

A note on the sanitation of Calcutta [and other papers] / [by W.J. Simpson and others].

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Simpson, W. J. Sir, 1855-1931.
London School of Hygiene and Tropical Medicine

Publication/Creation

1894-1897.

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A NOTE ON THE SANITATION OF CALCUTTA.

IN order that an adequate and comprehensive grasp of the sanitary defects and requirements of Calcutta may be obtained, and an equally comprehensive conception gained of the important as distinguished from the unimportant measures which require to be adopted to remedy the defects and permanently improve the sanitation of the city, it is necessary to give a detailed account of what the Health Department is, what its work consists of, and the sanitary problems with which the Health Officer has to deal.

2. Before doing so, and with reference to the recent reports on the insanitary condition of Calcutta, it should be stated that it was with the assistance

Introductory Remarks.

of the Medical Inspectors and other officers of the Health Department familiar with the localities surveyed that most of the defects mentioned were recently brought to the notice of the public. Moreover, the special efforts of the Health Department to prevent the introduction of plague into the city gave rise to the special cleansing of Burra Bazar, Jorabagan and other quarters of the town, and to the appointment of a Superintendent-in-Chief of the Sanitary Department whose reports have once more brought prominently to notice the filthy condition of the overcrowded localities of Calcutta, and the necessity of more supervision for cleansing purposes. Most of the insanitary conditions described by the Sanitary Officers and summarised in the medical letter of the Medical Board have, for many years, engaged the attention of the Health Department with the object of the adoption of measures for their improvement or abolition. They are all, more or less, carefully recorded in the Quarterly and Annual Reports issued by the Health Officer during the past 10 years, and which after discussion by the Commissioners are regularly submitted to Government. It is necessary to point out that it is these reports which have frequently led to important and sometimes acrimonious debates in the Corporation, and which have at times brought Dr. Simpson and the Health Department into great disfavour on account of the large interests and monetary expenditure which the questions involved; and that it is due to these reports that some of the most important and extensive sanitary reforms which have been effected in Calcutta during the past 10 years have been brought about. True, the progress has been slow, too slow indeed for the best interests of the town and its inhabitants, and the cause of much plain speaking on the part of the Health Officer, but it is only fair at the beginning of this Note to record what has been done. It is owing to the Health Officer's Reports and the constant relationship shown in them between the prevalence of cholera and scarcity and impurity of water that the water-supply has been improved and increased. It is due also to these reports that the tanks are no longer filled up with the garbage of the city, a procedure which polluted the atmosphere and contaminated to a far-reaching extent the sub-soil of Calcutta; that a portion of the suburban refuse is incinerated, and that the question of adopting incineration for the whole of the refuse of the city is now and has been for years under consideration. It is to statements in these reports that the rectification of the drainage of Calcutta and the suburbs chiefly owes its conception and that the several schemes have been thoroughly considered and latterly hastened on to the adoption of a final plan which the Commissioners have now begun, and which is destined to transform the city and the suburbs in the matter of its sewage disposal and to lessen its death-rate from fever. Lastly, it is due to the same reports which have recorded memoranda, year by year since 1886, on the necessity of a Building Act to regulate the width of streets and the ventilation and distribution of houses in

order to lessen overcrowding, and to render sanitation possible, that the all important question of a proper Building Act, on which much of the sanitation of Calcutta depends, has been brought to-day to the front. With these introductory remarks I shall proceed to describe the Health Department and its functions.

3. In 1886 it was evident to the Health Officer, Dr. Simpson, that the reorganisation, or rather the formation of a Health Department was the first object to be attained. The current view at the time was that it would be sufficient to transfer the Scavenging Department to the Health Officer, because the Commission of 1884 appointed by His Honour Sir Rivers Thompson to inquire into the cleansing of Calcutta had found it defective, and were of opinion that by its transference to the Health Officer a Health Department would be formed. Apparently at that time it was supposed that the position

No Health Department in 1886.
The duties of a Health Officer not those of a Superintendent of Scavenging.

and duties of a Health Officer were those of a Superintendent of Scavenging.

The Health Officer at the commencement opposed this view as being unsound and as not being in the interests of the public health as will be seen from the following extract from his Memo., dated 21st April, 1887 :—

“ In regard to the recommendation of the Commission, namely, that the duties of scavenging, bustee-cleansing, and night-soil removal, should be placed under the Health Officer, it seems to me that this is a misapprehension of the duties of a Health Officer attached to a Municipality. The object of his appointment is “that through him the Municipality may be informed of such influences as are acting against the healthiness of the population, and of such steps as medical science can advise for their removal.” By his professional knowledge and the special attention given to sanitary matters, to advise the local authority on all matters pertaining to health, whether it be in relation to the water-supply, drainage, buildings, ventilation, nuisance removal, new projects, etc., etc. He is in the position of health adviser to the Municipality as a crown advocate is adviser to the crown in matters of law. As to his becoming practically head scavenger of the town, this was never intended, and further the working needs no professional knowledge, but merely an acquaintance with the management and prices of horses, carts and coolies and good business qualifications. To limit the duties of a Health Officer in the way proposed is to divert his attention from far more important work. I agree with the Commission that the Health Officer is directly interested in the sanitation of the town, but I do not agree with the following “that he should be held responsible for the efficient working of the measures devised for this end.” If this is to be so, he must also be responsible for the proper drainage of the city, for a sufficiency in the water-supply, for the proper distribution of that water, for the clearing away of unhealthy areas, reconstruction of old and new bustees, arrangement of dwellings, etc., which are equally important factors in the sanitation of the town, and which are as influential in determining the state of the public health as the proper cleansing of the town.”

This limited conception of a Health Officer's duties is the survival of an old notion that if the streets of a small cantonment are well swept and the latrines kept clean, all that is necessary in sanitation has been done and that if cholera or typhoid fever or other disease prevails, it is due to the climate, or to a particular prevalence of the wind, or to some occult influence or to something wrong with the latrines.

4. The Health Officer had to show that in western towns where notwithstanding differences of custom, the sanitary problems were the same as in

Sanitary problems are similar in all Towns.

the east his duties did not lie in cleansing the town which was a matter that required only for its routine performance, special first-class supervision and an adequate establishment without which whatever other agencies may be employed, it is impossible to keep a large city clean. The Health Officer pointed out at the time in his Memos. on the subject what were the duties of a Health Department. As a compromise it was decided to form a Health Department and to add to it the conservancy branch all to be under the Health Officer.

5. For this purpose the Health Officer drew up two schemes—one with the scavenging branch kept distinct from the sanitary and the other with these two branches amalgamated. The recommendations in his Note were as follows :—

Two schemes for the formation of a Health Department.

The plan for working the Health Department with its distinct scavenging and sanitary sub-departments as already described is to place the health administration of the town on much the same basis as the Police administration. The town for Police registration purposes is divided into 18 wards. I would divide the town for health purposes into 18 districts, which for convenience might correspond to the present Police wards. The size of each district should be small, to enable it to be efficiently supervised and to allow the staff to obtain a thorough knowledge of its sanitary requirements; a desirable feature in small districts is that neglected work is easily discovered and fixed on the responsible party. Having divided the town into sanitary districts—

- (a) Each district should have an Inspector, Vaccinator and Registrar :
- (b) A certain number of sanitary districts grouped together would form a sanitary division to which should be attached one Medical Inspector. It is proposed to constitute five such divisions :
- (c) The staff of the districts and divisions would be under the control of the central office.

Amongst other advantages this arrangement provides for the system being extended when the suburbs are included in the town administration. With such a system the staff will be as follows :—

SANITARY.

*1 Superintendent of Nuisance.	1 Deputy Superintendent of Vaccination with Assistants.
5 Medical Inspectors.	2 Food Inspectors.
18 Sub-Inspectors.	2 Assistant Analysts.
18 Registrars.	
18 Vaccinators.	

The proposed scavenging districts will correspond with those of the Sanitary Department. A Sub-Overseer or Foreman-scavenger will be made responsible for the condition of each district, and the whole will work under the supervision of the Superintendent and his Assistant as follows :—

SCAVENGING.

*1 Superintendent.	With their necessary staff of subordinates working establishment.
1 Assistant Superintendent.	
18 Sub-Overseers.	

If, however, it is considered more desirable to merge the Scavenging and Sanitary Departments into one and not to work them separately, then the supervising agency should be—

ALTERNATIVE SCHEME.

*1 Superintendent.	18 Registrars.
2 Assistant Superintendents.	1 Deputy Superintendent of Vaccination with staff of Vaccinators.
5 Divisional Inspectors.	2 Food Inspectors.
5 Medical Inspectors.	2 Assistant Analysts.
18 Inspectors or Overseers.	

The alternative scheme was in the main accepted. Two Superintendents were sanctioned instead of one Superintendent with two assistants. The five divisional Inspectors were not entertained, but an Assistant Health Officer was appointed, and at first the five Medical Inspectors were refused, but later on they were sanctioned.

6. It is to be noted that this scheme was for the town alone and drawn out two years before the suburbs were added; that it contemplated practically eight Superintendents with an Overseer for each ward, the intention being that the five superior officers should devote themselves to the thorough supervision of the routine work connected with the cleansing, and that the local Overseers or Inspectors of the wards should devote themselves to the removal of nuisances and prosecutions while the Chief Superintendent with his assistants should supervise the whole and see that nothing flagged. When the

The scheme accepted did not include the Suburbs.

* Refer to the town proper only, the suburbs being still under another Municipality.

suburbs, which are twice the extent of Calcutta and more backward in a sanitary point of view, were added one Superintendent, one Assistant Superintendent and an Inspector, for each ward were appointed together with a number of Assistant Inspectors. The Assistant Inspectors, except in two wards, have since on the grounds of economy been dispensed with.

Thus it is that for the whole of the suburbs and town of Calcutta there are only three Superintendents and one Assistant Superintendent, whereas 8 Superintendents were recommended by me for the town alone.

7. The work of the Health Department as it at present exists is divided into 4 branches :—

The Health Department has 4 branches.

- | | |
|----------------|--------------|
| (1) Cleansing. | (3) Medical. |
| (2) Nuisances. | (4) Office. |

CLEANSING BRANCH.

The cleansing branch has—

(1) The sweeping of the streets, lanes, gullies and bustees and the removal and disposal of the refuse :

(2) The removal and disposal of the night-soil.

8. For the sweeping of the streets and the removal of the refuse which

Nearly 1,000 tons of refuse removed daily. amounts to about 1,000 tons daily the Municipality entertains 543 carts, 543

carters, 1,822 coolies. The carts and carters are housed in four Gowkhannahs in different parts of the town. In addition to this staff there are 252 carts and 180 coolies supplied by contractors. The men are mustered at the Ward Offices at 4-30 A. M and begin work at 5 or 5-30 in charge of the section supervisors. The refuse is taken to the platforms in the town area of which there are 6 in the Circular Road and to the refuse grounds, of which there are 3 in the added area and to the incinerator at Goragatcha. No special establishment is entertained for the refuse grounds. An establishment was asked for in the Budget estimate of 1895-96, but it was not sanctioned. Rs. 10,000 are granted for the removal of road-scraping in the town area. The amount used to be Rs. 17,000, but was cut down against every protest. The total cost of the working establishment of the conservancy of town and suburbs amounts to about Rs. 4,30,000.

9. *Removal and disposal of the Night-soil.*—Owing to the latrines in private houses not being connected and therefore no advantage being derived

52,000 unconnected privies cleansed daily.

in this respect from the sewerage system, all but a small fractional portion of this heavy work for which the sewers were intended has to be carried out by this Department. There are 32,209 unconnected privies in the town from which the excreta has to be removed every morning, and in the suburbs which have no sewers there are 20,597 privies, making a total of 52,806. There are also 84 public latrines, 49 Municipal and 35 Jemadari. For the night-soil service 2,082 mehters are employed. For the disposal of the night-soil there are in the town 28 night-soil discharge-depôts connected with the mains sewers, and in the suburbs there are 2 trenching-grounds and 2 discharging-depôts. A depôt is under construction at Hazra to replace the Dhacooriah Trenching-ground and a second depôt at Porabazar to replace that at Tiljullah. The cost for the removal and disposal of night-soil in town and suburbs is about Rs. 2,50,000.

10. It will be seen from what is stated above that the introduction of the sewer system has not done away

Seven lakhs an inadequate sum for cleansing.

with the mehter system, as it was intended to do, but on the contrary has added to the expenditure by increasing the outlay on the sewers by the cost of the mehter system which has to

be maintained; and further that the ordinary cleansing of the city of Calcutta of its refuse and excreta even with this additional expenditure which is not incurred in other efficiently sewered cities costs only in working establishment, seven lakhs which is an inadequate sum considering the size of the city or as compared with the expenditure of other towns equally large. *The supervision of this extensive cleansing does not in other towns devolve on the Health Officer.*

To come now to the sanitary branches as distinguished from the scavenging the first is the—

NUISANCE BRANCH.

11. This branch is mainly devoted to inspection work with the view of getting nuisances abated by service of notice on the parties on whose premises the nuisance exists, and in the event of non-compliance by prosecutions and in some cases in having the work done departmentally. The work consists of—

- (a) Attending to complaints from the public :
- (b) Arranging for mehter-service :
- (c) Disposal of privy applications as to whether they should be granted or refused on sanitary grounds :
- (d) Disposal of applications for offensive trades :
- (e) Disposal of applications for certificates for license of cowsheds stables, milk-shops, slaughter-houses, meat-shops :
- (f) Inspection of cowsheds, stables, bathing-places and wash-houses, meat-shops, slaughter-houses, public and private latrines, drains, cess-pools, urinals and premises especially in bustee land, and the application to the central office for notices, and summonses to remedy nuisances which may be discovered. There are 811 cow-sheds, 821 cattle sheds, 569 stables, 498 premises used for offensive trades, 918 bustees, 76 public latrines, 60 hackney-carriage-stands, 31 Kalisthans, 105 meat-shops, 28 slaughter-houses, 78 public urinals :
- (g) The attendance at Court to conduct cases to apply for summonses :
- (h) Licensing of public necessities :
- (i) Enclosing deserted houses :
- (j) Taking the steps to have filled up excavations, wells, tanks, marshy lands and waste or stagnant pools :
- (k) Taking measures to executive work in default when the amount is below 25 rupees.

In each ward this branch is attended to by the Inspector who, at the same time, has to supervise the scavenging. The result of endeavouring to overtake these double duties is that when the nuisances of a ward are thoroughly investigated—a work which involves much inquiry with prolonged and repeated attendances in Court,—the scavenging of the ward suffers, and when the scavenging is effectively looked after the nuisances have to be neglected. If the Health Officer's scheme for effective supervision had been adopted then the local Inspectors would have had much of their time free to attend systematically to the abatement of nuisances.

MEDICAL BRANCH.

The medical side of a Health Department is extensive, varied and complex.

12. The medical branch has to deal with—

- (a) Registration of births and deaths :
- (b) Compilation of the vital-statistics and issue of weekly, monthly, quarterly and annual reports :
- (c) Vaccination :
- (d) Food inspection :
- (e) Medical inspection :
- (f) Laboratory work :
- (g) Dispensaries :
- (h) Slaughter-house :
- (i) Opinions on sanitary subjects referred to the Health Department by Chairman, Engineer, or Nuisance Department.

13. *Vital Statistics*.—For the collection of the Vital Statistics there are at each Burning-ghât of which there are 3, a Sub-Registrar who records in

Collection and compilation of statistics.

registers provided the particulars regarding every cremation which takes place. At each of the Burial-grounds of which there is also a Sub-Registrar. In each of the ward there is also a Sub-Registrar to register births and deaths which have occurred in the ward. Returns are submitted weekly to the medical branch of the Health Office from the Ward Offices, Burial-grounds and Burning ghâts, and are compiled into weekly, monthly, quarterly and annual reports for the whole town. Monthly returns of births are also sent to the Vaccination Department from the Ward Offices.

14. *Vaccination*.—For carrying on the vaccination of the town there are 14 stations, at which infants and others are vaccinated free of charge on stated days. Home vaccination is also performed for which a fee of 4 annas per head is charged *plus* the expenses of conveyance of calf which is not to exceed two rupees.

Public and home vaccination.

Vaccinators go into the bustees and search out unprotected cases which is practically house-to-house inspection, and on the discovery of unprotected children notices are served for their vaccination either at the public stations or on the payment of a fee at their own homes and those who neglect to have their children vaccinated are prosecuted. Recently lanoline vaccine paste has been introduced, and unprotected persons are as a rule vaccinated when discovered. *Nearly 55,000 persons were vaccinated last year owing to an epidemic of small-pox. The whole of this enormous work fell on the Health Department which even had to vaccinate the crews in the Port.* A list of all births is received from the Sub-Registrars of each ward monthly, which together with the results of house-to-house inquiry and with those of enquiry made specially in houses and localities affected with small-pox or chicken-pox form the basis of the vaccination work which is supervised by an Assistant-Surgeon.

15. *Food Inspection*.—There are 4 medical men employed for this purpose—2 for the town and 2 for the suburbs. They visit with the object of inspection—

Systematic inspection of food in markets, shops, etc

(1) Markets to ascertain whether the articles sold are wholesome, to seize and destroy unwholesome food and to report on any insanitary conditions discovered :

(2) Milk marts and milk shop :

- (3) Sealdah Station meeting the early train bringing fish :
- (4) Boats at Meerbohur Ghât twice or 3 times a week to examine the sour milk brought from Ghattal :
- (5) Meat shops to examine condition of the meat there are 120 meat shops in town and 30 in the suburbs :
- (6) Grocer's shops where foods-stuffs, such as rice, *dhal*, oil, salt, *ghee*, spices, arrowroot, barley, etc., are kept and retailed ; also oilmanstores :
- (7) Grain shops to examine condition of grain and if it is of a doubtful nature samples are brought to the Health Officer for orders :
- (8) Sweetmeat shops selling prepared confections to ascertain that the articles are not decomposed :
- (9) *Ghee* manufacturers and *ghee* shops :
- (10) Allopathic Dispensaries and Drug shops to examine condition of the medicines sold, and examine their registers :
- (11) Attend large sales of articles of food such as those at Messrs. Mackenzie, Lyall and Co., etc.

On visiting these places they examine the food-stuffs and if they deem them unwholesome, they under Section 365 seize the articles and under Section 366 destroy them. Occasionally they prosecute under Section 366. They also purchase samples of any articles which they may suspect to be adulterated and bring them to the laboratory for analysis, and if the analysis proves adulteration they prosecute the vendors under Section 364 getting the analyst to give evidence.

16. *Medical Inspection.*—There are 5 Medical Inspectors of whom one is utilised in examining samples of water, milk, food, etc., sent to the laboratory, and in preparing cholera vaccine. The Medical Inspectors enquire into every case of infectious disease, small-pox, diphtheria, enteric fever, tetanus or other dangerous disease, that is, reported by the hospital authorities, private Medical Practitioners, Police Sub-Registrars of Burning and Burial-grounds and others. The house in which the disease occurs is visited by them, and they make an investigation as to the probable cause, they cleanse and disinfect the premises, destroy infected articles and submit a report in every instance on the disease, and on the sanitary condition of the house. The forms of report are attached in the appendix, Exhibits marked A and B.

17. Every inquiry is conducted with the object of discovering the cause of an outbreak as quickly as possible in order to apply preventive measures promptly and effectively. Thus, in the event of an outbreak of cholera if from enquiries made certain tanks, wells, bathing-platforms, or articles of food are suspected to have produced the disease, samples of water food, etc., are brought by the Medical Inspectors to the laboratory for bacteriological and microscopical examination the object being to ascertain exactly whether or not the suspicion is well founded. If, for example, from several tanks, the cholera *bacillus* is found in one or more, a Police guard is immediately placed on the tank or tanks in question to prevent the use of the water. When the cause cannot be ascertained the Medical Inspectors endeavour to persuade the people to be inoculated against cholera. Similarly, in cases of small-pox they endeavour to get the inmates of the house and the neighbours vaccinated, in addition to the other preventive measures of segregation and disinfection which they carry out. In suspected cases of plague the determination of the nature of the disease depends on medical enquiry and microscopical examination of the blood. Accordingly in suspected cases blood from the finger or groin is taken and subjected to microscopical examination in the

laboratory. When the *bacillus* is found immediate measures for isolation and disinfection are taken; similarly when rats were found to be dying in certain houses and the plague *bacillus* was found in them the houses were cleansed and disinfected as carefully as if plague patients had been there. In this manner control is kept over isolated infected spots.

18. In times of epidemics the Medical Inspectors make house-to-house

Other duties of Medical Inspectors.

enquiry to search out cases and in every case discovered action is taken as described above. Apart from disease in a house, they visit private premises under Section 317 in order to ascertain their condition as regards cleanliness, privy accommodation, water-supply, drainage and general sanitary condition, and report defects to the Superintendent of Conservancy with a view to the necessary action being taken. They treat cases of cholera and dysentery among the very poor. They also examine the birth, death and vaccination registers which are kept in the Ward Offices and report any neglect in keeping these registers. An annual report of work done by the Medical Inspectors is annexed in the appendix, Exhibit C.

19. *Laboratory.*—There are two medical men who have been thoroughly

The laboratory work is of great importance in the practical sanitation of the city.

trained in analytical chemistry and bacteriology working in the laboratory.

Both are able men and experts in the subjects with which they have to deal. The work is as follows:—

- (1) Weekly analysis of river water at Pulta and the water of the settling tanks:
- (2) Weekly analysis of filtered water as supplied to the town:
- (3) Weekly examination of the gas supply as to its illuminating power, pressure and impurities:
- (4) Analysis of water of tanks and wells, samples of which have been sent in by the Ward Inspectors:
- (5) Analysis and examination of articles of food brought by Food Inspector. These are generally *ghee*, milk, mustard-oil, flour, barley meal, arrow-root, etc. etc.:
- (6) Bacteriological examination of water and milk in connection with cholera. Periodical examination of filtered water bacteriologically, also of river water, canal water, etc.:
- (7) Reporting of results for prosecution and attendance at Court.

A summary of work done in the laboratory last year will show the relation which it bears to the sanitation of the town.

Chemical examination—

Description.	No. of samples examined.
(1) Filtered water taken from a tap in town	... 48 analyses.
(2) River water at Pulta	... 48 do.
(3) Water from the settling tanks at Pulta	... 48 do.
(4) Special analysis of Hooghly water at Pulta	... 12 do.
(5) Tank and well waters	... 64 do.

Bacteriological examination—

(6) River water	... 64 do.
(7) Hydrant water	... 10 do.
(8) Tolly's Nullah and canal water	... 12 do.
(9) Bathing-platforms	... 5 do.
(10) Water and milk from private houses	... 24 do.
(11) Samples of air	... 3 do.
(12) Tank and well waters	... 64 do.
(13) Samples of brine	... 8 do.

of these cholera *bacilli* were found in 11 samples of river water, in 8 of Tolly's Nullah, in 35 tanks and wells and in 3 samples of water from private houses.

(14) *Food-stuffs and other articles*.—The articles of food brought by the Food Inspectors for analysis were chiefly milk and *ghee*. 106 samples of *ghee* 92 of milk, 9 of barley powder, 29 of mustard-oil, 17 of arrowroot, 4 of flour, 8 of butter, and 8 of miscellaneous nature were analysed; of these 19 of *ghee*, 45 of milk, 3 of barley powder, 3 of mustard-oil, 10 of arrowroot were found to be adulterated; 13 of *ghee*, 1 of milk, 3 of barley powder and 1 of butter were found inferior in quality.

20. *Dispensaries*.—Until recently there were two Municipal Dispensaries—one in Russa Road, the Sumbhoo Nath Pundit's Dispensary and one in Kidderpur. The first has been incorporated in the new Bhowanipur Hospital at Kidderpur; there is a medical man attached who also acts as Medical Inspector of the ward.

22. *Slaughter-house*.—The Municipality have a slaughter-house at Tengrah. It is in charge of a Resident Superintendent, who examines the animals before and after slaughter.

OFFICE BRANCH.

22. There is a General Office for all things relating to Conservancy and Nuisances and an Office for the Medical Branch.

With such large working establishments there must necessarily be a fairly sized clerical staff to check the attendance rolls, make out bills for payment of outdoor and indoor establishments, receive and classify bills for stores, hired carts and cattle, and for work executed by contractors in default of compliance of notices served by the Nuisance Department, to prepare recoverable bills and make out indents for stores applied for by Conservancy and Night-soil Departments. There is also a general department costing a little over Rs. 6,000 annually, to carry on the general clerical work relating to conservancy, cleansing of bustees, night-soil removal, tank-filling and nuisances as well as work of a miscellaneous nature. These clerks keep the records of all applications connected with the departments, receive docket and register all letters, copy replies, make out sanctions, receive diaries and papers from Inspectors and Ward Offices, issue reminders on notices served, write notices, issue licences for dangerous trades and markets, register papers and correspondence regarding tanks and wells and keep a record of prosecutions with their results.

23. The following figures show, so far as figures can the principal items of work done in the general office:—

- (1) Privy sanctions, annually 1,228 (average of 3 years) :
- (2) Letters received, annually 11,209 (average of 3 years) :
- (3) Letters issued, annually 4,116 (average of 3 years) :
- (4) Case files received, daily 300 to 500 (average 540 on 13th July, 1896) :
- (5) Case files despatched, daily 22 (7,800 during the year 1895-96) :
- (6) Daily work in connection with Ward Inspector's diaries—

Files received	200	} about :
Files sent out	...	...	220
Extracts made and sent out	...	...	30
- (7) Replies to letters written, 20 daily average.

Office of Medical Department.

24. The following is a summary of clerical work done—

- (1) Compilation of statistics of births and deaths :
- (2) Correspondence regarding the sections of the medical branch :
- (3) Keeping up registers of disease and of vaccination :
- (4) Issue of weekly, monthly, quarterly and annual reports of medical branch :
- (5) Keeping and filing records of births and deaths and searching out and giving certificates of births and deaths to applicants :
- (6) Preparing special returns of diseases :
- (7) Getting daily cash deposited in Treasury and granting receipts to parties.

25. It will thus be seen that the Health Department has many various duties to perform and in the scavenging branch alone has a yearly expenditure of nearly 7 lakhs. To imperfectly officer it, therefore, is not a wise policy and it is one by which the Corporation do not secure full value for the money they expend. It also opens the door to every kind of temptation, and there can be little doubt that money is consequently wasted.

26. *The Health Officer has entered into the above details of the functions of the Health Department because it seems to be a general impression that the duties of a Health Officer mainly consist in perambulating the town in search of unpleasant smells. As I have shown the duties of a Health Officer of so large and important a town are of the greatest complexity and involve scientific work and investigation of the highest order which can often only be done by the Health Officer himself or under his direct supervision. Those duties, such as scavenging and the abatement of nuisances do not come under this category, and it is sufficient that they should be carried on by trained Inspectors under a highly qualified and responsible officer of the Health Department.*

Factors Conducing to Inefficiency.

27. Turning now to the factors conducing to inefficiency they may be summarised as—

- (1) The sanctioning of plans and the approval of applications by the Complaints Committee and the Roads, Conservancy and Buildings Committee :
- (2) Inadequate supervising agency for the Scavenging and Nuisance Departments :
- (3) Inadequate working establishment for the cleansing establishment :
- (4) The want of a proper Building Act.
- (5) The throwing of *domestic refuse* into the streets during the day :
- (6) The throwing of *trade-refuse* into the street without payment of a trade-refuse tax for its removal, and failure on the part of the persons concerned to remove it themselves :
- (7) Other important causes leading up to inefficient cleansing and the unsatisfactory disposal of refuse, are—
 - (a) The dependence on contractors for much of the work :
 - (b) The want of sweeping-machines :
 - (c) The delay at the dumping-platforms in Circular Road.
- (8) Impossibility of getting carried out departmentally any but the pettiest repairs—
 - (a) Partly due to legal difficulties :

(b) Partly to difficulties in recovering the amount from the owners or occupiers of the premises in which the work has been done, and partly to want of establishment in the Engineering Department for the special purpose.

(9) The difficulties in getting matters remedied by prosecutions owing to—

(a) Delays in securing summonses ;

(b) Inadequate fines ;

(c) Defects in the law.

(10) Inadequacy of Police sanitation.

(11) Overlapping of some of the duties of the Health Department with those of the Engineer.

(12) An inadequate unfiltered water-supply.

The sanctioning of plans and the approval of applications by the Complaints Committee and the Roads, Conservancy and Buildings Committee.

28. The Complaints Committee was formed on the 4th of April, 1889 the motion being carried by only two votes at a large Meeting of the Commissioners and against the earnest advice of so experienced a Chairman as the late Sir Henry Harrison, who stated that "*such a Committee would paralyse the action of the Executive.*"

29. The Complaints Committee and as a rule the Roads, Conservancy and Buildings Committee are not presided over by the Chairman, and gradually both Committees have become courts of appeal which practically reverse every important decision of the Executive. It has been due to the action of these two Committees that much friction has at times arisen between the Health Officer and the Commissioners owing to his inability to acquiesce in proceedings which as a rule have been against the interests of the public health of the city.

30. As early as the 21st of August, 1889 the Complaints Committee found themselves in opposition to the Chairman, Sir Henry Harrison, who gave it as his opinion that one of its orders was *ultra vires*. On the 29th August, 1889 the first important difference took place between the Complaints Committee and the Health Officer in which against his advice the Complaints Committee recommended the sanction of the erection of certain stables in Waterloo Street which have ever since been the subject of complaint. The Health Officer and Chairman opposed the recommendation, and the Health Officer submitted the following Note :—

"This is a street in direct continuation of Government Place into Bentinck Street. It has several European hotels in it which are much frequented, and many complaints have been made about the filthy condition of the street and the nuisances of which the existing hackney stables are the cause. I do not agree to the recommendation of the Sub-Committee, first, for the above reason ; second, because hackney stables should never be erected near dwelling-houses, and specially two or three-storied dwelling-houses, as they are invariably complained of as almost insupportable nuisances ; third, because the hackney stables already existing are complained of as being a nuisance to the neighbourhood and to the occupants of the houses close by, and I would recommend their removal ; fourth, because the proposed new hackney-carriage stables will add to that nuisance ; fifth, because the proprietor of one of the hotels has already complained of the additional nuisance which is about to be created, and will probably take further steps if the nuisance is permitted ; sixth, because the street in front of the hackney-carriage stables is always kept in a filthy state which no prosecutions alter. Hackney-carriage stables should only be allowed in special localities as in other towns and not in every and any street."

31. *The recommendation of the Complaints Committee was nevertheless sanctioned, and it has been impossible notwithstanding many complaints on the part of the neighbours and the public to get this continuing nuisance removed.*

32. The sanctioning by these two Committees of plans and the approval of applications which have been objected to by the Executive has had a gradual undermining influence on efficiency in the sanitation of the town and has created a decided tendency on the part of people to erect buildings, huts and privies without obtaining sanction, or in deliberate disregard to the existing Bye-laws and Regulations in the hope of having them sanctioned by the Committee, if objected to by the Executive. When the officers bring such cases to notice it unhappily brings them into opposition with the Complaints Committee and exercises a demoralising influence on the subordinates who as a natural consequence become disposed to overlook cases. *In the Annual Report for 1894 I showed that out of a list of cases placed before the Roads, Conservancy and Buildings Committee 90 per cent. of the deviations, to which the Executive took exception, were sanctioned.*

33. The Complaints Committee also prevent or delay sanitary improvements which the Executive consider necessary. The following are examples of delay:—

(1) At 12, Juggernath Dutt's Lane there is a sloping privy with several compartments. Sloping privies are merely sloping slits in the wall of the premises and the excreta drops through this slit and that which does not adhere to the wall falls on the ground outside. They are as insanitary contrivances as can possibly be imagined. This particular one is situated between two tanks. From one tank the privy is situated about 5 feet distant and from the other about 8 feet. The Superintendent of the North Division served a notice under Section 286 on the owner for demolition on 11th April, 1896. The matter was brought before the Complaints Committee and a Sub-Committee was formed to enquire and report. The Sub-Committee have up to date not submitted a report and the nuisance still remains.

(2) Another example is that of a privy at 6-4, Bulloram Dey's Street Ward 6, Jorasanko. It was rebuilt without sanction within 4 feet of a tank and is one of the worst types of privies with cess-pools. A notice under Section 286 was served for its demolition on 3rd December, 1895. On non-compliance the owner was prosecuted on the 28th December, 1895. The case came on for hearing on 3rd March, 1896 and was adjourned, because the case had been placed before the Complaints Committee which formed a Sub-Committee for enquiry and report. The Magistrate adjourned it to the 19th March and again to the 28th March, but as the Complaints Committee had come to no decision by that time the case was adjourned *sine die*. The place was inspected by two of the members of the Sub-Committee. No report has yet been submitted and consequently no orders can be passed in the case: meanwhile the privy exists.

(3) A third example is that of a privy at 9, Kansaripara Lane where the owner was prosecuted for building a privy without sanction. The Magistrate made a local enquiry and the Ward Commissioner having represented that the new privy had been in existence for the last 30 years the case was thrown out. The Health Department, under these circumstances, asked that the Drainage Department should provide proper flushing arrangements but the subject was brought up before the Complaints Committee which allowed the privy to remain without any arrangements for keeping it clean or in a sanitary condition.

(4) A fourth example is that of a privy at 11, Jugulkissore Das' Lane which was built without sanction; the Health Department objected to it on the

ground that it would be nuisance to a neighbour, and that it was impossible for it to be cleaned as it could only be approached through a passage 9 inches in width. The privy was, however, sanctioned by the Buildings Committee.

(5) At No. 28, Munshi Sudderud lin's Lane a site-plan was submitted with an application for approval of a site for a stable; as the site was in a crowded locality, close to dwelling-houses and near a mosque the Health Officer disapproved of the site under Section 286. The Buildings Committee, however, approved of the site being of opinion that the recommendation of the Health Officer that the stables should be 15 feet from the adjoining buildings was unworkable. The party having succeeded so far has built the stable and has now added a second-story above the stable to be used for dwelling purposes.

(6) On 19th February, 1895 the Chairman, on the recommendation of the Health Officer, sanctioned Donaldson's latrine as a standard plan for unconnected privies. On the 29th September, 1896 the Roads, Conservancy and Buildings Committee resolved that no particular pattern should be insisted on.

34. *These examples will suffice to show that it is not the Health Officer's views in regard to sanitation that are always allowed to prevail but that in their stead are adopted the views of a small section of active Commissioners the value of whose ideas of sanitation can be best noted by a reference to the examples above cited and whose action paralyses the efforts of the Health Department.* It is this small section which is loudest in its denunciations of the Health Officer and his doings whether they relate to conservancy, nuisances or medical matters. The policy of late years of this section appears to be, to gradually weaken the Executive and to grasp as much executive power as possible without at the same time realizing or accepting its responsibilities, such a policy, if it should prove successful, can only end in disaster to the town.

35. Again, cases where prosecutions have been ordered by the Executive have from time to time to be withdrawn or postponed, because some Commissioner has represented the case to be one which should be enquired into by the Complaints or Buildings Committee. The result has been at least delay and in many cases complete defeat of the Executive. Two examples, out of many, will suffice to illustrate the difficulty against which the Executive have to contend in this direction.

(1) At No. 2-5 and 2-6, Parbutty Charan Ghose's Lane two privies were constructed without sanction. The owner was prosecuted and fined. A notice was then served to demolish or stop the use of the privy, and on not complying herewith he was on the 29th August, 1896 again prosecuted under Section 289. The case came on for hearing on 23rd October but was adjourned as the matter had been placed before the Buildings Committee who have not yet given a decision.

(2) Two cow-shed-owners of Chorebagan Lane, in Ward 6, Jorasanko, were prosecuted under Sections 336, 388 and 389 after they had been served with notices under Section 387 to improve their cow-sheds, or abate the nuisance by removing the animals. These cases came up for hearing on the 30th December, 1895 and were postponed till the 6th of January, 1896. On that date the Corporation Pleader produced an order to stay action until the case was decided by the Complaints Committee. The Magistrate not caring to keep the cases pending for any length of time struck them off the list thus precluding the possibility of any further prosecution until after the close of the official year.

36. The case of one of the cow-shed-keepers is instructive. In 1894 he was prosecuted twice under Section 336 and fined Rs. 5 on the first occasion, and Rs. 15 on the second. In December, 1894 the Chairman, Health Officer,

the Chief Presidency Magistrate and Mr. Lees, Secretary of the Prevention of Cruelty to Animals, inspected the cow-shed, and the case was taken before the Chief Magistrate and the owner was fined Rs. 100 on the 23rd of January 1895, with a continuous penalty for every day the nuisance lasted. As the owner still refused to improve his shed he was taken before the Magistrate and fined Rs. 354. This fine had a wholesome effect on many of the cow-shed owners who began after this to improve their sheds. But this particular owner was rich and he determined to do nothing. He was therefore again prosecuted on the 6th of January, 1896 with the result that the Complaints Committee was asked to intervene and as the result he got off scot free. The Executive were unable to take further action until April when he was again prosecuted, but the case came before a different Magistrate and he was fined Rs. 15. The owner having died during the year his successor after prosecution has begun to improve the shed.

37. Sub-Committees are not unfrequently appointed to enquire into complaints which have been lodged against officers instead of these complaints being left to the chief executive officers to inquire into and deal with. The result of this, I am bound to say, is a strong feeling among the officers that they will get blamed for whatever they do. If they were credited with and praised for good work instead of being continually blamed it can be readily understood that better work would be secured and the interests of of the Corporation and the public proportionately advanced.

38. Great delays are also caused by matters being referred to Sub-Committees appointed by the Complaints and the Roads, Conservancy and Buildings Committees, as will be seen by the following examples, all of which are important and none of which have been decided:—

(1) Case of 13-1, Badurbagan Lane referred to a Sub-Committee of the Buildings Committee on the 8th November, 1892 :

(2) Case of 21 to 25, Cotton Street referred to a Sub-Committee on 16th August, 1893 :

(3) Case of 40, Burtolla Street referred to a Sub-Committee on 20th June, 1894 :

(4) Case of 11, Narain Prosad Babu's Lane referred to a Sub-Committee on 10th December, 1894 :

(5) Case of 18, Shampuker Street referred to a Sub-Committee on 15th May, 1895 :

(6) Case of 11, Puggyaputty Street referred to a Sub-Committee on 28th January, 1896.

A Sub-Committee was appointed on 22nd April, 1893 to consider the whole question of Kalisthans and to consider the proposal of establishing Municipal Kalisthans, and was asked to submit a report within a month. No report has yet been submitted though in the Resolution of the Bengal Government on the Administration Report of the Corporation for 1892-93, dated November, 1893 the Government draws attention to the importance of the question on the following words:—

The regulation of the *Kalisthans* is a matter which calls for early disposal, and His Honour while approving of the desire to deal thoroughly with the subject trusts that the measures adopted will be prompt as well as thorough.

The mere statement of the foregoing examples is sufficient to show that the late Sir Henry Harrison was justified in objecting to the establishment of such Committees, and that his anticipations as to the effect they would have on the working of the Executive have been amply realised.

Inadequate Supervising Agency for the Cleansing and Nuisance Departments.

39. As already stated when first reorganising the Department the Health Officer was of opinion that eight superior officers were needed for the town alone. But only two, and an Assistant Health Officer whose duties lie in another direction, were granted. With town and suburbs amalgamated, there are only now three Superintendents and one Assistant Superintendent. With this inadequate supervising agency the work has been carried out as well as it could be with an inadequate staff. When two of the old Superintendents in the town proper left the Municipality the Health Officer in a Note submitted, setting out the duties, recommended that in their place two Superintendents of a higher status with engineering qualifications should be appointed on a good salary. This suggestion was not however accepted by the Commissioners and two Superintendents were appointed as Officiating Superintendents on salaries little higher than some of the Inspectors, but out of all proportion to the value of the work they perform. On this being done the Health Officer accepted the situation, and considering that these Superintendents were much in the position of the subordinate superior officers he contemplated in his first scheme, he on that basis asked for a Superintendent-in-Chief of the Sanitary Department whose duty should be entirely devoted to the conservancy and nuisance branch of the Health Department and whose qualifications and status should be such that he should, though subordinate to the Health Officer, carry on the work independently, and be responsible for that work communicating ordinarily with the Chairman without reference to the Health Officer as is done by the heads of branches in the Engineering Department, and only consulting the Health Officer on matters which he might consider too important for him to deal with by himself. A special Note was submitted by the Health Officer on the 16th of July, 1896 on the reorganisation of the Health Department on those lines, Exhibit D. It would secure more efficiency and expedition, and at the same time would relieve the Health Officer of duties not belonging to him in regard to papers relating to privies, cow-sheds, stables and nuisances. He has in one day in Calcutta to dispose of a larger mass of such papers than he had in 5 years when Health Officer at home.

A Superintendent-in-Chief of the Sanitary Department is found necessary for all large towns. Such a Superintendent is entertained at Bombay, and until one is appointed in Calcutta the conservancy cannot be expected to be other than in a state of confusion which, while it tends to bring the Corporation into disrepute, involves a heavy money loss.

Inadequate Establishment.

