lurking places of rats and kill them. The method of fumigation suggested itself to me at once. I experimented in my servant's godown as follows. Rats in traps were suspended from the roof, placed on the ground, under bundles of clothes, etc., in a godown. Thirty to fifty cow-dung cakes or *chapattis* (easily obtained of course in every village) were arranged in a loose circle in the centre of the cleared floor of a hut and set on fire, with or without the aid of a little kerosine oil. The various substances to be experimented with were piled on the burning cowdung *chapattis* when well alight, the doors and windows were shut, and the fire was allowed to burn itself out. In this way rats were subjected to the fumes of innumerable burning substances in turn, but although a number of experiments were performed, the rats (though occasionally shewing signs of distress) survived as a general rule.

In the course of examining some rats after the experiments I noticed some dead fleas on some that had been fumigated with neem leaves. I repeated the experiments with neem leaves, but surrounded the rat-traps, except on top, with muslin. I then found that in practically every case the rats were found to be free from fleas, but the muslin under the traps contained a number of dead fleas. Some further experiments shewed that the longer the rats were exposed to the neem fumes the greater the number of dead fleas that were found. The best results were obtained by an exposure of over two hours, and up to three hours.

I now experimented with a large number of other substances, but failed to discover any better pulicide than the fumes of fresh *neem* leaves.

I tried in turn naphthalin, native tobacco ("kaini"), pyrethrum flores, sulphur incense, as well as the leaves of the castor oil plant, the banyan tree, bamboo, various grasses, sirish, pulses, pipul, oleander, and many others, burnt with a fire made of cowdung *chapattis*; but none of the substances tested acted as pulicides, nor did any of these substances burnt with neem leaves, give as good a result as neem leaves alone.

I have also endeavoured by various experiments to improve the method of fumigation by neem leaves, but failed. I am not satisfied that neem leaf fumigation will kill all the fleas on every rat; a few fleas do occasionally survive at times. This may be due to imperfections in the method of carrying out the experiments,—either the muslin had been wrapped too much around the trap, and so protected the rat to some extent from the fumes, or the fire had gone out too soon, or the fleas at times may be better able to obtain protection in the fur of some rats, than in that of others. It seems more than likely, however, that fleas that had dropped off the bodies of dead plague rats, (*viz.*, real plague fleas, or plague-infected fleas) would be killed with greater ease in exposed positions on floors, and on walls, than they are when buried in the furry coat of the rat.

Lastly, I find that some kinds of fleas are killed more easily than others. I will endeavour to ascertain whether, as I suspect, the true rat flea or plague flea is more easily killed than the other kinds of fleas infesting rats. Believing, then, that this is the best method of breaking the chain of infection from rat to man, I had instructions printed in pamphlet form, and had them distributed in thousands all over the district by the plague staff last plague season. People of all classes took to the method immediately. It costs little or nothing and the materials are available in every village in the Province. It is not necessary to dry the neem leaves; they can be used, and in fact are most effective when taken direct from the tree and burnt. They give off a dense penetrating smoke.

I believe there are great possibilities in this simple and inexpensive method of disinfection for plague, which I consider to be the most practicable that is available at present.

T. H. DELANY,  
M.D., F.R.C.S.I., Major, I.M.S.



Notification No. 3582-M., dated the 3rd September 1912. 14

[No. 4]

The services of Captain L. Cook, I.M.S., are, on the expiry of his leave, placed temporarily at the disposal of the Sanitary Commissioner of Bihar and Orissa.

No. 3583-84—M., dated Ranchi, the 3rd September 1912.

[No. 5]

Memo.—By the Under Secretary to the Government of Bihar and Orissa.

Copy forwarded to Sanitary Commissioner  
Inspector-General of Civil Hospitals, Bihar and Orissa, for information.

No. 3585-M., dated the 3rd September 1912.

[No. 6]

From—The Under Secretary to the Government of Bihar and Orissa, Municipal Department,

To—The Sanitary Commissioner, Bihar and Orissa.

I am directed to acknowledge the receipt of your letter No. 1846, dated the 15th August 1912, in which you submit proposals for dealing with plague in this province during the ensuing cold weather.

2. I am to say that, pending a decision on the detailed proposals contained in your letter, the services of Captain Cook are placed temporarily at your disposal. It has also been arranged with the Inspector-General of Civil Hospitals, Bihar and Orissa, that an Assistant Surgeon shall be deputed to assist Captain Cook.

No. 3586-M., dated the 3rd September 1912.

[No. 7]

Memo.—By the Under Secretary to the Government of Bihar and Orissa.