40. At the time of the reorganisation of the Health Department the Health Officer in a Memo., dated 20th June, 1887 pointed out the inadequacy, of the establishment proposed and sanctioned for the town proper. Again in a memorandum presented on the 4th February, 1888 previous to the consideration of the Budget of 1888 and 1889 the defects of the conservancy system and the weakness of the establishment were carefully gone into and recommendations made to remedy the defects and strengthen the cleansing staff. In the Budget of 1889 and 1890 during the last year of Sir Henry Harrison's Chairmanship a distinct advance was made and many of the recommendations were adopted. But the tendency towards a policy of disintegration has been, and still is very strong in the Calcutta Municipality, and there is a constant tendency to make reductions in the staff which impair its efficiency. *This is clearly shown in the Health Officer's Memo., dated 21st April, 1887 in which the Health Department as built up by Dr. Payne in 1877*

There is a marked tendency to make reductions in the staff which impairs its efficiency.

was gradually but effectually destroyed. An extract from that Memo. is annexed as an Appendix marked E to which special attention is directed in illustration of what has just been stated. It must be borne in mind that such extract has reference only to the town proper, the suburban area not having at that time been amalgamated. The policy disclosed in the extract coupled with a manifest tendency to recur to it led the Health Officer to record in his Annual Report for 1890 an account of the then existing organisation and working of the Health Department for as stated in the introductory remarks of that report—"there is a periodical tendency to make retrenchments in the Health Department to the detriment of the public health."

41. In the Budget for 1891-92 Rs. 8,139 were asked for to provide carts, coolies and melters for the canal area; Rs. 2,000 only were granted. During

Rs. 34,000 struck off the Budget in 1893.

the Health Officer's absence in England in 1893 the tendency towards retrenchment became markedly active, and unfortunately for the city the sum of over Rs. 34,000 was struck off the Budget allowance for 1893-94. Later in the year, under Mr. Ritchie's Chairmanship, and when the Health Officer returned from England, still further retrenchments were considered, and the Health Officer was asked to try the experiment of carrying on the duties of the Health Department with half the number of Inspectors, the services of the other half being dispensed with. The experiment was tried under protest, and in a short time the Health Officer reported that matters in the town were becoming serious, and that all the Inspectors should be reinstated, which was done. But in the interval the unwisdom of the policy of retrenchment which had been in operation had left its mark.

42. On the 14th of June, 1893 the Health Officer submitted an estimate of Rs. 8,000 for cleansing the canal area, stating that the canal area is one

Rs. 8,000 to cleanse the canal area disallowed.

of the most unhealthy in the town and can only go from bad to worse if there be no bustee conservancy. On the 24th June, 1893 the Health Officer's Note and estimates were placed before the General Committee and were disallowed on the ground that the funds did not permit of the entertainment of this establishment.

43. The Health Officer in a Note submitted previous to the Budget of 1894-95 recommended that at least a portion of the amount deducted from

Rs. 16,800 for removal of road-scrappings struck out of Budget in 1894.

the previous Budget should be restored. This recommendation was not entertained, but proposals which were only the reappearance in a new form of the old policy of retrenchment, were brought forward at the Budget Committee for amalgamating the Conservancy and Nuisance with the Road Department. In the same Budget of 1894-95 Rs. 16,800 were struck off, which had always been granted for the removal of the road-scrappings, which caused the Health Officer to submit the following Note:—

"Dr. Sen informs me that the road-scrapping carts have been struck out of the Budget. Probably this has been done from some misconception. The mud must be removed from the roads, and it cannot possibly be removed without carts. The difficulty at present is that there are not sufficient carts available for that purpose. The conservancy carts cannot possibly do this work for there are not a sufficient number of carts to remove in an efficient way the garbage of the town. The striking out of the road-scrapping carts will only produce disorganisation and lead to the streets remaining more filthy than they are at present. Such will be the accumulation that as Health Officer, I beg to state that a most deplorable condition of things will arise and I would therefore urge that this question be reconsidered and the Budget allowance passed as in previous years. What I do think might be done, and which would lead to an improvement, is that the *scrapping* of the roads should be under the *Health Department*. This Department would take advice from the Engineer and carry out his views so as to avoid injury to the roads. The advantage of this arrangement would be that the roads would be scraped and the scrapings removed immediately. Under present arrangements it is not known what roads are going to be scraped or the time, for they are often scraped when the carts have passed and the scrapings consequently are not removed that day."

"The Engineer's opinion might be asked on this point. It is certain however that it is impracticable to do without the road-scraping carts."

Notwithstanding this protest the item was not restored to the Budget. Within four months, the evils which followed on the reduction were only too apparent in the filthy condition of the streets in which the garbage got mixed up with the unremoved slush and mud and formed a most offensive nuisance. On a strong representation of the Health Officer a sum, not of Rs. 16,800, but of only Rs. 10,000 was granted. Here again the consequences of retrenchment made themselves felt and were aggravated by the inevitable delay involved. It may be noted in passing that the sum of Rs. 10,000 has never been increased and that the Department has to work at a disadvantage in consequence.

44. On the 16th July, 1894 a Committee was appointed for considering the proposal of amalgamating the Conservancy and Nuisance Departments with that of the roads and sewers. On the 11th April, 1895 the Committee was reappointed a new Corporation having come into Office. This Committee is still sitting and the only practical effect, it has had hitherto is to occupy, so far needlessly, the time of the Executive and delay many much needed reforms. In the Budget of 1895-96 of over Rs. 8,000 asked for Rs. 880 was granted.

45. On 24th July, 1895 the Health Officer wrote a Note to the Engineer advising that the establishment engaged at the end of the previous year on his recommendation should be retained for maintaining and cleansing drains in the whole of the suburbs and offered to take over the cleansing if a proper establishment was granted. This proposal was submitted to the Chairman, who, on the 2nd August, 1895, asked the Health Officer to take over charge of the drains and as a preliminary to submit proposals in that connection.

46. On 21st December, 1895 the Health Officer submitted an estimate of Rs. 28,450 a year for cleansing the drains, cow-sheds and bullock-sheds in the canal area of the town. Nearly 3 months later on the 9th March, 1896 the General Committee postponed the question. On the 9th January, 1896 the Health Officer submitted estimates to Chairman for taking over the cleansing and removing the excavations from the surface drains of the amalgamated portion of the Suburban Wards 19 to 25, viz., Entally, Baniapukur, Ballygunge, Bhowanipur, Alipur, Khidderpur and Watgunge at a cost of Rs. 73,000 annually.

47. On the 28th November, 1895 the Health Officer submitted an estimate for an additional establishment for the Town Wards 1, 2 and 3 : Shampukur Kumartolly and Burtola. The initial cost for carts and cattle was Rs. 5,830 and the annual cost Rs. 8,310. A small establishment was asked for in the hope that when the good results of the increase were seen in the wards a larger establishment would gradually be sanctioned not only for these wards but for every ward in the town. On the 14th of December, 1895 the General Committee resolved that the question should be considered by the Amalgamation Committee. On the 19th of December, 1895 the Health Officer protested against this resolution in the following terms :—

"If this matter is to be postponed until the Departments are amalgamated I think it will never be carried out for the amalgamation scheme is perfectly impracticable. What is wanted is a first-class Superintendent with engineering knowledge who shall have charge of filling up of tanks and all the petty work, which is now sent over to the Engineering Department, but which should be carried out by the Health Department. The Superintendent of the Sanitary Department should be assisted by Assistant Superintendents to supervise in a thorough manner the work of the Inspectors. It is only in this way the cleansing and nuisance branch of the Health Department can be made efficient, certainly not by mixing it up with the duties belonging essentially to the Engineer."

48. On the 17th December, 1895 the Health Officer submitted an estimate for increased establishment in Wards 5 and 7, Jorabagan and Burrabazar. The initial cost for carts and cattle was Rs. 1,920 and the annual cost Rs. 2,344. On the 4th January, 1896 the General Committee referred it to the Amalgamation Committee.

49. On the 18th December, 1895 the Health Officer submitted an estimate for increased establishment in Wards 4 and 6, Sukea's Street and Jorasanko at an initial cost for carts and cattle of Rs. 2,000 and an annual cost of Rs. 4,740. On the 4th January, 1896 the General Committee referred it to the Amalgamation Committee.

50. It will now be convenient to summarise the recommendations and their cost, details of which have been given in the paragraphs immediately preceding—

	Rs.
For the Canal Area	28,450
For the Suburbs, Wards 19 to 25	73,140
Total for Suburbs	1,01,590
For 7 wards in north part of town, Shampuker, Kumartoly, Burtola, Sukea's Street, Jorasanko, Jorabagan and Burrabazar	15,894
	<hr/> 1,17,484 <hr/>

It will be seen that while a sum of Rs. 1,17,484 was asked for for the conservancy of the town and suburbs between the 18th of November, 1895 and 9th of January, 1896 nothing was granted, and indeed the proposals are still under consideration.

The want of a proper Building Act.

51. This is the most important factor in defeating the efforts of the Health Department of Calcutta. If the town is allowed to grow without control over its streets and buildings repetitions of Burra Bazar and Jorabagan arise, overcrowding is inevitable, and efficient cleansing or any other sanitary measures are rendered impossible. The town will in course of time not only retain the plague spots it now possesses, but will in its entirety become a city of pestilence. It is because I was greatly impressed with this condition of Calcutta that from the first as Health Officer I have in season, and to the minds of many out of season, persistently advocated a Building Act for Calcutta.

52. The proposals of the Health Officer to remedy and prevent overcrowding began in 1886, when he was invited by the late Sir Henry Harrison, who was President of the Select Committee of the Bengal Council, appointed to frame the Municipal Act of 1888 to attend the Meetings, and advise the Committee on the Sanitary Sections of the Bill. Most of the Health Officer's suggestions were adopted, but owing to the manner in which the sections embodying them were framed their full value could not be secured. Among the suggestions made were proposals which practically embodied a Building Act, regulated the width of streets and the height of houses, their ventilation and distribution. But these proposals were strenuously opposed by some of the members especially the Indian gentlemen on the Committee on the ground that these were details which should not be introduced into a Municipal Act, but should form the subject of Bye-laws. The contention adopted against my proposals was one to which I could not agree.

I had been engaged only two years previously on a similar subject which was to affect all Municipalities in Scotland. As a matter of fact most large towns have either Building Clauses included in their local Act or possess a special Building Act. The view of the opposition however prevailed and thus beyond a few sections in relation to buildings of minor importance the Act has practically no control over the growth of the city. The adoption of the view that the subject of Building Regulations should be relegated to a Bye-laws Committee of the Corporation transferred the consideration of the subject from a tribunal which would have formed and enforced an independent opinion, to a Sub Committee of Commissioners which could not command the same body of expert opinion to aid them, and which as experience has established is very sensitive to the private and personal interests which they represent.

53. In the Annual Report for 1886 in a lengthy memorandum on the subject the Health Officer drew attention to the dangers arising in a town without Building Regulations and the impossibility of effective scavenging under such conditions. In the Annual Report for year 1887 a further long Memorandum was written on the subject, and a definite scheme for the opening up of the crowded portions of the town, and for the laying out of the suburbs was proposed, and the Health Officer suggested for this purpose the appointment of a Committee of experts and attached to the report, the map embodying the scheme and plan of streets proposed for a similar purpose to the Calcutta Municipal Inquiry Committee by Lieutenant Abercrombie in 1836. The same report contains photographs and a description of privies which by their construction and situation, it is impossible to keep clean and which were added in order to give some conception of the difficulties to be met with in the drainage, ventilation and building arrangements of the city, and which under the existing law, and without wholesale demolition, can never be overcome.

54. In the Annual Report of 1888 this important question was again referred to, and it was pointed out that every year's delay in carrying out the construction of broad streets in the over-built localities of the town would bring with it greater difficulties and expense, and that even during the three years which had then elapsed since the Health Officer took charge a marked change was observable. "The crowding together of houses is becoming greater, the open spaces are being more encroached upon, the building space is gradually contracting and the localities are progressively attaining a more unhealthy state of the inhabitants."

55. This and previous reports resulted in a protracted debate in the Corporation in which it was contended as in previous years that the sanitary condition of the town was depicted in most sensational terms and that the drainage on which over 100 lakhs had been spent, the water-supply, overcrowding of buildings and scavenging were not such as described. This itself shows that the Health Officer made recommendations and that the majority of the Commissioners considered it was unnecessary to adopt them. One good result which must not be overlooked, however, was that the arrangements for an increased water-supply were expedited, and doubts were revived as to whether the drainage was actually in the perfect condition that had hitherto been claimed for it and whether or not it was an important factor in improving the health of the city. From that time the drainage question has gradually evolved itself until the other day it culminated in the inauguration of the new drainage works. In 1889 at different Meetings of a Committee formed by the Commissioners to frame Bye-laws, the Health Officer proposed clauses regarding the height, ventilation and construction of buildings and huts, and the width of streets similar to those he had put before the Committee.

of the Bengal Legislative Council in 1886. Many of the proposals were accepted, but in such a modified form that the Health Officer wrote for the Commissioners a Special Note on the proposed Building Bye-laws pointing out that the modifications completely destroyed their utility. As the result of this Note a few unimportant alterations were made, but the most serious defects were left untouched. No minimum width of streets was determined on, and things were left very much as they were before.

56. In the Annual Report of 1889 another very full Note with plans showing over-built upon areas where ventilation and other sanitary laws were disregarded occupies a large portion of the report. The Health Officer in this report again urged the appointment of a Committee, consisting of Government Engineers, medical men and others, both Native and European, to frame proper Building Laws on the lines indicated in his report. It was an effort on his part to secure for the Corporation the aid of that body of expert opinion which the Legislative Council of Bengal could command, but of which the Corporation could not otherwise get the advantage. On receipt of this report the Bengal Government in their Resolution endorsed the opinion of the Health Officer that the ventilation of the city by proper streets and squares, and the enforcement of proper Building Regulations were the most important sanitary measures which remained for the Municipal Commissioners to undertake. The resolution concludes as follows :—

"The demand for residential houses is now so great in Calcutta that there is a marked tendency to construct brick buildings on bustee sites. But unwholesome as were the bustees, it were almost better from a sanitary point of view to have bustees through which the wind can permeate than groups of high houses if these are to be separated from each other only by narrow tortuous and foul alleys which in Dr. Simpson's expressive words 'signify obstruction of traffic, obstruction of proper circulation of air, overcrowding of houses and inhabitants with all their attendant evils, foul and inefficient drainage and pollution of air by sewage, by sewer gas, by unremoved filth from defective scavenging and by the organic products given off from animals and men in a crowded state.'"

Dr. Simpson then points out that the executive is powerless to prevent these defects under the existing Law or Bye-laws, that there is no regulation as to the minimum width of existing or new streets and that the only real control the Commissioners can exercise is by planning out the city under Section 208 with the aid of Engineers and medical men in accordance with certain laid down sanitary problems. There are also the problems of ventilation of houses and the ventilation of rooms to be considered. For all these difficulties the Health Officer proposes remedies in detail and suggests that a Committee formed of Engineers, medical men and others should be appointed to thoroughly investigate and report on the whole subject.

The Lieutenant-Governor trusts that this suggestion will receive the very early attention of the Chairman and of the Commissioners.

57. In the Annual Report of 1890 examples and plans of houses are given which though built in conformity with the Bye-laws were really unhealthy houses, and it is stated that "the laws and Bye-laws now in force might very appropriately be termed laws and bye-laws to legalise insanitary buildings." Exception was taken by some of the Commissioners at a Meeting of the Corporation to the Health Officer continually pointing out the defects in the law and a motion to expunge the paragraph and to censure the Health Officer was brought forward but subsequently withdrawn.

58. In the Annual Report of 1892 the Health Officer again in a Note draws attention to the necessity of a Building Act for "that in force is not merely a defective law, but a radically bad one for under its sanction unhealthy houses are being built whilst areas in the town are being created which as they grow can only breed pestilence." He also pointed out that notwithstanding the resolution of the Bengal Government on the report for 1889, three years had elapsed without anything being done and that plague spots were being created in the town. After describing a few such spots the Health Officer remarked

that "sanitary science knows of no methods by which areas of this description can be rendered healthy. All that can be done is to pull the houses down and begin on new lines. This being so it may, with reason, be asked why such a system is permitted to continue and evils to be perpetuated which can only end in calamity." The result of this was a resuscitation of the Bye-laws Committee, and the Health Officer was asked, in the summer of the year 1893, to report on the difficulties in carrying out the Bye-laws and the alterations which he would suggest. The Health Officer accordingly drew up a revised set of Bye-laws which he forwarded to the Chairman on the 12th of October, 1893, with a Memo. stating that the Engineer would report on the difficulties, the Health Officer's experience having reference chiefly to the thorough inadequacy of the law and bye-laws to secure healthy buildings and healthy localities as explained in his Note on Building Regulations and overcrowding in the Annual Report for 1889. In appendix Exhibit F. will be found the Health Officer's proposed alterations in the Bye-laws as framed by him on this occasion.

59. On the adoption of the report of 1892 by the Commissioners the Government of Bengal passed its resolution on that report, and in doing so again referred to the Health Officer's report on the necessity of a Building Act and to the suggestion that a strong Committee formed of Engineers, medical men and others should be appointed to thoroughly investigate and report on the subject.

"The Lieutenant-Governor is disappointed to learn that no action has been taken on the suggestion thus commended to the Commissioners * * * The Lieutenant-Governor will be glad to see a draft of the new Bye-laws referred to above at an early date; and eventually if in the opinion of a considerable section of the Commissioners these Bye-laws are still insufficient, he will be prepared to consider any representation that may be made to him on the subject. His Honour believes that the public mind in Bengal is awakening to the benefits of sanitary improvement; and he notices with pleasure the passage in this report in which the Commissioners assert that their eagerness for sanitary improvement is as great as that of their Health Officer, His Honour trusts that nothing will prevent them from giving full effect to these good intentions."

60. In the Annual Report of 1893 the subject was only briefly alluded to because it was hoped that the Bye-laws Committee would do something. But as matters were no further advanced than in 1889 the Health Officer in his Annual Report for 1894 devoted 2½ pages out of 64 to the insanitary condition into which Calcutta was gradually being allowed to drift owing to the want of proper Building Regulations. In introducing the subject the Health Officer observes that—

"For a large city with 3 quarters of a million of people and which is at the same time the Capital of India it is hardly conceivable that there are no regulations whatever controlling the width of streets, and that the town is being permitted to be built up without the slightest attempt to follow the ordinary canons of sanitary law. But such unfortunately is the case, and yet it is expected that a city growing up under these conditions shall be a healthy one. I desire in the most earnest and emphatic manner to draw the attention of the Commissioners and of the Government to the urgent necessity of a Building Act. Before such an Act can be passed a searching and preliminary enquiry is necessary as to the lines on which such an Act should be framed which, while securing a healthy city, shall at the same time be in conformity with the best habits and customs of the people and with tropical requirements. Personally I am of opinion that this is a matter for the Government to enquire into aided perhaps by a few Commissioners. After 9 years' experience I am convinced that the question is too comprehensive and complicated to be dealt with satisfactorily, or in any way approaching the necessities of the case by the Commissioners themselves who, besides not being able to bring the requisite knowledge to bear on the technical sides of the subject, are busy men and quite unable to spare the time to grapple with this important problem."

61. In this report it was also pointed out that even as the Bye-laws stand the Buildings Committee passed 90 per cent. of those cases which were a breach of the Bye-laws and which were for that reason objected to by the Superintendent of Roads.

When this report came before the Commissioners they resolved that contentious matters were not to be referred to by the Executive in Annual Reports.

62. Subsequently several Meetings of the Bye-laws Committee took place but nothing practical was the result. On the

Chairman's Memo.

19th August, 1895, the Health Officer was asked to submit a Note with a draft of the Building Regulations and Bye-laws which he considered necessary. On 22nd August the Health Officer submitted a copy of his previous Notes and this was ordered to be circulated to the Committee. On 24th August the Chairman wrote a Memo. on the Building Sections of the Municipal Act and the Bye-laws. On 7th December, 1895 the Health Officer submitted his opinion on that Memo. It is as follows :—

"The Chairman has placed the requirements of the Bye-laws in a clear light, but I am of opinion that this will in no way alter what is required for the health of Calcutta. The law relating to buildings of every kind is not of the kind necessary for a city like Calcutta and nothing short of having a proper Building Act will, in my opinion, do any good. The reasons I have already given in my Annual Reports."

63. No progress being made the Health Officer again dealt shortly with the subject in his Annual Report for 1895 submitted in July, 1896 and recorded the necessity for a Commission on the subject.

64. The Government of Bengal in the resolution on the Administration Report again specially referred to the Health Officer's remarks on the urgent need of suitable Building Regulations for Calcutta, and concluded by stating that—

The Bengal Government's 3rd resolution on the need of building regulations for Calcutta.

"If after considering the subject which has now been before them for several years the Commissioners come to the conclusion that a special Building Act for Calcutta is called for in the interests of the health of the town, the Lieutenant-Governor will be prepared during the cold weather to appoint a Representative Commission to formulate the principles on which such an Act should be based."

65. *After ten years' endeavour on the part of the Health Officer and three resolutions on the subject by three Lieutenant-Governors, a Building Act has still to be introduced.* The question, however, I am glad to say has now been brought to such an acute stage that no longer delay is likely to be permitted and after due consideration Calcutta will secure its much needed Building Act.

The throwing into the streets of domestic refuse during the day.

The only wards in which this practice is not permitted are a few of the southern. With a system such as this it is impossible that conservancy can be efficient and the streets and lanes kept clean. Recommendations to change the practice have frequently been made by the Health Officer in quarterly, annual and special reports but without success. It would be no hardship on the inhabitants to insist on all *domestic* refuse being deposited in the streets only between the hours of 9 P. M. and 7 A. M.

Hours should be fixed for domestic refuse being deposited in streets.

The throwing of trade-refuse into the streets without payment of a trade-refuse tax for its removal, and the failure on the part of the persons concerned to remove it themselves.

66. Owing to a ruling of the High Court that the Municipality has no legal power under the Act to impose a fee, or enforce payment in advance, for the removal of *trade-refuse*, most people do not pay and the whole of the trade-refuse of the town has to be removed by the carts allowed for conservancy which in other towns have to do with the removal of *domestic refuse* only. As business increases in the town the trade-refuse becomes larger in quantity. Increased quantities are thus deposited on the streets from small livery stables, *gowala*

Trade-refuse increasing every year.

sheds, and premises belonging to horse-dealers, screw-house-keepers, shoe-makers, coach-builders, hotel-keepers, boarding-house-keepers, hide-store-keepers, sugar-candy manufacturers, flour, oil and soorkey-mill-owners, etc.

The following table will show the large amount of refuse which is removed from Calcutta without making much apparent difference in the quantity of filth that remains to be dealt with:—

Statement showing the quantity of refuse removed in wagon loads to Salt water Lakes.

Year.	Refuse.	Offal.	Total.	REMARKS.
1879	8,011	380	8,391	
1880	10,016	372	10,388	
1881	11,197	...	11,197	
1882-83	16,948	...	16,948	For four quarters of 1882 and 1st quarter 1883.
1883-84	13,437	...	13,437	
1884-85	11,511	...	11,511	
1885-86	12,237	365	12,602	
1886-87	14,472	365	14,837	Tank-filling with garbage lessened.
1887-88	13,755	366	14,121	
1888-89	16,073	365	16,438	
1889-90	21,018	365	21,383	Tank-filling with garbage stopped.
1890-91	21,899	362	22,261	A small quantity of suburban refuse included.
1891-92	21,895	366	22,261	
1892-93	23,956	365	24,321	
1893-94	26,829	365	26,194	
1894-95	26,599	365	26,964	
1895-96	28,043	366	28,409	

67. There can be little doubt that a reform is urgently needed in this direction and that an adequate tax should be imposed on trade refuse in a town

An adequate tax on trade-refuse should be imposed.

which is rapidly developing into a manufacturing centre. The revenue to be so derived would materially help in defraying the cost of an efficient removal of refuse which no Municipality is supposed to cope with unless paid for doing so. The only other alternative is to force every one of those subject to the trade tax to remove their own refuse, in their own carts, at a certain hour, but in the majority of cases, and in a town like Calcutta, such a course is likely to be unsatisfactory and unworkable.

Another point is that refuse is not defined in the Act, and is included within the definition of rubbish, so that when an old building is pulled down, or foundations dug up for a new building, the rubbish and earth are thrown on the street and have to be removed by the Health Department as house refuse. In several instances when the parties were prosecuted under Section 230 for depositing building material on the street they have pleaded that the same was thrown out as house refuse, and the plea has been upheld, and the cases dismissed.

Other important causes leading to inefficient cleansing and the unsatisfactory disposal of refuse.

(a). Contract system by which much of the work is done by Contractors instead of by the Corporation direct :

(b). The want of sweeping machines :

(c). The delay at the dumping platforms owing to structural defects in the platforms themselves, which were constructed for the requirements of Calcutta 30 years ago ; irregularity in the despatch of wagons, and an insufficient supply.

63. These defects have been brought to the notice of the Commissioners several times, and are being considered by them with a view to their rectification.

Defects reported on.

The last formed the subject of a special report submitted to the Commissioners in March, 1896 with a recommendation that the platforms in Circular Road should be abolished, and incinerators introduced ; an extract of the report on the subject is annexed as an appendix Exhibit marked H.

69. The incinerator which has been at work at Goragatcha for over four years has proved successful in burning the refuse of the district. There can be no

Incinerators can be worked without nuisance.

doubt that if special furnaces are adopted, as in England, to burn the gases proceeding from these incinerators, they can as in English towns be worked without the slightest nuisance. If the special cremator which I recommended for the first incinerator, and which Mr. Baldwin Latham also suggested when on his visit to Calcutta had been constructed the Entally incinerator would also have proved a success.

The impossibility of getting carried out departmentally any but the pettiest repairs. This arises partly on account of legal difficulties and partly on account of the difficulty of recovering expenses from owners, and want of establishment in the Engineering Department.

The law appears to be sufficient in that both the owner of the land and the owner of hut or house are liable for any works carried out by the

Legal difficulties in working Section 277.

Commissioners, in default of compliance with the requisite notice, but the majority of hut-owners are tenants-at-will and immediately a notice is served on both owner and occupier, the owner of the land sends in a letter stating that he is anxious to get rid of the people, has served them with a notice to remove or abate the nuisance and he cannot be held liable. In 1891 two cases were submitted to the Chairman by the Health Officer in which notices had been served under Section 277 to pave and drain hide-godowns, and the land-owners objected on the ground that they only received the ground rent, that the huts belonged to the tenants and that the paving and draining were required in consequence of their business and that therefore they were not liable for the expenses. The case was referred by the Chairman to Messrs. Sanderson and Co. for opinion which was as follows :—

"We have to acknowledge the receipt of your letter No. 4975 asking as to advise as to the construction of the term owner as used in Section 277 of the Municipal Act. Section 277 provides * * * * * we gather from your letter that two notices have been issued under Section 277 for the efficient paving and draining of certain hide-godowns. We think for the purposes of Section 277, the word, house, in that Section may be said to include a hut, shed, or any other structure. Hut is also defined to include any structure erected upon land which the owner lets out for the building of huts in such manner that the tenant of the land is the owner of the hut, whether such structure is roofed with tiles or otherwise or constructed with bricks, earth, or other materials. The owners of the land say they receive rent for the land only, and in effect that the godowns are structures erected upon land which they let out for building in such a manner that their tenant of the land is the owner of the structure.

If these statements be accepted as correct the ownership of the land is distinct from the ownership of the structure or hide-godown, and judging from your letter the notice relates to the efficient draining of the godown only, hence we construe the word owner in Section 277 as applied to the present case to mean the owner of the godown and not the owner of the land. The notice should in our opinion be served on the owner of the godown."

70. The same argument must be applied to cow-sheds, stables and other structures in which paving and draining are required in consequence of the

The same for Section 286.

particular business of the owner of the house or shed. The Government Solicitor's opinion showed that the Executive had not secured by Sections 277 and 286 the powers which it was hoped that those sections would secure. The majority of the people engaged in these trades are hut-owners and if work on a large scale is done by the Corporation there is always the danger of the tenant waiting until the work is nearly completed and then removing the hut. It was on account of this difficulty and also on account of the bye-laws relating to cow-sheds, cattle-sheds and stables being framed with special reference to Section 335 that prosecutions under Section 336 are mainly resorted to.

71. With reference to the execution of work in default of compliance with notices under Sections 277 and 286

Difficulty in realising money for work done Departmentally.

most of the work has always rested with the Engineer's Department and not with the Health Department.

The remarks which follow are not directed against the personnel of the Engineer's Department, but are intended to point out the defects of a system which needs reform and by their removal to enable the Engineer's Department to co-operate more effectually with the Health Department than is at present possible. Previous to and since the opinion expressed above by the Government Solicitor notices under Sections 286 and 277 have been served by the Health Department on owners of land and on owners of cow-sheds, stables, etc., to improve the sanitary condition of the premises. A number of the owners have accepted the notice and done the work, but the majority of notices are disregarded, and through no action being taken in the Engineer's Department hundreds of notices have to be cancelled. Before the year 1890 the Engineer's Department was responsible for the execution of work above Rs. 100, and the Health Department for work under that amount. In both cases the responsibility of proving that all legal steps have been taken in the service of notice with the view of recovering the money lay with the Health Department. So many bills, however, were found to be unrealisable that an order was passed by the Chairman on the 30th June, 1890 that contractors' bills under Rs. 100 in the Health Department for work done at owner's cost were not to be paid until a corresponding recoverable bill was made out by the Health Department and submitted to the Accountant to be handed to the Joint-Collector for realisation. Should any objection be made the bill was to be returned to the Health Department for inquiry, and if the objections touched the Contractor the bill was not to be paid until the objection was decided. No bill has ever been presented that was not objected to. The order had the effect of causing Contractors to refuse to take up any work whatever in the Health Department especially as in the Engineering Department Contractors were paid without question.

72. This state of affairs was represented several times by the Health

Want of special establishment in Engineering Department to carry out work Departmentally on failure of parties complying with notices from Health Department.

Officer, and in a Note submitted on the 22nd of April, 1892 he pointed out that all the cow-sheds, bullock-sheds and stables in the northern portion of the town had been served with notices under section 286; a very large number of such notices had been sent to the Engineer's Department for action but nothing had been done, and notices for work under Rs. 100 were lying in the Health Department unexecuted, because no Contractor would take up the

work while the order of the 30th June remained in force. The Chairman looked into the matter and on the 20th November, 1892 ordered that the Engineer should take over all *takeed* work "as the Contractors to do the works were men who did other work for the Engineer, and the only punishment to which they were amenable for neglect to carry out these *takeed* works had to be inflicted through the Engineer by their names being struck off the list either permanently or for a period." The Chairman added that the less the Health Officer's Department had to do with the execution of petty works the necessity of which it discovers the better. The transfer did not mend matters. Notices were served by the Health Department, and on non-compliance sent to the Engineer, but they were not executed, because no Contractors would do the work, and because the Engineer had no establishment for the work. It was not until January, 1894 after a number of representations as to the stand still to which all this kind of work had come that the order of 1890 was superseded. Even with this obstacle removed the difficulties of carrying out work are apparently such that on 25th April, 1895 the Health Officer had to point out to the Chairman that out of 1,000 *takeeds* sent to the Engineer's Department for action only about 20 had been attended to, and in a Note submitted on 27th June, 1895 the Assistant to the Engineer estimated that if the work was to be done an establishment costing Rs. 1,300 a month was required. On the 27th July, 1894 Mr. Silk, the Officiating Engineer to the Corporation, wrote a full Note on the subject showing that in 12 months 2,184 *takeed* cases had been sent to the Engineer's Department by the Health Department, of which 212 had been executed by the Engineer's Department, 259 had been executed by the owners themselves, 72 had been returned to the Health Department and 1,641 were in hand awaiting the preparation and sanction of estimates. He very properly divided the work into that which required technical knowledge and that which did not, and recommended that for the latter work a special establishment should be given to the Health Department, and for the former a special establishment should be granted to the Engineer's Department. On this coming before the Commissioners a small establishment was granted to the Health Department provisionally to see how it worked, and which does work which costs less than 25 rupees, but no establishment was given to the Engineer. The result has been that the small establishment which consists of one mason, one *gharami*, one carpenter and two coolies for each Superintendent is doing good work, but it is obviously insufficient, an establishment like this being required for each Inspector. *As regards the larger works, however, sanitary improvements are still as before at a stand still and no such works can be executed departmentally by the Engineer until he has a special establishment for the purpose.*

The difficulties in getting matters remedied by prosecutions.

73. In consequence of the obstacles in the way of remedying sanitary defects by departmental execution of the work in default of compliance with notice, the Health Department has mainly directed its attention to the prosecution of those on whose premises the nuisances exist. There are, however, causes at work which to a large extent nullify the good effect which this procedure would undoubtedly produce. In most cases there is great delay in the issue of summonses from the Police Court sometimes extending to 2 or 3 months. In the meantime the nuisance for which prosecution is undertaken continues unabated. It may be noticed in this connection that the Act provides for the appointment of a special Magistrate for Municipal cases, but none has ever been appointed, and the overworked staff at the Police Court cannot be held responsible for the delays which have been indicated. There is a reluctance also on the part of some of the Honorary Magistrates to issue contempt warrants. When the defendants fail to appear after having received a summons-cases are struck off and fresh summonses ordered which means further

delay. In the majority of cases in which conviction is obtained the fines imposed are so small that the prosecution fails to have the desired effect of preventing a repetition of similar offences. The defendants would as a rule sooner pay a small fine from time to time than go to the expense of making sanitary improvements. Magistrates generally are unwilling to inflict continuous or daily fines for continuing offences, and only a few such sentences have been secured. In some cases a reduced penalty has been inflicted on the second or third conviction.

There are also defects in the law. Section 336 which provides for closing cow-sheds, stables, etc., after conviction is a failure in so far as the animals may be turned out to-day and brought back at once without any penalty.

74. Section 320 provides only for overcrowded buildings, and huts are not included in buildings. Moreover, the Act does not give power to any Municipal officer to enter any premises between sunset and sunrise which is the only time when it can be ascertained whether a house or hut is overcrowded. Apart from this there is no clause in the Act defining what overcrowding is, or the amount of cubic space allowed for each person.

75. Section 286 has no penal clause by which persons called upon to make improvements can be punished for neglect, such as Section 316. In many instances when the work is done by the Corporation in default the cost cannot be realised, poverty and general inability to pay being pleaded.

76. Section 300 (regarding the deposit of refuse on the streets during prohibited hours) is rendered useless owing to no powers of arrest, and to the duties not devolving on the Police.

77. Section 357 (relating to markets and shops for the sale of meat, fish, &c., without a license) provides a penalty for permitting any place to be so used, but no penalty is imposed on the person who sells. Cases have been lost under this section by the owner pleading that he had let the premises as a dwelling or shop and not as one for the sale of meat, &c.

Inadequacy of Police Sanitation.

78. The remarks which follow with reference to the inadequacy of Police In certain matters the Police should be the recognised sanitary agents. co-operation are not made with the object of criticising the present Police staff or casting any reflections whatever upon them. On the contrary the Police under Sir John Lambert have always been ready to render valuable assistance to the Health Department. Attention is directed to the system the importance of which has never yet been recognised in Calcutta where the need for Police sanitation is perhaps greater than it is in those European towns where the joint system prevails. In European towns the Police are in certain matters the recognised sanitary agents, but this is not the case in Calcutta, and consequently there is a license here to commit nuisances which would not be permitted elsewhere.

Police sanitation consists in—

(a) Preventing the inhabitants throwing out refuse except at the hours fixed by the Municipality:

(b) Arresting and prosecuting persons committing nuisances. The Police no doubt do in some cases bring to the notice of the Magistrates instances in which persons have committed nuisances on the road sides, but in the experience of every one the percentage of cases dealt with in the Police Court is far short of what actually takes place:

(c) Preventing horses or other animals being cleansed or stabled in the street or on the pathway or being fed without proper arrangement for preventing fodder from being scattered in the street, and prosecuting offenders. Here

again the Police do arrest, and take before the Magistrates *ticca gharry* drivers who obstruct the traffic, but the cleansing and indiscriminate feeding of horses by the road side is not checked by these prosecutions, and are the more objectionable evil and help to keep the streets filthy :

(d) Preventing persons in the street breaking any special Municipal law, for example, if a notice is put up that people are not to bathe or wash their clothes in a certain pond it is the Police who elsewhere enforce the order :

(e) The carrying out of the laws or Bye-laws relating to all lodging houses. The existing Bye-laws on this subject apply only to small European common lodging houses. In European cities all registered lodging houses are subject to the control of the sanitary authorities through the Police :

(f) Preventing encroachments on the pathway or in markets :

(g) Assisting the Sanitary Department in removing infected patients, etc. Police Assistance is rendered here under present arrangements.

These are duties which are recognised everywhere in Europe as devolving on the Police. It is obviously impossible that a small body of Inspectors, belonging to the Health Department with other duties to perform, can supervise for these purposes a large city, and any attempt to do so must necessarily, as it does in Calcutta, prove infructuous.

Overlapping of some of the duties of the Health Department with those of the Engineer.

Amalgamation would in these cases add to efficiency.

79. Overlapping occurs in 3 things—

(a) Scraping and removal of mud from the roads. The present arrangement is for the Engineer's Department to scrape the roads and the Health Department to remove the mud. This divided duty does not tend to efficiency, and it would be better for the road-scraping and removal to be done by the Health Department.

(b) Cleansing of *kutchra* drains in the suburbs and amalgamated area and removal of the filth to dumping-grounds. The present practice is to cleanse the drains and leave the mud and filth on the sides until it is either washed back again, or the Health Department which has no carts for the purpose endeavors to remove a small portion of it with its ordinary conservancy carts on the orders of the Health Officer. This work should be solely under the Engineer, and an establishment of carts and men should be granted for doing the work.

(c) *House Drainage.*—The Medical Inspectors and other officers in the Health Department frequently discover defects in house drainage. Moreover, occupiers of houses or neighbours complain of defective drainage to the Health Officer, and these complaints are enquired into by the officers of the Department and the complaints with the Inspectors' reports are sent either to the House Drainage Superintendent or Road Superintendent for action. At present the House Drainage Department is completely under the control of the Engineer's Department, and as the complaints are always made to the Health Officer if there is any delay in the nuisance being removed, the Health Department is blamed. It would be advisable in order to get defects in house drainage expeditiously removed that the Health Department should also exercise some control over the House Drainage Superintendent and his staff.

An Inadequate Unfiltered Water-supply.

80. A deficiency in the unfiltered water-supply has postponed many important and urgent sanitary reforms. It prevents an efficient flushing of the drains and a proper flushing of connected latrines, and it is the main obstacle to the improvement of those very insanitary latrines which may be capable of

Several sanitary reforms depend on an ample supply of unfiltered water.

improvement in the crowded areas of the town: some latrines, however, are incapable of improvement. This deficiency will, however, be soon remedied for the Engineer has a project in hand which will, he believes, give an ample supply of an unfiltered water.

Summary.

81. The object of this Note, as stated at its commencement, is to help towards the formation of a clear conception of the large sanitary problems which present themselves in Calcutta, and to show how they are dealt with at present. It must be admitted that much good work has been done; but the factors conducing to insanitary conditions are greater than those which make for improvement, and it is obvious that if Calcutta is to escape the effect of this downward tendency a more vigorous and constructive policy must be pursued, the city must be "Hausmannized," a Building Act must be introduced without delay, and measures of sanitation, similar to those adopted in equally large and important cities elsewhere, must be applied systematically, and on a liberal scale in the Metropolis of India.

December 23rd, 1896.

W. J. SIMPSON, M. D., M. R. C. P., D. P. H.,
Health Officer, Calcutta.

2145—6-1-97—300.

Exhibit A.

SMALL-POX REPORT.

WHEREVER POSSIBLE THE INFORMATION IS TO BE GIVEN BY STRIKING OUT THE WORDS OR SYLLABLES NOT REQUIRED IN THE REPORT.

Name of patient _____ Age _____ Sex _____

Race or creed _____ Caste _____

Residence _____ Ward _____

How long resident in Calcutta? _____ If stranger, from where? _____

Patient's occupation _____ At _____

Inoculated or vaccinated _____ Date of inoculation or vaccination _____

Has ever had small-pox? _____

Date of first feeling ill _____ Date of death or recovery _____

Attended by _____ Total number of persons in household _____

Total number affected in household _____

Number of persons occupying the patient's room _____

Other residents in house occupied at _____

Other recent cases in the family or amongst relatives _____ or neighbours? _____

If so, how many? _____

Previous diet.	{	Articles of food _____
		Source of food-supply _____
		Do. drink _____ Source _____
		Milk-supply wherefrom _____

Is any business or trade carried on on the premises whereby infection may be communicated to the customers or the public _____ If so, what? _____

How were clothes disposed of _____

In what other way is infection liable to be spread _____

No. of unprotected persons in the house _____

No. of inoculated persons in the house _____

No. of vaccinated persons in the house _____

Preventive measures taken _____

Disinfection _____

No. of children vaccinated _____

No. of adults vaccinated _____

No. re-vaccinated _____

Any further information the Medical Inspector may think important. _____

CHOLERA REPORT.