Copy forwarded to the Inspector-General of Civil Hospitals, Bihar and Orissa, for information and necessary action.

No. 3587-M., dated the 3rd September 1912.

[No. 8]

Memo.—By the Under Secretary to the Government of Bihar and Orissa.

Copy forwarded to the Accountant-General, Bihar and Orissa, for information.

No. 2845, dated Ranchi, the 6th September 1912.

[No. 9]

From—Lieutenant-Colonel F. J. DRURY, M.B., I.M.S., Inspector-General of Civil Hospitals, Bihar and Orissa,

To—The Secretary to the Government of Bihar and Orissa, Municipal Department.

I have the honour to acknowledge the receipt of Government Order No. 3586-M., dated the 3rd instant, sanctioning the deputation of an Assistant Surgeon to assist Captain L. Cook, I.M.S., whose services have been temporarily placed under the Sanitary Commissioner for dealing with plague in this province.

2. In reply I have the honour to say that it is not possible at present to depute one of the permanent Assistant Surgeons for the purpose. Five Assistant Surgeons are now on leave, one is officiating as Civil Surgeon, Singhbhum, one is under orders of transfer from Bengal, and as the number of reserve Assistant Surgeons in this province is 9, there are only 2 Assistant Surgeons available. The services of these two will shortly be required to relieve the two Assistant Surgeons who will attend the next X-Ray Class at Dehra Dun. Under the circumstances I have the honour to request that I may be permitted to employ a temporary Assistant Surgeon on Rs. 160 per month (as is laid down in the Punjab Manual for temporary Assistant Surgeons employed on plague work), together with the usual travelling allowance.



[No. 10]

No. 3973-M., dated the 17th September 1912.

From—G. F. SMITH, Esq., Officiating Under Secretary to the Government of Bihar and Orissa, Municipal Department,

To—The Inspector-General of Civil Hospitals, Bihar and Orissa.

With reference to your letter No. 2845, dated the 6th September 1912, I am directed to say that, in the circumstances explained, Government sanctions the entertainment of a temporary Civil Assistant Surgeon to assist Captain L. Cook, I.M.S., whose services have been placed temporarily at the disposal of the Sanitary Commissioner in Bihar and Orissa for plague duty. The salary of the Assistant Surgeon should be Rs. 133-8-0 a month, with the usual travelling allowance, in accordance with the orders contained in memorandum No. 721-Medl.-P., dated the 17th December 1907, from the Government of Bengal, to the address of the Inspector-General of Civil Hospitals, Bengal.

[No. 11]

No. 3974-M., dated the 17th September 1912.

Memo.—By the Officiating Under-Secretary to the Government of Bihar and Orissa, Municipal Department.

Copy, with a copy of the letter to which it is a reply, forwarded to the Sanitary Commissioner in Bihar and Orissa for information, in continuation of this Department letter No. 3585-M., dated the 3rd September 1912.

[No. 12]

No. 3975-M., dated the 17th September 1912.

Memo.—By the Officiating Under-Secretary to the Government of Bihar and Orissa, Municipal Department.

Copy, with a copy of the letter to which it is a reply, forwarded to the Accountant-General of Bihar and Orissa for information, in continuation of this Department memorandum No. 3587-M., dated the 3rd September 1912.

[No. 13]

No. 4504-M., dated the 30th September 1912.

From—G. F. SMITH, Esq., Officiating Under-Secretary to the Government of Bihar and Orissa, Municipal Department,

To—The Sanitary Commissioner in Bihar and Orissa.

In continuation of this Department letter No. 3585-M., dated the 3rd September 1912, I am directed to communicate the following observations and orders of Government on your remaining proposals for dealing with plague in this province during the ensuing cold weather. They are enumerated below :—

- (a) Appointment of six temporary Assistant Surgeons for carrying out inoculation in certain endemic centres on a pay of Rs. 100 a month *plus* a special allowance of Rs. 2 a day from the 15th October 1912 to the 30th April 1913.
- (b) To provide permanent Civil Assistant Surgeons stationed within the affected area with inoculation apparatus, with instructions to offer inoculation and to encourage people to accept it as far as they possibly can.
- (c) To employ Sub-Assistant Surgeons in charge of hospitals or dispensaries in the same manner provided that they have been granted a certificate signed by a Civil Surgeon to the effect that they are competent to perform inoculation and are fit to be entrusted with the work.