Wherever possible, the information is to be given by STRIKING OUT the words or syllables not required in the Report.

Date of Inquiry _____ 189 _____

Name of Patient _____ Age _____ Sex _____

Race _____ Caste _____

Residence _____ Ward _____

How long resident in Calcutta _____

If a stranger, from where _____

Date of first feeling ill _____ Date of death or recovery _____

Attended by _____ Total number of persons in household _____

Total number affected in household _____

Patient's occupation _____ at _____

Number of persons occupying the patient's room _____

Other residents in house occupied as _____

Other recent cases in the family or amongst relatives? _____ or neighbours? _____

If so, how many? _____

Personal hygiene. { Previous diet _____
drink _____
milk supply wherefrom _____

Is any business or trade carried on on the premises whereby infection may be communicated to the customers or the public _____

If so, what _____

Where were the discharges thrown _____

Where were the soiled clothes washed _____

In what other way is infection liable to be spread _____

Sanitary Condition of Premises.

Kind of house, kutcha or pucca _____

(A) Overcrowding? _____ state particulars _____

(B) Ventilation of house—good—fair—indifferent—bad, size of rooms _____

(C) Premises clean—dirty. _____

Drainage—Underground, surface, both or none, condition, choked, free, clean, distance from well _____

Any likelihood of escape of sewer gas—if so, state particulars _____

Privy—feet distance from door—window. Kuteha, pucca or connected.

If connected, what means of ventilation adopted?

Clean or foul. State defects.

Smells complained of?

Compound—What state is the ground in

Are there any stagnant pools?

Animals kept on premises?

Any other nuisance on or near premises?

Water-supply—By well?

Liabile to pollution?

Distance from privy?

Distance to nearest tap water

tank

river

Number of hours each day tap water can be obtained?

What water is used for drinking

for cooking

For washing utensils

for bathing

What precautions have been taken to stop spread of the disease

State briefly sanitary requirements of the place

Is there any scarcity of water, if so, state particulars

Was the patient inoculated against Cholera?

Were there any other persons in the house inoculated against Cholera?

INSPECTOR.

Any further information the Inspector may think important

INSPECTOR.

N.B.—Whenever the Inspector thinks it desirable to give a rough sketch of the ground plan shewing the relative position of well, privy, drain, &c., he should do so.

Medical Inspector for report after careful inquiry into Causes.

Asst. Health Officer.

Exhibit C.

Statement showing the work done by Medical Inspectors during the year 1895.

	CHOLERA.						DIARRHEA AND DYSENTERY.				TYPHOID FEVER.				DIPHTHERIA.				TETANUS AND CONVULSIONS.				SMALL-POX.				OTHER COMMUNICABLE DISEASES.		SANITARY INSPECTION APART FROM VISITS FOR INQUIRY INTO DISEASES.							
	Total No. of cholera cases.	No. of deaths of total cases.	No. of cases treated by Medical Inspector.	No. of deaths of cases so treated.	No. of recoveries of cases so treated.	No. of cholera forms filled up.	No. of premises disinfected and cleaned on account of cholera.	No. of cases treated by Medical Inspectors.	No. of deaths of cases so treated.	No. of recoveries of cases so treated.	No. of premises cleaned and disinfected.	Total No. of cases.	No. of deaths.	No. of cases enquired into and reported on.	No. of premises where the death occurred.	No. of premises cleaned and disinfected.	Total No. of cases.	No. of deaths.	No. of cases enquired into and reported on.	No. of premises where the death occurred.	No. of other communicable diseases reported on.	No. of premises where these occurred.	Total No. of premises visited on account of disease and reported on.	Total No. of premises cleaned and disinfected on account of disease.	No. of special reports regarding disease and disease outbreaks.	No. of houses inspected.	No. of houses in which sanitary defects discovered.	No. of houses in which sanitary defects have been abated.	No. of houses inspected.	No. of reports made to A. H. O. respecting houses inspected and nuisances.	No. of nuisances removed by action of Medical Inspectors.	No. of nuisances discovered and necessary notice sent to Supt.				
Dr. Chatterjee	40	8	32	756	716	40	...	40	38	...	...	40	49	559	...	...	40	49	74	43	1,603	1,324	66	2,372	408	267	252	31	94	170		
" Das	15	4	11	458	446	82	1	80	81	...	...	13	14	1,012	...	...	14	15	49	29	1,625	1,431	417	15,051	537	473	1,555	27	332	178		
" B. Basu	7	...	7	275	275	60	...	60	60	...	...	9	9	542	...	...	9	9	...	...	849	889	73	2,180	375	570	974	45	552	...		
" Sircar	1	...	1	174	154	...	...	1	1	...	...	15	15	478	...	...	15	15	3	2	611	611	192	856	269	2,428	1,335	14	42	185		
" Mookerjee	349	339	...	...	...	...	...	...	7	7	477	...	...	7	7	...	...	822	762	7	36	...	...	...	...	...	...
" Paul	71	69	...	...	...	...	...	...	7	7	23	...	...	7	7	...	...	105	93	9	3	...	...	...	...	...	...
" Chakrabarty	117	117	...	...	...	...	...	...	...	...	18	...	...	...	...	...	...	135	124	...	110	6	3	61	1	...	...		
Total	2,147	2,064	63	12	51	2,341	2,116	182	1	181	180	...	...	92	92	3,040	1,494	3,040	92	92	136	100	5,388	5,132	764	10,857	1,784	4,741	3,882	118	1,031	633		

* Besides these 1,494 investigated by the permanent Medical Inspector, 726 cases of deaths were investigated by the temporary Medical Inspectors employed during the epidemic.

† Food Inspectors in suburbs doing Medical Inspector for want of Medical Inspectors.

‡ Medical Officer of Kudderpore Dispensary.



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Exhibit D.

DR. SIMPSON'S NOTE ON THE REORGANISATION OF THE HEALTH DEPARTMENT, DATED 16TH JULY, 1896.

I SEND you the Assistant Health Officer's Memo. It is interesting as a sort of *resume* of the work of the Health Department, and some of the difficulties though he does not bring out the immense amount of work entailed under nuisance and general sanitary work. This section he places under Conservancy, but Conservancy has to do with cleansing while nuisances and sanitary work generally is seldom a matter of cleansing though it may be connected with cleansing, but it is mostly connected with structural work. Thus the placing of cow-sheds, stables, hackney-carriage-stands, privies, surface drains, urinals, wells, spouts, meat-shops, kalisthans, &c., into a sanitary condition means not cleansing of these by the Conservancy Department, but the service of notice on owners or occupiers, or both, to carry out certain alterations which shall keep them from being a nuisance, the consideration of objections to these notices, and frequent prosecutions before the object wanted can be attained. It is this nuisance section of the Department which gives an immense amount of clerical work to all concerned, Inspectors, Superintendents, Assistant Health Officer and Health Officer, and it should be borne in mind that this is the Sanitary Department proper of European towns and is always a large establishment under a highly paid sanitary Superintendent, with assistants and Inspectors and is quite distinct from the Superintendents, Assistants and Inspectors employed for the supervision of the cleansing or scavenging operations in large towns. They have been combined here for economies' sake but as recommended in my first memorandum on the subject in 1887, this can only be done with a good European Superintendent of good status at the head who shall be responsible for the cleansing and Nuisance Departments alone. 10 years' experience has only convinced me that this proposal is the only one which, if adopted, will have the effect of efficiency. I have, with great inconvenience to myself and with much useless sacrifice of valuable time, performed the duties of a Superintendent of Conservancy, but it is not my duty and it only keeps me from more important work, and I must ask that matters for the sake of the public health of the city be put on a proper footing and that a highly qualified and energetic sanitary Superintendent be appointed who at the same time shall have engineering qualifications. The Health Department would then be divided into two divisions, a medical branch supervised by the Assistant Health Officer and a sanitary branch supervised by the sanitary Superintendent who shall have engineering qualifications. The branches would be as follows :—

I. Medical, supervised by Assistant Health Officer—

- (1) Vaccination.
- (2) Medical Inspection and enquiry into causes of disease and disinfection.
- (3) Registration.
- (4) Vital Statistics and issue of Weekly, Monthly, Quarterly, and Annual Reports.
- (5) Dispensaries.
- (6) Laboratory for analysis of water, foods and gas, and bacteriological examinations.
- (7) Food inspections and prosecutions.
- (8) Markets.
- (9) Slaughter-houses.
- (10) Cholera Inoculations.
- (11) Burning and burial-grounds.
- (12) Offensive trades.
- (13) General Medical questions connected with nuisance.
- (14) Special reports relating to medical and sanitary matters.
- (15) Buteo schemes.

SANITARY BRANCH SUPERVISED BY THE CHIEF SANITARY SUPERINTENDENT.

- (1) Conservancy of streets, lanes, passages and bustees, and removal of refuse thrown out from houses, markets, stables, cow-sheds and bullock-sheds.
- (2) Gowkhannahs or Municipal Buildings of which there are 4 for the accommodation of the horses, buffaloes, bullocks, cart and cart-drivers employed in cleansing.
- (3) Refuse platforms of which there are 6 and to which the carts take their refuse to be discharged into waggons to be removed to the Salt-lakes.
- (4) Incinerator 1 for burning refuse.
- (5) Supervision of Contractors' carts and men.
- (6) Night-soil removal from 50,000 privies.
- (7) Trenching-grounds 2.
- (8) Discharging night-soil depots 28 in number.
- (9) Public privies 47.
- (10) Public urinals 80.
- (11) Jemindari latrines 36.
- (12) Bathing-platforms 87.
- (13) Dust-bins 340.
- (14) Gully-pits cleansing 6,764.
- (15) Steps to be taken for removal of complaints regarding nuisances.

(16) Nuisance inspection. Condition of cow-sheds 850, stables 370, cattle-sheds 601, hackney-carriage-stands 60. Surface drains in bustees, Kalisthans and slaughter-houses 49. Tank and well-filling. Paving of passages and court-yards. Meat-shops 124. Choked drains and pits. Reports on privies. Dealing with application for privies. Granting of licenses. Examination into the causes of sewer gas escaping and producing a nuisance.

(17) Service and signing of notices under the Sections of the Act for sanitary purposes, 3,600 annually

(18) Takeed work.

(19) Applications for summonses 2,600.

(20) Prosecutions under different Sections of the Act, 3,000 annually.

(21) Correspondence connected with complaints, nuisance, inspection and the action taken.

(22) Passing of bills over 3,000 in the year.

(23) Passing of indents.

(24) The management and direction of 1,750 sweepers, 850 carters and 2,000 mehters.

(25) A travelling area of 1,18,500 acres and a population of nearly $\frac{1}{2}$ of a million.

It will be seen from this enumeration of the work in these two branches that for it to be done properly and efficiently the Assistant Health Officer should have the sole supervision of the Medical Branch and a well-qualified Superintendent of good status and with engineering knowledge the supervision of the sanitary branch both being under the direction of the Health Officer, but dealing with the routine matters independently and only bringing any important cases to him for instructions.

As regards other changes I think there should be two special prosecuting officers so as to relieve the Inspectors spending a large portion of their time uselessly in the Police Court. The prosecuting officers would have the getting up of the cases for the pleader and the necessary evidence which the present Inspectors do not always present in an intelligent form.

As regards the Assistant Health Officer's suggestion about the cleansing of bustees and streets being one it should be adopted and also that the Inspectors of the Wards should keep up a strict account over the distribution of their men and carts; but the keeping of diaries by peons and sirdars does not commend itself to me. I find the tendency of the Assistant Health Officer's views is to run into the keeping of many books which means clerical work and not real out-door work. The number of books which has to be kept already in each Ward Office is very considerable, and I should like to cut them down rather than increase them. Of course the Inspectors always keep diaries and the present Superintendents would keep diaries which would be presented to the Chief Superintendent whose appointment I am advising. The additional cost would be—

	Monthly.	Annually.
Chief Superintendent rising from Rs. 500 to 800 a month by annual increments, with horse-allowance of Rs. 100 a month ...	600	7,200
2 Prosecutors at Rs. 150 a month ...	300	3,600
Total Rs.	900	10,800

To appoint a Chief Superintendent and then overburden him with Office work would not effect the improvement in supervision required. A large portion of his time would be taken up in signing notices to be issued, approving of applications for summonses on account of nuisances and the passing of bills which duty really belongs to the Accountant. It would be much better if this work is decentralised; when the duty falls on one man so as to take up a large portion of his time and keep him from other important duties the work is apt to become merely mechanical and the signature is attached to notices, summonses and bills which have been not been carefully gone into, and accordingly the signature has no value whatever. For notices and summonses I would advise that the Superintendents of divisions should have the power to sign the notices and summonses belonging to their own divisions and should be held responsible for their accuracy. This brings the number within a moderate compass for one man. For exceptional cases which may be defined it may be considered advisable to have the Chief Superintendent's signature; but this would be few in number.

As regarding the passing of bills it should be sufficient for the Health Department to present the vouchers properly certified to the Accountant. There are two classes of bills, one establishment pay-bills, the other contractors' or other parties' bills. The work was always very heavy and the certifying of the accuracy of the bills by the Superintendents and Assistant Health Officer really becomes worthless as a check. To do this work properly and carefully it would take up almost the whole Office hours of an Accountant. So long as the acquittance rolls and vouchers are properly certified by the Superintendent of the divisions who is the head of his branch there should be no need of further certification by either the Assistants Health Officer or proposed Chief Superintendent. There should be either this arrangement or a special Accountant in the Office for the work who would be responsible for thoroughly examining the acquittance rolls with the bills as well as all vouchers with the bills from contractors and with the power to send them on to the Accountant, when signed as correct by him. It may be urged that the certifying by the head of the department is merely formal. If it is, then it wastes the time of the head of the department, and if it is not, it is a duty which with the other work he has to perform is so onerous as never to be done, and under these conditions the insistence on the signature is that it does not mean what it signifies.

There is another point connected with the Office establishment which it is important to bring before the Chairman. It is the increasing amount of work thrown on the Office without any corresponding increase in Office clerks. The following statement gives an abstract of the work done in the Canservancy and Nuisance Branches :—

HEALTH DEPARTMENT.

OUTTURN OF WORK.—PRIVY SANCTION.

Privy Register kept since October, 1891—

October 1891 to March 1892	337.	October 1894 to March 1895	1,197.
" 1892 to " 1893	826.	" 1895 to " 1896	1,171.
" 1893 to " 1894	1,317.	" 1896 to " 1897	231.

To the end of 1st quarter ending June, 1896—

CORRESPONDENCE.

LETTERS ISSUED.				LETTERS RECEIVED.			
1891-92	...	...	3,943.	1891-92	...	...	9,250.
1892-93	...	...	4,118.	1892-93	...	...	9,900.
1893-94	...	...	4,275.	1893-94	...	...	10,784.
1894-95	...	...	3,671.	1894-95	...	...	11,099.
1895-96	...	...	4,403.	1895-96	...	...	11,744.
1896-97	...	...	1,424.	1896-97	...	...	3,555.
To the end of 1st quarter ending June, 1896.				To the end of the 1st quarter ending June, 1896.			

CASES DAILY RECEIVED.

Average from 300 to 500.

CASES DESPATCHED.

In the year, 1895-96	...	...	...	...	...	7,800
Daily average cases	...	...	...	...	...	22
During the 1st quarter ending June, 1896	...	...	...	...	...	2,500
Daily average cases	...	...	...	...	...	28

ACCOUNTS.

Passing bills of Conservancy.

Nuisance branches and Medical branches.

Establishment bills 1,242 (yearly average for 2 years).

Contractors' and Miscellaneous bills paid, 2,938 (yearly average for 2 years).

Miscellaneous recoverable bills 99 (average of 3 years);

and I append a statement of the daily outturn of work in which it will be seen that the Head Clerk deals with 500 items himself.

5 Record-Clerks	...	...	...	...	...	1,015
1 Reply-Clerk...	...	...	...	...	...	19
1 Despatch-Clerk	...	...	...	...	...	40
2 Diary-Clerks	...	...	...	...	...	480

It is obvious that the Head Clerk is unable to exercise that amount of supervision he should do with so much personal work to perform. The despatch clerk, I consider, not physically able to do much work. The diary clerks have more than they can do properly.

To relieve this pressure of work I would recommend that the Head Clerk should be relieved of much his work by a clerk who should docket all letters received by the Head Clerk and should directly distribute files received from officers of the Department and should issue periodical reminders of papers in arrears. This would allow of the Head Clerk's time being freer for general supervision. I would recommend that the despatch clerk should be replaced by a stronger and more energetic man. There should also be another diary clerk, the two now in Office have always to work over time.

Docket Clerk	...	...	Rs. 50 a month	...	...	Rs. 60	annually.
Diary Clerk	...	...	" 20 do.	...	...	" 240	do.
Total	...	...	70	...	...	840	

After the Chairman has read this Note I shall be glad if he will inspect the Health Office and the work done in this Department.

16th July, 1896.

W. J. SIMPSON, M. D.

Exhibit E.

EXTRACT FROM DR. SIMPSON'S MEMO. ON THE REORGANISATION OF THE HEALTH DEPARTMENT, DATED
APRIL 21ST, 1887.

THE Commission do not put forward their proposals as final, but merely as suggestive of what commend itself, to them, & c., from the knowledge they obtained from a cursory inspection of the town and from the evidence laid before them. No special evidence was taken on what was necessary as a supervising-staff. Some questions were asked of the Engineer, who answered that the supervising agency was not sufficient, but he was not asked what would constitute a sufficiency. Dr. O'Brien was new to the position of a Health Officer, and had scarcely time to study details and certainly not the details of an amalgamation as a complete scheme. Dr. Payne, the only one in a position to say what was necessary, was not asked. I shall, therefore, under these circumstances, place before the Committee the establishment that was considered necessary in 1877, when the new night-soil service was introduced, and when also an attempt was made to organise a Nuisance Department as well as a Conservancy Department. It will demonstrate to the Committee that the supervising-staff then proposed under an organization which did not contemplate the conservancy work being placed under the Health Officer, was proportionately much greater than the supervising agency which I have proposed, including, as it does, nuisance inspection, local enquiry into disease, also scavenging, bustee-cleansing and registration of deaths, and actually much larger than the proposals of the Commission. What follows will also show how the desire to economise has entirely disorganised the different Departments and rendered them unworkable.

In 1877 the supervising agency was as follows :—

UNDER THE HEALTH OFFICER, WHO HAD A PERSONAL ASSISTANT.—NUISANCE AND NIGHT-SOIL.

	Monthly.
	Rs.
1 Superintendent at Rs. 600	600
18 Inspectors at Rs. 100 each	1,800
18 Sircars at Rs. 25 each	450
200 Peons at Rs. 8 each	1,600
18 Jemadars at Rs. 20 each	360

UNDER THE ENGINEER, CONSERVANCY AND ROADS.

	Monthly.
	Rs.
2 Superintendents at Rs. 400 each	800
8 Overseers at Rs. 225—100	
7 Sircars at Rs. 7 each	49

In 1878 the organization was partly broken up; the Night-soil and Nuisance Department was taken from the Health Officer, who was left only with his Personal Assistant, and was handed over to the Engineer. The Superintendent of Nuisances was abolished, and the two Roads and the Conservancy Superintendents were instructed to act also as Superintendents of Night-soil and Nuisances Removal. The supervising agency was also considerably reduced.

UNDER THE ENGINEER.

HEALTH DEPARTMENT.	NIGHT-SOIL AND NUISANCE DEPARTMENT.	CONSERVANCY AND ROADS.
Health Officer and Personal Assistant.	11 Inspectors.	2 Superintendents.
	2 Sub-Inspectors.	8 Overseers.
	11 Sircars.	7 Sircars.
	190 Peons.	
	3 Jemadars.	

This may be considered the starting point of the disorganization. From this time until quite recently it has gone on from bad to worse, and while new duties have been added and the work has increased, no adequate additional supervising agency has been allowed.

In 1879 a still greater reduction took place—

UNDER THE ENGINEER.

HEALTH DEPARTMENT.	NIGHT-SOIL AND NUISANCE DEPARTMENT.	CONSERVANCY AND ROADS.
Health Officer and Personal Assistant.	5 Inspectors.	1 Superintendent.
	5 Sircars.	5 Overseers.
	80 Peons.	5 Sircars.

It will be observed that, in this year, 1 Superintendent, 3 Overseers, 6 Inspectors, 2 Sub-Inspector 2 Sircars, 3 Jemadars and 40 Peons were abolished.

In 1880 a still further reduction took place—

UNDER THE ENGINEER.

HEALTH DEPARTMENT.	NIGHT-SOIL AND NUISANCE DEPARTMENT.	CONSERVANCY AND ROADS.
Health Officer and Personal Assistant.	5 Inspectors.	1 Superintendent.
	5 Sircars.	5 Overseers.
	50 Peons.	5 Sircars.

In 1881 a further reduction took place. The separate Inspectors for night-soil and nuisance removal were swept away altogether as a separate establishment, and a thorough amalgamation made with the Roads and Conservancy. One Night-soil Inspector was dispensed with, the other four becoming Overseers.

UNDER THE ENGINEER.

HEALTH DEPARTMENT.	NUISANCE, NIGHT-SOIL, CONSERVANCY AND ROADS.
Health Officer and Personal Assistant.	1 Superintendent.
	9 Overseers.

This continued to June, 1882, when the charge of night-soil and nuisances was again transferred from the Engineer to the Health Officer, but in place of an establishment equal to that when it was taken away from the Health Department, the Health Officer's Personal Assistant was made Superintendent, and allowed 2 Inspectors, 2 Sircars, 9 Jemadars, 18 Mate Jemadars, while the peons were reduced from 50 to 27.

HEALTH DEPARTMENT.

NIGHT-SOIL AND NUISANCE DEPARTMENT.

1877.	1882.
Health Officer and Personal Assistant.	Health Officer and Personal Assistant.
1 Superintendent.	2 Inspectors.
18 Inspectors.	2 Sircars.
18 Sircars.	27 Peons.
200 Peons.	9 Jemadars.
18 Jemadars.	18 Mate Jemadars.

UNDER ENGINEER.

Roads and Conservancy.

1882.	1877.
1 Superintendent.	2 Superintendent.
9 Overseers.	8 Overseers.

By the change the Engineer had gained one Overseer, but was *minus* one Superintendent which he had in 1877, although the greater amount of road surface and extension of sewerage system required a larger supervising agency.

In 1883 the same totally inadequate supervising agency continued both in the Health Department and in the Engineer's Department, but new duties were undertaken, viz., the conservancy of bustees, which up to this time had been left to private owners. For this the supervising agency was 2 Inspectors, 2 Sircars and 12 Peons. Bustees over 2 bigahs number more than 200, and they are scattered over every part of the town. Clearly 2 Overseers for supervising this work was of a merely initiatory character. It was perfectly impossible that 2 Overseers should be able to supervise such an area. They did what they could, which was to have the larger bustees cleaned out once a week and the others cleaned occasionally. Bustee conservancy was at first directly under the care of the Chairman.

In 1884 a special Inspector was appointed for Jorabagan Ward under the Health Department.

In 1886 the Bustee Overseers, with their work and duties, were handed over to the Health Department.

W. J. SIMPSON, M. D.,
Health Officer.

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(2)

Exhibit F.

TO CHAIRMAN.

THE Engineer will report on the difficulties in carrying out of the Bye-laws. The Health Officer's experience lies only on the thorough inadequacy of this law as it stands and the Bye-laws to insure healthy buildings and healthy localities as this is fully explained in my Note on Buildings Regulations, etc., overcrowding in my Annual Report for 1889. I beg to append this Note to the alterations which I have thought proper to suggest in the present Bye-laws.

12-9-93.

(Sd.) W. J. S.

DR. SIMPSON'S REVISED BUILDING BYE-LAWS.

Regarding the height and mode of construction of buildings.

1. Whenever any old masonry building has been taken down to an extent equal to or exceeding one-half of such building such to be measured in cubic feet, the re-building of the portion thereof shall be deemed to be the erection of a new building and such portion shall be subject to the regulation of the Act and to the Bye-laws respecting new buildings.
2. Every masonry building shall have its outer walls constructed of bricks or other hard and incombustible substance and the foundation shall be concrete or other solid non-absorbent substructure on which the footing shall rest 3" to 9" (unchanged).

Rules for the regulation of new huts built in bustees under Section 247—

10. In any bustee when new huts are being added under Section 247 to existing ranges or clusters of huts they shall be so erected as to block up no existing roads or paths so as to keep in line with the existing main lines of huts which are to be taken as directing lines.
- In no case shall the roadway left between two new huts or between a new hut and an existing hut be less than 20 feet, and no brick building shall be allowed to be erected abutting on this 20-foot road in a bustee unless set back at least 10 feet.
11. If new ranges of huts are being erected they shall be built in regular lines with a road or path of a minimum breadth of 20 feet between every two lines. The direction of the lines shall be determined by the Commissioners in accordance with the position of the land, but preference shall be given to roads or paths running due north and south or due east and west.
13. (Unchanged).
14. No new huts shall be erected on one of the above roads.
15. The space between the eaves of any two new huts or of any new hut and any existing hut or masonry building shall not be less than 4 feet for one-storied huts or less than 8 feet for two-storied huts.
- 15 (a). All spaces, roads or paths between a hut and a masonry building to be left according to the above rules, shall be and shall be kept clear and open to the sky.
16. (Unchanged)
17. No new hut shall be erected unless sufficient privies have been provided to allow of at least one privy for common use to every 20 residents, and no hut shall be erected without a privy.
18. By Section 247 every new hut must have a plinth of at least 2 feet above the level of the centre of the nearest public road, or road connected with the general drainage of the town, and the level of the ground on which the hut stands, that is to say, the bottom level of the plinth shall be at least one foot above the level of the said road so as to admit of free surface drainage to the road.
- 19 and 20. (Unchanged).
21. Every person who rebuilds the sides and roof of any old hut shall apply to the Commissioners for approval thereof under Section 247. Whenever a hut has been taken down to an extent equal to one-half of such hut, such to be measured in cubic feet the rebuilding of the portion thereof shall be deemed to be the erection of the new hut and such portion shall be subject to the regulations of the Act and to the Bye-laws respecting new huts.

Regarding ventilation and the extent to which space must be left for the free circulation of air as required by the provisions of Section 243 Act II. (B. C.) of 1888.

- (1) WITH RESPECT TO MASONRY BUILDINGS WHICH ARE TO BE NEWLY ERECTED ON ANY SIDE THE FOLLOWING PROVISIONS SHALL HAVE EFFECT, viz.—

The foundation of any such building shall not be constructed on any side which has been filled up with street or other refuse unless such refuse is thoroughly removed or unless a period of at least 20 years has elapsed from the date when the refuse was deposited and the state of the soil after investigation is found to be such as to admit of the erection of a building thereon.

- (2) No new masonry building which abuts on a street of less width than 40 feet shall be erected to a greater height than two stories, and no house shall be allowed to be built unless it abuts on a public street.

(3) Every such building intended to be used as a dwelling shall be so constructed that the whole of at least one side of every room thereof shall either be an external wall or abut on an interior open space such interior open space shall have an area equal to not less than $\frac{1}{3}$ rd of the aggregate floor area of all the rooms on all the stories abutting thereon and shall not be in any direction less than 12 feet across; in case the building is one-storied the interior open space shall be equal to that of a two-storied building required under this rule so as to admit of the addition of a second story in future. Such external wall shall, where it faces a street of less than 40 feet in width, have between the street and the boundary line of the owner's premises an open space of not less than 2 feet in width. At one of the sides (but not both) the building may be attached to adjacent premises, but if not so attached at the side, and in every case at the back, it shall have a space of at least 8 feet along the whole side of the building between it and the boundary line of the owner's premises or between it and the inner edge of the boundary wall, if that boundary line is a wall. And every open space whether interior or exterior, required by this clause, shall be free and be kept free from any erection other than a boundary wall and shall be open to the sky and shall be and be kept open to access from each end thereof.

3 (a). Every such building intended to be used as a dwelling, which is constructed without court-yards, shall have at the back a space equal to not less than 32 feet between the external wall of the building and the boundary line of the owner's premises or between the external wall of the building and the inner edge of the boundary wall if that boundary wall is a wall, and this open space shall not be built upon and shall form the compound of the house being enclosed within the boundary wall, but it shall otherwise conform to the provisions contained in the last preceding rule.

4. Every open space or interior court-yard referred to in the above two rules shall be raised at least 1 foot above the level of the centre of the nearest street, so as to admit of free drainage into the street.

5. Every room intended to be used as a dwelling room in any such building, except a room in the roof thereof, shall be in every part at least 12 feet in height from the floor to the ceiling.

6. Every such room shall have clear superficial area of not less than 120 square feet.

7. Every such room shall be ventilated by means of doors and windows which open directly into the external air or into a verandah and have an aggregate opening equal to not less than $\frac{1}{4}$ th of the superficial area of the side of the room which faces an open space. There shall be at least one door and one window to every such room. Such doors and windows shall be so placed as to admit of free perfilation of air through the room.

(8 shall be omitted.)

RULES FOR THE REGULATION OF HUTS BUILT UNDER SECTION 247—

8. No new hut shall be constructed on any site which has been filled up with street or other refuse unless such refuse is either completely removed or unless a period of 20 years has been elapsed from the date when the refuse was deposited and the state of the soil after investigation is found to be such as to admit of a hut being built upon it.

9. No new hut shall be erected to a greater height than one-story except in special cases when the Commissioners may allow a second story, but in the event of this and there being no interior court-yard as provided for in the clause 10 there must be a clear space of 32 feet all along the back to form a compound, but in no case shall any hut (old or new) be erected to a greater height than two-storeys.

10. Every new hut intended to be used as a dwelling shall be so constructed that the whole of at least one side of every room thereof shall be either an external wall or abut on an interior open space on a verandah. Such interior open space shall have an area equal to $\frac{1}{3}$ rd of the aggregate floor area of all the rooms on all the stories abutting thereon and shall not in any direction be less than 12 feet across at the sides and at the back; in every case the hut shall have a space of 4 feet along the whole side of the building between it and the boundary line of the owner's premises. Every new hut constructed without an interior court-yard shall have a space at the back of not less than 12 feet between it and the boundary line of the owner's premises. And every open space, whether interior or exterior required by this clause, shall be and shall be kept free from any erection other than a boundary or boundary fencing and shall be open to the sky and shall be and shall be kept open to access from each end thereof.

11. Every open space or interior court-yard referred to in the last preceding rule shall be raised at least 1 foot and 6 inches above the level of the nearest street so as to admit of easy drainage into it.

12. Every distinct compartment in any such hut or every component hut of a *baree* intended to be used as a dwelling shall be so constructed as to be in no part less than 9 feet in height from the floor to the roof.

13. Every such compartment of a hut or component hut of a *baree* shall have a clear superficial area of not less than 80 square feet.

14. Every such compartment of a hut or component hut of a *baree* shall be ventilated by means of doors and windows of which there shall be at least one of each and which shall open directly into the external air or into a verandah and have an aggregate opening of not less than $\frac{1}{4}$ th of the superficial area of the side of the room which faces an open space.

15. Before any bustee land is built upon with masonry buildings streets not less than 40 feet in width shall be marked out and shall be strictly adhered to. In any bustee improvement new streets shall not be less than 40 feet in width.

16. No new street constructed in the town shall be less than 40 feet in width.

17. No masonry building shall be constructed for dwelling purpose without proper privy accommodation.

Note.—In many instances when buildings have been constructed exactly in accordance with the Building Laws and sanitary requirements, these buildings have been partitioned giving rise to distinct houses violating the Bye-laws, as well as the requirements of sanitation some provisions should be made in the Bye-laws to prevent such occurrences.

12th September, 1893.

W. J. SIMPSON, M. D.

Exhibit G.

BUILDING ACT.

(Re-printed from Health Officer's Annual Report on the Health of Calcutta for 1894.

1. Once more I have to refer to the insanitary condition into which Calcutta is gradually being allowed to drift owing to its want of proper building regulations. For a large city with three quarters of a million of people, and which is at the same time the capital of India, it is hardly conceivable that there are no regulations whatever controlling the width of streets, and that the town is being permitted to be built up without the slightest attempt to follow the ordinary canons of sanitary law. But such unfortunately is the case, and yet it is expected that a city growing up under these conditions shall be a healthy one. I desire in the most earnest and emphatic manner to draw the attention of the Commissioners and of the Government to the urgent necessity of a Building Act. Before such an Act can be passed, a searching and preliminary enquiry is necessary as to the lines on which such an Act should be framed which, while securing a healthy city, shall at the same time be in conformity with the best habits and customs of the people and with tropical requirements. Personally I am of opinion that this is a matter for the Government to enquire into, aided perhaps by a few Commissioners. After nine years' experience I am convinced that the question is too comprehensive and complicated to be dealt with satisfactorily, or in any way approaching to the necessities of the case, by the Commissioners themselves, who, besides not being able to bring the requisite knowledge to bear on the technical side of the subject, are busy men and quite unable to spare the time to grapple, with this important problem.

2. The subject has at times aroused a certain amount of attention and interest since I first brought the matter to notice. Government has referred to the necessity of improved building laws and bye-laws in one or more resolutions. But beyond this nothing practical has been attempted, and in the meanwhile insanitary houses are being built unhealthy localities are being created, and narrow and winding passages are becoming more numerous.

3. Under the present laws every open space can be built on irrespective of the fact that the building will obstruct the light and air of adjacent buildings, and at the same time give neither sufficient light nor air to the newly-erected building. Nos. 9-1 and 9-2 Sumbhoo Nath Mullick's Lane, may be quoted as an instance out of many in which the ventilation of adjacent buildings is obstructed by a new building, and in which the light and air of the new building itself is most unsatisfactory. This is a case of the erection of a house partly two and partly three storeyed in height on a sort of passage 23 feet wide, on either sides of which are houses facing the passage. Since the erection of the new building, which is also likely in the future to be extended, the former entrance lane to the older houses has been converted into two narrow passages of about 4 feet in width.

A different style of building to that of the old is coming into vogue. Instead of two storeys, as in most parts of the town, three and four storeys are being erected, and the interior compound is being contracted into very small dimensions, and frequently it is, dispensed with altogether. The older kind of buildings were as a general rule undoubtedly

much more airy and much healthier than the new. I give the plan of No. 11, Mullick's Street, which is a three storeyed house facing a street 20 feet wide. The plan with its adjacent buildings shows the manner in which every available space is being built upon, and this is effected even though the building conforms to the building laws and bye-laws which are in force in Calcutta. The entrance passage of No. 11 is dark and badly ventilated, so badly indeed that on entering the air feels quite stifling. The latrine (P) in the passage is so dark as to exclude all possibility of cleanliness or healthiness. The lower back-room receives its light from a back passage, 4 feet wide, which separates it from a three storeyed building. The lower storey of this new building is quite uninhabitable from a health point of view; and no such building would have been permitted in any town with proper building laws.

The next house, which is also new and which is in reality a part of No. 11, is set into the available piece of land in such a manner as to leave narrow passages of only 4 feet in width between houses two and three storeys in height. The houses are dovetailed into one another with the sole object in view of placing as many buildings as possible on the land without reference to light, ventilation, or any other sanitary requirement. Localities built up in this way are but reproductions of the bustee in a much worse form, because instead of one storeyed huts irregularly built with narrow passage between which distinguish the bustee there are two and three storeyed houses built in the same irregular manner and having between them similarly narrow passages: 21, Mullick's Street may be mentioned as an instance also of the powerlessness of the present law to prevent this dangerous degeneration when produced by additions to existing buildings. It is a house approached by winding passages not more than 4 feet wide. Formerly it was a one storeyed house, but now additions have been made forming it into a three storeyed building. Such is the crowding together of the houses in certain localities, and their consequent insanitary condition, that a visit to them almost always makes one feel ill afterwards. Should plague once get into these quarters the ravages would be terrible, and it is doubtful whether anything but wholesale destruction would ever succeed in freeing them from this disease.

4. My previous remarks have referred more particularly to localities which are mostly occupied by brick buildings, and where the filling in with houses of all vacant spaces is proceeding slowly but surely; my next remarks will refer more especially to the equally dangerous transformation which is being effected in the bustees of the town. Fortunately for Calcutta, a great portion of its area consists of bustees which, as a general rule, consist of groups, varying in size of one storeyed huts constructed of bamboo and mud with tiled roofs. The majority of these huts have only one entrance, which leads into an inner compound which is open to the sky, and around this compound and facing it are the little compartments occupied by the inmates of the hut. A bustee may consist of a group of 20 or more of these huts or a hundred or even several hundreds. They are not built with any special relation to roads, but each hut-owner selects the piece of land he wishes to build on and there erects his hut; the land-owner has little interest in the matter further than being paid the rent for the land. The consequence is that the bustees have sprung up as irregular groups of huts, often without roads, and separated from one another by narrow passages. Here and there in the bustees may often be found lands on which no huts have yet been built, and which form sort of breathing spaces for the village, or there may be one or more tanks in the bustee which will serve the same purpose. Some years ago it was shown that these bustees were extremely unhealthy, and it was decided to open them up by carrying through them passages 9 and 12 feet wide. Experience soon showed however that much wider roads were needed, and of late bustees which have been improved have had roads of 16 and 20 feet run through them. The great majority however which have been opened

up, possess lanes only 9 and 12 feet wide, and many have never even got so far, not having been taken up for improvement.

I consider it fortunate for Calcutta that it possesses these bustees, partly because though they are overcrowded and insanitary to a high degree, they are by no means so overcrowded, dangerous, and unhealthy as the localities which have almost every foot covered by large three storeyed houses; and, secondly, because they render the laying out of wide and good streets in Calcutta practicable. It is for these two reasons that I look with apprehension upon the change which is going on in the Calcutta bustees. Whether the people are becoming richer I am unable to state, but there is a decided tendency to build in these bustees brick-houses, which are gradually taking the place of the huts. The 9, 12, and 16 feet

Brick buildings are taking the place of the huts, while the narrow passages are being converted into and used as the streets of the locality.

passages are now being put to uses for which they were never intended; these passages were made for means of access to the bustees for purposes of cleansing and of ventilation, and since the huts themselves were only one storey high, and each possessed an airy compound, 12 and 16 feet

lanes served the purpose fairly well. But they were never intended to become streets for high storeyed brick buildings, for as such they would only repeat and perpetuate the evils of those unhealthy localities in Burra Bazar and Jora Bagan, where the streets are for the most part as narrow now as when Sir Ranald Martin stated 50 years ago that—"Whoever has visited the native portion of the town with its narrow lanes and rankest compound of villanous smells will require no argument in favour of widening the streets, so as to effect the two greatest improvements as respects the salubrity of the city, free exposure to the sun, to rarify and elevate the vapours to the winds and to dilute and dissipate them."

5. I shall give one or two illustrations of brick buildings being erected in bustees.

The plan of No. 13, Kerr's Lane, shows a bustee in which a large two storeyed building has replaced one of the tiled huts. The new brick-house is situated well inside the bustee, and faces a passage 9 feet wide, and is separated from a hut behind by a very narrow passage. There is a 4 feet passage at each of the sides of the house, and to avoid leaving 4 feet space behind the house. According to the requirements of the bye-laws, one of the 4 feet passages has been designated the frontage of the house. It is obvious that, if the other proprietors convert their huts into brick buildings in a similar fashion—and there is nothing to prevent them from doing so—the bustee will become a most unhealthy and congested area, devoid of roads and means of ventilation, and impossible to efficiently drain or cleanse.

Plan 2 is that of Keranee Bagan bustee, which is a large one, inhabited by a low class of people. At the beginning of bustee improvements in the town, passages of 9 feet were cut through the bustee. These passages are now being used as frontages for two storeyed brick houses which, as will be seen from the plan, are taking the place of the one storeyed huts. In this bustee there is the commencement of a network of narrow lanes and passages which will intersect an area that in the near future will be covered with brick buildings, and a large locality will thus be converted into one of the worst types possessing all the insanitary features of those I have already written about. Plans 3 and 4 show Ram Bagan bustee as it was and as it is now. The west portion of Ram Bagan bustee formerly consisted of huts; now it is largely covered with brick buildings, the lanes not being more than 6 feet wide. The south-east portion is at present being sold in plots for the same purpose, and when built on will be as unhealthy a locality as can be found in the town. Ram Bagan bustee is an excellent illustration of what a locality can become when, the bustee is replaced with brick buildings; 66, Simla Street bustee is also gradually being changed from a bustee of huts to a bustee of brick buildings. It is only a matter of time and season for it to become exceedingly unhealthy. All these narrow lanes get sewered,

and the smells emanating from the drainage are nearly always offensive. There can be no proper means of ventilation for the sewers in these congested localities, and the work which the sewers are required to perform is far beyond that which should be legitimately theirs. Many illustrations could be given of similar changes going on in other bustees, but those given will suffice to show the nature of the evil and the gravity of the danger. There is a distinct tendency to cut up the land of many bustees into small plots for building purposes, and to sell them to the greatest advantage to those who will buy. Speculation in land is not

A tendency to cut up the land of bustees into small plots and sell them for building purposes without any provision of roads.

uncommon. There are men engaged in the trade of buying up land, dividing it into very small plots, and then selling the land plot by plot to those who wish to build houses.

Proper roads and spaces for ventilation of these proposed houses would only reduce the profits. It is no interest to these men for sanitary houses to be built: all they look to is to get as much money as possible for the smallest outlay. It is a lucrative business—this buying up of bustees and selling them in small plots. Of course the smaller the plots the more money is made, and the more disadvantageous it is to the public.

By these and other processes houses are springing up without any attention to the most elementary principles of sanitation. Nowhere in Calcutta is the landlord compelled before selling off plots for building purposes to provide the roads which these buildings ought to face, or the requisite amount of space around the building for free ventilation. In England and elsewhere, before a plot of land is allowed to be built on in a city, roads and sufficient space for ventilation of the house have to be provided. In Calcutta every man or contractor builds his house according to his own tastes without reference to roads, and hence it is that,

The landlord is not compelled to make roads, and the Municipality has not the money to construct the roads that are necessary.

as the city develops, more unhealthy areas are being created every year, and no measure, short of demolition and making wide streets through these unhealthy areas, will suffice to bring them into a condition where sanitation is possible.

The Municipality in undertaking to make all the roads at its own cost is attempting to carry out an impossible financial task, for no Municipality can afford the money to construct on private lands the roads which are necessary for access to, and the free ventilation and proper drainage of, the houses built on those lands. Calcutta, owing to its numerous bustees, has still the means of escape from further deterioration in this respect, and more than this the opportunity, by suitable building laws and bye-laws, of securing wide roads whenever brick buildings begin to replace the huts.

During the nine years of my incumbency as Health Officer of Calcutta, I have in my annual reports regularly pointed out the dangers to which a policy of drift is bringing the public health of the city; and in order that the various points which I have adverted to during those years may be brought in its completeness before the Commissioners and the Government, I have appended to this portion of my report the extracts on the subject embodied in my annual reports since 1886, and it is with the earnest hope that this report will be the means of a commission being appointed to enquire into the subject with powers to frame a Bill which shall pass into law as the Building Act of Calcutta.

6. I have dealt with the crowding of houses more in relation to neighbouring houses

The practice of deviating from the sanctioned plan or of building and ignoring the small requirements of the present inadequate bye-laws is not uncommon.

and the absence of streets and sufficient space for ventilation; but there are also a number of points in regard to the sanitation of the house itself which also requires attention, and which needs to be regulated by a Building Act. Most of these are referred to in the annexed extracts of remarks in

reports. Here may be mentioned, however, the practice recently introduced of sending in a plan representing one building upon it, and when this plan is sanctioned converting the

single building into a number of separate houses by putting up a few walls and opening up a number of entrances, and before any action can be taken selling the separate houses to different parties. This is one method of which there are many of evading the small requirements of the present bye-laws. Deviation from the sanctioned plan and the ignoring of the requirements of the present bye-laws are very frequent, as will be seen from the subjoined list of instances in which the Executive, that is, the Engineering Department, refused sanction because of some objection, and the aggrieved party took means of having the matter placed before the Buildings Committee. The decision of the Buildings Committee has also been noted for information.

List of building applications refused by Executive and action taken by Buildings Committee.

No. of premises and names of streets.	Subject of application.	Grounds of refusal.	Decision of the Buildings Committee.
33, Shikdarpara Street ...	New building, third-storey without sanction, street less than 40 feet in width, hence objectionable.	Third-storey and no space left at the back.	Sanctioned on 25th April 1894.
5-2, Jelliapara Lane ...	New building ...	Spaces not left as provided under the bye-laws; rooms less than 80 square feet in area, &c.; quite objectionable.	Sanctioned as a special case on 25th April 1894.
17, Shiboo Thacoor's Lane...	Verandah over existing one ...	Road less than 40 feet in width ...	Sanctioned as a special case on 25th April 1894.
26, Modhoo Roy's Lane ...	New building ...	Spaces not left as provided under the bye-laws.	Sanctioned on 25th April 1894.
131, Manicktolla Street ...	Ditto ...	Third-storey objectionable, as road is less than 40 feet in width; verandah to be projected over the space within regular line of the street, but the owner proposed that space will be made over to the Commissioners free of cost, if he is allowed to build according to his plan.	Proposal accepted on 25th April 1894.
42, Baloram Mozoomdar's Street.	Ditto ...	Third-storey and verandah over the public road are objectionable, as street is less than 40 feet in width and also plans incorrect.	Sanctioned as a special case on 25th April 1894.
10-1, Bahir Mirzapore Road	Verandah projected over the road.	Road less than 40 feet in width ...	Allowed as it was thought that the same has been projected under a misapprehension—15th May 1894.
72-1 & 72-2, Mooktaram Baboo's Street.	Hut sanction refused ...	Falls within the regular line of the street.	The strip to be acquired on 15th May 1894.
182, Harrison Road ...	New building ...	Spaces not left according to bye-laws; privy site disapproved and plans incomplete.	The objection regarding 2 feet space alongside the lane should be waived; other objections regarding the privy must be removed by the party—20th June 1894.
6, Beadon Street ...	Theatre House ...	Deviation from sanctioned plan ...	Building sanctioned with certain modifications 20th June 1894, which have since been carried out.
15, Upper Chitpore Road ...	Verandah on the third storey ...	Over the regular line of the street ...	Allowed 20th June 1894.
17-1, Chuckoo Khansama's Lane.	New building ...	Objectionable under the bye-laws ...	Treated as an additional building, and sanctioned on 20th June 1894.
154, Baranassy Ghose's Street.	Tiled hut ...	3 feet spaces not left on the south and verandah projected on the north over the 3 feet space.	Verandah to be removed 20th June 1894; removed.
16, Ramkanto Bose's Street	New building ...	A room on the third storey objectionable, as the road is less than 40 feet in width.	Allowed as a <i>thakoorgur</i> —20th June 1894.
44, Bachoo Chatterjee's Street.	New buildings after partition ...	Spaces not left as provided under the bye-laws; drainage arrangement not shown, &c.	Sanctioned on 20th June 1894.
33-1-1, North Sealdah Road	New building ...	Spaces not left according to the bye-laws.	Demolition of portions of building ordered; could not be carried out; owner prosecuted and fined; building still stands.

No. of Premises and Names of Streets.	Subject of Application.	Grounds of Refusal.	Decision of the Buildings Committee.
49, Bow Bazar Street ...	New building ...	Deviation from the sanctioned plan by building within the 4 feet space at the back.	Sanctioned on 18th July 1894.
11, Goabagan Street ...	Ditto ...	2 feet space alongside the sewered ditch not left.	Ditto ditto
37, Shibtollah Street ...	Re-building portion ...	Verandah over road at a different position.	Ditto ditto.
5-1, Sovaram Bysack's Street.	Third-storey (on new building)	Road less than 40 feet in width ...	Report of the Sub-Committee sanctioning two rooms only for cooking adopted on 18th July 1894.
17-2, (now 17-4) Panchanantola Lane.	New building ...	Deviation from the sanctioned plan by building over the space at the back (ordered to be demolished by the Buildings Committee on 20th June, 1894, but orders not carried out.)	Sanctioned on 18th July 1894.
109, Amherst Street ...	Ditto ...	4 feet space at the back not left; no privy and no drainage.	Ditto ditto.
72, Colootollah Street ...	Additional hut for hide-godown	Objectionable as a nuisance ...	The majority's report to take action under section 241 or 248 of the Act for its demolition, and proceedings should be taken under section 349 adopted but thrown back from General Meeting and not decided yet.
91, Upper Chitpore Road ...	New hut ...	9 feet passage for bustee road not left	Hut allowed to stand, 1st August 1894.
9-1 & 9-2, Shumbhoonath Mullick's Lane.	Additional building ...	General ground of ventilation ...	Sanctioned on 1st August 1895.
81-1, Bulloram Dey's Street	Deviation from sanctioned plans.	4 feet space at the back built upon. (Ordered to be demolished by the Buildings Committee on 20th June 1894, but order not carried out) ...	Allowed to stand, 1st August 1894.
4, Manicktolla Road ...	Tiled house ...	Plinth not 2 feet high; a tank within 5 feet.	Sanctioned on 15th August 1894.
122, Mooktaram Baboo's Street.	Additions and alterations ...	Spaces not left as provided under bye-laws.	Building allowed to stand, 15th August 1894.
1, Nilmoney Dutt's Lane ...	New building ...	Site disapproved for want of means of access; court-yards less than 6 feet	Sanctioned as a special case on 15th August 1894.
5-1, Sovaram Bysack's Street	Third storey ...	Road less than 40 feet ...	Sanctioned 22nd August 1894.
35, Sakea's Street ...	Site plan ...	Site disapproved, means of access being only through a sewered ditch.	Sanctioned as there are other doors facing the sewered ditch (wrong impression), 22nd Aug., 1894.
17, Mirzapore Tank Lane ...	Tiled house ...	Over a tank filled up with refuse ...	Allowed to stand on 22nd August 1894.
61-64, Monohor Dass's Street	New building ...	Road less than 40 feet, hence third storey objectionable; also the court-yard less than 6 feet.	Sanctioned on 22nd August 1894.
139, Harrison Road ...	Ditto ...	Verandah projected over the 4 feet space at the back.	Allowed to stand on 18th September 1894.

No. of Premises and Names of Streets.	Subject of Application.	Grounds of Refusal.	Decision of the Buildings Committee.
34, Ghose's Lane ...	New building ...	Site disapproved; no proper means of access.	Site to be approved if 4 feet space is left along-side the common passage, 18th September 1894. Space left, and building sanctioned.
11, Puggiaputty Street— Lots 159 and 160, Harrison Road ...	Re-building and additional new building.	2 feet space not shown to be left along-side the street, which is less than 16 feet in width.	Objection upheld, 18th September 1894. Space left by owner, and building sanctioned.
26-1, Gopee Mohun Dutt's Lane.	Hut ...	Building started without submitting plan; plan when submitted incorrect and incomplete; no drainage arrangement provided and to be used as stable.	Sanctioned on 26th September 1896.
5-1, Sevaram Bysack's Street.	Third storey without sanction...	Road less than 40 feet in width built against the resolution of the Buildings Committee.	Allowed to stand on 26th September 1894.
22-1, Gopee Mohun Dutt's Lane.	Re-building ...	Spaces not left as provided under bye-laws.	Prosecuted by order, dated 25th September 1894. Building not proceeded with by owner.
35, Kalliprosad Dutt's Street	Re-building without application	No plan submitted; no space left as provided under the bye-laws.	Prosecution ordered to go on 25th September 1894. Prosecution failed. Building allowed to stand.
24, North Sealdah Road ...	Hut re-built ...	Within 30 feet of a tank.	Allowed to stand on 25th September 1896.
25, Halderbagan Street ...	Addition to a building, more than half of which was pulled down.	4 feet space not left at the back; ill-ventilated.	Additional rooms built without sanction to be demolished, 25th September 1894. Nothing done. Prosecuted for obstruction to execution of work. Building stands.
63, Harrison Road ...	A room within 4 feet space at the back.	Objectionable under the bye-laws ...	Sanctioned as a special case on 23rd October 1894.
92, Ditto ...	A verandah over the 2 feet space on the east.	Ditto ditto ...	Sanctioned as a special case on 23rd October 1894.
39-4, Sukea's Street ...	Verandah over footpath ...	Footpath too narrow ...	Sanctioned on 20th November 1894.
85, Bachoo Chatterjee's Street.	Ditto ...	Portion of the verandah has got a roofing not proposed to be removed.	Sanctioned on 20th November 1894.
31, Dhurumtollah Lane ...	Re-building ...	Not according to the sanctioned plan...	The portion built without sanction ordered to be demolished, 10th December 1894. Subsequently allowed to stand.

No. of Premises and Names of Streets.	Subject of Application.			Grounds of Refusal.	Decision of the Buildings Committee.
74, Sickdar Bagan Street ...	New building	...	...	Spaces not left as under the bye-laws	Plans ordered to be re-submitted for consideration after arranging the privy, 10th December 1894. Plans re-submitted, but case not yet disposed of.
2, Gangooly's Lane ...	Third storey	...	...	Built without sanction ...	Plan ordered to be submitted, 10th December 1894. No plan submitted yet. Prosecutions and fines.
56, Chasadhobapara Street...	New building	...	...	Spaces not left as provided under the bye-laws.	Prosecution ordered, 10th December 1894. Building subsequently allowed to stand.
9, Patocatolla Lane ...	Ditto	...	...	Spaces not left as provided under the bye-laws and room over the privy ...	Sanctioned as a special case on 10th December 1894.
43, Harrison Road ...	Ditto	...	...	Spaces not left as provided under the bye-laws; the privy site disapproved and soil-pipe carried through dwelling-rooms, hence the drainage is objectionable.	Sanctioned as a special case on 10th December 1894.
14, Banstolla Street ...	Re-building	...	...	Third storey objected to, as the road is less than 40 feet in width and space not left as provided under the bye-laws.	Revised plans sanctioned as a special case and falling within the regular line being given up free of cost—8th January 1895.
184, Manicktolla Street ...	New building	...	...	Falls within the regular line, and spaces not left as provided under the bye-laws; privy site disapproved.	Building to be set back (only that question was before the Buildings Committee) 8th January 1895. Has been set back.
167-5, Cornwallis Street ...	Re-building	...	...	Spaces not left as provided under the bye-laws.	Sanctioned on 8th January 1895.
56, Chasadhobapara Street...	New building	...	...	Spaces not left as provided under bye-laws.	Sanctioned on 8th January 1895.

From the above list supplied to me at my request by the Superintendent of Roads, it is seen that about 90 per cent. of the deviations remain. Building laws and bye-laws which require to be carried out with the utmost stringency to be of any use, are practically rendered futile by these exceptions. Though each individual case seems small in itself, the amount of injury ultimately inflicted on the public health is accumulating and increasingly great. The law is chiefly to blame in this matter, which permits of exceptions being made on any occasion instead of defining when exceptions may be made. As a rule building laws limit exceptions to public buildings.

7. It is obvious then from the foregoing that a Building Act which shall meet the requirements of the town and a proper administration of

It is obvious that a proper Building Act and proper administration of such an Act, when secured, are urgently required.

the Act, when secured, are urgently necessary. The latter requisite is, however, dependent on the former. If the Act is framed on broad lines and clear in its requirements, there is no difficulty about its administration, which must necessarily carry out the policy demanded; but if it is vague and uncertain in its readings then difficulties immediately arise, and its administration, varying according to circumstances, loses the firmness absolutely necessary in dealing with buildings in a large town.

EXTRACTS FROM REPORTS ON THE NECESSITY OF A BUILDING ACT FOR CALCUTTA.

1886.

Need of Building Regulation.—In relation to buildings and laying out of streets, I have to suggest that the Commissioners should have full powers over the regulation of buildings, also the direction and the width of streets. I had hoped to have seen incorporated in the local Municipal Bill sections of a definite kind, which would have taken the place of a Building Act in Calcutta. There are certain regulating powers in the Municipal Bill, but of such a general character that they admit of nothing practical. They would never prevent a proprietor, if it suited him to do so, from filling up the compounds in the European quarter with other houses, however detrimental to health the want of space and the deprivation of free circulation of air round the building would be to the occupants of this and neighbouring houses. Examples of this kind could be pointed to which have occurred recently; nor will the regulations prevent the owner of a bustee which is covered with one-storeyed huts pulling down the huts, and covering every portion of the land with brick-built houses which may be of two or more storeys, and the only access to which would be by narrow and winding dark passages obstructive of air and light and fatal to efficient drainage. Such extreme examples are now to be found in different portions of the native town. The land so overcrowded with houses becomes an unhealthy area. Where there is space for five houses, double that number are erected. Daily we see houses being built in this fashion with little regard to access, aspect, ventilation or drainage; and zig-zag passages gradually are formed which take the place of streets. When considerations of health or traffic raise the question whether the passage or lane should be widened, the acquired rights of property cause the owners to demand large compensation from the municipal funds. This expense, by a certain amount of forethought, can and ought to be avoided. For the public health of this town in future, more attention should be paid to the structural manner in which individual houses are placed in relation to others, and in which blocks of buildings and streets are laid out, otherwise the benefits to be derived from a sewerage and drainage system and other sanitary measures will be greatly diminished. Sewers and drains to work effectively cannot be laid down in a zig-zag fashion, nor with many narrow lanes and passages can scavenging be effectively performed. By these narrow and tortuous passages the cost of clearing and scavenging is immensely increased, while the purifying influence of the wind is obstructed.

Brick buildings in bustees.—The plans of Manick Boso's Street bustee, of Kripa Nath's Lane bustee, and of Rajabagan will show the irregularity of huts with brick-built houses in their midst. In the plans P.-B. indicates *pucca* building, that is, brick building.

Rajabagan, already referred to, will be seen to have tanks, huts, and brick-built houses interspersed in a confused medley. Each family obtains a small piece of land, builds a hut or a house and squats there irrespective of surroundings. The same is seen in the plan of Aheeritollah bustee; here and there a slight amount of regularity is attempted, but so close are the huts, and so enclosed and broken up by brick buildings, that the attempt seems soon to have been abandoned; in fact, under the present system, it is impossible to obtain anything like regularity. The number of wells, almost one for every hut, and the proximity of these wells to the privies, will be duly noted. These are small bustees; but the number of wells in them will give a conception of the immense number of foul wells throughout the greater portion of the city, the water being in constant use by the inhabitants.

New huts erected and new bustees formed equally as bad as those remodelled at great expense.—In the plan of Kripa Nath's Lane are three huts marked N. H. which has been recently erected on a piece of vacant land in the bustee. It will be observed that they have been built with no relation to sanitary considerations, but simply with reference to the number of huts which could be put down on the unoccupied land. The passages leading to these huts inside the bustee are not more than three feet in width. It only remains now for the remaining unoccupied space to be filled up in a similar manner, which, as will be seen from the diagram, is approaching that stage, and then there will have been created a new bustee as badly off, from a sanitary point of view, as many of the bustees on the partial improvement of which the Municipality have spent large sums of money. There will be the same difficulty in the way of scavenging, the same want of ventilation, and the practical impossibility of draining effectively. In the plan of the bustee in Kripa Nath's Lane will be seen the tank, the privies, the irregular collection of huts, and the introduction of brick buildings amongst them—the common features of a Calcutta bustee.

Well-arranged streets lessen overcrowding and other insanitary conditions.—I look upon a controlling power over structural changes of buildings, both hut and brick-built, as one of the first of those sanitary principles which should guide the Commissioners in future, and not only should these principles apply to the older and crowded part of the town, but also to the suburban portion, which at an early date will be included in the city. Well-arranged streets prevent those evils of overcrowding which are apt to arise in every city.

A model plan of the city and proposed extension into suburbs required.—A model plan of the city, as it is intended to be laid out with reference to existing streets and future streets, both in town and suburbs, should be drawn, and kept constantly in sight by the Commissioners, and no houses that interfere with this plan should be allowed to be built. The houses should adapt themselves to the streets and sewerage, and not, as has hitherto been the case, the streets and sewers being adapted to the faulty arrangements of the dwelling. Even for the older portion of the town such a plan is perfectly feasible. As explained in my third quarterly report, the tendency is to convert the one-storeyed bamboo huts into brick-built houses—a change which, unless conforming to what is necessary to public health and traffic, and strictly enforced, will eventually render the condition of these localities worse than they are at present, though it may be difficult to realize a worse condition. For

that portion of the town already closely built over and in an unhealthy state, the improvement would be very gradual. A long interval must elapse before the plan would be realised, yet as every alteration would be with a view to its ultimate realization, there would be sure and constant manifestation of a real improvement in progress.

For the suburbs and extensions in that direction there is no reason why every piece of land should not be laid out according to a fixed plan having for its object the avoidance of the frightful evils of overcrowding and of the ill-arranged houses and streets which prevail in the native quarters of the town, presenting at every turn an obstacle to sanitary progress. Such a model plan in the Municipal Office would effectually put an end to houses springing up in all directions in utter disregard of the first principles of public health.

In a town such as this, in which large proprietors of land do not build rows of houses, nor construct or lay out streets at the same time for those houses, but every occupier builds his house or hut on a given piece of land, and that without reference to his neighbour's house or plot of land, there is only one way of attaining uniformity and preventing irremediable irregularity, that is, for the Municipality to pay strict attention to the building of every house and hut with special reference to access, frontage, ventilation and drainage, and to cause each to conform to the plan of streets and other details laid down in the Municipal Office. The plan however must be a definite one, and not subject to any one's caprice. The idea should be got rid of that because a man owns a few square feet of land in the city, therefore he has a right to build a house on it, irrespective of what may be the result to his own health or his neighbours.

Width of streets should be regulated according to height of houses.—In the plan I have mentioned, would arise the question as to the width of streets, that is, the distance between the houses on opposite sides. Width of streets ought, for the narrow street at all events, to be fixed in relation to the proposed height of houses. The importance of this is apparent when we have such examples as Cotton Street, in some places 16 feet wide with houses 42 feet high, Old China Bazar 13½ feet wide, and houses nearly 40 feet high, and Cross Street, 15 feet wide with houses nearly 40 feet high.

Brick buildings in bustees should be erected in relation to streets, and not set down pell-mell.—Similar streets may arise in the bustees, in which there are roads, streets and passages of width varying from 5 to 16 feet. Brick buildings erected on each side of these passages or streets would perpetuate and increase the insanitary influences that one would wish to avoid. Whenever a brick building is about to be erected in a bustee, it should be put back to a fixed line on either side of the narrow roads, so that, should all the huts be ultimately replaced by brick buildings, a moderately wide street would be ensured, the width of the street being determined by the height of the houses.

The same conditions of space should be a guide in the relation of houses to one another, so that each may enjoy a sufficiency of frontage, circulation of air and ventilation. Unless definite minimum standards are laid down for these, all control is lost: minimum standards do not mean that greater space may not be given. As much space above the minimum may be taken as the builder chooses, but a minimum standard should be laid down below which the Commissioners, as preservers of the public health, would not sanction.

Description of a newly erected hut.—As with the streets and relation of buildings to one another, so with regard to the buildings themselves. The necessity of having a detailed plan of the proposed building, and control over these details, is seen by examining the accompanying ground-plan of a building recently erected and over which the Commissioners had not the slightest control. The erection covers an area of 2,250 square feet. It is somewhat rectangular in shape. It fronts a lane 12 feet wide, while one of its sides abuts on a passage 6 feet wide. This passage is completely darkened by the eaves of the two erections that abut on one another. At the back are numerous huts and a small piece of vacant land. There are two entrances to the house, one from the lane at A., the other from the dark passage at B.; each of the entrances is not more than 3 feet in width. A., leads into a yard of 4 feet in width. This yard forms the compound of the inner apartments A., B., C., D., and E.; the outer apartments being F., G., H., K., L., M., N. and O. The eaves of the roof however so overhang the yard that they are only one foot apart, and effectually shut out air and light from the rooms of the hut.

Passage B. also leads into a yard, the width of which is 3 feet 10 inches at one end, and 2 feet 7 inches at the other. The eaves do not project so much into this yard: still the light and air are much obstructed. On either side of the yard, are entrances to compartments P., Q., R., S., T., V., W., Y., X. and Z. At the end of the yard, and approached by a narrow, dark and covered passage are the compartments U., X. and Y., adjoining X., Y. in a dark corner are the two privies which serve for the numerous occupants of this part of the hut. A privy at the North end is used by the other occupants. The number of occupants found in the hut were 40, although 11 apartments are still unoccupied.

Dangers attached to such a building.—Here space, light, air, ventilation and other sanitary conditions have no place in the design of the building. The only consideration has been to get as much on the given plot of land as the native builder's ingenuity could devise. Each of the compartments will be occupied by a separate family consisting of 3 or more inmates: each family will pay so much rent, and the hut proprietor will make a goodly sum. In the meantime the place will become thoroughly saturated with filth which no amount of cleansing will remedy. Air and light are completely shut out. The first case of cholera that occurs in this hut will render it a fitting nursing-ground for a severe outbreak, not only amongst the occupants of the hut, but also amongst the neighbours. A similar virulence would attach to small-pox or any other contagious disease. With huts and houses such as these, no surprise needs be expressed at local explosions of disease. It should be remembered, it is the numerous local explosions that make up the sum total of the cholera cases in Calcutta. I have given the diagram of this hut, because it has been recently erected. I could give others, both of huts and brick-built houses, equally as bad, but this one is sufficient to show the absolute need of Municipal control over every detail of buildings, and of having a plan with details drawn to a regulated scale submitted to the Commissioners for sanction in every case. Should such details be considered likely to prove injurious to the health of the inmates or neighbourhood, the Commissioners should have the power to prohibit, pull down or alter the design of the building.

1887

A definite scheme for the opening up of the crowded portion of the town and for the laying out of the Suburbs should be drafted. In the Annual Report for 1886, I referred at length to the narrow and tortuous streets and lanes of Calcutta and to the need there was of a plan being drawn of the streets which might eventually be considered necessary to construct for improvement of the ventilation of the northern portion of the town and for the provision of greater facilities both for traffic and good drainage. That plan has not yet been drawn or considered.

For the suburbs a plan is an absolute necessity, if the chaotic state in which they are at present is to be reduced to anything like order; and if an efficient and beneficial drainage system is to be introduced.

The principles on which this improvement may be accomplished are few and simple. They consist in opening up wide streets in the direction of the prevailing winds, connecting them by cross streets and regulating the building of new houses on certain definite lines. By the amended Municipal Bill the Commissioners will acquire the power to carry out these principles, and it is therefore all the more important to have ready a definite scheme for the opening up of the crowded portion of the town, and for the laying out of the suburbs. Such a scheme, especially that part of it relating to the suburbs, involving as it will so much technical and professional knowledge, might best be devised by a *Committee of Drainage and Sanitary Engineers presided over by the Chief Engineer to the Corporation*, for the work is of such a magnitude as to tax practical abilities of the highest order, and is probably beyond the scope of one man. The drainage, laying out of streets and the water-supply with its distribution in the suburbs, might well form the subject of report, because any haphazard works in that direction without a thoroughly worked out scheme will involve much greater expense and less beneficial results. The scheme would not be one that could be carried out as a whole immediately, but it would be one that could be carried on gradually and continuously throughout a number of years, so that, notwithstanding the many changes which might take place in the corporate body from time to time, an unbroken line of policy would in 15 or 20 years convert what is now a confused and intricate labyrinth of narrow, badly ventilated and unhealthy streets into regular, broad, well-ventilated and healthy thoroughfares.

Lieutenant Abercrombie's scheme for the town in 1836, and J. P. Grant (Chairman), C. W. Smith, J. Young, J. R. Martin, S. Nicholson, Baboo Prossunno Coommar Tagore, R. Scott Thomson, Baboo Dwarka Nath Tagore, R. Rustomjee Cowasjee, Esq., Baboo Russomoy Dutt.—As regards opening up of streets in the North part of the town, I think the Commissioners might keep in view the plan of streets proposed to the Calcutta Municipal Inquiry Committee by Lieutenant Abercrombie in 1836. They would thus have before them a plan which would effectually clear away the most unhealthy areas of Calcutta. Some of Lieutenant Abercrombie's proposals, have already been carried out; the remainder however have been in abeyance for nearly 20 years. I give his map in order that the Commissioners shall have an opportunity of seeing what those proposals were, and of considering whether the continuance of a similar policy in the opening up of streets, both in Calcutta and the suburbs, is not as necessary now as it was 50 years ago. I am distinctly of opinion that it is. The map and plan of streets was drawn for the Municipal Committee, which consisted of the nine gentlemen whose names are in the margin. The Committee was formed as a consequence of a Note by Dr. Martin (afterwards Sir Ranald Martin) "on the medical topography of Calcutta and its suburbs chiefly with reference to the condition of the native health." This Note was in the first instance addressed in 1835 to the Governors of the Native Hospital, and had for its primary object the demonstration of the urgent necessity of the establishment of a Fever Hospital in the central part of the native town of Calcutta. The Medical College Hospital was one of the results of the Committee's deliberations. Lord Auckland, who was then Governor of Bengal and to whom Dr. Martin's Note was sent, recommended that, in addition to the inquiry as to the utility of the establishment of an Hospital, the gentlemen of the Committee should also undertake the difficult and more important task of endeavouring to frame such a plan of local management and taxation for matters connected with the health, comfort and improvement of the town as might be best calculated to secure efficiency and general confidence of the funds collected. It was to this Committee named the Fever Hospital and Municipal Inquiry Committee that Lieutenant Abercrombie, who was then Superintendent of Conservancy for Calcutta, and who was well acquainted with the town and its requirements, gave his valuable evidence and presented his plan for the formation of streets which had for its object the opening up of crowded localities and securing free ventilation to the native portion of the town. Evidence as to the need of broad streets to improve the public health of the town had been given to the Committee by medical and other witnesses. Many of the improvements which the Calcutta of to-day enjoys, were first suggested during the inquiry held by that Committee. But the schemes of supplying water and drainage have in a large measure thrown into the shade the important plans suggested for the ventilation of the city.

The close, narrow and ill-ventilated streets, stated as existing 50 years ago exist now to a great extent.—The close, narrow and ill-ventilated streets, stated as then existing in the northern and native portion of the town, exist now to a very large extent, and in consequence of new buildings having been erected, those localities which were crowded 50 years ago have become still more densely crowded. The access of fresh air to purify these places is so obstructed that for effectual purification the sweeping force of a storm is required to penetrate into the numerous narrow lanes, passages, nooks, crevices and gullies which intersect the more crowded districts. Immersed habitually in a polluted atmosphere, the inhabitants of these congested localities are in a totally different climate from those who reside in the southern portion of the town, or even from those in more open districts in the northern part. Seasonal changes operate and cause their influence to be felt more speedily and more strongly. The pervading stagnant air with its moisture and heat favours the more rapid formation of chemical and other products in the mass of fermentable and putrefactive matter which accumulate in proportion to the crowding of the population. Offensive and noxious products are constantly being elaborated, but more rapidly and with greater force at certain seasons of the year than at others. The gradual diffusion of these products in an atmosphere seldom thoroughly changed goes on causing an ever increasing offensiveness and danger, until a storm sweeps out the polluted and disease-generating air from the closely built locality.

Newcomers to such localities are subjected to greater danger than older residents. A considerable proportion of the former are attacked with cholera within a month of their arrival; for example, in Jorabagan and Burra Bazar 24 and 25 per cent. of the deaths which occur from cholera, are persons who have not resided more than a month in the respective wards.

The constitution of the older residents becomes as it were adapted to the deleterious conditions of the atmosphere, once that their superior powers of vitality and resistance have been able to withstand the first shock of the poisonous effects of the air they breathe. With few exceptions however is their escape from the effects of an unhealthy atmosphere complete. Sooner or later a constitution subject to fever and diseases marking a low state of health is acquired. This low state of health in the worst localities shows itself in the vital statistics by a high general death-rate as well as a high cholera death-rate; for example, the average general death-rate for Jorabagan and Burra Bazar for the past 10 years, is equal to 32.5 and 31.4, respectively. And these are wards which contain a large floating population, the residents of which almost invariably go to their own homes when any serious illness overtakes them.

The accompanying map shows what Lieutenant Abercrombie's proposals were.—Lieutenant Abercrombie's proposals which met with the approval of the medical men of the day and also with that of the Committee

of Inquiry, were the formation of certain wide streets running directly North and South. The new line of road suggested by him are denoted by yellow-coloured lines on the map annexed. It was proposed the streets should be 60 or 70 feet wide and should take the following direction :—

I. From Loudon Street in continuation of it in a right line across Dhurumtollah to the end of St. James' Street and in continuation of Amherst Street to the Upper Circular Road.

II. From Park Street at the end of Free School Street in a straight line to the bridge over the Circular Canal next the river at Raja Rajkissen's Ghât.

III. From the end of Chowringhee Road at Dhurumtollah Street in a straight line to the river near Baug Bazar at Nalaram Paul's Ghaut.

IV. Along the river side from the end of the Strand Road at Durmahatta Ghaut to where it will meet the new road to the Chitpore Bridge next the river at Soor's Bazar.

V. From the end of the Sobha Bazar in Chitpore Road in a straight line in continuation of Sobha Bazar to the Upper Circular Road where it will meet the proposed continuation of Amherst Street.

VI. From Tank Square opposite Old Court House Street in a straight line nearly parallel to the projected new line of the Chitpore Road to Sobha Bazar.

VII. From Upper Circular Road at the end of Manicktollah Road in the same line with Manicktollah Road, and in continuation of it to where the last-mentioned road (No. 6) will cross Nimtollah Street.

VIII. From the back of the new Mint in a straight line out of Clive Street and at right angles to it to the corner of the late Petty Court Jail in Machoon Bazar Street.

The object in view was two-fold.—The object in view was two-fold—one was to provide proper means of traffic; the other was to thoroughly ventilate the city. The North wind blows steadily during the cold season, and the South wind during the hot and rainy seasons. Consequently, streets running North to South would act as great conductors of fresh air throughout the whole length of the city. The main cross streets running East and West would receive an abundance of fresh air, and convey it into the branching narrow side streets and lanes. A free circulation of air would be thus established through portions of the town which do not at present enjoy this condition of a healthy locality. In a tropical climate such as belongs to Calcutta, the free and unobstructed circulation of air is a factor of health greater in importance than it would be in a cold climate, where differences of temperature, inside and outside houses give rise to strong currents, and where less rapid chemical changes do not to such a high degree be, foul the air of populous places. Whatever difficulties might arise to delay the carrying out of these improvements in the town of Calcutta, none should be allowed to act as obstacles against the absolutely necessary and radical improvements in the suburbs.

Testimony of Dr. (afterwards Sir Ranald Martin) as to the effect on the public health of wide streets.—Recently it has been decided to construct a street running from the Hooghly Bridge eastward to Sealdah, which will effect a magnificent improvement for that part of the town, sweeping away as it will a very densely built and unhealthy locality. This proposed improvement, however, is but an amplification of one of the lines which is marked on Lieutenant Abercrombie's map, and there will still remain to be considered the formation of those great roads running from North to South which will pass through the worst dens of Calcutta—dens which can only be remedied by clearance. Sir Ranald Martin's description and expressed opinion apply as forcible and as justly to-day as 50 years ago, and it is with his and Dr. Stewart's view, laid before the Committee of Enquiry, that I shall conclude my remarks on this subject. Dr. Martin said :—"Whoever has visited the native portion of the town before sunrise with its narrow lanes and 'rankest compound of villanous smells' will require no argument in favour of widening the streets, so as to effect the two greatest improvements as respects the salubrity of the city—free exposure to the sun to rarify and elevate the vapours, and to the winds to dilute and dissipate them."

Testimony of Dr. Stewart.—Dr. Stewart, supporting Dr. Martin's views, gave expression to the following opinion :—"In the suburbs East of the Circular Road of which Dr. Martin's general description is excellent, there can be no doubt that great and important improvements might be effected by opening up great arteries in the direction of the prevailing winds and others to cross at right angles, prohibiting in future the building of houses except on certain lines; the advantages of the proceeding would not be confined to that part of the town alone but would extend to Calcutta by abolishing the sources of malaria." By abolishing the sources of malaria Dr. Stewart meant the dilution of the malarial poison by a liberal supply of fresh air and the unimpeded circulation of air which those streets would afford.

In the improvement of localised unhealthy areas, care requires to be taken not to permit a repetition of the old conditions under a new and worse form.—Closely connected with the formation of well-ventilated streets and the enforcement of building regulations, is the improvement of small unhealthy areas. In the demolition of small unhealthy areas, care requires to be taken to prevent new conditions arising which under the name of improvements, are liable to render the altered areas as unhealthy as before. Puggiaputty bustee, one of the many two-storied bustees which are located in the riparian district, is a case in point. The bustee was crowded with huts which were dark in their interior, filthy and foul smelling, forming a very unhealthy spot. It was, therefore, decided to construct a road 15 feet wide which should run through its centre. This was done. And immediately the row of two-storied huts on each side of the 15 feet road were demolished, and were replaced by a range of three-storied brick buildings which contain an immense number of small and badly ventilated rooms. The new buildings on each side of the narrow road have no air space at the back, for they immediately abut on some old two-storied huts; they are provided with very primitive privies consisting of a small room on each storey at the back of the building, having an opening in the floor communicating with a vault below into which the excreta and soil water of the teeming population who will occupy this building will fall to create a stinking nuisance. Altogether the new conditions in their combination of narrow streets, projecting verandahs, three-storied buildings on each side, inadequate ventilation, offensive privies and a greater population than before, will render the area as unhealthy as it was previous to the alterations.

Building regulations are required additional to what are now in the Amended Municipal Bill.—To prevent the creation of unhealthy areas such as this, regulations should be framed regulating the height of houses according to the width of the street on which they abut, placing a limit on the division and sub-division of the building and requiring a minimum amount of air space behind houses, in order that a free circulation of air may be obtained and proper access can be got for cleaning purposes.

The following is the number of brick-built houses and huts as ascertained at the Census of 1876 and 1881 :—

			1876.	1881.
Brick-built houses	...	...	16,896	18,107
Huts	...	...	22,860	20,667

From this table it will be seen that brick buildings are gradually replacing huts. The clauses in the new Municipal Bill relating to the construction of bustees on sanitary principles probably give ample power as far as the building of huts are concerned ; but in the event of bustees being converted into *lands with brick buildings upon them*, I am afraid that, unless additional regulations dealing with the points I have mentioned, are framed, many unhealthy localities will in like manner gradually spring up, which will require to be afterwards cleared away only at an enormous cost.

1888.

Some of the other causes referred to still exist. They are difficult to deal with, demolition of the unhealthy areas and then rigorous enforcement of proper building laws being about the only remedy. In my report of 1887, I dwelt on the unhealthiness of the close, narrow and ill-ventilated streets in the riparian district, giving a map showing proposals which would rectify the condition of matters. Every year's delay in carrying out the construction of broad streets in these localities brings with it greater difficulties and expense. Even during the three years I have been in Calcutta, I have seen a marked change going on. The crowding together of houses is becoming greater, the open spaces are being more encroached upon, the breathing space is gradually contracting, and the localities are progressively attaining a more unhealthy state. Neither drainage nor water supply will make up for want of fresh air. Bad air is as unwholesome as bad water. Crowding together of houses means overcrowding of the inhabitants. Great density of population on a limited space is inevitably attended with great impurity of the air and marked insanitary conditions. A limit must be placed on the number of houses built on a given area of land if the public health is to be maintained. Should radical measures not be taken to counteract the forces which are active in causing the air of numerous localities in the city to become more deteriorated every year, then in spite of a good water-supply, and notwithstanding an expensive drainage system, the Commissioners must be prepared to see certain parts of the town becoming more unhealthy year by year. The policy at present pursued of constructing narrow lanes and rounding off corners here and there under the name of improvements does not improve the public health. It increases the value of property, but at the same time favours overcrowding and is injurious to the sanitary and best interests of the town. I may here repeat what I have mentioned in former reports, that a comprehensive plan of proposed new streets is one of the first essentials to the carrying out of improvement in the town and suburbs.

1889.

Next to the water-supply the ventilation of the city by proper streets and building regulations, is the most important sanitary want of Calcutta.—Next to the water-supply which the Commissioners are managing satisfactorily, the subject of building regulations and overcrowding is one of the most important that the Calcutta authorities have to deal with. The history of the water-supply is both interesting and suggestive. The enterprise, when first entered upon, was considered to be a most costly undertaking, but as it progressed step by step, the public benefits accruing from an abundant and pure water-supply became so apparent that its introduction redounded greatly to the credit of the Commissioners, and none were more eager than the Commissioners that the benefits should be extended to the suburbs. In the same way the undertaking of the building arrangements in Calcutta will probably appear to be a most costly and gigantic one, but there can be little doubt that the benefits to the public health will in course of time be little short of that gained by the introduction of the water-supply because intimately connected with it is the ventilation of the city which is as much a necessity for the public health as the proper aeration of the lungs is for the individual health. Without efficient means of ventilation there is in a city such as Calcutta stagnation of air which like water requires to be properly distributed, and comparatively pure if it is to be beneficial. Stagnation of air implies that all the impurities added by man and animals to the air in the process of living are under ordinary circumstances not properly removed except it be on the occasion of storms. In this respect the portions of the native town which are badly ventilated are in the matter of air-supply in much the same position as the town was for water-supply when dependent on stagnant tanks. A similarity may be discerned in both. In the one case the stagnant pools of water were polluted by the inhabitants and only purified and replenished during the rains. In the other case the stagnant air is likewise polluted by the inhabitants and only properly changed on the occasion of storms. The effect on health produced by drinking polluted water is well known, examples of which are frequent enough even now, while the injurious effects on the system of breathing impure air, though more insidious and less obvious to the public, are none the less apparent to the medical man.