2. As to the first proposal, I am to say that the Lieutenant-Governor in Council does not consider that the services of an Assistant Surgeon for relief in case of sickness amongst the other members of the staff is necessary ; as the officers of the staff will be temporary, it should be easy to replace any one by a fresh recruit, in case of illness. I am accordingly to convey the sanction of Government to the entertainment of five temporary Civil Assistant Surgeons



for plague duty in this province from the 15th October 1912 to the 30th April 1913. The salary of these officers will be Rs. 133-8-0 a month, with the usual travelling allowance, in accordance with the orders contained in memorandum No. 721-Medl.-P., dated the 17th December 1907, from the Government of Bengal, to the address of the Inspector-General of Civil Hospitals of Bengal. The Inspector-General of Civil Hospitals of Bihar and Orissa has been requested to recruit these five officers and to place their services at your disposal.

3. His Honour in Council accepts the second and the third proposals; but I am to observe with regard to the latter that the selection of Sub-Assistant Surgeons should be made very carefully as it is essential that no untoward accident should occur in connection with inoculation.

4. I am to add that the cost of the scheme will be met from the provision on account of expenses during the prevalence of bubonic plague.

No. 4505-M., dated the 30th September 1912.

[No. 14]

Memo.—By the Officiating Under-Secretary to the Government of Bihar and Orissa.

Copy forwarded to the Accountant-General of Bihar and Orissa for information, in continuation of this Department memorandum No. 3975-M., dated the 17th September 1912.

No. 4506-M., dated the 30th September 1912.

[No. 15]

Memo.—By the Under-Secretary to the Government of Bihar and Orissa.

Copy forwarded to the Inspector-General of Civil Hospitals of Bihar and Orissa, for information and necessary action, in continuation of this Department letter No. 3973-M., dated the 17th September 1912.

No. 4123, dated Ranchi, the 21st November 1912.

[No. 16]

From—Lieutenant-Colonel F. J. DRURY M.B., I.M.S., Inspector-General of Civil Hospitals, Bihar and Orissa,

To—The Secretary to the Government of Bihar and Orissa, Municipal Department.

In Government Order No. 3973-M., dated the 17th September last, sanction was accorded to the entertainment of a temporary Assistant Surgeon to assist Captain L. Cook, I.M.S., whose services have been placed temporarily at the disposal of the Sanitary Commissioner for plague duty. Nothing has been mentioned in the Government Order, referred to above, as to when the appointment of the temporary Assistant Surgeon will terminate. I have the honour to request that the necessary orders of Government may now be issued on this point. In my opinion his services should terminate on the 30th April 1913, as in the case of other temporary Assistant Surgeons appointed under Government Order No. 4504-M., dated the 30th September 1912.

No. 6306-M., dated the 29th November 1912.

[No. 17]

From—S. B. DHAVLE, Esq., I.C.S., Under Secretary to the Government of Bihar and Orissa, Municipal Department,

To—The Inspector-General of Civil Hospitals, Bihar and Orissa.

With reference to your letter No. 4123, dated the 21st November 1912, I am directed to say that the services of the temporary Civil Assistant Surgeon whose entertainment was sanctioned in this Department letter No. 3973-M., dated the 17th September 1912, for plague duty in this province, may be retained till the end of April 1913.



[No. 18]

No. 6307-08-M., dated the 29th November 1912.

Memo.—By the Under-Secretary to the Government of Bihar and Orissa.

Copy, with a copy of the letter to which it is a reply, forwarded to the Sanitary Commissioner, Bihar and Orissa, for information, in continuation of this Department memorandum No. <sup>3974-M.</sup><sub>3975-M.</sub>, dated the 17th September 1912.

बिहार सरकार

मंत्रिसंङल सचिवालय विभाग

(बिहार राज्य अभिलेखागार निदेशालय)



# REFERENCES TO FORMER CASES.

- Bengal Medical A, May 1897, Nos. 4—16. (File No.  $\frac{3-A.}{14}$ .)
- „ „ A, May 1897, Nos. 63—70. (File No.  $\frac{2-A.}{4}$ .)
- „ „ A, Decr. 1903, Nos. 44—46. (File No.  $\frac{2-P.}{147}$ .)
- „ „ A, Decr. 1907, Nos. 65—67. (File No.  $\frac{2-P.}{94}$ .)
- „ „ A, Feb. 1911, Nos. 11—12. (File No.  $\frac{3-A.}{14}$ .)
- „ „ A, Octr. 1911, Nos. 1—2. (File No.  $\frac{3-A.}{14}$ .)
- Sanitation A, November 1912, Nos. 1—3 (File No. S.-120.)
- „ B, Decr. 1912, Nos. 229—230 (S.-70).

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बिहार सरकार  
मंत्रिमंडल सचिवालय विभाग  
(बिहार राज्य अभिलेखागार निदेशालय)

# REFERENCE TO LATER CASES.

File No. S.-15 of 1913.