Overcrowding of buildings not only impedes the circulation of air, but prevents the possibility of laying down proper and efficient drainage, and hinders and adds to the cost of scavenging.—Overcrowding of buildings do more, however, than impede the circulation of air, thereby depriving the inhabitants of a supply of fresh air in place of that rendered impure by their own bodies. The construction of buildings too near to one another prevents the possibility of laying down proper and efficient drainage, and hinders and adds immensely to the difficulties and expense of scavenging. With inefficient drainage and inadequate cleansing, two of the most powerful factors detrimental to health, are brought into play by reason of the pollution of the air which they cause. Against these unfavorable conditions an adequate water-supply will not be sufficient to contend. No doubt it went far towards improving the health of the inhabitants, who at one time suffered from the effects of both a bad water-supply and a bad air-supply. The water-supply has indeed made a great impression on the public health of Calcutta, but it cannot perform more than its own rôle, and must be supplemented by good ventilation, for if people are breathing impure air, a good water-supply will not prevent the diseases caused by impure air.

The filling up of tanks and the building thereon has added to the overcrowding.—The filling-up of tanks has also served to bring the question of ventilation well to the front. The tanks have always exercised a certain amount of restraint on the crowding together to buildings, while at the same time they served as sort of reservoirs of air for the house and neighbourhood. But with the tanks filled up and the land appropriated for building purposes, it becomes more necessary than ever to provide by law open spaces and other means of ventilation.

A peculiarity of the native town is that the quarters of the rich are as much over-built as the quarters of the poor and by reasons of this overcrowding, the premises, of both are equally filthy.—A peculiar feature to be noted too in dealing with the crowding together of houses in the northern portion of the city,

is that this close packing takes place almost as much among the rich as among the poor. Herein lies an essential difference from the custom prevalent in towns in other countries. In European towns, for example, the better off the individuals the more anxious is he to obtain plenty of space. His residential house is usually away from the business portion of the town. In Calcutta, however, the rich Indian merchants reside in the business quarter, and in consequence of the value of land, every foot of ground in the mercantile district is bought up, and is built on, having only narrow passages for ingress and egress. It is thus that Burra Bazar, Jorabagan and other wards have in the matter of buildings become almost a piece of Mosaic work, so closely are the buildings pieced together. To bear out this statement I have given two diagrams of districts in two wards of the town. It will be seen how closely the ground is covered with houses, what narrow streets, winding lanes and numerous passages exist, and the obstacles there are to efficient ventilation. If a moment's reflection is given as to the means by which all the sullage of the inhabitants and of the numerous beasts of burden located in this quarter has to be removed, and to the fact that the houses are in most cases as crowded as the tenement houses in England, and that the habits of the occupants are not altogether cleanly, some conception may be obtained of the utter impossibility of keeping a district like this clean, and that the only remedy is to open it up with good wide streets.

The Central Road will make but a small impression on the overcrowded areas.—A. B. on diagram I. shows one wide street which the Commissioners have at great expense determined to cut through this overcrowded and over-built locality. It will be observed, however, that notwithstanding this great work, the one street will exert but a small influence in doing away with the over-building on so large an area unless streets from North to South and South to North be constructed to meet the new street. The great defect in these districts has been the permitting of too many houses, and too many people on too limited a space, instead of forcing them to spread out on a wider area. The constitution of the locality or the plan or construction of the district has been spoiled, and the supply of every other sanitary want is only palliative while that constitutional defect remains.

With this remarkable instance and lesson before the authorities of the results of a *laissez faire* policy in the matter of formation of streets, construction of houses and plan of the city, I have every hope that those interested in the public health will do all in their power not only to remedy the existing defects, but to prevent the possibility of anything similar in kind springing up in the future in other parts of Calcutta.

The same over-building on land is going on in other parts of the town unchecked.—That such localities are springing up, it is my intention in this report to establish and further to show that it will only be by a well considered Building Act that these insanitary conditions will be prevented. What has occurred in Calcutta in those parts of the town where crowding together of houses has been allowed to go on without restriction, and where the crowding has reached such a stage that nothing less than wholesale demolition will ever bring the localities into anything like a sanitary condition has already been described. I now desire to draw attention to the process that is going on in other parts of the town which until lately have not been crowded, but which are now becoming favourite localities for building brick-houses. The same methods of irregular building are being adopted, the same series of changes in growth are extending themselves, and the results in the course of time will be the same deformities, so that the new localities will be brought into as similarly an unhealthy and ill-conditioned plight as that which distinguishes the old. It will require only a plain statement of the condition of things, and a few diagrams to demonstrate the serious evil which is growing up Calcutta, and which, if not dealt with at once, will inevitably bring the native portion of the town in the course of years into a veritable hot-bed of disease which no amount of money will effectually remove. The problem is not an easy one and not to be handled lightly, but nevertheless it is one which requires to be taken up at once, studied and the necessary steps taken for its solution.

III. *Description of an area which its being over-built without reference to proper ventilation or any other sanitary law.*—Is a diagram of a small district in Jorasanko. It represents the ground plan of a small area bounded on one side by Chunder Mohun Soor's Lane, which is 6 feet 3 inches wide at its widest part, and which was formerly a bustee passage, on another side by Mohendra Nath Gossain's Lane, which is 10 feet 10 inches at its widest part, and a portion of which was originally one of the ditches or drains of the town, on a third side by Boloram Dey's Street, which is 23 feet wide and on a fourth side by brick-houses. The plot of ground contained on this West side a large tank which some years ago was filled up with refuse. The land was then sold in small plots to different people for building operations which commenced some time ago—the principle on which the building operation is carried on, is that one owner who builds a house, gives up 3 feet, and the owner on the opposite side also gives up 3 feet to make a private passage for air, light and access. This passage the owners are quite willing to give over to the Municipality for the latter to sewer, light, cleanse and keep in repair. The diagram shows that several buildings have been erected, and that there are several huts between some of the brick buildings. Each of these huts will be pulled down some day to give place to brick buildings. Applications have already been sent in for permission to build on the unoccupied land.

It will be observed that the frontages of the houses face projected narrow lanes, and that the backs and sides of the houses where they do not touch, have but narrow passages of 3 feet and less between them, nor would the situation be much changed if they were 4 or even 8 feet apart. Several of the houses are one-storey, but in the ordinary course of time one or more storeys will be added, the custom being to build one storey house first, and later on to heighten the houses as the owner can afford to do so.

The lane B, which some of the houses front, is not more than 6 feet wide, the actual width between the front door of 67-2 and 67-3 being 5 feet 9 inches from Chabutra to Chabutra. Nor is the other lane straight, for at the West-end of the house of 67-6 and at the back of 69-10, it bends at right angles, and then again turns into a passage 4 feet wide which further contracts to 3 feet 6 inches at its entrance into Chunder Mohun Soor's Lane, which I have already stated to be 6 feet 3 inches wide.

A photograph is given of three of the houses referred to in diagram III. In the foreground and marked (1) is seen the plot of ground to be further built upon; 4, 3 and 2 represent the houses Nos. 67-2, 67-3 and 67-6. The narrow passage (5) between the last two houses, is brought out in the photograph, also the narrowness of the frontage lane of the two houses, 67-3 and 67-2. When the whole plot is built over there will be as insanitary a locality as any of the old parts of the town. In fact, it will be worse, because even in Burra Bazar, Jorabagan, Coomertolly, the lanes are much wider than these newly formed, and it will be just as impossible to drain, sanitate or improve this area in health condition without wholesale demolition as is the case just now in the riparian districts.

After a good water-supply the sanitation of a city depends on the width and regularity of its streets.—I would here repeat that after the water-supply everything of a sanitary nature in a town like Calcutta hinges on the width and regularity of the streets, and if this fundamental principle is forgotten or not acted upon, no permanent

improvement in public health will ever be effected, and much of the money spent on drainage and so-called sanitary improvements might better never have been spent. Numerous examples taken from different parts of the town could be given in which plots of ground between streets and narrow lanes are being gradually filled in and blocked up, and in which narrow, tortuous and zig-zag lanes such as are to be found in the older portions of the town, are being reduced. One other example shown in diagram IV. will suffice to illustrate the condition of things.

Description of another locality where the open plots of ground are being gradually filled in and blocked up to an unhealthy extent—The diagram exhibits three brick-houses and a hut fronting a narrow street, Baranoso Ghose's Street, which at this part is only some 20 feet wide. The approaches to the back of these houses are two narrow lanes, running at right angles to the street, of which one is not more than 6 feet at its widest, and the other is but slightly wider than 7 feet, and leads into a lane 15½ feet wide. It will be observed that these narrow lanes have in their turn been converted into so-called streets, and that the frontages of other houses face them on both of their sides. It will further be observed that no space has been left at the back of two of the houses fronting Baranoso Ghose's Street, and that a space of about 4 feet has been left in the other two. The result which has followed is that the whole space in question behind the houses in Baranoso Ghose's Street has been effectually blocked up, and that two narrow lanes with houses fronting them have been added to the numerous family of narrow lanes that exist in Calcutta. It will be also noted that the new houses on this limited space are separated behind by a passage 3 feet in width. This passage is really intended for the mehter to get round to the back of the houses for the purpose of cleaning the privies. Practically, as regards ventilation, the houses are built back to back, which have been proved to be about the most unhealthy houses that can be built. For the sake of cleanliness it would be an improvement if the backs of the houses joined one another, for these numerous back and side-passages are receptacles of an immense amount of filth, and it is perfectly absurd to consider them as passages for ventilation or circulation of air. The air in them is always impure and unhealthy.

At the sides of the new house No. 29-1 is a passage 3 feet wide leading to a temple behind, and which has a small piece of ground next to it. No doubt an application will in time be made for permission to construct another house on this remaining portion of ground, and then building operations on this area will cease, simply because it would be impossible to build any more houses, for every possible foot of ground has been utilised, and at the expense of every sanitary principle. In another part of the diagram it will be noticed that there are other narrow passages marked C. and D., and that facing them are houses and huts. Passage D. is particularly worthy of attention. It is about 6 feet wide, and so zig-zag that within a very short distance it turns and changes its direction three times.

Land occupied by bustees of huts converted into land covered over with groups of brick-houses closely packed together—There is another change going on in Calcutta connected with houses which is deleterious to the public health, and for the prevention of its further extension immediate steps require to be taken. In bustees of one-storeyed huts huddled together without any definite order or regularity, there is a tendency to replace the huts by brick-houses some of which are one, two and three-storeys high. The latter kind of bustee will be infinitely worse from a health point of view than any existing village or bustee of huts, and will cost an immense sum of money for the slightest improvement. The air has some opportunity of getting through a bustee of huts, the huts being usually one-storey, having their roofs constructed of material which will allow of a certain free circulation of air through the compartments, but with groups of brick buildings in their place, every impurity will be pent up and unremoved except under the influence of storms. From a health point of view it were better to have bustees than groups of brick houses divided by narrow, tortuous and foul lanes.

Every narrow lane and ditch in Calcutta is liable to become a frontage; the consequence thereof is most objectionable on the score of traffic as well as health—Let it be remembered that the native part of Calcutta is full of narrow lanes and of filled up ditches, and that each of these lanes and ditches often misnamed streets is liable to become a frontage to brick houses, and then the importance of preventing this catastrophe will be understood. Narrow and tortuous streets signify obstruction of traffic, obstruction of proper circulation of air, overcrowding of houses and inhabitants, with all their attendant evils, foul and inefficient drainage and pollution of air by sewage, by sewer gas, by unremoved filth from defective scavenging, and by the organic products given off from animals and men living in a crowded and living in too close proximity to one another.

The existing law is powerless to prevent the foregoing defects, nor is it in the powers of the executive—Having given these examples I shall now quote the new law on the subject, and endeavour to show that, although it contains a modicum of good, it does not meet the requirements of the case.

Before beginning to build any new house or to convert any hut or any temporary structure into a house, the person intending so to do shall obtain the sanction of the Commissioners to the site on which he proposes to build. With this object he shall submit a plan drawn to the scale of 40 feet to the inch, showing the position of the house with reference—

- (a) To some existing public street; or
- (b) Some projected public street approved of by the Commissioners in Meeting under section 208; or
- (c) Some existing private street; or
- (d) Some proposed private street which it is intended to construct under section 213.

Such plan shall also show the position and approximate height of all the masonry houses within 40 feet of the proposed site.

Provided that, for special reasons, the Commissioners may sanction any site without reference to its position in relation to any public or private street.

On receipt of such plan, the Commissioners shall, within 30 days, signify in writing their approval of such site, or their disapproval thereof as not being a proper site with reference to—

- (a) The street shown in such plan; or
- (b) Any other street or projected street on which it will abut; or
- (c) The position of the adjacent buildings.

If the street shown in the plan is a proposed private street, the Commissioners may at their discretion decline to approve of the site till such private street is commenced or completed.

Now the important point is what is a public and private street. The following definition from the new Act gives the answer :—

"Public street" means any road, street, square, court, alley, or passage, whether a thoroughfare or not, over which the public have a right of way, and also the roadway over any public bridge or causeway, and also the footway and drains attached to any such street, public bridge (other than the Hoogli Bridge), or causeway, within the town.

"Street" means any road, street, square, court, alley or passage not included in the definition of "public street."

It will, therefore, be noted that, as there is no mention in the law or bye-laws of the minimum width of street in which buildings shall be allowed, all the filled up drains, narrow and winding passages and bustee passages can be used as frontages to new buildings. It is impossible for the executive to lay down a standard width for, as in the case of verandahs and other matters, it would be so frequently overruled that its utility would be practically destroyed, one exception in a street being sufficient for that purpose. Moreover, in a matter of this kind, where so many contending influences will always be at work, the only satisfactory manner by which a minimum and uniform standard can be obtained, and which will at the same time be in accordance with the ordinary teachings of sanitation and which is found to be absolutely essential to the well-being of all growing cities, is a building law defining the minimum width of a street fronting which a house may be permitted to be built. Compared with the rules relating to width of the street which regulate the ventilation of the city, other building regulations take a secondary position. On the width of the streets depends not only the amount of fresh air, the houses abutting on the streets shall obtain, and whether these houses shall be efficiently and healthily drained, but also whether the sewerage in the street and its ventilation shall be a success or not.

There is no regulation as to the minimum width of existing or of new streets.—In short an examination of the existing law shows that for Calcutta there is no regulation as to the width of existing streets, and that buildings can be constructed without reference to the width of the street or lane which it faces, and further there is no regulation as regards the minimum width of new streets. As new houses are being built in localities, or perhaps in not new localities but in those districts less populated than others, new streets are gradually formed. It is the units which make the aggregates. It is the houses erected one by one at a time which ultimately form the streets and tortuous lanes; the natural tendency of building in Calcutta being to follow the line of some existing lane, street or passage.

There is some control over a private individual who lays out a street, but no private individuals lay out streets.—True, there is Section 213 placing the control of the width of streets in the hands of the Commissioners when an individual applies to them to be permitted to make or lay out a new street thus—

"Every person who wishes to make or lay out any new street shall give notice in writing thereof to the Commissioners, showing the intended level and width of such street, the arrangements made for draining it and the level and width of every such street; and the drainage arrangements shall be subject to approval by the Commissioners.

On receipt of such application the Commissioners shall, within 30 days, either sanction the making of such new street, or disallow it, or ask for further information with respect to it. If further information is asked for, no steps shall be taken to construct the street until orders have been passed upon receipt of such information."

But in this city no one ever wishes to make or lay out a new street. A man if he wishes to build, buys a plot of land just sufficient for his house and nothing more. Every person wishes to build houses, no one wishes to make or lay out streets, the system of building here and in European towns is on a totally different principle, and this clause, therefore, is practically a dead-letter.

The only real control the Commissioners have, is by planning out the city themselves. This, however, requires a special establishment and the acceptance of certain sanitary principles.—The only real control the Commissioners can exercise over the building operations of the city is by Clause 208, in which they have power to plan out the city themselves. This, however, with no special establishment for the purpose, and no principles laid down to guide them, is one of peculiar difficulty.

"The Commissioners may from time to time prepare plans of proposed public streets showing the alignment of such streets, the intended regular line on each side of them, and such other details as may appear desirable; and after such plans have been approved of by the Commissioners in Meeting, such streets shall be deemed to be projected public streets, and the provisions of section 207 shall apply to all houses which may fall down, be burnt down, or may be taken down, in order to be rebuilt or altered, so far as they shall fall within the regular lines of the projected public street."

The Commissioners during the year have been actively engaged in projecting some fine and broad streets in the suburbs, and in planning out the alignment of some of the principal streets in the town such as Chitpore Road; but a number of streets here and there in different parts of the suburbs will never meet the requirements of the case, which needs the following out of a well-laid scheme to be drawn out by a Committee of Engineers and Medical men who have thoroughly gone into the question, become conversant with its difficulties and ascertained what is necessary both as regards streets, their direction, the distances they shall be apart and the limit to the number of houses that can be built between the streets without interfering with the healthiness of the locality.

There is also the problem of the ventilation of houses in relation to one another, so that the one shall not shut out the ventilation of the other.—Should the difficulty connected with existing and new streets be overcome, there remains still the problem connected with the ventilation of the houses. The streets relate only to houses with frontages abutting thereon, but the relation of these houses to those behind them has also to be considered. In towns generally provision is made to prevent a house being built immediately behind another which abuts on a street unless an intervening space is left between the two houses to secure proper ventilation. The width insisted on is usually the width of the street, namely, 36 or 40 feet. Again, to prevent a house which fronts the street, but whose frontage is a little way off the street having a second house built between it, and the street with the possibility of shutting off ventilation, there is in some towns a rule insisting on an intervening space equal to 36 or 40 feet, otherwise no building is allowed to be erected in front of that house.

The present proposed bye-laws.—In the subjoined bye-laws, the space to be allowed between the back of two buildings is 4 feet, when a new building is erected and the other is old, or if they are both new buildings, then 8 feet.

(f) Regarding ventilation and the extent to which space must be left for the free circulation of air as required by the provisions of section 243 of Act II. (B. C.) of 1888.

2. No new masonry building which abuts on a street of less width than 40 feet, shall be erected to a greater height than two stories without the special consent of the Commissioners in Meeting.

3. Every such building intended to be used as a dwelling shall be so constructed that the whole or at least one side of every room thereof shall either be an external wall or abut on an interior open space or on a verandah. Such interior open space shall have an area equal to not less than one-fourth of the aggregate floor area of all the rooms abutting thereon, and shall not be in any direction less than 6 feet across. Such external wall shall, where it faces a street of less than 16 feet in width, have between it and the boundary line of the owner's premises an open space of not less than 2 feet in width. At the sides it may be attached to the adjacent premises, but if not so attached at the sides and in every case at the back, it shall have a space of 4 feet long the whole sides of the building between it and the boundary line of the owner's premises, or between it and the inner edge of the boundary wall, if that boundary line is a wall. And every open space, whether exterior or interior required by this clause, shall be and be kept free from any erection other than a boundary wall and shall be open to the sky and shall be and be kept open to access from each end thereof.

4. Every open space or interior court-yard referred to in the above rule, shall be raised at least 1 foot above the level of the nearest street so as to admit of easy drainage into it.

5. Every room intended to be used as a dwelling-room in any such building, except a room on the roof thereof, shall be in every part at least 8 feet in height from the floor to the ceiling.

6. Every such room shall have a clear superficial area of not less than 80 square feet.

7. Every such room shall be ventilated by means of doors or windows which open directly into the external air or into a verandah, and have an aggregate opening equal to not less than one-fifth of the superficial area of the side of the room which faces an open space.

8. The Commissioners may exempt from the provisions of clauses (e) or (f) any particular building or class of buildings to which the rules or any particular rule may appear them to be inapplicable.

Originally there was a clause in the bye-laws proposing that the minimum width of new streets should be placed at 16 feet. The minimum of new streets or of existing streets, if it had been placed at 16 feet, would have perpetuated the insanitary evils which exist in the riparian district and in other parts of the town, but the minimum width of 16 feet was even deleted from the bye-laws leaving no minimum.

A note on the proposed bye-laws.—On the first appearance of the bye-laws I wrote the following note on their inapplicability to the requirements of Calcutta:—

A NOTE ON THE PROPOSED BUILDING BYE-LAWS.

"Probably it will be of advantage to the Commissioners if I state clearly my opinion on some of the building bye-laws which they are asked to pass, and the effect which these bye-laws will have on the public health.

"For a clear understanding of the matter there are two things to which I would especially draw the Commissioners' attention.

1st.—The very inadequate idea that many people possess of distances when stated in feet.

2nd.—The utter uselessness of taking building laws adapted to a city in a cold climate and applying them to the requirements of a city in the tropics.

"A possible source of error lies in the fact that moderate distances are usually measured in yards. Accordingly, the mind accustomed to yards commonly reverts to that measurement when a distance is stated in feet; 20, 30, and 40 feet are considered moderately long distances, not because the distances in feet have been put to any practical test, but because mentally they are likely to be confounded with those in yards. The result is frequently an error of over-estimation in which distances in feet are considered greater than what they are. If instead of 20 feet we were to say 6½ yards, the distance would appear, as it really is, very small. Just the opposite effect to this happens in judging of circumferences as contrasted with height. Here it is generally a case of under-estimation as illustrated in the old test of the measurement of the circumference of the elephant's foot in relation to its height. It is only men like surveyors and other accustomed to the careful measurement of distances who are able without difficulty to form accurate mental estimates of these differences. When the practical test of actual measurement is applied to lengths stated in feet, what sounds very long becomes insignificantly short. I am sure it would surprise most Commissioners to learn that the 16 and 24 feet wide streets proposed would not be wider than an ordinary-sized room in a Calcutta European dwelling-house, and that 40 feet would not be greater than the length of many of their reception-rooms.

"If in the bye-laws the measurements in feet were changed into those of yards, the streets of 16 and 24 yards wide would be nothing more than ordinary streets, and it would only be when they were made 40 yards wide that they would be considered fine streets.

"As regards my second observation I need not lay stress on the differences of physical conditions in Calcutta and those of London. We recognise this in the most common of every day things. The clothing that is absolutely necessary in the one is almost superfluous in the other, and that of a totally different texture and kind is required. In matters of food the same differences present themselves. No one who wishes to lead a healthy life would adopt exactly the same *regimes* for living in Calcutta as living in London. Many attempt it and get into ill-health in consequence. So also it is with the requirements of healthy dwellings, the same necessities of light and ventilation exist, but they are to be obtained not wholly in the same manner as in England. The physical forces which are at work in nature purifying the air may be the same here as they are in London, or any other part of the world, but these forces differ very materially in their powers and degree of action in different regions.

"In London, for example, the wind is not by itself the great purifier and ventilator of houses, though indirectly it may be, but it is the continual movement of air caused by the differences in temperature inside and outside the houses which affect the changes necessary in the replacement of pure air for impure. The fires burning in the houses give to the inside air a much higher temperature than that outside, and the cold and fresh air is constantly pressing inwards owing to a well-known physical law. The currents of air, moreover, will veer in different directions often several times a day. The power which gases possess of diffusion, also acts very effectively. The provision of sun-light is to a great degree the element that has been always chiefly looked after in England, and houses have been built with that purpose in view. Given a few extra hot-days in the summer time in London, and nearly every house and street becomes oppressive for want of fresh air and good ventilation.

"In Calcutta it is on wind and a certain amount of diffusion that the movement of the air, and therefore proper ventilation depends. Movement by differences in temperature act very slightly, hence closely-built localities with narrow streets leading to them, are always oppressive and unhealthy. The houses are deprived of the wind which should be allowed proper facilities of circulating in and around them; and the same arrangements which would make a house healthy and comfortable in a cold climate, would render it uncomfortable and unhealthy in a warm one. Space is required in tropical cities—space through which the wind can blow unimpeded when it is in movement and plenty of space where the air may diffuse when it is almost stagnant, as occurs at times in Calcutta. Sun-light here is not a desideratum: on the contrary, the necessity lies in the exclusion of too much of it, hence the importance attached to verandahs in all hot countries, while in cold countries, verandahs are mere matters of ornamental decoration.

"It will be seen from what has been stated that wide streets and plenty of space inside and outside the houses are required, and that to apply the cramped space allowed in English and Scotch towns to the necessities of Calcutta, is to fall into a serious mistake in the sanitary administration of the town. This is being recognised in Australia where it has been found that the ordinary English pattern of house is not the one adapted for the hot parts of the country even with very wide streets. Wide streets with space in and around the houses as well as verandahs have been found to be the proper conditions under which a house should be constructed in a hot climate.

"Applying these principles I shall touch on several of the clauses in the proposed bye-laws which judged from this point of view, that is, from the health point of view, are totally inadequate to secure healthy houses of a healthy city.

"First of all in regard to width of streets, it is proposed to have 16 feet wide streets. This would, under the name of sanitary laws, perpetuate the insanitary plans in the city, to clear away one of which the Commissioners have recently voted about a quarter of a million sterling. Nothing less than 40 feet should be thought of, more would be better; and Calcutta might well follow Rangoon in this respect, where all cross-streets are 50 feet wide and the principal public streets 100 feet.

"In connection with the width of streets I would refer to the width of the paths or lanes in bustee lands, they are to be not less than 12 or 16 feet wide. Nearly a third of Calcutta, probably more than one-third, consists of bustee land. As the city becomes richer, the bustee land will be built upon. So that it is of the utmost importance for the future welfare of Calcutta that any changes in these bustee lands should be under sanitary control. I have no objection to the paths and lanes remaining only 12 and 16 feet wide as long as the land is covered with single-storied huts. But as soon as an application is made for a double-storied hut or brick-building of any kind, then the path of 16 feet wide is no longer healthy, and the double-storied hut or the brick-building should be placed back from the side of the road, so that it shall be at least 20 feet from the centre of the road.

"This would insure that, whenever the bustee began to change its character, provision would be made for the street passing through the land to be the same width as other public streets. In this way that third of Calcutta which now consists of huts would, as the lands became built upon by brick-buildings, be gradually provided with streets of the requisite width, and the insanitary conditions of Jorabagan and Burra Bazar prevented from being reproduced.

"I now pass on to the height of buildings. It is proposed that the height shall be twice the width of the street that is, in a 40 feet street the buildings may be 80 feet high; and proportionally in a narrower street. This would insure that no wind would reach the lower stories of houses in streets which ran East to West. The northerly and southerly winds which prevail for a considerable proportion of the year striking against the upper part of one house, would be so deflected upwards, that there would be insufficient width in the street for the fresh air to find its way down far enough to reach the lower floors. These would mainly depend for their supply and change of air on the eddies of the moving wind, and the disturbances which it created in the lower stratum of air in the street, and the changes thus effected would be so slow as to practically leave the air always impure. Under ordinary circumstances, the wind or air, when obstructed by a building, does not reach the same level on the other side until it has travelled nearly three times the distance of the height of the obstruction. This, of course, only applies to a wall with no openings. The usual rule, however, for practical purposes, is to make the height of the houses no higher than the width of the street.

"The model town would be where the height of the houses were only half the width of the streets; and this is the rule adopted in hospital buildings.

But here in Calcutta it is proposed to turn matters topsy-turvy altogether, and give the houses four times that height. I trust that the good rule of the height of the house being not more than the width of the street will be adopted. In large public buildings exceptions may be made; these are few and far between, and do not affect the question.

"I would now draw particular attention to the construction and ventilation of the house as dealt with in Nos. 4 and 8 sections of clause f.

"4. Every such building intended to be used as a dwelling shall be so constructed that the whole or at least one side of every room thereof shall either be an external wall or abut on an interior open space or on a verandah. Such interior open space shall have an area equal to not less than one-tenth of the aggregate floor area of all the rooms abutting thereon, and shall not be in any direction less than 6 feet across. Such external wall shall, where it faces a street of less than 16 feet in width, have between it and the boundary line of the owners' premises an open space of not less than 2 feet in width. At the sides it may be attached to the adjacent premises; but if not so attached at the sides and in every case at the back, it shall have between it and the boundary line of the owners' premises or between it and the inner edge of the boundary line, if the boundary line is a wall, a space of not less than 2 feet if one-storey high, 3 feet if two-storeys high and 4 feet if three or more storeys high. And every open space, whether exterior or interior, required by this clause, shall be and be kept free from any erection other than a boundary wall and shall be open to the sky, and shall be and be kept open to access from each and thereof.

"8. Every such room shall have a clear superficial area of not less than 80 square feet.

"These regulations are of vital importance—vital in the sense that if they pass, they will give a license to build houses which would be exceedingly unhealthy, and under theegis of the law, permit localities as bad as Burra Bazar and Jorabagan to spring up. I think I may make my meaning clearer if I illustrate it by an example. A man wants to build a house, and he wishes to conform to the Municipal rules. He consults them and finds that the minimum spaces allowed for each room is 80 square feet. He decides to have 5 rooms on the ground-floor, hence the combined floor space would be —580—400, and as he has to provide in his little court 1-10th of the combined floor space of the rooms; looking into the court, this would be 40 square feet,

that is, less than 7 feet by 6 feet, which would be scarcely enough room for two stout men to move in. This would be absurdly inadequate for a one-storied house, and it would become still more inadequate for more than one-storey.

"In the latter case it would become more like a central chimney than a court-yard. I have come across court yards in Calcutta, with not much more air space than this; but they are exceedingly few in number. But in these bye-laws it is proposed to legalise the very evil which it is the object of enacting building laws to prevent. If I have not been able to convince the Commissioners on this point by the foregoing remarks, I would ask them, before proceeding further in this matter, to take up a piece of land and build a few houses in conformity with this section, and they will then see for themselves the gigantic mistake that would be committed. No court yard should be less than one-fourth or one-fifth of the superficial floor space of the rooms which look into it if one-storey high and should be proportionately increased, storey by storey, according to the height. The same observations apply to the amount of space allowed around buildings. A locality built in accordance with the bye-law of having 4 feet between each house, would be a perfect piece of Mosaic work, and one of the best arrangements for the destruction of human life owing to want of fresh air. I think, if the Commissioners could arrange for a Committee to be appointed of Government Engineers, Native and European, having associated with them several medical men, also Native and European, to frame Building bye-laws for approval and on the lines which I have indicated, the Commissioners would feel more confidence in considering and passing measures, which, as Health Officer, I consider to be the most important that have come before them, and which will have the most influential result for good or for evil on the sanitary condition of the Calcutta of the future."

As a consequence of the foregoing note some slight alterations were made, but the most important defects were not dealt with.—As a result of this note the size of the court yard was enlarged to one-fourth of the aggregate floor area of all the rooms abutting thereon, and 4 feet at the back was substituted for 2 feet if one-storey high, 3 feet if two-storeys high and 4 feet if three or more storeys high. The other matters in the note, however, relating to width of streets, height of houses in relation to width of street, and the importance of laying down regulations in regard to brick buildings and street in bustees were not taken up, and it is just these which seriously affect the public health interests of the town.

Statement of remedies required.—I have shown that the building clauses in the Act though good are useless from a sanitary point of view without the width of street, height of houses and space intervening between houses being defined, and the first and last being of an ample kind; and I would now once more draw attention to the great importance for the future welfare of Calcutta to the existing bustee lands of not having erected on them any brick building unless in relation to a wide street projected through the bustee, for should brick houses be allowed to be built without such a provision, they will add much to the cost of any future improvement, and the unhealthy areas allowed to spring up will be in a worse condition than the existing bustees, for the improvement of which the Commissioners have during the past 10 years spent so much money. The timely recognition of these evils and their removal will not only save much money, but prevent the loss of many lives and much suffering. Briefly summarised the following are the present additional building requirements of this city which might be embodied in an Act :—

FOR THE VENTILATION OF THE CITY.

(1) A clause stating the minimum width of public streets, 40 feet should be the minimum except in cross street of less than 300 feet in length which might be 32 feet or even 24 feet. Large thoroughfares should be double 40 feet.

(2) A clause defining the height of houses in relation to the width of street; no building, except it be a public building, should be higher than the width of the street on which it immediately abuts.

It could of course, be built higher if it was retired from the street provided it had sufficient ground not to block up the ventilation of the house behind it.

(3) A clause providing for the prevention of the construction of brick buildings in bustees except in regular lines and 20 feet from the centre of any road passing through the bustee.

In addition to the above clauses in a future Building Act the policy systematically pursued should be—

(a) The laying out of the less populated parts of the city with projected streets and the abandonment of following out of the line of the existing narrow streets and lanes.

(b) All streets should be planned so far as possible to be straight and to cross one another at right angles.

(c) The gradual demolition of houses and the formation of wide streets in the most congested and overcrowded localities, and the proper clearance of existing unhealthy bustees with a view to projected streets, would facilitate this work and lessen the expense.

FOR THE VENTILATION OF HOUSES.

(1) A clause is needed to regulate the size of the court yard when there is one. In many houses there is no court yard. One-fourth the superficial floor space of the rooms abutting thereon would probably be sufficient as a minimum.

(2) A clause providing a minimum space to be left between the backs of houses for the purpose of securing free ventilation in each, and for the purpose of preventing either house from obstructing the ventilation of the other. This space should be at least equal to the width of the street, namely, 40 or 32 feet. In the event of a house not abutting on a street open space equal to the width of a new street, should intervene between it and the rear of the house fronting the street. The space should not be left as a lane or passage, but should be enclosed and form part of the premises of the owner who would, however, be not allowed to build upon it. The passages and lane around houses which become receptacles of filth, should also be done away with in future, and enclosed as part of the premises of the individual to whom they belong, who would require to keep them clean.

(3) An example of the pernicious effect of building houses in front of others without sufficient space intervening between the two, is to be obtained in considering what will happen along the new Central Road. At that part of it now open near the bridge on the South side are some very high houses; they are immediately behind the portion of the land which will be sold for building houses on to form the new street. A space of 4 feet will be all that intervenes between the two buildings, so that, however fine and effective the new street

may be the building laws and bye-laws will allow of a slum being formed immediately on each side of it. This is scarcely what should be allowed to happen after so much money is spent over this new road in order to demolish a similar condition of things.

FOR THE VENTILATION OF ROOMS

A clause is needed giving as a minimum a moderately large superficial floor space; 120 square feet should be the minimum. The windows facing court-yard or outside should also be of moderate size.

Conclusion.—From the foregoing I think it will be seen that the question is a large one. And my own views on the matter is that the best way of having the question thoroughly considered is by a Committee formed of engineers, medical men and others.

It may be added that the same problem as stated here presents itself for solution in Howrah and other large towns of Bengal.

1890.

Building Laws.—The uselessness from a sanitary point of view of the laws and bye-laws for streets and buildings in Calcutta becomes more apparent the longer they are in force. I wrote very fully on the subject in my last Annual Report. I have little to add to that report excepting to record that longer experience in working of the laws brings out the fact that in different parts of the town unhealthy houses are being built according in every respect with the requirements of the existing laws. The laws and bye-laws now in force might very appropriately be termed laws and bye-laws to legalise insanitary buildings.

I give plans of two buildings which are now being built under these laws.

The first plan is that of a two-storied house, the rooms of which, C. and D, look into a narrow gully, of passage E., which has two verandahs projecting above it. The passage is closed at both ends and is really a sort of well, at the bottom of which are apartments intended for living in. I have many times, in my capacity as Health Officer at home, had much better houses shut up and eventually pulled down, and the ground cleared because they were unfit for human habitation. They were old houses, for such buildings would not be permitted to be built now; but here, in Calcutta, this building which is quite unfit for human habitation conforms to the building requirements of the Calcutta Municipal laws and bye-laws.

The second plan is that of a building intended to accommodate a large number of tenants being practically a sort of barrack. It will be seen that the building wedged in between other houses with an intervening space of only 4 feet, which is useless for ventilation, and the central passages which separate the different parts of the building are of such a nature as to form merely blind lanes. The whole arrangement is unhealthy, and with a large population will be a repetition of some of the worst types of houses and of overcrowding in the Buzra Bazar and Jorabagan quarters.

It may be noted here that the finances of the Municipality are being drained by the cost of the new Central Road, which was undertaken mainly to relieve the congestion of insanitary buildings and insanitary localities that had been allowed to spring up in that part of Calcutta.

Apart therefore from the important health question involved in allowing similar insanitary localities to spring up in every part of the town, the policy is one which will lead in the future to embarrassing costliness to demolish what cannot in the interests of public health be allowed to remain.

There is another point in connection with the building of huts and houses which requires attention. It is a well-known fact that much disease in Calcutta is caused by the drainage of houses and huts flowing into tanks. If houses and huts are erected close to tanks, it is impossible to prevent the tanks becoming polluted. I would, therefore, recommend in any amendment of the building laws and bye-laws that a clause be inserted to the effect that "no hut or house or building of any kind shall be allowed to be built within 50 feet of any tank."

1891.

Sanitary improvement.—Much has been done in the year in demolishing unhealthy areas, especially in connection with the construction of the new Harrison Road in the heart of the northern portion of the town, which has cleared away some very congested and unhealthy localities. Similarly, the erection of the new water-works at Bhowanipore has been accompanied by the clearance of a large tract of bazaar land which was always remarkable for its filth and as a centre for the diffusion of disease to the surrounding neighbourhood. In this case the substitution of good roads, open spaces and building plots has materially improved the healthiness of the surrounding houses. The construction of the Lansdowne Road has also been the means of clearing away many unhealthy spots, removing a number of unhealthy tanks, improving others and opening up a wide street from North to South which will act as an excellent ventilator to that part of the town. These measures have conduced to healthiness and constitute good work in the cause of public health; but it is necessary to mention in connection with these improvements what I have mentioned in almost every report I have written on the health of Calcutta, that to grapple with the problem of rendering Calcutta a healthy city, a system or scheme very different from this is needed. Demolition and clearness are necessary, and a vast amount remains to be done in this direction, especially in the riparian and some other wards: but if any permanent good is to be effected, the demolition of unhealthy areas must be accompanied and supported by that which in the long run is a much more powerful factor in making a city healthy, namely, a good Building Act which shall provide that streets shall be laid out sufficiently broad and regular, and shall render compulsory the erection of buildings and houses on a healthy plan and system. It is only by this means that the sanitary appliances of drainage can be effective. To attempt to sanitise some of the crowded localities of Calcutta must by the nature of the circumstances end in failure. The crowding together of houses under the present rules and the erection of badly ventilated houses can only end in foul passages, the formation of unwholesome narrow lanes, faulty and offensive drainage, and impurity of the air. There is a very intimate connection between the building laws of a city, and the benefits which will accrue from sanitary measures and from drainage. For in a thickly-populated unhealthy area the very necessities of the inhabitants are such that every place is filthy notwithstanding much cleansing, and the drains are always out of order, giving forth offensive effluvia which no ingenuity or methods in sanitary science can rectify.

1892.

A Building Act required for Calcutta.—Again, it is necessary to draw attention to the law as it stands regarding streets and buildings. That in force is not merely a defective law, but a radically bad one, for under its

sanction unhealthy houses are being built, whilst areas in the town are being created which, as they grow, can only breed pestilence to. In 1889 I gave a very full report on this subject, and the Bengal Government resolution on that report endorsed the opinion that the ventilation of the city by proper streets and squares and the enforcement of proper building regulations were the most important sanitary measures which remained for the Municipal Commissioners to undertake; and in para. 16 of the same resolution the Lieutenant Governor expressed his hope that the suggestion of the Health Officer for the appointment of a suitable Committee to investigate and report upon the subject with the object in view of the framing of a Building Act would receive very early attention. Three years having elapsed without any action being taken in this direction it becomes a duty to urge the early adoption of a measure of such vital importance. The deterioration in health conditions of certain localities during the past few years is very marked, and nothing can stop this deterioration, while the present law remains in force. When a house may be built anywhere without reference to efficient ventilation, proper drainage, or surroundings, when it may be built in any lane or passage irrespective of the width of that lane or passage, and when it may be built in such a manner as to permit it to obstruct the light and ventilation of the neighbouring houses so long as it is 4 feet away from them, no long time is necessary under this régime to create plague-spots in different parts of the town. Such a process is going on continuously now, and while that process is allowed to continue, the money spent on the new Harrison Road and on the lanes which are constructed through bustees will have but a poor return; because the destruction of insanitary areas which is effected by new roads and lanes can never even keep pace with the progressive creation of areas much worse in type. A Calcutta bustee, as it used to be, even with its drawbacks is infinitely preferable to what is now springing up in its stead. At one time a landlord let the whole of his land for bustee purposes, and one storied huts as a rule were built on every available space. The huts were built irregularly and according to the requirements of the hut-owner. The spaces between the huts served generally as passages, but occasionally the owners left sufficient space for the purposes of scavenging and cleansing the bustee. Drainage and ventilation were left to themselves, and as always happens when too large a population is crowded on too limited a space without reference to sanitary conditions, these bustees became very unhealthy and the source of epidemics. Bustee improvements accordingly became an important factor in the sanitation of Calcutta. At an enormous cost narrow lanes have been put through a number of the largest bustees, and drainage laid down. While, however, some advance has been made in this direction, a new development has taken place. The land of bustees and of vacant spaces is being sold in small plots, and each owner of his plot is building a brick-building upon it. The outcome of this system is that, instead of bustees consisting of huts, bustees consisting of brick-buildings are being erected. Now, as formerly, no one thinks of roads or streets. Every piece of land purchased is bought to be covered with a building. The objections against a bustee crowded with huts, regardless of the slightest attempt at sanitation, are infinitely greater against a bustee of brick-buildings. In the majority of the former the huts were only one storey in height, they had a large court-yard open to the sky, they were built of bamboo with mud-plastered walls, and the work was of such a kind that air could get into the rooms from creeks and corners everywhere. The sun had access to the court-yard and its powerful rays lessened, or even prevented to a great extent, putrefactive processes set up by the needs and dirty habits of the inmates, and thus largely protected them from the results of their own ignorance by which every law of health is violated. But the bustees and areas of land covered with brick-buildings on the new plan, or perhaps more accurately the plan copied from Jorabagan, will not have these advantages. The houses are at least two-storeys high, many of them have no court-yard, and those that possess one, have it contracted to the smallest limits. The influence of the sun is diminished, and the ventilation is reduced. The houses, shut in on every side from the perfation of the wind, become veritable hot-beds of disease, and will inevitably get worse. The effect of a pure water-supply in these districts can only be palliative. It is doubtful whether such drainage, as is possible, is of any real and lasting service. As I have stated in former reports, no proper drainage can be introduced into such localities. Sanitary science knows of no method by which areas of this description can be rendered healthy. All that can be done is to pull the houses down and begin on new lines. This being so, it may, with reason, be asked why such a system is permitted to continue, and evils perpetuated which can only end in a calamity. Water-supply and drainage, however good in themselves, are not the panacea for every disorder to which the public health is subject, nor will they prevent diseases due to impure air or the absence of the purifying effect of the sun. Pure air can only be obtained in Calcutta by open spaces, wide and regular streets, and efficiently ventilated buildings. Under these conditions drainage and cleansing can be effective and beneficial. But under the opposite conditions the forces, favouring the generation of diseases, are stronger than those directed to their prevention. *Time and season are the only factors wanting to ensure disaster.* Nothing but a Building Act on comprehensive lines can deal with this important problem. Many of the Commissioners realise the position, as will be seen from the following extract taken from the proceedings of the Conservancy and Buildings Committee held on 7th September 1892:—

"Dr. Bhoobun Mohan Sircar observed that it was more for ventilation than for traffic that wide roads were needed."

"Baboo Lall Behary Bysack said it was an admitted fact that in this case the public road was only 6 feet wide; what use therefore would there be of insisting upon a wider passage as a bye-lane. He had already said on a previous occasion that grave injustice was done in applying the provisions of section 235, because in the first instance, it had retrospective effect against the purchases of bustee lands. The interests of the landed proprietors should be considered. The section was not so clear as was supposed. It did not say that, when a large plot of land was sub-divided and sold in small plots the purchasers would be precluded from building. All that the section provided was that, having reference to the position of the site in respect to any street, the Commissioners could refuse sanction. He thought the Commissioners should give public notice of the action they intended to take, so that persons might not purchase such plots of land. Where the public roads themselves were only 9 feet or even 6 feet wide, with what justice could the purchasers of small plots of building land be asked to leave wider passages? To do so would amount to confiscation of property. There was a case in which the Commissioners in remodelling a bustee opened out 9 feet roads, but when building lots were sold, the provisions of section 235 were deliberately enforced compelling the making of 16 feet roads. There was neither uniformity in action nor justice nor equity. The law was defective and had been declared to be so on all hands; the Commissioners should not, therefore, enforce provisions which would be detrimental to the interests of landed proprietors."

"The Officiating Chairman admitted that the action of the Commissioners had been rather inconsistent. They spent large sums of money to widen roads, but when they had the chance of opening out broad streets, where new buildings were springing up, they were told they were confiscating property. It was said in this case that the existing public road was narrower than the road which the Commissioners wanted the owners of this land to make; but it should be remembered that the Commissioners could always widen existing roads, and with the ordinary teachings of sanitation, and which is found to be absolutely essential to the well-being of all growing cities, is a building law defining the minimum width of a street fronting which a house may be permitted to be built. Compared with the rules relating to width of the street which regulate the ventilation of the city, other building regulations take a secondary position. On the width of the streets depends not only the amount of fresh air the houses abutting on the streets shall obtain, and whether these houses shall be efficiently and healthily drained, but also whether the sewerage in the street and its ventilation shall be a success or not."

There is no regulation as to the minimum width of existing or of new streets.—"In short, an examination of the existing law shows that for Calcutta, there is no regulation as to the width of *existing* streets, and that buildings can be constructed without reference to the width of the street or land which it faces, and farther there is no regulation as regards the minimum width of *new* streets. As houses are being built in new localities, or perhaps in not new localities, but in those districts less populated than others, new streets are gradually formed. It is the units which make the aggregates. It is the houses erected, one by one at a time which ultimately form the streets and tortuous lanes; the natural tendency of building in Calcutta being to follow the line of some existing lane, street or passage."

With a good Building Act Calcutta would have the chance of ultimately becoming a healthy city. The process would be slow, but the progress would be sure. A very large portion of the city is still in the condition of bustee land, and accordingly it is quite easy to prevent the sale of this land or other kind of land for building plots until proper streets are laid down by the owner. This system is only that which is insisted on in every other country. *Roads with a minimum width of 40 feet are absolutely essential to ensure a healthy condition of the houses abutting thereon.*

1893.

Necessity of a Building Act.—The two most important factors, which continue to exercise a deleterious effect on the health of Calcutta, are the condition of the drainage and the absence of a Building Act. I have already remarked on the former subject; and in each Annual Report I have drawn attention to the evils that arise from the latter, and the prospective evils that are likely to ensue, if no action be taken. Land is increasing yearly in value, and with no efficient law to control buildings or lay out streets, sanitary improvements in other directions are more than counterbalanced by the insanitary conditions, which are being continually created and perpetuated by the want of a Building Act.

Calcutta, 8th June, 1895.

W. J. SIMPSON, M. D.

10.

Exhibit H.

Extract from Dr. Simpson's Memorandum on the Disposal of the Refuse of Calcutta and the Sanitary Advantages of adopting Incineration.

To

THE CHAIRMAN OF THE CALCUTTA CORPORATION.

SIR,

I HAVE the honour to bring before the Commissioners the desirability of making a further advance in the incineration of the refuse of Calcutta, and I trust that, after due consideration of the question, they will feel justified in deciding to adopt a system which will effect a great and much-needed sanitary reform in the metropolis of India.

2. It is now about 30 years since the refuse of Calcutta was first taken out to the Salt Lakes, and there deposited, the scheme being to reclaim gradually a portion of these Lakes, and use the land for agricultural purposes. With this object in view six large platforms were constructed in Circular Road, which at that time was the extreme eastern boundary of the city. A railway was laid from the platforms along Circular Road and out to the Salt Lakes, and waggons and engines were provided to carry away the refuse after it had been discharged from the conservancy carts into the waggons, which were stationed every morning at the refuse-platforms. At the time of construction of these platforms the removal of the refuse of Calcutta was not such a serious matter as it is now, first, because the greater portion of it was not removed, and, secondly, a large quantity was disposed of in filling up tanks.

Existing system for disposal of the Calcutta refuse at the Salt Lakes.

3. In 1889 the Commissioners decided that tanks should no longer receive the garbage of the city, and in the same year the suburbs were amalgamated with the town.

Tank filling with refuse stopped and suburbs amalgamated with town in 1889.

4. The first change had the effect of throwing an enormous strain on the work connected with the platforms, for all the refuse which would in the ordinary course have been carted away and deposited in the nearest tank had now to be taken to the platforms which were not originally constructed for so great a supply, and the waggons proved to be insufficient in number to carry off in good time the refuse brought to the platforms by the carts. This condition of things has only slightly been remedied by an extension of the platforms and by an addition to the number of waggons, and the result is that, notwithstanding the efforts of the Engineering Department, there has been for many years past a regular blockage of conservancy carts at the platforms. More than once a complete breakdown has been imminent, and the Commissioners will understand that should such a breakdown occur, it would be a very serious matter to the inhabitants. In the rainy season, when the strain is greatest and the coolies can only be with difficulty induced to work at the Lakes, the waggons can seldom be returned from the Salt Lakes in proper time, and on many occasions it has been found impossible to get the empty waggons stationed at the platforms before a late hour. Only as recently as 10th February there were no waggons at two of the northern platforms until nearly 11 A. M., and the loaded carts which arrived before 7 A. M. had to wait at the platforms till nearly noon before they could discharge their contents into the waggons. In the meanwhile the cleansing of that portion of the town was completely stopped, and the refuse remained unremoved in the streets, lanes, and bustees. The carters begin to feed their animals a little after 2-30 A. M., and leave the gowkhannahs at 4 A. M. to be mustered at 4-30 P. M. in the summer months and 5 A. M. in the cold season, and it is impossible for

All the refuse which formerly went to tanks had to go to the platforms: the effect of this on the conservancy.

them or the animals to work the whole of the day, so that a delay of 3 or 4 hours at the platform means 3 or 4 hours less time devoted to conservancy. The conservancy of the town beginning thus early, a number of the loaded carts from the nearest wards are at the platforms a little after 6. The extent of confusion and disorder therefore into which the conservancy of the town is thrown when the waggons are not at the platform at an early hour is readily understood. But even when the waggons are at their places in time, such is the difficulty connected with the size of the platforms, the steepness of their gradient, and the management of the animals on the platforms, that much valuable time is lost before the carts can discharge their refuse into the waggons, and return to town for a second and third load. Not infrequently an hour or more is lost by the carters in awaiting their turn, and the block is felt throughout the town, the whole conservancy arrangements being thrown out of gear, and the removal of refuse not only thrown back to a late hour but inefficiently performed, thereby adding to the unhealthiness of the city.

5. The second change which I referred to, *viz.*, the amalgamation of the suburbs, besides adding a portion of the suburban refuse to that already brought to the platforms, placed Circular Road almost in the centre of the town, so that all this offensive business is carried on in a central road which runs the whole length of the town proper, and which, were it not for this nuisance, would be the finest and broadest road in Calcutta. In place of being as it was intended by the Marquis of Wellesley in whose time it was constructed a fine healthy street worthy of the metropolis of India, it has been converted into the great dumping-depôt for the garbage of Calcutta. At about every $\frac{1}{2}$ mile of its length is a refuse platform, and the road in front of the platform is from 6 in the morning until nearly 1 in the afternoon lined with carts full of refuse. Even when the waggons are filled with refuse by 12 noon, it is seldom they are removed by the engines before 5 o'clock in the afternoon. Thus for the whole day the inhabitants of Circular Road are subjected to a serious nuisance, from which hitherto they have had no relief, and a fine street is depreciated in its property value owing to the crude and insanitary mode of disposal of the refuse now adopted. To place against these disadvantages there are no advantages.

6. The system is injurious to the health of those who live near these platforms, many of them being subjected to dysentery, diarrhoea, and fever on account of the breathing and swallowing of the filth which is wafted by the air into their houses. It moreover perpetuates a totally inadequate cleansing of the town which is detrimental to its well-being. The system has also a still more widely injurious influence during those periods of the year when the wind is easterly and blows off the Salt Lakes; at these times, especially at night and when the night is sultry, the smell coming from the decomposing filth deposited at the Lakes and spreading over the whole city is most offensive and nauseating. Fortunately for the inhabitants of Calcutta the east wind is not a prevalent one. Were it so, Calcutta would be uninhabitable.

7. The above health considerations led me in the first instance to advocate the burning of the refuse, for with a system of burning the garbage would at once be reduced to a harmless and useful material; the platforms and waggons whose contents now pollute the air would be abolished; and the railway with its line of waggons would no longer spoil a fine street which would be cleared of the foulness that now offends sight and smell, and which is a disgrace to a large city, whilst the continual dumping of filth on the margin of the Salt Lakes, with its consequent dangers, would be ultimately stopped. These advantages, combined with an earlier and unobstructed conservancy with consequently greater efficiency and improvement in the public health, establish strong sanitary reasons in favour of burning.

The amalgamation of the suburbs added to the amount of refuse going to the platforms, and also placed the Circular Road almost in the centre of the town.

The injurious effect of the present system on the public health of the town.

The sanitary advantages secured by burning the refuse furnish strong reasons for its adoption.

8. There can be no doubt that the benefits to Calcutta would be immense, for there is another health consideration of great importance which the burning of the refuse of Calcutta materially advances, and that is the filling up of the foul tanks in Calcutta. No one who has given attention to the subject can fail to be struck by the large amount of sickness and death caused by these foul tanks. The Commissioners at a very early period fully realised this fact, and on the assumption that filling them up with refuse was a lesser evil than letting them alone, the mistaken and injurious practice of filling them up with garbage came into vogue, with the result that, even now after 30 years, the subsoil of many of these filled-up tanks is a stinking mass of decomposition giving forth sickening smells. Recently the soil of one of these tanks was disturbed to secure a foundation for the northern wing of the Municipal Market, and decomposition was still found to be going on.

In connection with the filling of tanks in Calcutta, there are three things to be considered—1st, the tanks must be filled up; 2ndly, they cannot be filled up with refuse; and, 3rdly, there is very little material available in Calcutta to fill them up with. Under these circumstances, the burning of the refuse becomes peculiarly useful to Calcutta, because the cinder and clinker thus obtained can be used for filling up of tanks; in fact, experience has shown that for road-making and tank-filling the products of the incinerator form most excellent material. Owing to the value of the ash for these purposes the Commissioners secure an abundant supply of material, which has always been scarce, and in fact almost impossible to obtain; while at the same time the actual cost of burning in Calcutta will be reduced, and will ultimately compare favourably with other towns where there are no tanks to fill.

9. The problem regarding the incineration of refuse is much more simple now than it was when I first introduced the subject to the attention of the Commissioners in December 1888. Then it was strongly contended that the refuse of Calcutta was of such a kind that it could not be burnt. It was pointed out that it differed in its composition from that collected and dealt with in English and American towns, and that the latter contained ashes in the form of breeze which kept up the fire in the furnaces once they were thoroughly heated without the addition of further fuel, while the former contained no ashes and would not burn without a very heavy expenditure of coal. I always admitted that there was a vast difference in the composition of the refuse of an eastern town and that of a western city, but I could not admit that the one was combustible and the other not.

Both kinds of refuse are combustible, the special characters being differences rather of kind, quality, and quantity; and the large amount of moisture contained in vegetable matter of eastern refuse during the rainy seasons; such differences are not however of so fundamental a nature as to interfere with incineration, though requiring a different form of furnace from that used in England.

10. The experimental incinerator erected at Entally proved beyond a doubt that eastern refuse was combustible. It proved that the refuse of Calcutta could be burnt even during the rains as completely and as well as the refuse in western towns; that during the most heavy rains when the refuse was saturated with moisture, a very slight expenditure of fuel was all that was necessary, and that the clinker and ashes obtained from the incinerator furnished valuable material for road-repairing and tank-filling. It also proved, as was the case in England and elsewhere, when destruction of refuse by fire was first introduced, that the products of combustion proceeding from the chimney were apt at times to be offensive, and that in order to make incineration a success for large towns in which the incinerators could be placed in crowded localities, these products must be effectually dealt with so as to destroy all offensive gases before they are allowed to escape from the chimney.

The cinder and clinker produced from the burning of the refuse would also provide excellent material for tank-filling.

The problem of incinerating the garbage of Calcutta is much more simple now than in 1888.

The experimental incinerator at Entally proved that the garbage of eastern cities was combustible and that the Calcutta garbage could be burnt during the heaviest rains.

11. To accomplish this I have always contended that the only satisfactory and

The products of combustion must be passed through a special fire of intense heat to break up the gases into their elements before being allowed to escape from the chimney.

effectual way is to pass these products of combustion through a special fire subjecting them to high temperature and breaking them up into their constituent elements. Other methods have been tried, mainly directed to the improvement of combustion in the

ordinary furnaces by modifications in the form of the furnaces, position of the flues, and by the adoption of air-blasts and steam-blasts. A fairly successful method has been the arranging of the outlets of the furnaces in such a position as to compel the gases to pass over the hottest part of the fire before escaping into the common flue which leads to the chimney. In the case of the employment of steam-blasts, the heated gases escape from the furnaces to the chimney, pass on their way through a multitubular boiler which generates the steam, that is, conveyed by pipes to the hearth of the furnaces, and supplies the blasts. The air-blast has steam generated in the same manner, and this is utilised to work an engine which turns a fan which supplies air in great force to the furnace flues.

Both air-blast and steam-blast undoubtedly improve the combustion in the furnaces but neither has proved absolutely effectual in totally destroying the empyrematic vapours escaping, though there can be no doubt as to their usefulness in raising the heat of the furnaces, and consequently burning the refuse more expeditiously. In the majority of instances they are used merely as auxiliaries, the natural draft of the chimney being employed when from any cause the blast is not working. For the constant and complete destruction of unburnt and offensive vapours, experience has shown that these vapours must be dealt with separately after leaving the furnaces and before entering the chimney. With this object in view nearly all incinerators have been provided with special fume cremators which, by the intense heat at which they are maintained, break up into their constituent elements the gases that have escaped unburnt from the furnaces.

12. In my report in 1891 on the subject of incineration, I referred to incinerators,

Owing to the success of the fume cremators, it has been rendered possible to erect incinerators in crowded localities in western cities.

I had visited in England which, owing to the adoption of special cremators for burning the products of combustion, had been erected in central quarters of the different towns without fear of nuisance,

The following extract from that report indicates the success of the fume cremators :—

"I saw a destructor in Bradford which has been recently erected that bordered upon one of the principal roads quite close to inhabited houses; another destructor recently erected in Liverpool is in a central part of the town. That at Ealing struck me as furnishing the most crucial test of the efficiency of the burning process and of its freedom from nuisance. Ealing is a residential suburb situated about 10 miles from London. The sewage of the town has to be purified before being discharged into the river. Part of the purification is accomplished by precipitating the sewage with chemicals in tanks. The sewage falls to the bottom of the tank in the form of sewage sludge. This solid sludge is periodically removed and mixed with house refuse put into the destructors and burnt. If anything can produce an abominable smell from a chimney this would, yet the vapours here are so completely burnt after leaving the furnaces and before entering the chimney that there is absolutely no smell. Houses have been built within 100 yards of the works. The locality is an undulating one, and it so happens that the top of the chimney is on a level with the first floor windows of Baron X's residence, which is less than half a mile away. If there was the slightest nuisance from the chimney, there can be no doubt that, with such a powerful opponent close by, the destructor would not be tolerated.

"For burning the vapours before they enter the chimney several kinds of cremators are used. In Birmingham they use one kind; in Manchester another; while in most of the towns Jones's Fume Cremator is used. It does not matter much what kind of cremator is used as long it accomplishes its object, *viz.*, the breaking up of the offensive vapours

into simple inoffensive elements, and that is obtained by keeping the cremator at a continuous heat of over 1,000 degrees."

13. The Goragatcha incinerator, which has been working in the suburbs since the 14th August, 1892, was erected on the understanding that a fume cremator should be attached to it. This special furnace, provided by Mr. Harrington, proved to be useless, its temperature never rising above 300 or 400 degrees Fahrenheit, and, as I pointed out at the time, the cremator was not constructed on proper principles. The burning of the refuse however was so successful, producing no noticeable nuisance, that the provision of a special crematorium was never insisted on, and the incinerator has for the past 3½ years been burning a daily average of 150 cart-loads or 66 tons of refuse collected from the districts of Watgunge, Kidderpore and Alipore, and could burn more if a larger quantity of refuse was available. Recently I have had a small cremator constructed in such a manner that the whole of the gases shall pass through the fire, and I find by examining the smoke before the cremator is worked, and again after it is lighted, that the gases have been most effectually broken up and all source of offence destroyed.

The fume Cremator of Mr. Harrington's is worthless because constructed on wrong principles. With a proper cremator it is found that all offensive gases are destroyed.

14. The Goragatcha incinerator has 8 furnaces, each cell burning on an average about 10 tons or 500 cubic feet of refuse daily in the wet weather and more in the dry weather. All the furnaces are at work during the rainy season, but only 6 during the dry weather. The cost of burning, excluding sinking fund and including only the working expenses with supervision, is during the four rainy months of the year Rs. 810 per month when all the furnaces are at work and Rs. 470 per month in the dry season. One ton of refuse is burnt at an average cost of 4 annas 9 pies, or nearly 5 annas. The larger the incinerator is the more cheaply it can be worked. If in place of an incinerator with 8 cells, one having 16 cells was erected double the amount of refuse would be burnt at not much greater cost.

The amount of refuse burnt at the Goragatcha incinerator and the cost per ton.

15. The maximum amount of refuse removed from the towns in one day has been 90 waggons, but this is exceptional and due rather to the accumulations of a previous day unremoved. The average is a little below 80. I think 40,000 cubic feet of refuse may be considered to be the maximum daily quantity of refuse to be disposed of, and that will ever be required from the town and portion of the amalgamated area. Mr. Kimber in a note in November, 1890, calculated that a safe limit would be 35,000 cubic feet. In addition to this and excluding the area which is served by the Goragatcha Incinerator, another 7,500 cubic feet is disposed of by filling up low-lying lands. The total therefore for town and suburbs is equal to 47,500 cubic feet, or nearly 1,000 tons. I consider that a constant and daily removal of 800 tons would keep Calcutta quite clean. It would be safer however, in order to remove all possibility of doubt, to calculate the amount at 1,000 tons. This amount of refuse can be easily burnt by 6 incinerators of 16 cells each, advantage being taken of the improvements of furnaces which experience has suggested and the use of steam or air blasts. I append a plan to this note indicating on it the sites for incinerators which recommend themselves to me. These are one on the river bank not far from the Neemtollah Burning-ghat, three on the Chitpore Canal bank, one at Entally near Palmer's Bridge, one in Baniapooker Ward, and one in Bhowanipore Ward; five of them are on the eastern side of Calcutta, and four of them well removed from crowded localities. The latter might be constructed first. The chimneys and works might also be adapted to the ventilation of the sewers near them, especially the intercepting sewer in Circular Road, and the main sewer approaching Palmer's Bridge, the gases from these being also destroyed by fire. The cost of the scheme can be dealt with better by the Engineer than myself. Mr. Hughes is of opinion that these incinerators can be built

800 to 1,000 tons of garbage required to be burnt daily in Calcutta. This can be done by 6 incinerators of 16 cells each situated on the sites indicated in this note.

at nearly $\frac{1}{2}$ the cost of the experimental incinerators, and I would recommend that this note be placed before him for his opinion, estimates, and suggestions.

16. These two methods by which this scheme of incineration can be carried out—
The incineration can be done by a contractor or by the Corporation. one is for the undertaking to be placed in the hands of a large contractor, who shall for a certain sum annually dispose of the refuse by burning; the other is for the Corporation to build the incinerators and work them themselves. It is for the Commissioners to decide which is the best. As regards the first method I have had an interview with Sir A. Martin, and he informs me he is willing to enter into the details of the project and consider them favourably, and if he is satisfied and can make arrangements with the Commissioners, he would be prepared to advance the capital and undertake the work.

17. In conclusion, I would recapitulate the advantages to be derived from the system. They are a vast improvement in the conservancy, and therefore cleanliness of the town with its accompanying benefits to the health of the city; the removal of an injurious and almost insupportable nuisance to which the residents of the Circular Road are subjected; the abolition of platforms, waggons and railway, which, besides disfiguring the finest and broadest street in Calcutta, cost for maintenance and working over $\frac{3}{4}$ of a lakh of rupees per year; with the abolition of the railway the removal of one of the chief obstacles to Circular Road becoming a good and healthy residential street, with consequent increase of value of property in the street and a higher return to the Corporation in municipal rates; the opening up of a new and broad thoroughfare running eastwards from the Circular Road and almost continuous with Dhurumtollah, which is now occupied by the railway in its course to the Salt Lakes; the abolition in a few years' time of the offensive smell which pervades Calcutta on sultry nights when the air is still or the wind is eastward, and which is due to the enormous number of tons of decomposing filth which is being deposited at the Lakes, and which in its soakage by the rains and drying by the sun before it is converted into earth and used for agricultural purposes is a hot-bed of disease; and, lastly, the supply of excellent material in the ashes and clinker obtained in the burning of the refuse for the filling up of the foul tanks of Calcutta which, owing to scarcity of suitable earth, are left to add their share to the unhealthiness of Calcutta. I append for the information of the Commissioners some useful notes regarding incineration of refuse which I placed before them in 1891, and which I think are worth reprinting. Much progress has been made since 1891, no fewer than 3,000 furnaces being now at work burning refuse in different western cities.

W. J. SIMPSON, M. D.,

Health Officer.

25th February 1896.

11.

Exhibit I.

Extract from Health Officer's first quarterly report for 1895.

29. *Sanitary condition.*—As regards the sanitary condition of the town, the replies which I gave to one of the Commissioners the other day, involving as they do important lines of policy, might be here recorded.

The questions were—

Baboo Lall Behary Bysack to enquire what part or parts of northern portion of this town has been visited by the Health Officer within the last month and how often and with what result, that is to say, what did he see or inspect, and what steps did he take to keep the northern portion as clean as it is necessary considering the epidemic that is raging in the part of the town.

Also to move—

(a) That pressure be put upon the Conservancy Inspectors and their subordinates to exercise better supervision, and have more work done by the dhangurs and coolies and by the carts so as to keep their division clean, and extra exertion be made to keep the roads and filled-up ditches clean.

(b) That disinfectants be freely used and sulphur and coal-tar be burnt in bustees and condensed quarters such as Burra Bazar and Jorabagan and in filled-up ditches to prevent the spreading of the epidemic.

The replies were as follows :—

I have the honor to state that the particular part of the question put by Baboo Lall Behary Bysack as to the cleansing of the streets, should have been put rather to the Superintendent of Conservancy than to the Health Officer.

As Health Officer I have visited the north part of the town on an average 3 times a week during the past month, more specially in connection with the small-pox epidemic, and the supervision of the measures which I have had caused to be taken for checking the spread of the epidemic such as the searching out of infected houses, vaccination, isolation, disinfection of infected premises and removal of patients to hospital. It is not through dirt that a small-pox epidemic is produced or spread but the factors are overcrowding and an unvaccinated community such as obtains in the northern portion of the town.

As a side matter I have, at various times, drawn the attention of the Superintendents of Conservancy, to the necessity of extra cleanliness and they have been doing their best. I have had to complain of the insanitary condition of several wards and have had to find fault with the Inspectors. I have asked the Engineer to stir up the men under him responsible for the flushing of the sewers, and I have had the Assistant Health Officer under my directions and instructions making a most searching enquiry into the temporary rise in cholera prevalence. It will be seen therefore that there is much activity.

The suggestion of Baboo Lall Behary Bysack about burning sulphur and coal-tar in the bustees and condensed quarters such as Burra Bazar is useless and a waste of money. Burra Bazar is not now the worst affected ward. There is no doubt that all the wards in the north part of the town are in a filthy state. This is what I have been telling the Commissioners for the past 9 years, and for the improvement of which I have constantly advised remedies, but which remedies, I regret to state, have not been adopted.

For the information of the new body of Commissioners, I now briefly repeat them :—

1st.—The restriction of the hours for throwing out refuse. There is no other town in India that I know of that permits the same license as is practised in Calcutta, and it would be no hardship whatever to compel the inhabitants to throw out their refuse not later than 8 o'clock in the morning in the northern portion of the town and not again until 8 at night. Until this is done the streets and lanes and bustees will never be clean.

2nd.—The restoration of some of the Rs. 50,000 which were taken from the Conservancy Budget during my absence in England in 1892-1893, and the use of the amount for more carts, men, coolies and Sub-Inspectors for the proper cleansing of the north part of the town.

3rd.—The substitution of Corporation carts and men for the present system of hired carts. The hired cart system is a continual source of annoyance to the Superintendents who have no real control or check over the work done, and the system as a rule means bad conservancy, besides the temptations it leads to as regards peons, &c., and their returns.

4th.—The acceptance of my recommendation for better qualified Superintendents who would have full control over their subordinates and a good understanding of their work and who would be able to carry out under their own Department the petty engineering works which are frequently attached to sanitary matters.

In Mr. Wright, who is about to retire, the Commissioners have had a most energetic Superintendent of Conservancy and Nuisance, who has worked well and done good work notwithstanding the unfavorable and trying conditions under which he has been placed.

5th.—The realization that the underground drainage of the town is in the same condition as reported on 4 years ago by Mr. Baldwin Latham, and the imperative necessity of introducing radical measures at once to remedy its defects.

6th.—The framing of proper laws and bye-laws for streets and buildings. My reports constantly refer to the injury that is being done to Calcutta and the insanitary condition into which it is year by year falling owing to the crowding of insanitary houses on too small a space and to the want of any attention to the formation of proper streets. This is a matter that is becoming worse every year, adding to the difficulty of cleansing and rendering it quite impossible to make any sanitary progress. The small-pox epidemic has shown what an infectious disease can do to an overcrowded and unprotected population, *but its ravages are nothing to what they would be if Calcutta should ever have the misfortune of having imported into it the plague which I see has re-appeared in China. The crowding and filth in the northern portion of the town would be only too fruitful a nursery ground for its virulence and spread, and there is no such known preventive as vaccination which can be adopted against it.*

MEMO. OF HEALTH OFFICER ON COMMISSIONERS'.

NOTE TO HIS HONOUR THE LIEUTENANT-GOVERNOR OF BENGAL SO FAR AS IT TOUCHES THE HEALTH DEPARTMENT.

THE standard of sanitation required now in a city the size of Calcutta is far higher than it was 20 years ago, and I note that much in the Commissioners' memo. relates to the history of the past, and has little bearing on the present sanitary requirements. Dr. Payne is stated to have been impracticable, though able and energetic. It will be seen, however, by my note on Sanitation, para. 39, that he built up a Health Department which the Commissioners effectually destroyed. The destruction of this department led to the Commission in 1884. I am also classed as being impracticable, and the same endeavour has been made to break up the department which I have organized for the sanitation of the town. This will be seen by paras. 34, 39, 40, 41, 42, in the same note.

Remarks on
paras. 9 & 10.

2. The examples cited by the Commissioners in para. 9 and 10 against the Health Officer's administration are most unfortunate as regards appropriateness, for they all relate to the Engineering Department, and not to the Health Department. Probably, however, that department has a satisfactory explanation of the points raised by the Commissioners.

3. The illustrations, however, serve a good purpose in bringing out the fact that the Health Officer has all along in nearly every important hygienic matter been blamed for failures for which he is not in the slightest degree responsible. On the contrary if his advice had been taken and acted upon the various schemes would have not only been less costly but would have proved more successful.

4. In the Appendix, Exhibit A, is the note on the hospital which was submitted to the Commissioners. It is clear enough as regards the requirements of a hospital. The Commissioners decided to erect two hospital sheds, and in doing so they must have known that the sanction implied arrangements for servants, nurses, and medical men, without which the sheds were useless.

5. As regards the construction of the hospital at Manicktollah, it should be understood that the Health Officer had nothing whatever to do with its construction or with the contractors concerned. The Engineering Department was asked by the Health Officer to clear the jungle and improve the tanks on the premises, and to erect two sheds as soon as possible, and to prepare a site plan of the hospital premises, so that the Health Officer might locate the sites on which the rest of the hospital buildings, if required, should be constructed. That plan was not forwarded to the Health Officer nor were the plan and estimates asked for for the drainage of the hospital, though it was pointed out at the time, and later, that the healthiness of the hospital depended on its proper drainage. The Health Officer was as surprised as others to find sheds beyond the two asked for being erected without having been consulted as to the site of those sheds, no signs of these structures having existed on his previous visits.

6. As to the cost, this is purely a matter between the Engineering Department and the Contractor. The Health Officer has no dealings with the Contractor and no voice in the settlement of the estimates. That the amount asked for by the Contractor was preposterous was patent to every one. But why the Commissioners should blame the Health Officer is difficult to understand.

7. Similarly, in regard to the Incinerator, the Health Officer is blamed because the Entally Incinerator cost $\frac{1}{2}$ a lakh. It is omitted, however, to be stated that it was

erected as an experiment to decide what the Health Officer always contended for, *viz.*, that the Calcutta garbage could be burnt, and the ashes of the refuse used for filling up tanks. It is also omitted to be stated that the Engineer, Mr. Kimber, was not in favour of the incinerator, and that the special furnaces recommended by the Health Officer for burning the unconsumed gases coming from the furnaces, and which were also advised by Mr. Baldwin Latham on his inspection of the Incinerator while it was at work, were not attached to the incinerator at Entally. These special furnaces are found to be necessary in all incinerators in England and with such attached there can be no question that an incinerator could even be placed in Burra Bazar on the river bank without causing the slightest nuisance. In fact, in the Health Officer's last Memorandum on the subject such a site is recommended. The Entally incinerator proved that the garbage of Calcutta could be burnt during the heaviest rains, it led to the erection of the Goragatcha incinerator which has burnt the refuse of Alipore, Watgunge and Kidderpore during the past 4 years, and there is no doubt that if the special cremator as advised had been attached, the Entally incinerator would have been burning now, without nuisance, a portion of the Calcutta refuse.

8. Again, had the Watgunge Dépôt been erected when the Health Officer made the recommendation, it would have prevented the Goragatcha scandal. The construction of the dépôt was delayed through no fault of the Health Department, not, as stated, on account of its impracticability, as it had been approved of by Mr. Baldwin Latham in 1891, but because it was thought to interfere with some larger scheme which was being considered at the time. The nature of the larger scheme, which also involved a dépôt at Watgunge, is seen from Mr. Kimber's note of April 3rd, 1894, and which I have annexed. Again if Mr. Silk's scheme with reference to the Watgunge Dépôt had been carried out, a copy of which is annexed, it would have been not more costly than that now in operation in the adjoining district, and it would have at the same time cleared away the larger portion of an overcrowded and very insanitary bustee. The opposition raised by some of the Commissioners was not on the impracticability of the scheme but on the inadvisability of placing more work on the pumps at Entally, and this, when pointed out, was to be met by an extra pump. As a matter of fact all the sewage which would have been pumped from the proposed Watgunge Dépôt is now pumped from its substitute, the Budge-Budge Dépôt, and without the extra appliances at Entally.

9. It was of no importance to the Health Officer where the dépôt was placed, whether at Watgunge on the site which he pointed out or on the Budge-Budge Road, or any where between these points, as long as his recommendation was carried out that sufficient land should be taken up by the Corporation to prevent the dépôt being a nuisance to the neighbourhood. His contention was that a dépôt was absolutely necessary. He recommended such a dépôt in 1890, and reiterated his recommendation over and over again, and it was not until 1896 that a dépôt was ultimately constructed, and then only because a public scandal had arisen on account of the state of the trenching-grounds, which also, as Health Officer, he had recommended should be raised, levelled, and prepared, but all to no purpose. As the Health Officer has not the executive work in his own hands, he cannot be blamed for his recommendations not being carried out.

Remarks on
para. 14.

10. There is no doubt in the Health Officer's mind that the cases of suspected plague examined by him and Dr. Cobb were cases of true plague. The Commissioners are incorrect in their view that cases of plague must necessarily be fatal. It is only the fatal cases which attract attention. When an epidemic arises the mortality is great, but the beginnings of epidemics in nearly all diseases are unobserved. Had the Health Officer not isolated the early cases which appeared in Calcutta, and thus stamped out the disease in its very inception, the Calcutta community would not be now enjoying the benefit derived from this

action, *viz.*, freedom from plague. To allow plague to gain a foothold in a city is a most suicidal policy, for it is only over the early cases that any effectual control can be exercised. If the disease is not promptly stamped out at the very commencement, but permitted, by want of promptness, thoroughness and decision, to gain ground, it soon gets beyond the efforts of the sanitary authorities and runs its course, as may be seen in the case of Bombay. The fatal case at Raja Rajbullub Street was an undoubted case of plague, and it is due to the fact that immediately after death the Health Officer had the body removed to the burning ghât in charge of a Medical Inspector and speedily burned, the infected clothes burned, and the premises lavishly and thoroughly disinfected, that the Commissioners have heard of no more cases of plague in that quarter.

Again, with reference to Tincowry Pal, the case was one of plague, and however apparently flagrant was the abuse of power in removing the boy to the hospital, it was successful in preventing the disease from spreading. With reference to the section quoted, it should be stated that the Health Officer himself is the Superintendent of the hospital to which the boy was removed, and the hut in which the boy resided did not provide proper accommodation for the segregation of a case of plague.

Remarks on
paras. 18 & 19.

11. The subject is fully explained in the Health Officer's note on sanitation, paras 3—26.

Remarks on
para. 22.

12. The paragraphs on the building regulations in the Health Officer's note on the sanitation of Calcutta show that instead of plague spots being got rid of many are being allowed to spring up.

Remarks on
para. 24.

13. The Health Officer, though opposed to the view that the conservancy should be supervised by him, has nevertheless opposed the transfer of this department to the Engineer on the ground that the Engineer is already too fully occupied to be able to give any attention to this important branch. The Health Officer thinks it should remain an integral part of the Health Department, but that it is too important and large not to form a separate and independent branch of the department, supervised by a capable Superintendent-in-Chief responsible for its efficient working and whose time is solely devoted to its supervision. The Health Officer has strenuously opposed the amalgamation scheme brought forward, because it was merely the re-appearance of retrenchment in another form, and could only disorganize and render less efficient than at present the work of the several departments concerned. It has been entirely in the interests of the public health that the Health Officer has taken up this attitude, for it would have saved him a vast amount of work, trouble and blame if he had acquiesced in the proposed arrangements and allowed the transfer with its inadequate provision for carrying on the work. The consequences would, however, have been disastrous to the sanitation of the town, and it is because the Health Officer is convinced of this that until a better scheme is advanced than the one he has himself put forward he will be opposed either to the transfer or to the amalgamation. Paras. 28—38 of the Health Officer's note on the sanitation of Calcutta show that the violation of the building regulations and the ordinary sanitary rules do affect the conservancy.

Remarks on
para. 26.

14. In para. 56 of Health Officer's note on the sanitation of Calcutta it will be seen that the Government of Bengal endorsed in 1890 the view of the Health Officer that the construction of brick buildings on bustee sites without building regulations produce more unhealthy areas than the bustees themselves.

W. J. SIMPSON, M.D.

January 5th, 1897.

The Health Officer's Scheme for a Plague-hospital.

TO CHAIRMAN.

I HAVE drawn up the following scheme for the construction and equipment of a Plague-hospital, if unfortunately plague should break out in this city. It is hoped, however, that the precautionary measures already being taken will obviate the necessity for it. In the meantime, in order to be prepared for any stray case which may be imported I would suggest that a pattern ambulance be constructed, and two huts be erected on the site selected for the proposed hospital.

2. The site I would recommend for selection is the eastern portion of the island on the north-east of Calcutta, formed by the new Canal and Belliaghata Canal.

3. It is a locality very sparsely populated and well away from the populous part of Calcutta and its suburbs, and can be easily reached by the different bridges which connect it with Calcutta as well as by boat. Being an island it is more isolated than any other locality.

4. It is in the Maniktola Municipality and not far from the Cossipur Municipality, and as these Municipalities will also require hospital accommodation, I would suggest that the three Municipalities join in arranging for one hospital with the other arrangements suggested. It is desirable, if possible, not to multiply these hospitals in different localities.

The details of the scheme are as follows :—

(1) The plague-hospital must be enclosed by wire-fencing and mat-walls, the object being to prevent delirious patients escaping.

(2) Huts, accommodating 10 patients each, should be constructed within this area. The kind recommended by the Government, viz., angle-iron with matting, should be adopted. The huts should be erected on piles with a wooden flooring. The objects of this method of construction are—

(a) The raising of the floor well above the ground-level 3 feet; and (b), the ultimate destruction of the huts by fire when no longer required.

(b) A pipe connected with one of the mains of the Calcutta water-supply should be laid down to the hospital premises.

(c) The drainage of this area must be carefully planned by the Engineer.

(d) An incinerator should be constructed for the destruction of infected clothes and for the disposal of the refuse, etc.

(e) There should be baths and wash-houses within the enclosure with arrangements for disinfection of the persons enclosed.

5. An observation hospital should also be erected separate from the Plague-hospital; also convalescent wards of 20 beds each.

6. Houses for doctors, nurses, servants, sweepers, domes, etc., will be required.

7. Kitchens, godowns and dispensaries will have to be built and equipped.

8. The Lyon's disinfecter belonging to the Municipality may be employed within the hospital enclosure.

9. On this island a separate burial-ground will have to be selected for the burial of Mahomedans and a Burning-ghât for Hindus, and a care-taker told off for each who will keep records. Mortuaries should also be provided in the hospital.

10. Ambulance-carts for accommodation for two stretchers drawn by one or two horses should be provided. These ambulance-carts which must have good springs to render them comfortable, might be of the simplest construction, consisting of a wooden frame-work with canvas top and wooden stanchions, with iron-supports to suspend the stretchers upon. Within the ambulance should be space for a closed box to contain the bedding and the spare clothing of the patients. Two coolies should be told off for each ambulance.

Arrangements must be made for thorough disinfection of the ambulances after the conveyance of any case to the hospital.

11. The ambulance stations should be connected by telephone with the nearest Police stations.

12. After removing the patient from the infected house and burning every thing that can be burnt, thorough disinfection will be carried out. I would suggest the use of the fire-engine pump, the reservoir of which will be filled with a strong disinfectant, and every part of the house internally and externally thoroughly washed out. The ambulance waggons might be treated in a similar manner at the hospital.

13. For the treatment of patients I propose to communicate with Dr. Yersin as to securing a supply and obtaining directions for the preparation of his antitoxin.

W. J. SIMPSON, M. D., M.R.C.P.,

Health Officer.

4th October, 1896.

Exhibit B.

Kidderpore Night-Soil and Drainage project.

CHAIRMAN,

The Engineering survey for the carrying out of which the sum of Rs. 500 was sanctioned on 22nd September 1893, is so advanced that I now beg to recommend sanction to the employment of an Assistant Engineer to prepare the working plans and estimates.

2. The work that has now to be done in this direction consists of—

- (1.) The buildings and arrangements generally of the Air Compressing Station and main Ejector Chambers at Watgunge.
- (2.) The Pipe Sewers and their adjuncts for the service of about 20,000 people which will converge on this point.
- (3.) The Flushing Machinery with its pipage for these sewers. This will involve either direct pumping or a special Ejector Station, which question has to be determined.
- (4.) The works connecting the Main Ejectors with the Calcutta Sewerage. This includes a cast-iron pressure main 3,000 yards long joining to the Lower Circular Road Sewer below the point of connection of the Bhowanipore Flushing Reservoir.
- (5.) The fourteen non-return valves and their chambers at the junctions of the town sewers with the Lower Circular Road Sewers. These are adjuncts in any case necessary to the town sewers as shewn in my Baldwin Latham Note, but would be rendered more necessary by the admission of the Kidderpore project to prevent sewage and sewer gas backing up into the town sewers.
- (6.) The surface drainage of the area sewered in Kidderpore.

3. The establishment I would propose to employ is as follows:—

One Assistant Engineer	...	...	Rs. 350
His horse allowance	...	...	" 50
One Surveyor and Leveller	...	...	" 60
One Draftsman	...	...	" 20
Khalasées and Peons	...	...	" 46
Stationery and Contingencies	...	...	" 30
TOTAL			Rs. 556

I would ask that this be sanctioned, say, for three months.

4. I beg to recommend that Mr. F. Barckley be employed on this work.

JAMES KIMBER, M. INST. C. E.,

Engineer to the Corporation.

Dated 3rd April 1894.

WATGUNGE DEPOT.

TO CHAIRMAN.

IN compliance with the Resolution of the Suburban Improvement Committee recorded at their Meeting held on the 22nd August last, and confirmed at the Special General Meeting of the Commissioners held on the 5th instant, I beg to submit herewith my proposals, together with an estimate of approximate cost for establishing a night-soil discharging depôt at Watgunge. The site and most of the details have been settled in conjunction with the Health Officer, and speaking generally, the scheme consists of passing the night-soil of 50,000 people under Tolly's Nullah, and discharging it into the existing sewer in Circular Road near the Kidderpore Bridge.

2. *The Site.*—In order to avoid as far as possible all nuisance likely to arise from a depôt located in a thickly-populated quarter, the Health Officer desires that a piece of land, measuring as nearly as possible 400 by 400, should be acquired. For only the buildings connected with the discharge of night-soil, this of course, would be a very large area of land; but it is extremely desirable to establish mehters' barracks in the Suburbs, and the surplus land could be used for that purpose. The site chosen for the depôt is a triangular piece of land lying between Watgunge and Moonshigunge Roads; it will not be possible in this locality to get a piece of land 400 feet wide, as I think it will be desirable to leave a frontage at least 100 feet deep on the Watgunge Road and one 50 feet deep on the Moonshigunge Road, so that the site of the proposed depôt will only be 300 feet wide on the average.

It will be necessary to acquire a small piece of land on the banks of Tolly's Nullah on which to place the engines and pumps for the unfiltered water supply.

3. *The Depôt.*—This will consist of a masonry trough 60 feet long 6 feet wide and 7 feet deep, into which the sewage will be discharged through 9 shoots from the carts and buckets. The shoots receiving sewage from carts will be square holes in the masonry floor, while the shoots for the buckets will be circular holes in cast-iron plates. The trough will be emptied every quarter of an hour, and arrangements will be made for emptying the trough in 5 minutes. Arrangements will be made for thoroughly washing the carts and buckets. The platform round the trough will be raised 4 feet above ground level, and will be surrounded with corrugated iron screens, and covered with a corrugated iron roof properly ventilated and carried on scrap-rail posts: it has been found necessary to raise the platform above ground level in order to obtain sufficient slope in the sewer connections.

4. *The Quantity of Sewage.*—At the request of the Health Officer, I have arranged for the discharge of 3.2 gallons per head per day from 50,000 persons; this discharge is equivalent to 2lbs. of fecal matter and 3 gallons of flushing water. The total discharge therefore to be dealt with is 160,000 gallons per day, and if this is to be got rid of in 4 hours, arrangements should be made for sewers capable of carrying a discharge of 40,000 gallons per hour or 100 cubic feet per minute; as a matter of fact, however, if the masonry trough at the depôt is to be emptied in 5 minutes, the sewers must be capable of carrying a discharge of 320 cubic feet per minute.

5. *Unfiltered Water supply.*—Arrangements will be made for supplying 40,000 gallons per hour by means of a centrifugal pump driven by portable engine stationed in the banks of Tolly's Nullah. It will not be necessary to incur any expenditure on pumps or engines, as the Commissioners already possess sufficient machinery.

6. *The Dimensions of the Sewers.*—To carry the discharge mentioned in the preceding paragraph, it will be necessary to have sewers 18" diameter. On the south and north sides of Tolly's Nullah the sewers will consist of ordinary glazed earthen-ware pipes, while for the conveyance of the sewage under Tolly's Nullah, it will be necessary to use flanged steel-pipes laid on concrete, similar to those used for the conveyance of the filtered water

supply under the Kidderpore Docks. I do not anticipate any difficulty whatever in laying the steel-pipe, because at low-tide in the cold weather, there is only some 4 or 5 feet of water in Tolly's Nullah, whereas in the Docks the steel-pipe was laid in a depth of nearly 40 feet of water.

7. *Circular Road Sewer.*—This consists of circular brick masonry sewer 36 inches diameter, and possessing when running full a discharging capacity of 1,183 cubic feet per minute. This sewer was constructed for carrying off the sewage of Hastings, but from observations I caused to be made on the 26th August last I found that the maximum flow of sewage only filled the sewer to a depth of 8 inches which is equivalent to a discharge of 224 cubic feet per minute. In para. 4 I have shown that the maximum discharge from the Watgunge depôt will not exceed 320 cubic feet per minute, so that this discharge, together with the discharge from Hastings, will only amount to approximately 550 cubic feet per minute, whereas the sewer is capable of discharge 1,183 cubic feet per minute. This 36" sewer discharges at the junction of Circular Road and Chowringee into a horse-shoe sewer measuring 6'-6" x 6'-3."

8. *Cost.*—I estimate the cost of the scheme to be as follows:—

	Rs.
Land 11 bigahs	1,20,000
Depôt	15,000
Steel-pipe under Tolly's Nullah	15,000
Sewers	10,000
Unfiltered water supply	2,000
Grand total	1,62,000

The above are, I think, outside figures, for when the detailed estimates are prepared, it is not improbable that the cost will be somewhat reduced; it must, however, be borne in mind that this is the cheapest scheme which I can devise for the disposal of the sewage of the wards to be served by this depôt.

9. According to the agreement made with the Port Commissioners, this depôt must be in working order by the 1st March, 1896, so it is very necessary that orders be passed at very early date in order that immediate steps may be taken for the acquisition of the land and for the construction of the steel-pipe.

A. E. SILK, A. M., I. C. E.,
Offg. Engineer to the Corporation.

10th September, 1895.

TO CHAIRMAN.

WITH reference to the Engineer's note regarding Watgunge depôt, I would beg to explain to the Commissioners the reason for asking for so much land. It is to avoid any possibility of being turned out after having erected a depôt there. If a sufficiency of land is taken up, any slight nuisance created by the emptying of the carts and pails will not extend beyond our own premises, and therefore it will be impossible for any objection to be taken to the depôt by surrounding houses. A clear piece of land enclosed belonging to the Corporation will prevent houses being built in such proximity to the depôt that the inmates might, afterwards with reason, complain of the work going on. This is a policy that is always adopted in large cities, in order that the Corporation may protect itself against injunctions and public complaints, and I would therefore strongly advise the Commissioners to carry out this policy in the case of the Watgunge depôt. As the Engineer states the premises may be also used as a mehters barracks and a general depot for conservancy appliances. I approve of the site marked out by the Engineer. I think, however, that there should be no houses fronting the depôt on Moonshigunge Road, for the reasons I have already mentioned. It may be necessary to take up the whole of the tank in the bustee.

W. J. SIMPSON, M. D.,
Health Officer.

10th September, 1895.

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Exhibit D.

Extract from Chairman's letter to Bengal Government, dated August 1895, relating to Watgunge depot and trenching grounds.

"I desire to place before Government a review of the action taken by the Corporation since 1st April, 1889, when they became responsible for the Suburbs in the matter of the disposal of the sewage of Wards 23, 24 and 25, distinguishing the recommendations of the Executive, the resolutions passed by the Commissioners, and the action taken by the Executive on those resolutions.

In April 1890, the following Note of the Health Officer was placed before the Commissioners and considered in Suburban Improvement Committee :—

The trenching ground itself is also in a condition to be a nuisance to the neighbourhood. A large part of it consists of low-lying ground, which, during the rains, becomes flooded. The remaining portion has been so much used that the ground is thoroughly saturated and has lost its disinfecting properties.

Recommendations.

1st.—A depôt should be constructed with ample flushing arrangements near the Kidderpore Bridge, and not far from Tolly's Nullah. This would relieve to a very great extent the trenching grounds.

2nd.—A new trenching ground might be chosen for the disposal of the night-soil of those districts too far away from the Kidderpore Depôt.

3rd.—A Supervisor should be specially appointed to be in charge of the old and new trenching grounds to see that the night-soil is properly trenched, that it is properly covered over, and that the trenched ground is immediately planted with vegetables, grass or tobacco. In fact, the same care and supervision is needed as is exercised in the case of trenching grounds attached to Jails. Even more care is required because larger quantities of night-soil are being dealt with.

A conference of Commissioners was arranged with Dr. Simpson on the remedies suggested by him.

On 25th April, 1890, the Committee resolved.—(a) that there should be a new trenching ground and that a site should be selected; and (b) that there would be fresh discharging depôts, one of which should be selected for Bhowanipore, Ward No. 22.

On 15th November, 1890, the Suburban Improvement Committee asked the Health Officer to seek out a piece of land suitable for trenching both in situation and size with a view to trenching.

On the 19th December, 1890, a report was submitted to the Suburban Improvement Committee by the Health Officer on the trenching of night-soil at Howrah, giving size of trenches, quantity of night-soil and earth put into each trench, and comparing the differences between the sandy soil at Howrah and the clayey soil at Goragatcha. This report was made because the trenching at Howrah had been found to be arranged on the best principles in Lower Bengal. A statement was made of a calculation for securing a trenching ground in lieu of Goragatcha on the system adopted at Howrah and elsewhere. The land was to cost Rs. 2,40,000 and its raising and preparation Rs. 40,000.

It was resolved that estimates, for taking up about 100 biggahs, in the most suitable site, to replace the trenching ground at Goragatcha, and for raising the land.

100 biggahs of land were accordingly selected at Sonadanga, and the estimate of Rs. 1,59,259 for acquiring, raising and preparing the land made by the Engineer, was placed before the Commissioners on the 18th of December, 1891. A very detailed calculation was made of the number of cubic feet of night-soil to be disposed of. The site was, however, objected to by the Suburban Municipality; and the Port Commissioners and the Commissioners finally resolved on 1st July, 1892, to abandon the project. Mr. Lee acquiesced in this arrangement and expressed hopes of being able to adapt the Incinerator to the destruction of night-soil.

On the Health Officer's return from 6 months' leave in England in 1893, the following Note of 11th May was submitted to the Chairman in regard to the disposal of the night-soil from Wards 23, 24 and 25 :—

With reference to the complaint from the Port Commissioners regarding the Goragatcha trenching-ground, I have asked the Superintendent to put up as brief a précis as possible relating to the Goragatcha trenching-ground. The first thing that happened after the suburbs were amalgamated with the town was the prosecution of the Municipality for creating a nuisance at Goragatcha. Such a prosecution had been long threatened against the Suburban Municipality, but had been staved off by the promise that when the amalgamation took place, the nuisance would be removed. The nuisance being proved, the Corporation was fined, and an injunction against the use of the land was only prevented by my telling the Magistrate that measures would be taken as soon as possible to lessen the quantity of night-soil going there, annexed A. is a note on the subject which I drew up, on 6th April, 1890. The two main recommendations in that note are marked B. and C. ; B. that "a depot should be constructed with ample flushing arrangements near the Khiderpore Bridge and not far from Tolly's Nullah. This would relieve to a very great extent the trenching-ground." C. that "a new trenching-ground might be chosen for the disposal of night-soil of those districts too far from the Khiderpore depot."

The Health Officer went on to say—

These two measures are the only proper solution of the difficulty. The cost of the depot near Tolly's Nullah connected with Circular Road Sewer with proper flushing arrangements would be between $\frac{1}{2}$ and 1 lac of rupees. It is perfectly feasible, for I put it before Mr. Baldwin Latham when he visited this city, and he informed the Chairman that there was not the slightest difficulty, and it could in no way affect the Circular Road Sewer. The second measure is to buy no ground between the trenching-ground and the Incinerator.

It is absolutely necessary that something should be done considering the present position and the history of this trenching question which are ; that it is—

1. An abominable nuisance ;
2. Complained of by rate-payers ;
3. Complained of by Port Authorities supported by their Medical Officer ;
4. Cause of one successful prosecution against the Corporation with the fine of 100 rupees ;
5. Prospective cause of further prosecution ;
6. Reported against by Sanitary Commissioner ; there can be no defence ; in fact, the state of things is indefensible, and the only matter for consideration is the abatement of the nuisance ; and I strongly recommend the adoption of the two measures proposed, and more especially the construction of the depot at Khiderpore.

A further note was submitted on 6th June, 1893, by the Health Officer to the Chairman on the same subject. It is as follows :—

I forward a letter from Dr. Dutt, Officiating Civil Surgeon, 24-Pergunnahs, regarding the condition of the Goragatcha trenching-ground. You will see that the matter is reaching a crisis. As I have always said that the present trenching-ground is an intolerable nuisance and totally indefensible, the measures which I recommended several years ago, *viz.*, the construction of a depot at Khiderpore and buying up of more land near the trenching-ground should be immediately taken in hand. If it comes to a prosecution, I absolutely refuse to go into the witness-box again and endeavour to extricate the Municipality from their difficulties. I did so once three years ago and in place of carrying out the relief-measures which I promised, nothing has been done since.

On the 23rd of June, 1893, the Suburban Improvement Committee resolved that the Health Officer and the Engineer be asked to submit estimates at an early date for an alternative system of disposing of the night-soil, and that the Committee recognise the urgency of the matter and the advisability of discontinuing the use of the trenching-ground, and are prepared to give effect to any reasonable scheme that may be brought forward.

On 1st July, 1893, the amount of *excreta* for 50,000 inhabitants to be discharged at the proposed Khiderpore depot was calculated by the Health Department and submitted to guide the Engineer for his estimates for Watgunge depot.

On 1st September and 22nd September, 1893, the Engineer's application for a grant of Rs. 500 to enable him to prepare the Watgunge scheme was discussed and sanctioned.

On the 24th of November, 1893, estimates were submitted by the Health Department for the acquiring, raising and preparing of 21 biggahs of land adjoining Goragatcha ground, at a cost of Rs. 49,000, to dispose of the night-soil of 8000 to 10,000 inhabitants of Alipore ; that of Watgunge, Khiderpore and a portion of Alipore to be served by the proposed depot at Watgunge. It was pointed out that the matter was most urgent so as to have the land ready for use before the rains of 1894.

On 7th January, 1894, the Suburban Improvement Committee sanctioned Rs. 15,000 to acquire the 21 biggahs. The confirmation of this was twice postponed by the Corporation on the ground that the suitability of the site was under enquiry by Government, first, on the 8th of March, then on the 15th of March and was not agreed to until 7th June, 1894.

On the representation of the South Suburban Municipality the Government refused to sanction the acquisition of land in a letter, dated 13th March 1894.

On 30th April, 1894, the Government wrote to the Corporation that it would not stay any longer the proceedings of the acquisition of the 21 biggahs, and that instructions would be issued to the Board of Revenue to push on proceedings.

On 17th June, the Government wrote to the Secretary of the Board of Revenue authorising the Collector of the 24th Pergunnahs to take possession of the land. A copy of this communication was forwarded to the Chairman of the Corporation on the same date.

The necessity of preparing the ground by raising and levelling was fully acknowledged at the time and discussed. On 1st October, 1894, the Suburban Improvement Committee sanctioned an estimate of Rs. 7,068 for raising a portion of the new Goragatcha ground, and on 29th May, 1895, a further estimate of Rs. 11,168 for the same purpose. I did not lay the complete estimate for raising and levelling the land before the Committee in October, because the estimates with which I was furnished seemed to me unnecessarily high, and also because we were threatened with a suit of which the object was to prevent us trenching at Goragatcha at all which was not disposed of till 31st May, 1895. In the course of this suit, a temporary injunction was issued against the Corporation prohibiting them from the use of the new ground. For these reasons the ground could not be completely prepared by the time the Corporation was compelled to abandon the old ground and use that newly acquired. As has been clearly explained to the Commissioners by me, I have had the expectation that the temporary scheme for disposing of the sewage of these wards devised and elaborated by Mr. Hughes, in 1894, which had been referred to Mr. Baldwin Latham for opinion, would have been approved this year, and the works have been undertaken and completed in the working season, 1895-96. This expectation has been based on Mr. Hughes' expressed opinion. When it became apparent that the temporary scheme was not approved by Mr. Latham, I recommended to the Commissioners the acquisition of 50 biggahs of land at Jinjrapul. This was sanctioned on 29th May by the Suburban Improvement Committee, though the site was subsequently altered to Bhatchala. At the same Meeting, Rs. 27,745 was sanctioned for raising the site of the new land at Bhatchala. Trenching is now being carried on at Bhatchala under the best conditions that circumstances will allow."

Other notes by the Health Officer on the same subject.

On 17th January, 1894, Health Officer protested against only Rs. 15,000 being sanctioned, he states that the land unless prepared is useless for trenching purposes. "That the raising of the land and filling in of the proposed tanks before the trenching-ground was to be used are important parts of the scheme. The present procedure is like determining on water works acquiring the land and leaving out the pipes for its distribution. I may mention that this raising of the land has been held as the essential feature of a trenching-ground for several years past."

On the 5th April, 1894, Health Officer addresses a note to Chairman asking that the land at Goragatcha be raised and the estimate of Rs. 50,000 be sanctioned, and stating that if this is not done before the rains, the nuisance now existing will be worse than ever.

On April 23rd, 1894, Health Officer sends a reminder to Chairman stating that he had several times pointed out the urgency of this matter, and that unless immediate steps be taken, trenching will be completely stopped in the rains, and he adds that no responsibility will attach to the Health Department.

NOTE.—In July 1895, the Chamber of Commerce addressed to the Government of Bengal a letter of Complaint regarding the Goragatcha trenching grounds.

Memo. on the letters of the Medical Board.

TO THE CHAIRMAN OF THE CORPORATION OF CALCUTTA.

SIR,

WITH reference to the letter of the Medical Board dated 9th December 1896, I have the honour to submit the following report on the particular points raised in the letter regarding the sanitary condition of Calcutta. I shall follow the order adopted by the Board in their summary, which is as follows:—

I. Overcrowding and badly-built houses.—This question is exhaustively dealt with in my note on the sanitation of Calcutta submitted with this report. The subject has, owing to the representations of the Health Officer, engaged the attention of the Commissioners for the past 10 years, and is now advanced to such a stage as to be beyond discussion. There can be no doubt that a good Building Act is required, and without such an Act neither overcrowded nor badly-built houses can be prevented. It is only by the provision of broad streets and a rigid regulation of the distribution of houses, with a view to their efficient ventilation and circulation of air around them, in order that too many houses may not be built on too limited a space, that the overcrowding of houses and overcrowding of the inhabitants can be effectively controlled by a Municipality.

As regards overcrowding of the inmates of houses and huts in Calcutta, it may be stated that 50 per cent. of the houses in Jorabagan, Burra Bazar, Jorasanko, Colootollah, and portions of Coomertolly, Fenwick Bazar, Entally, Toltollah, Baniapooker, Bhowanipore, and Watgunge are overcrowded, and to prevent this overcrowding it would be necessary to dislodge about half the inhabitants in these localities. No application of any section in the Act would be of any practical utility in reducing this overcrowding, and it would only be advisable to attempt it in special cases when a dangerous disease had broken out in the house. In any new Act the cubic space per individual should be defined for tenement houses and huts. Section 320 of the existing Act, which is intended to deal with overcrowding, does not apply to huts but to buildings. Section 393 gives no right of entry during the night, which is the only time that overcrowding can be correctly ascertained. The special instances of overcrowding in Russick Lall Lane given in the Sanitary Officer's report are no doubt correct, but to show the difficulty of proof it happened on the occasion of the Health Officer's visit that most of the rooms were unoccupied, but probably if the visit had been made at night the overcrowding would have been found to be even greater than that reported. An inspection cannot be made under existing conditions against the will of the occupiers without 24 hours' notice, which would defeat the object of enquiry if it was once known what these inspections were intended for. There is moreover no penalty for overcrowding, and there is no minimum cubic space per person fixed by the Act. The Health Officer on suggesting a prosecution as a test case was advised by the Municipal Pleader to first get the minimum cubic space fixed by a bye-law. The Health Officer on the 15th September 1893 framed a bye-law which was ordered by the Chairman to be placed on the buildings bye-law revision file. Section 385 includes a hut, but is unworkable for the same reasons. Even if full powers were given to enter occupied premises at night, they should only be exercised by the police. Sections 320 and 381 are taken from an English Act, and in that country are applied as a rule only to common lodging-houses and to exceptional tenemented houses, which, by reason of the habits of the inhabitants who occupy them, are subjected to special surveillance. These form a very small proportion of the houses in a large town elsewhere, but in Calcutta they on the contrary form a very large proportion. It is for these reasons that the Health Officer has always advocated a Building Act to reduce overcrowding of buildings and overcrowding of inhabitants.

II.—PUBLIC LATRINES.

There can be little doubt that a larger number of public latrines and urinals are required. Recently two large latrines—one with 16 seats for men and one with 12 seats for women, also a 4-seated urinal—were erected at Kalighat on the recommendation of the Health Officer. The Health Officer recommended these latrines in September 1893, and they were commenced about two years afterwards. The seats are of Donaldson's pattern, which is by far the best type in India for native latrines and are of glazed earthenware, while the whole understructure of the latrines is of glazed brickwork. It will be seen, therefore, that the recommendation of the Medical Board as to Latrine seats of glazed clay is one with which the Municipality agrees and has been carrying out for some years. Several years ago 14 sites were selected by the Health Department for public latrines and urinals, but the financial condition of the Corporation at the time did not permit of their construction. More recently four sites were selected by the Health Officer, and the question is still under consideration. The annexed Loan Budget of 1893-94 (Exhibit A.) will show that the question of providing public latrines, urinals, and discharge depôts for the suburbs to replace the trenching-grounds was not forgotten or neglected by the Health Department. In the same budget will be seen a recommendation to allot Rs. 30,000 annually for the systematic filling up of tanks. Suggestions have been made by the Health Department to acquire some of the worst *jemadari* latrines, which are the property of private persons who charge for their use, remodel them, and convert them into free public latrines. Such a course was recommended with the view of providing a larger number of free latrines and abolishing the insanitary *jemadari* latrines. Suggestions have also been made to erect latrines on a modern principle along the river bank north of Howrah Bridge, which is much crowded during the day.

Those latrines which were found faulty in construction by the Sanitary Officer are old. Many old latrines however have been replaced by those of a modern type; for instance, the foul-smelling latrines and urinals in Dalhousie Square were replaced by Macfarlane's on the Health Officer's suggestions and according to his design. Necessarily those latrines which are in a dilapidated condition cannot be cleansed so thoroughly as could be wished; but as a rule they are kept fairly clean, one and two mehters being kept at each night and day, and after the rush of the morning is over the mehters thoroughly wash down and disinfect the latrine with phenyle or carbolic acid. It is no fault of the Health Department that these latrines and depôts are in an unsatisfactory condition, for they have been repeatedly reported on and recommendations made for their repair.

III.—PRIVATE LATRINES.

With reference to private latrines, a peculiar feature of Calcutta, causing it to differ from most other sewered towns, is that though it is a sewered town yet only 5,000 latrines are connected with the sewers, and the mehter system prevails to-day more extensively than at a period before the drainage system was introduced. In this respect therefore the drainage system has not advanced the sanitation of the town, and not fulfilled one of the objects for which it was constructed. Some 52,000 private latrines require to be cleansed every day by means of a large establishment of mehters. This of itself is a work of much magnitude, and were the latrines of the best pattern would, to be done properly, require very close supervision by thoroughly reliable inspectors. Under contrary conditions the result is obvious. As things exist, an enormous number of these latrines are of a primitive character, many of them belonging to exceedingly poor people, and it is a work of time to abolish the latrines and replace them by sanitary structures.

It is only by steady, systematic, and unthwarted action that a thorough impression can be made. Where the people are very poor, an attempt is being made to compel the owner of the bustee to construct ranges of latrines. A set of Donaldson's cheap latrines were some months ago erected in Purbibagan bustee at 5, Alipore Lane, and in other localities under section 294. The latrines are excellent and cheap, but there has been a difficulty in realising the money from the bustee owners. For private latrines standard plans have been

adopted, and no new latrine is allowed to be built unless it conforms to that plan. In order that applicants may have every facility in understanding what is required of them, models of Donaldson's latrines have been built in the Health Office compound for their inspection. A copy of the official sanction (Exhibit B.) is annexed.

With reference to the old types of latrines, their insanitary nature was brought before the Commissioners in a note on the subject on 25th February 1888, when it was recommended that none of these latrines should in future be permitted, and those now existing should, as far as possible, be remodelled; the note was also included in the Health Officer's annual report for 1888, and photographs of the different types given. The result of this note was that several model latrines were erected at Municipal expense, and the best form was found to be connected latrines detached from the house and only connected by a passage, and this is being insisted on by the Health Department in new connected latrines. None of the kind described in the note of 1888 have ever been sanctioned by the Health Officer since that date. He has refused to have anything to do with such abominations, and only a few have been sanctioned during the past eight years by the Commissioners themselves; a fair number of them has been remodelled and converted into connected latrines, but progress in this direction is stopped by an insufficient unfiltered water-supply, whilst for a very large number of them nothing short of demolition of the latrine, as well as the whole or part of the house, can effect any improvement. It is impossible under existing, or indeed under any circumstances for these types of latrines to be properly cleaned. The fault of their being in a filthy condition does not lie with the cleansing staff. The sanitary officers have in no way exaggerated their terrible condition, but it is doubtful whether they have in their report described them in such strong measures of condemnation as has been done by the Health Officer. Demolition of the latrine and the house is frequently the only improvement that is possible, while to improve the remainder an ample unfiltered water-supply requires to be provided.

As regards connected latrines, the charge of these is with the Drainage Department, whose duty it is to make house-to-house inspections and have defects remedied. The Health Department only inspects when complaints are made to the Health Officer by the occupiers or neighbours, or when the medical inspectors visit the house for inquiry into infectious diseases, and the cases are then reported to the Drainage Department, on which devolves the duty of taking the necessary action.

When the drainage system was first introduced, connections were allowed without any flushing arrangements. This defect has been remedied in many houses, but those latrines which remain are very liable to get choked and out of order. Subsequently filtered water taps were fixed on to the seats for flushing purposes. This was a most dangerous arrangement, which when pointed out by the Health Department was discontinued. In view also of the Health Officer's opinion that filtered water should not be used as a supply for latrines, unfiltered water with supply tanks for its storage and flush tanks have been adopted.

IV.—HOUSE DRAINS AND DOWN PIPES.

These are in charge of the House Drainage Department.

V.—SURFACE DRAINS.

Surface drains in the town are to be found in bustees, and between closely built houses and on the sides of lanes and roads, and they form the general drainage system of the suburbs. In bustees and narrow passages where there are unconnected latrines, under existing arrangements, a quantity of the urine and privy washings pass into the surface drains before reaching the gully pit by which the surface drain is connected with the underground drains. As long as the surface drain is in good order, there is nothing particularly insanitary about this arrangement. It is far more preferable than a direct connection, which would inevitably get choked. It has the advantage of showing any defect at once and allows of it being readily dealt with.

In the morning many of these surface drains have foul matter in them, and in localities where overcrowding and overbuilding are greatest, the surface drains get fouled soon after they are cleansed; but the condition of the surface drains in the morning is repeated inside and outside of nearly every public urinal and latrine in the town. This state of things does not necessarily indicate so much the need of public latrines as the absence of sanitary police control. The absence of police sanitation would lead to similar practices in other towns. Practices of this kind can never be stopped by a few inspectors in the Health Department, whose outdoor work commences about 4 A.M., and is over by noon. Police sanitary regulations exist in other towns for the special purpose of preventing a similar condition of things, and until such are framed for Calcutta and enforced by the police authorities matters in this respect will not improve, however many public latrines may be provided. The police are the recognised sanitary agents in all large towns for carrying out what is called "police sanitation," and it is necessary that a similar system should be introduced into Calcutta. The police authorities here give the Health Department every assistance when required. But more than this is necessary. Police sanitation must be recognised as a system necessary for the cleanliness of the town; special police sanitary regulations require to be framed, and the police empowered to enforce them.

VI.—ROAD SCAVENGING.

As shown in the Health Officer's note on the sanitation of Calcutta submitted with this report, there are many contributing factors not producing the neglect of road scavenging but rendering it inefficient; they are inadequate supervision, inadequate establishment, the scraping of roads by the Engineering Department, and the removal of the mud by the Health Department; the system of throwing *domestic refuse* into the streets during the day, the increasing quantity of *trade refuse* thrown on the streets, the absence of police sanitation, the want of sweeping machines, the dependence on contractors for part of this work, and the blockage with consequent delay of the conservancy carts at the Circular Road dumping platforms. Each of these have been fully discussed by the Health Officer. With the causes explained the remedies are obvious.

VII.—COMPOUNDS AND COURTYARDS.

This is a matter of extreme difficulty in Calcutta. In western towns, the inside of houses, even among the poor, are kept clean and in good order, and are never visited by a sanitary inspector unless illness occurs in the house traceable or suspected to be due to some insanitary condition. It is only amongst the lowest orders, which form but a fraction of the population and where overcrowding exists, that filth and insanitary conditions prevail to any large extent, and for which a large special class of qualified sanitary inspectors are maintained. But in Calcutta, owing to the peculiarly migratory character of the people and their habits which are not adapted to town life, with its bringing together of a large population, western conditions of town life are reversed, and it is only a fraction of the population that keeps the inside of their premises, and especially the courtyards or compounds, clean and in a sanitary condition. Under the conditions stated, to provide for the frequent inspection, cleansing and placing in a sanitary condition the insanitary premises of an eastern city such as Calcutta means the maintenance of an immense staff of well-qualified sanitary inspectors. For the overcrowded localities of Burrabazar and Jorabagan and other quarters even the appointment of such inspectors would not be effective unless a staff was granted such as the Health Officer, in September last, recommended the Commissioners to employ for the special cleansing of the inside of premises and which has been steadily working in Jorabagan and Burrabazar since that time. This is due to the fact that in large tenemented houses and huts it is no one's business to keep the premises clean and notices to be followed by prosecutions if not complied with would be of little avail in securing the object for which the notice was served. The prosecution would take 2 or 3 months; in the meantime the filth would remain, and probably the fine would be so small as not to force the landlord to keep the premises clean. It was the knowledge of this that

lead the Health Officer to insist in the present emergency on a special cleansing staff. Notices are issued under sections 317 and 318 and if not complied with within 24 hours the work is done and the landlord has to pay. One of the means, and probably the only effectual method of keeping the premises of these overcrowded tenement houses in anything approaching a sanitary state would be the permanent appointment of such a special staff which should be maintained by the levying of a tax on those houses requiring cleansing. Possibly an arrangement of this kind would be the means of inducing landlords keeping in these houses a special individual to see to the cleanliness of the house. A great deal could however be done by having independent of the Overseers of cleansing a special Sanitary Inspector in each Ward, as was recommended in the Health Officer's first scheme in 1887.

VII.—WELLS IN COURTYARDS.

Formerly wells were filled up after service of notice under section 315, and much activity was shown in this direction until a motion was brought forward by a Commissioner that no well should be filled up without analysis of the water, and should the water be found impure, the owner should be called upon to excavate and cleanse the well. The Health Officer wrote the following note to the Chairman on the subject :—

Opinion of the Health Officer on the subject of the motion of Baboo Lall Behary Bysack.

This is a motion which should be strongly opposed, because it is calculated to retard sanitary work and do an immense deal of harm. All the wells in the town (town proper) are a source of ill-health and disease. There is not a well that I know of the water of which is not injurious to health. There is no use of analysing these wells. All are impure and unfit for use. Numbers have at times been analysed in the laboratory, and have been found worse than the sewage taken from the sewer in some respects. No dewatering or cleansing would have the slightest effect, and it would be merely playing with the matter to call upon any owner to excavate and cleanse his well. I have had trial wells made all over the town, and the analysis of the new wells shows the water to be impure and unfit for use of any kind. Every well in Calcutta (town proper) should be filled up, and until this is done there will always be a great deal of cholera and other disease: there is no excuse now for a well in Calcutta (town proper), seeing that there is a public water-supply, which is intended to take the place of the old wells. This filling up of wells is a most important sanitary work, and should on no account be retarded in the slightest degree.

W. J. SIMPSON, M.D.,
Health Officer.

The General Committee however resolved that a month's notice under section 315 should be issued, and if any objections were raised that the water should be analysed. Objections are of course made to every notice served to fill up a well, and the effect of the resolution has been to practically stop the filling up of wells, as the laboratory staff is insufficient for carrying on this extra work of analyses of well waters.

IX.—COWSHEDS AND STABLES.

Excellent bye-laws have been framed by the Commissioners for the securing of sanitary cowsheds, and the only defect in them is that they do not apply to cowsheds which contain less than five cows. The bye-law makes every cow-house, cattle shed, and stable or building in which an animal is kept subject to section 335 of the Municipal Act, and it will be seen from the list of prosecutions—annexed in the appendix and marked C for violation of that section, and which only refers to seven of the northern wards, that the Health Department has, so far as the bye-laws permit, made every endeavour to get the cowsheds of Calcutta improved. After a large number of notices had been served and further prosecutions were threatened, the Health Officer with one of the Ward Commissioners had a conference with a number of the *gowallas* in August last, and on their representing that the cubic space asked for each animal pressed on them as a hardship,

he consented to recommend to the Commissioners a reduction from 800 to 600; and on their further representing that they had a difficulty in obtaining filtered water for their cowsheds, he also promised to bring this to the attention of the Commissioners. The Health Officer explained the bye-laws to the *gowallas*, and on their promising to improve their sheds ordered that all the threatened prosecutions should be cancelled. The result of the conference has been that a fair number of the *gowallas* have begun to put their cowsheds into order.

The wells in cowsheds have been allowed in many cases to remain because there has been difficulty in supplying the cow-houses with a sufficient supply of filtered water. The question of a supply of filtered water to all cowsheds is now being considered by the Engineer and Commissioners, and immediately it is decided to grant every cow-keeper a proper supply of filtered water the wells will be ordered to be filled up. There is scarcely an owner of a cowshed, bullock shed, or public stable in Calcutta who has not within the past five years been served with notices to improve his shed or to remove it, and numbers have complied with the notices; but the great majority have disregarded them and have been prosecuted under section 336, with the result that they are fined such small sums that it is cheaper for the owners to pay the fine periodically for keeping a cowshed without a license than to incur the expense of putting the cowshed, stable, or bullock shed in order. It is stated that among the *Gowallas* there is a fund out of which prosecution fines are paid.

(1.) Section 336 gives power after conviction to turn out the animals and close the shed, which seems a very effective remedy. The carrying out of such a measure, however, soon shows that it is unworkable. There is passive resistance by closure of doors. In one case an inspector went with 80 men to turn out the animals and close a cowshed at 114, Shambazar Street, where 60 cows were kept. The door was kept closed and no admission could be obtained, and the inspector failed in his purpose. A complaint against the inspector was immediately lodged with the Chairman through an attorney, that the Inspector had taken a gang of *lattials* and had trespassed on the premises of the cowshed and that the proceedings were illegal.

On another occasion the owner of a cowshed in Ward C was convicted under section 336, and it was decided to close the shed. The inspector was obstructed and his men ill-treated until the police interfered. This led to another prosecution, which however was withdrawn on the party giving an undertaking that the place would be no longer used as a cowshed. The promise however was never kept.

Even if resistance is overcome and the inspector succeeds in turning out the animals and the cowshed is closed, there is no penalty for re-opening the shed and replacing the animals which were turned out. This has occurred on many occasions, and the whole proceeding of service of notice and prosecution has to be commenced afresh.

One instance illustrates the others. Recently at 109, Russa Road, a buffalo shed, which was in a very filthy condition, was closed after prosecution and the animals were turned out. The owner took charge of the animals and drove them away. Subsequently they were brought back and placed in the shed. Fresh prosecutions have now to be instituted. There is indeed nothing to prevent the owners taking charge of the animals immediately after they have been turned out, and returning them to the shed after it has been closed and the inspector has gone.

(2.) Notices have also been served under section 387 requesting owners of cowsheds to improve the sheds or remove the animals. This section is misnamed "Summary" for there is nothing summary about the procedure. In default of compliance with notices prosecutions were instituted under sections 388 and 389 and small fines were inflicted. The only difference apparently in procedure was the insistence on medical evidence to prove that a nuisance existed.

(3.) To improve cowsheds, notices under section 286 used to be served on owners of the land and on the shed owners. After the opinion, on section 277 referred to in the Health Officer's note on the sanitation of Calcutta, and given by the Government Solicitor that the owner of the land is not responsible for draining and paving sheds or houses used for trade purposes when built and owned by those to whom he had let out the land, notices were no longer served on the owner of the land but on the owner of the shed. Such notices are seldom complied with, and the Engineering Department do not like to incur the risk of doing the work with the probability of being unable to realise the cost, for there is nothing to prevent the *gowalla* removing his cows and shed before the completion of the work.

In regard to cattle sheds similar obstacles present themselves, with the additional one that when any vigorous action is being taken in this direction a strike is threatened. On 28th November 1894, when an impression was being made on the cattle shed owners the Chairman issued an order not to prosecute in cases of cattle sheds as he feared a strike.

(b.) As already stated, places with less than five animals cannot be touched by the bye-laws, and the Building Committee are of the opinion that section 286 cannot be applied.

Applications are made for constructing huts for dwelling-places and are sanctioned, and these huts are occasionally converted into cowsheds. There is no provision in the Act or bye-laws to prevent this.

The remedies consist in —

- (1) selection of sites for new cowsheds as provided in section 335 ;
- (2) Magistrates to inflict exemplary and daily continuous fines ;
- (3) the order for turning out the animals and closing the shed, and not to use it again as a shed for keeping animals, or to so alter it as to bring it into a sanitary condition satisfactory to the Commissioners, should be made by the Court ; it would immediately become a police case if the orders of the Court were not carried out.

X.—HACKNEY CARRIAGE STANDS.

Most of the hackney carriage stands have at one time or other been recommended to be improved. On the 14th December, 1895, the Health Department made the following recommendations relating to hackney carriage stands.

GREY STREET, WEST END.

The stone-sets require to be relaid and levelled ; it may also be extended a little towards the east. A urinal should be provided here for the use of the drivers, &c.

CORNWALLIS STREET, OPPOSITE No. 129.

Should be paved with stone-sets and drained ; also a urinal should be provided here.

DURMAHATTA STREET AT THE JUNCTION OF AHEEREETOLLA STREET

Should be paved and drained.

CORNWALLIS SQUARE, N.-W. CORNER.

The stone-sets should be relaid and levelled. Two gully pits should be provided. The kerb stones at the south end should be replaced.

MUSJIDBARI STREET, WEST END.

The stone-sets should be relaid and levelled. The north entrance should be widened, and damaged kerbstones should be replaced.

UPPER CIRCULAR ROAD, OPPOSITE No. 120, AT THE JUNCTION OF

NAWABDI OSTAGUR'S LANE

Should be paved with stone-sets and drained. A urinal should be placed also in this locality.

UPPER CHITPORE ROAD, JUNCTION OF SIKDAR PARRAH STREET

Should be paved. A urinal, if provided on the opposite side of the road, will be of great use.

CANNING STREET, OPPOSITE No. 39 to 42

Should be provided with gully pits for drainage. A urinal also is required here.

HOOGHLY BRIDGE APPROACH.

Pavement should be repaired and relaid. Gully pits should be provided for drainage.

DALHOUSIE SQUARE, NORTH

Should be paved and drained.

The urinals were recommended because the Superintendent found that drivers and syces were in the habit of committing nuisances on the side drains, footpaths, &c. It was also suggested that a ground hydrant with unfiltered water should be provided near each stand, so that they might be thoroughly cleansed each morning.

The General Committee on having this list submitted to them requested that two stands be selected in each ward and estimates for paving be submitted. On 27th January, 1896, the Health Officer submitted a list of 24 hackney stands, which should be paved and repaired. On the 18th September two of these were sanctioned.

XI.—CONDITION OF BUSTEES.

With regard to the more overcrowded bustees, and especially those with two storeyed huts, the description is correct. Appended is a list marked D, of bustee which have been recommended by the Health Officer to be improved, and the results. The bustee question is however essentially one intimately connected with the building regulations of the city, and they can only be successfully dealt with by a Building Act which will apply not to any particular bustee but to all the bustees within municipal limits. Much of the earlier work in opening up of bustees by cutting narrow lanes through them, was costly and of doubtful utility. Since 1886 the Commissioners have gradually come round to the Health Officer's view that structural improvements, based on the construction of narrow lanes, are not an advantage from a sanitary respect, and when roads are now made through bustees they are generally 16 or 24 feet wide.

As the two letters of the Medical Board, dated 30th November 1896 and the 9th December 1896, cover nearly the same ground, it is only necessary to refer here to two subjects which are mentioned in the first letter and not in the second. One is the pollution of the subsoil; the other is the disposal of house refuse. There is one remark however in the letter which should not be allowed to pass unchallenged. It is that there has been a complete failure on the part of the Health Department to carry out the ordinary operations of town conservancy. With the Health Officer's note on the sanitation of Calcutta, and a better understanding of the magnitude of the operations which are carried out in this city under exceptional difficulties, I am sure that a very different opinion will be arrived at.

XII.—POLLUTION OF THE SUB-SOIL.

The surface cleansing of the streets is not as efficient as it should be, and in some of the worst localities causes offensive smells, but that this rather than the sewers is answerable for the foul smells injurious to the public health and so frequently complained of, is a misconception on the part of the Medical Board, and is not in accordance with the Health Officer's 10 years' Calcutta experience or investigations. If it were a fact, which it is not, there would be no need of spending 20 lakhs or more in remedying the defects in the existing drainage, which has been proved after a prolonged and thorough inquiry by sanitary experts to be in a dangerous condition. Moreover the opinion of the Medical Board that several cases of tetanus which have occurred were traceable to persons falling and cutting themselves on soil impregnated with poisonous germs which has been caused by the condition of the streets is altogether unsupported by facts, and considering the general and wide distribution

of the tetanus bacillus in all soils is a statement which could only be made under the most exceptional circumstances and after the most careful investigation. All soils are more or less impregnated with the tetanus bacillus, which is a widely distributed organism quite common in the superficial layers of the soil in temperate and especially tropical regions, and may be found also in most stables, and probably on the maidan, and certainly on the racecourse. Most cases of tetanus in Calcutta are among infants within a fortnight of their birth, and are due to cutting the navel cord with a split bamboo coupled with other native customs. The recommendation of the Board to sterilise the soil of Calcutta by watering all roads and lanes accessible to watering carts once a week with a solution of one part of perchloride of mercury to 5,000 parts of water would not effect the purpose for which it was intended, and does not commend itself to the Health Officer on account of its impracticability and danger. The roads and lanes accessible to carts form only a very small portion of the unoccupied surface area of Calcutta. The suggestion would necessitate the purchase of some 300 new watering carts. Corrosive sublimate is a deadly poison, and children may be seen any day rushing up to watering carts, catching the water in their hands, and drinking it. It is moreover most undesirable that ignorant coolies should have the handling on such a large scale of a dangerous poison. To these reasons may be added the fact that the roads and lanes of Calcutta are alkaline on account of the dung and the urine of animals. And it is a well-known fact that if corrosive sublimate in solution, not well mixed with hydrochloric acid and salt, is added to an alkali, or even to waters containing carbonates, that the corrosive sublimate decomposes, and the compounds which are formed are quite inert as germicides. Moreover, should the corrosive sublimate not be decomposed, the action of the sun dries the surface of the ground almost immediately; and it is a fact, not so well known, that corrosive sublimate is only a germicide when in solution, and that the powdered sublimate would be absolutely useless for sterilising the soil. On the contrary as dust on the streets it would be dangerous. The recommendation therefore of the Medical Board that all roads and lanes accessible to water carts be watered once a week with a solution of one part of perchloride of mercury to five thousand parts of water would do no good whatever, and is certainly what no experienced sanitarian would advise. Phenyle was recommended to be used in some of the worst lanes in the most crowded localities as a deodorant. It is a disinfectant used in nearly every native gentleman's house, and it was most effective in carrying out the object for which it was used.

XIII.—DISPOSAL OF HOUSE REFUSE.

Section 298, to which the Medical Board refers, gives power to provide dustbins. There are 350 dustbins in town and suburbs, and when suitable sites can be obtained others are added. Dustbins are however as a rule nuisances, and cannot be placed on narrow streets, because they impede traffic, and because they are injurious to the health of the occupants of the houses immediately adjacent. In broad streets they cannot be put on the footpath, and in bustees the landowners will not allow them, being of opinion that the placing of a dustbin indicates possession by the Commissioners and interferes with his proprietary rights in the future. The above objections involve the acquiring by purchase of a suitable site for each dustbin which the Commissioners wish to locate. There are certain caste prejudices against the dustbin, even among servants, and there are many families too poor to keep servants, and the work of cleansing is done by the female members of the family who are *pardanashins*, and who simply open the door, and not infrequently an upper storeyed window, and throw the refuse into the street or lane. No one can be compelled to use a dustbin unless it is within 50 yards of his premises. Thus if section 298 was enforced, every portion of Calcutta would become worse than Circular Road with its garbage platforms. In a city like Calcutta, with its large native migratory and heterogeneous population, whose ideas of sanitation are at the lowest level, the only practical method which suggests itself to the Health Officer is to permit the inhabitants to throw their refuse into the streets between 9 P. M. and 6 or 7 A. M., and after due warning to

empower the police to arrest and prosecute any who throw refuse into the street at any other hour. The Health Officer has very frequently made a similar recommendation to the Commissioners. One of these, dated July 31st 1889, is subjoined.

To CHAIRMAN,—I would beg to bring before the Chairman the desirability of regulating the throwing out of refuse on the streets of Calcutta. In my quarterly report, dated 18th October 1887, I drew attention to this matter, and there stated that unless such regulations are put in force, the conservancy carts might be travelling the streets and lanes the whole day and yet not succeed in keeping them in a state of cleanliness. The present regulations are as follows:—

NOTICE.

DEPOSIT OF REFUSE ON PUBLIC STREETS.

The following hours have been fixed by the Commissioners, under section 300 of Act II (B. C.) of 1888, for the deposit of refuse on public streets:—

For Wards Nos. 1 to 11—between the hours of 12 P. M. to 8 A. M. and 12 A. M. to 2 P. M.

For Ward No. 12—between the hours of 12 P. M. to 9 A. M.

For Wards Nos. 13 to 17—between the hours of 12 P. M. to 5 A. M.

As these hours may be inconvenient, the following rules are framed to meet the convenience of occupiers who wish to avail themselves of them:—

(a) If persons will set up dustbins in their compound, the cart will remove refuse daily, entering the compound for that purpose, if necessary. Plans and designs of dustbins can be obtained at the Municipal Office, or on receiving a request to that effect. The inspector of the ward will attend at the house and explain the different kinds of dustbins.

(b) The refuse may be kept in baskets of a convenient size inside the gate, and be placed on the cart when it goes its rounds. The approximate hour of the visit of the cart will be notified to each house wishing to dispose of its refuse in this manner. Baskets can be provided by the inspector, if requested, at four annas a piece. If the baskets are placed close to the entrance, the municipal carter will empty them into the cart.

MUNICIPAL OFFICE,
Calcutta, 1889. }

JOHN COWIE,
Secretary to the Corporation.

I would state that, as regards Wards 1 to 11, there are no afternoon conservancy carts, and unless the Commissioners are prepared to give extra carts, coolies, peons, and a regular establishment, these rules are unworkable, and the refuse thrown out after 8 A. M. must remain in the streets the whole day. I would suggest that for these wards no refuse be thrown into the streets between 8 o'clock in the morning and 9 o'clock at night. In other tropical cities more stringent rules than these are in force; for example, in Rangoon no refuse is permitted to be thrown out on to the streets between the hours of 7 A. M. and 12 at night. The police are entrusted with the administration of this part of the Act in all towns I am acquainted with, and I think it should be a police law in Calcutta.

With regard to No. 12 Ward, the inhabitants should throw out their refuse during the same hours as Wards 13 to 17, *viz.*, between the hours of 12 P. M. to 5 A. M., allowing shopkeepers only to deposit the *sweepings of their shops* in baskets in the street until 9 A. M.

W. J. SIMPSON, M.D.,
Health Officer.

31-7-89.

***Previous action of the Health Department on the specific instances of
insanitary conditions recorded by the sanitary Officers.***

With reference to the specific instances given by the Sanitary Officers I have had reports submitted to me by the Superintendents of Conservancy, and for information they are annexed as Exhibits X. Y. I. It will be seen from these reports that the examples given by the Sanitary Officers have with *very few* exceptions been all dealt with by the Health Department previous to the appointment of the Medical Board, and that had the Health Departments recommendations been carried out these insanitary conditions would not have been found.

I have the honour to be,

Your obedient servant,

W. J. SIMPSON, M. D.,

Health Officer:

January 12th, 1897.

Exhibit A.

The Superintendent has put up a note on the loan budget which is required for the suburbs. I purposed to ask for latrines Rs. 20,000, as the suburbs are exceedingly badly off for latrines, and the Commissioners have on several occasions recommended that there should be public latrines in each ward. But considering the state of finance of the present year, I ask only for Rs. 10,000 to replace the three dilapidated latrines, the only public ones in the suburbs. For discharging depôts a sum of Rs. 28,611 is urgently required in order to relieve the trenching-grounds, all of which are a nuisance.

Rs. 34,000 are also required for gowkhannas at Ballygunge and Entally, both of which are in a very bad condition.

Rs. 8,895-8 is needed for sub-registrar's office and accommodation for mohurrirs at Shahanagur Burning-ghat. This was sanctioned in December 1891, but the money lapsed.

The total amount asked for is Rs. 81,506-8-0. Full details are given in Superintendent's note.

31-7-93.

W. J. S.

Will you kindly have prepared a tabular loan budget in exactly the same form as the Engineer for drainage and miscellaneous. The details should be very full in the column of remarks, and reference be given to any estimates that may have been prepared. The whole should be carefully revised and faired. I will then have it printed and submitted. I should like to have had it earlier.

2-8-93.

G. N.

Herewith the loan budget for suburbs made out according to Chairman's desire. It includes cost of gowkhannas, free latrines, discharging depôts, three bathing platforms, urinals, burning ghat, and money required for filling tanks and marshy lands and miscellaneous work. Opposite each is given a full account of what is required and the reasons of the Rs. 1,61,455-1-8.

Rs. 35,000 would be recoverable. The main expense is due to gowkhannas acquiring and the erection of discharge depôts.

8-8-93.

W. J. S.

HEALTH OFFICER'S DEPARTMENT.

LOAN BUDGET FOR 1893-94.

*Gowkhanahs, Free Latrines, Discharging Depots, Bathing Platforms,
Urinals and Burning Ghat.*

ABSTRACT.

Item No.	Description.	Amount.		
		Rs.	As.	P.
1	Acquiring land at Ballygunj for extending and permanently establishing the Gowkhanah ...	15,071	1	8
2	Erecting three sheds at Ballygunj to accomodate 100 bulls @ 800 cubic feet for each bull. ...	9,500	0	0
3	Erecting one shed to accomodate 10 sick cattle at Ballygunj ...			
4	Making up Compound or Yard at Ballygunj Gowkhanah ...			
5	Erecting three bullock sheds at Entally to accomodate 100 animals @ 800 cubic feet each ...	9,500	0	0
6	Erecting a shed at Entally for 10 sick cattle ...			
7	Dismantling old buildings at Entally Gowkhanah and repairing Yard with old materials ...			
8	Replacing, existing free latrine at Kallyghat, by substituting Donaldson's Patent ...	6,000	0	0
9	Constructing a 10 seated Donaldson's Patent Latrine at Watgunj bustee, in place of the existing Free Latrine ...	2,000	0	0
10	Constructing a 10 seated latrine Donaldson's Patent at Woolfut Bagan in place of the existing Free Latrine ...	2,000	0	0
11	New Discharge Depôt, latrine, bathing platform, Urinal including boundary wall and new roads at Russa Road, Bhowanipur ...	20,542	0	0
12	Acquiring land at Bhowanipur for Discharge Depôt, &c. ...	15,000	0	0
13	Discharging Depôt and Bathing Platform at Circular Road ...	9,000	0	0
14	Discharging Depôt and Bathing Platform at Woolfut Bagan ...	10,000	0	0
15	Acquiring land for Depôt and Bathing Platform at Woolfut Bagan ...	10,000	0	0
16	New Urinals ...	5,000	0	0
17	Shanngar Burning Ghât accomodation for Mohurers and Sub-Registrars, &c. ...	11,342	0	0
18	Filling up foul Tanks, dobas, and marshy lands	30,000	0	0
19	Miscellaneous works, filling up Wells, repairs to Privies, building new Privies, &c., in default of compliance with notices on owners ...	5,000	0	0
20	Repairing Roads to Refuse and Trenching grounds	1,500	0	0
21	General Discharging Depôt at Watgunj bustee ...	.....	
TOTAL RS. ...		1,61,455	1	8

Lowest tender for
2 and 3 is
Rs. 8,635-1-3.

Lowest tender for
5 and 6 is
Rs. 8,635-1-3.

Engineer's esti-
mate to follow.

HEALTH OFFICER'S

Loan Budget, 1893-94, Gowkhanahs, Free Latrines, Discharging

1	2	3	4	5	6
Item No.	Description.	ESTIMATED PROBABLE COST.			
		Sanctioned.	Date of Sanction.	Not yet Sanctioned.	Amount.
1	Acquiring land at Ballygunj for extending and permanently establishing the Gowkhanah.	.....	.....	.....	.....
2	Erecting three sheds at Ballygunj to accommodate 100 bulls @ 800 cubic feet for each bull.	.....	.....	.....	.....
3	Erecting one shed to accommodate 10 sick cattle at Ballygunj.	.....	.....	.....	.....
4	Making up Compound or Yard at Ballygunj Gowkhanah.	.....	.....	.....	.....
	Total for Nos. 2, 3 and 4, inclusive ...	.....	.....	.....	.....
5	Erecting 3 bullock sheds at Entally to accommodate 100 animals @ 800 cubic feet each.	.....	.....	.....	.....
6	Erecting one shed at Entally for sick cattle, 10 animals.	.....	.....	.....	.....
7	Dismantling old buildings at Entally Gowkhanah and repairing Yard with old materials.	.....	.....	.....	.....
	Total for Nos. 5, 6 and 7 inclusive ...	.....	.....	.....	.....

DEPARTMENT.

Depots, Bathing Platforms, Urinals & Burning Ghat.

7	8	9	10
Expended to 31st March 1893.	Proposed by the Executive for 1893-94.	Sanctioned by the Commissioners, 1893-94.	REMARKS.
.....	1,5071	.....	<p>Special reasons why acquiring and extending is recommended :—</p> <p>(1) This site from past working has proved to be a most desirable one. (2) It would be extremely difficult to obtain another site; should we be called upon to vacate this land. (3) The present ground is much too small and will have sooner or later to be extended, and there is now a suitable plot adjoining, the acquisition of which is included in this amount. (4) The late owner of the land now rented and the plot adjoining, has recently died, and it is not improbable the sons will convert it into a building plot, it being so well situated, having roads on three sides, even should the adjoining plot only be built upon, we shall lose the present favorable opportunity of extending unless at the cost of acquiring buildings. (5) This land is well raised when compared with other suburban lands, and should we be compelled to leave a large sum of money would have to be paid for raising sufficiently any land we might go to.</p>
.....	.....	.....	<p>The existing structures are little better than useless from their dilapidated condition and are far short of our requirements, the majority of our animals being left without shelter, exposed to all weathers day and night, which does them much harm. The proposed sheds will be substantially built on the revised standard plan for cow and bullock sheds allowing 800 cubic feet to each bull as required by-law 8, part III of sub-section (l) section 412 page 38 of Bye-laws.</p>
.....	.....	.....	<p>This shed would be divided off into parts for segregating any animals which perchance may be attacked with contagious or infectious diseases. At present we have no such shed, the necessity for which must however be obvious.</p>
.....	.....	... ..	<p>This yard is at present in a very bad state full of holes and ruts, and must in any case be repaired promptly.</p>
.....	9,500	.....	<p>Lowest tender for 2 and 3 Rs. 8,635-1-3 put up.</p>
.....	.....	.....	<p>See remarks against No. 2.</p>
.....	.....	.....	<p>See remarks against No. 3.</p>
.....	.....	.....	<p>See remarks against No. 4.</p>
.....	9,500	.....	<p>Lowest tender for 5 and 6 Rs. 8,635-1-3 put up.</p>

HEALTH OFFICER'S

Loan Budget, 1893-94, Gowkhanahs, Free Latrines, Discharging

1	2	3	4	5	6
Item No.	Description.	ESTIMATED PROBABLE COST.			
		Sanctioned.	Date of Sanction.	Not yet Sanctioned.	Amount.
8	Remodelling existing Free Latrine at Kali-ghat, substituting Donaldson's Patent.	.....	.....	.....	.....
9	Constructing a ten seated Donaldson's Patent Latrine at Watgunj Bustee, in place of the existing Free Latrine.	.....	.....	.....	.....
10	Constructing a ten seated latrine Donaldson's Patent at Woolfut Bagan, in place of the existing Free Latrine.	.....	.....	.....	.....
11	New Discharge Depôt, Latrine, Bathing Platforms, Urinal including boundary wall and new Roads at Russa Road, Bhowanipur.	.....	.....	.....	.....
12	Acquiring land at Bhowanipur for Discharge Depôt, &c.	.....	.....	.....	.....
13	Discharging Depôt and Bathing Platform at Circular Road.	.....	.....	.....	.....
14	Discharging Depôt and Bathing Platform at Woolful Bagan.	.....	.....	.....	.....
15	Acquiring land for Depôt and Bathing Platform at Woolfut Bagan.	.....	.....	.....	.....
16	New Urinals	5,000	Budget Committee 1892-93	.....	5,000

DEPARTMENT.

Depots, Bathing Platforms, Urinals & Burning Ghat.

7	8	9	10
Expended to 31st March 1893.	Proposed by the Executive for 1893-94.	Sanctioned by the Commissioners, 1893-94.	REMARKS.
.....	6,000	.....	This Latrine is most objectionably situated on the banks of Tolly's Nullah, and is so faulty in construction that its washings with no small intermixture of night soil run direct into the canal at the very spot, where hundreds of persons bathe daily. During the rains the Well which contains night soil overflows into the canal; the state of affairs is insanitary. It is proposed to replace this objectionable structure, by a 30 seated Donaldson's Patent Latrine further away from the Canal.
.....	2,000	.....	The existing Latrine is a dilapidated old structure, and should be replaced by one of Donaldson's Patent.
.....	2,000	.....	The existing structure is a veritable nuisance. It is largely used and should be at once replaced by a 10-seated Donaldson's Patent Latrine.
.....	20,542	.....	The urgent necessity for establishing night soil Discharging Depôts in the suburbs has long been admitted on all sides, the only practicable difficulty hitherto being the selection of suitable sites. Such a site has been selected where it is proposed to erect a Discharge Depôt, Latrine, Urinal and Bathing Platform, with a boundary wall, enclosing all, with new roads or approaches; the engineer's estimate for which inclusive is Rs. 20,542. Apart from the Discharge Depôt, the need of a public Latrine and Urinal is obvious, and so also is that for a Bathing Platform, the waste water from which would be valuable for keeping the sewer flushed and clear.
.....	15,000	.....	This is an approximate estimate.
.....	9,000	.....	This is according to engineer's estimate. The land has already been acquired 10th February 1890.
.....	10,000	.....	This is approximate based on the two preceeding estimates. With this and the proposed Depôts at Circular Road and Russa Road established, trenching night soil from Wards 19, 20, 21 and 22 will be reduced to a minimum, if not discontinued altogether.
.....	10,000	.....	This may be roughly estimated at Rs. 10,000, but should the land acquired for <i>dhobee khanah</i> , be not required for the purpose, an exchange might be affected for other more suitably situated. There is at present a Discharging Depôt at Woolfut Bagan, which has not been used for some years past owing to its objectionable position and faulty construction.
Nil.	5,000	.....	Urinals are very much needed in the suburbs, and the Commissioners realizing this fact recommended in Budget Committee of 1892-93 Rs. 5,000 for this purpose, but the sanction lapsed.

HEALTH OFFICER'S

Loan Budget, 1893-94, Gowkhanahs, Free Latrines, Discharging

1	2	3	4	5	6
Item No.	Description.	ESTIMATED PROBABLE COST.			
		Sanctioned.	Date of Sanction.	Not yet Sanctioned.	Amount.
17	Shanngar Burning Ghat accomodation for Mohurers and Sub-Registrars Office &c.	8,895-8-0	18-12-91	.....	.....
18	Filling up foul Tanks, and dobas, and marshy lands.	.....	.....	.....	.....
19	Miscellaneous works, filling up Wells, repairs to Privies, building new Privies, &c., in default of compliance with notices on owners.	.....	.....	.....	.....
20	Repairing Roads to Refuse and Trenching grounds.	.....	.....	.....	.....
21	General Discharging Depôt at Watgunj Bustee.	.....	.....	.....	.....

DEPARTMENT.

Depots, Bathing Platforms, Urinals & Burning Ghat.

7	8	9	10
Expended to 31st March 1893.	Proposed by the Executive for 1893-94.	Sanctioned by the Commissioners, 1893-94.	REMARKS.
8,895-8-0	11,342	.....	This is urgently necessary and the Suburban Improvement Committee of 18th December 1891, sanctioned Rs. 8,895-8-0 of the estimated amount which lapsed. Sanction for the whole sum estimated for, is now asked. The land was acquired on 31st March 1891.
.....	30,000	.....	It is most desirable that a sum of money be provided in the Loan Budget for filling up foul Tanks, dobas and marshy lands for the suburbs <i>recoverable</i> .
.....	5,000	.....	It is very necessary to make provision for these odd jobs, which should certainly be done to bring about a more healthy and sanitary condition. <i>The amounts expended for Nos. 18 and 19 would be recoverable.</i>
.....	1,500	.....	The roads to Refuse grounds and Trenching grounds are in a very bad condition and require frequent repairs. Several of our bulls have been badly hurt through this, and it is most necessary that a sum be set apart for keeping these Roads in good order.
.....	.....	.....	Engineer's estimate to follow.

(Sd.) W. J. SIMPSON.

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE
IN RESPONSE TO A RESOLUTION OF THE HOUSE OF COMMONS
PASSED IN 1861

Description of the Land	Area in Acres	Value in £	Remarks
Land in the parish of St. Andrew, near the town of St. Andrew, which was purchased by the Government in 1841, and is now used as a military depot.	11,000	11,000	
Land in the parish of St. Andrew, near the town of St. Andrew, which was purchased by the Government in 1841, and is now used as a military depot.	20,000	20,000	
Land in the parish of St. Andrew, near the town of St. Andrew, which was purchased by the Government in 1841, and is now used as a military depot.	5,000	5,000	
Land in the parish of St. Andrew, near the town of St. Andrew, which was purchased by the Government in 1841, and is now used as a military depot.	1,500	1,500	
Land in the parish of St. Andrew, near the town of St. Andrew, which was purchased by the Government in 1841, and is now used as a military depot.

Section No.

HEALTH OFFICER'S DEPARTMENT.

Ward No.

Dated _____ 189 .

To

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THIS is to inform you that the Health Officer has sanctioned the construction of a ^{single}/_{double} seated Donaldson's pattern oriental latrine No. at No.

তারিখ

১৮৯ ।

subject to the provisions of Act II of 1888, on the following conditions :—

1. The upper portion of the privy should be properly enclosed according to plan.

2. The roof of the privy shall be always separate from that of the house or hut.

3. The privy must be made in accordance with the standard plan, herewith.

4. No privy can be allowed within 50 feet of a tank, 20 feet of a well and 6 feet of a street public or otherwise, or a public drain.

এতদ্বারা তোমাকে উপরোক্ত বাড়ীতে খঃ ১৮৮৮ ২ ধারার নিম্নলিখিত নিয়মানুসারে একটি এক বা দুই ফৌকর ডোনাল-সন পেটেন্ট ৪ নং পাইখানা প্রস্তুত করিবার অনুমতি দেওয়া হইল।

১ম। নক্সা অনুসারে পাইখানার উপরাংশে চারিদিক রীতিমত আবৃত করিতে হইবে।

২য়। পাইখানার চাল বসবাসের ঘরের চাল হইতে সতন্ত্র রাখিতে হইবে।

৩য়। কমিসনারদিগের নক্সা অনুযায়ী পাইখানা তৈয়ার করিতে হইবে।

৪র্থ। পুকুরিগীর ৫০ ফুট পাতকোয়ার ২০ ফুট সরকারি বা অন্য কোন রাস্তার এবং সরকারি ডেন ৬ ফুটের ভিতর কোন পাইখানা তৈয়ারি করিতে দেওয়া যাইবে না।

চৌহদ্দি মধ্যে।

Boundary of the Site.

North

East

South

West

উত্তর

পূর্ব

দক্ষিণ

পশ্চিম

Further information, if required, can be had on application at the Health Officer's Department, where samples of Donaldson's pattern sanitary latrines have been erected for inspection. These latrines are to be obtained from

অন্য কোন বিষয় জানিতে হইলে ডাক্তার সাহেবের আপিসে দরখাস্ত করিলে জানিতে পারিবে যেখানে ডোনালসন পেটেন্ট পাইখানার নমুনা প্রদর্শনার্থ স্থাপিত হইয়াছে, এই সকল পাইখানা নিম্নলিখিত স্থানে পাওয়া যায়।

Superintendent.

সুপারিনটেন্ডেন্ট।

Exhibit B.

Statement shewing the notifications issued signed by the Chairman under Sec. 336 of Act II (B. C.) of 1888, for closing the cowsheds.

Serial No.	LOCALITY OF SHED.		Name of owner of shed.	Requirements of the notifications issued under sec. 336 of Act II (B. C.) of 1888.	Result.
	No. of Premises.	Name of Street.			
1	16	Ram Kanto Bose's Street	Goopi Dari ...	It is hereby notified under Sec. 336 of Act II (B. C.) of 1888. That the premises mentioned have been closed against the keeping of animals. Any person who contravenes this notification will be prosecuted.	Notifications cancelled, vide Memo. No. ¹⁶ 43 or 3070 dated 5-4-93, the <i>godalas</i> having protested through their Attorney, Mr. Manuel.
2	16	Ditto	Surjimoni Bewa and Nilbarun Ghose ...		
3	54/1/H/3	Raja Rajballub's Street	Purneshwar Ghose ...		
4	54/1/H	Ditto	Nobo Dari ...		
5	114	Shambazar Street	Do. ...		
6	114/1	Ditto	Nufer Chunder Ghose ...		
7	54/3/H/1	Raja Rajballub's Street	Gopi Nath Ghose ...		
8	155/H/60	Chitpore Road, Upper	Bhoot Nath Ghose ...		
9	115 H/6	Grey Street	Shama Bewa ...		
10	153	Shambazar Street	Behari ...		
11	153	Ditto	Shaik Auckloo ...		
12	161/H/23	Chitpore Road, Upper	Mohendra Das ...		
13	161/H/51	Ditto	Shaik Ashomudly ...		
14	25	Raja Nobokissen's Street	Ram Subul Laha ...		
15	30/H	Doorga Churn Mukerjee's St.	Hurrochunder Ghose ...		
16	13	Ram Kanto Bose's 1st Lane	Rugho Nandan ...		
17	161/H/69	Chitpore Road, Upper	Nilloo Shome ...		
18	176/H/5	Ditto	Sriram Das ...		
19	176/H/7	Ditto	Gobiada Shaw ...		
20	58/H/4	Raja Rajballub's Street	Premchand Ghose ...		
21	58/H/1	Ditto	Amulya Ghose ...		

U. R. MOOKERJEE,
Inspector, WARD I.

Exhibit C.

Statement shewing the notices served in 1892-93 on the goalahs in Ward I to thoroughly improve and remodel their cowsheds, bullocksheds, &c., as required under the provisions of the Municipal laws and Bye-Laws before they could be licensed.

Serial No.	LOCALITY OF SHED.		Name of Owner of shed.	Requirements of notice served under the provisions of the Act.	Takeed No.	RESULT.
	No. of Premises.	Name of Street.				
1	54/	Raja Rajbullub's Street	Nilmoni Ghose	To thoroughly remodel, pave, drain and connect with the street sewer and supply with water, and otherwise put into sanitary condition according to the bye-laws and rules framed by the Commissioners, the cowsheds to the satisfaction of the Commissioners.	1	Takeeds cancelled as the Engineer objected to allow cowsheds to be connected with the street sewers that are less than 15 inches in diameter.
2	10/H/4	Ram Kanto Bose's 1st Lane	Makhun Ghose		2	
3	10/H/6	Ditto	Behari Ghose		3	
4	10/H/5	Ditto	Narain Ghose		4	
5	10/H/0	Ditto	Kali Ghose		5	
6	10/H/0	Ditto	Nilmoni Ghose		6	
7	54/1/H/1/1	Raja Rajbullub's Street	Khetter Ghose		7	
8	54/1/H/3	Ditto	Farmeshwar Ghose		8	
9	54/1/H/	Ditto	Nobo Dari		9	
10	114	Shambazar Street	Nobo Dari		10	
11	114/1	Ditto	Nuffer Chunder Ghose (dead)		11	
12	54/3/H/1	Raja Rajbullub's Street	now Nani Ghose.		12	
13	16/H	Ram Kanto Bose's Street	Gopinath Ghose		13	
14	16/H	Ditto	Bissonath Ghose		14	
15	16/H	Ditto	Nibaran Ghose		15	
16	8/H/2	Khetter Dhole's Lane	Goopi Dari		16	
17	155/H/54/1	Chitpore Road, Upper	Behari Lal Ghose		17	
18	155/H/60	Ditto	Laul Ch. Ghose		18	
19	155/H/61	Ditto	Bhootnath Ghose		19	
20	155/H/53	Ditto	Laul Ch. Ghose		20	
21	155/H/	Ditto	Bideo Bariwalli		21	
22	113/H/	Grey Street	Kali Dassi		22	
23	125/H/20	Shambazar Street	Shoshi Ghose		23	
24	115/H/6	Grey Street	Umesh Ghose		24	
25	10/H	Ram Kanto Bose's 1st Lane	Shama Bariwalli		25	
26	54/H	Raja Rajbullub's Street	Nuffer Chunder Ghose		26	
27	54/5	Ditto	Chinibash Ghose...		27	
			Huttoo Bakuly		28	

Exhibit C.—contd.

Statement shewing the notices served in 1892-93 on the goalahs in Ward I to thoroughly improve and remodel their cowsheds, bullocksheds, &c., as required under the provision of the Municipal laws and bye-laws before they could be licensed.

Serial No.	LOCALITY OF SHED.		Name of Owner of shed.	Requirements of notice served under the provisions of the Act.	Takeed No.	RESULT.
	No. of Premises.	Name of Street.				
28	27	Raja Rajbullub's Street	Madhub Ghose ...	To thoroughly remodel pave, drain and connect with the street sewer and supply with water, and otherwise put into sanitary condition according to the bye-laws and rules framed by the Commissioners, the cowsheds of your premises to the satisfaction of the Commissioners.	118	
29	27	Ditto	Bholanath Ghose...		119	
30	58/H/4	Ditto	Premchand Ghose		120	
31	58/H/28	Ditto	Shiboo Ghose ...		121	
32	58/H/5	Ditto	Atul Ghose ...		122	
33	58/H/1	Ditto	Amulya Ghose ...		123	
34	58/H/7	Ditto	Nuffer Ghose ...		124	
35	58/H/3	Ditto	Benode Ghose ...		125	
36	55/H/6	Ditto	Troyluckho Ghose		126	
37	55/H/0	Ditto	Panchoo Ghose ...		127	
38	55/H/3	Ditto	Hem Ghose ...		128	
39	55/H/2	Ditto	Soshi Bhusun Ghose		129	
40	55/H/1	Ditto	Narain Ghose ...		130	
41	14	Ram Kanto Bose's 1st Lane	Khirode Ghose ...		131	
42	9/H/2	Ram Kanto Bose's Street	Mullick Ghose ...		132	
43	9/H	Ditto	Nobo Ghose ...		133	
44	10	Ditto	Nuffer Ghose ...		134	
45	0/H/1	Ram Kristo Bose's Street	Preo Ghose ...		135	
46	11/H/3	Ditto	Laul Chand Ghose		136	
47	11/H/4	Ditto	Hori Ghose ...		137	
48	13	Ditto	Meghnad Ghose ...		138	
49	13/H/1	Ditto	Troyluckho Ghose		139	
50	16/H/9	Ditto	Surjimoni Bewa ...		140	
51	16/H/10	Ditto	Goopi Dari ...		141	
52	13/H/2/11	Ditto	Uday Ghose ...		142	
53	17/H/6	Raja Rajbullub's Street	Narain Ghose ...		143	
54	17/H/1	Ditto	Issur Ghose ...		144	
55	17/H/7	Ditto	Gopal Ghose ...		145	
56	17/H/8	Ditto	Chimibash Pyne ...		146	
57	10	Sita Katno Banerji's Lane	Nundo Ghose ...		147	
58	5/H/1	Beer Chand Gossain's Lane	Kalipodo Ghose ...		148	
59	5/H/2	Ditto	Jodoo Ghose ...		149	
60	5/H/3	Ditto	Hem Chander Ghose		150	
61	47/H/0	Shambazar Street	Gopi Ghose & Lakhmoni Bewa		151 & 152	
62	47/H/0	Ditto	Kunaoni Bewa ...		153	

63	25	Raja Nobokissen's Street	...	Khetter Mohun Dass	...	159
64	22/H/0	Bulloram Ghose's Street	...	Hen Chunder Neogy	...	160
65	27/	Ditto	...	Auckhoy Coomar Ghose	...	161
66	37/H/0	Raja Nobo Kissen's Street	...	Mukta Bewa	...	162
67	6/H/10	Kombuleatola Lane	...	Brojo Mitter	...	163
68	4/H/0	Kristoram Bose's Lane	...	Kader Ghose	...	164
69	161/H/5	Chitpore Road Upper	...	Meajan Coachman	Do. Do. bullockshed	165
70	161/H/6	Ditto	...	Tincori Bewa	...	166
71	54/6/H/6	Raja Rajbullub's Street	...	Neamuth Khan	...	167
72	54/6/H/7	Ditto	...	Luckhi Bibee	...	168
73	161/H/44	Chitpore Road Upper	...	Urno Bibee	...	169
74	76/H/12/3	Shikdar Bagan Street	...	Brojo Ghose	To thoroughly remodel	1289
75	76/H/0	Grey Street	...	Durga Churn Ghose	pave, drain and connect with	1290
76	76/H/0	Ditto	...	Hori Manick	the street sewer and supply,	1291
77	76/H/0	Ditto	...	Nundalal Ghose	with water and otherwise	1292
78	81/H/0	Ditto	...	Gura Churn Lahiri	put into sanitary condition	1293
79	66	Ram Kanto Bose Street	...	Bykanto Ghose	according to the bye-laws	1294
80	76	Ditto	...	Madhub Ghose	and rules framed by the	1295
81	74/H/12	Baugbazar Street	...	Hori Uria	Commissioners, the cowsheds	1596
82	119/H/3	Shambazar Street	...	Nependranath Bose	of your premises to the	1297
83	5/H	Kethor Dhole's Lane	...	Kader Ghose	satisfaction of the Commis-	1298
84	8/H	Ditto	...	Shiboo Ghose	sioners.	1299
85	119/H	Shambazar Street	...	Nani Ghose	...	1300
86	81/H	Grey Street	...	Sewrutun Dhobi	...	434
87	155/H	Chitpore Road Upper	...	Situl	...	435
88	76/H	Baugbazar Street	...	Khoso Bibee	...	436
89	76/H	Ditto	...	Jemedar Mullick	Do. Do. bullocksheds	437
90	76/H	Ditto	...	Shaik Nidoo	...	438
91	76/H	Ditto	...	Jomir Sirdar	...	439
92	76/H	Ditto	...	Megnad Mullick	...	440
93	76/H	Ditto	...	Toolook Sirdar	...	441
94	114	Cornwallis Street	...	Modhusudan Sadhkan	...	470
95	155/H/13	Chitpore Road Upper	...	Giribala Dabi	...	473
96	47/H/19	Raja Nobo Kissen's Street	...	Mungur Coachman	Do. Do. stables	474
97	155/H/30	Chitpore Road Upper	...	Durbasi	...	475
98	78	Shambazar Street	...	Preonath Ghose	...	476
99	161/H/4	Chitpore Road Upper	...	Kangali Sadhkan	...	477

N. R. MOOKERJEE,
Inspector, Ward I.

TABLE I
OF THE

REVENUE ACCOUNTS OF THE

No.	Description	Amount	In	Out	Balance
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Exhibit C.

Statement re prosecutions for continuing offence.

Locality.	Section of the Act.	Date of 1st conviction.	Result.	Date of 2nd conviction.	Result.	Date of 3rd conviction.	Result.	No. of Animals kept.	REMARKS.
1 Gopalpara Lane ...	336	13-3-1896	Fined Rs. 30 0	4-12-1896	Fined Rs. 50 0	.....	.....	12 cows & 4 buffls.	Repeatedly prosecuted and fined several times in several cases which has not been shown here.
55 Raja Rajbullab's Street ...	336	12-5-1896	6 0	15-12-1896	8 0	.....	.....	10 cows.	
1 Baughazar Street ...	336	12-5-1896	6 0	15-12-1896	F. S.*	.....	.....	8 cows & 4 buffls.	Party being absent.
114 Cornwallis Street ...	336	23-5-1896	10 0	15-12-1896	12 0	.....	.....	16 Horses.	
161 Upper Chitpore Road ...	336	23-5-1896	10 0	15-12-1896	F. S.	.....	.....	6 "	Party being absent.
78 Shambazar Street ...	336	23-5-1896	10 0	15-12-1896	Adj'd. to 29-12-96	.....	.....	12 "	Party having denied charge.
37 Raja Nobokissen's Street ...	336	23-5-1896	10 0	15-12-1896	12 0	.....	.....	17 "	
47 Shambazar Street ...	335	22-6-1896	10 0	15-12-1896	15 0	.....	.....	12 cows.	
47 Do. ...	336	22-6-1896	10 0	15-12-1896	15 0	.....	.....	12 "	
76 Shikdarbagan Street ...	336	22-6-1896	10 0	15-12-1896	15 0	.....	.....	6 "	
58 Raja Rajbullab's Street ...	336	12-5-1896	5 0	15-12-1896	5 0	.....	.....	6 cows & 2 buffls.	
58 Do. ...	336	12-5-1896	5 0	15-12-1896	5 0	.....	.....	10 cows.	
8 Ram Kanto Bose's Street ...	336	18-8-1896	8 0	Pending	.....	.....	.....	12 "	There were several repeated prosecutions in most of these and other cases which have not been included.
9 Do. do. ...	336	18-8-1896	8 0	do.	.....	.....	.....	10 "	
66-1 Do. do. ...	336	15-8-1896	20 0	do.	.....	.....	.....	50 "	
66 Do. do. ...	336	15-8-1896	20 0	do.	.....	.....	.....	30 "	
76 Do. do. ...	336	15-8-1896	20 0	do.	.....	.....	.....	25 "	
114-1 Shambazar Street ...	336	12-6-1896	15 0	do.	.....	.....	.....	50 "	
56 Khetter Dhole's Lane ...	336	12-6-1896	15 0	do.	.....	.....	.....	40 "	
55 Raja Rajbullab's Street ...	336	12-6-1896	15 0	do.	.....	.....	.....	35 "	

* Fresh Summons.

N. R. MOOKERJEE,
Inspector, Ward No. 1.

Statement re prosecution for continuing offence.

Locality.	Section of the Act.	Date of 1st conviction.	Result.	Date of 2nd conviction.	Result.	Date of 3rd conviction.	Result.	No. of Animals kept.	REMARKS.
138H Ahireetolah Street ...	307	25-6-96	Fined Rs. 2 0	4-7-96	Fined Rs.	.....	.....	30	
Do.	do.	do.	5 0	27-6-96	Warned D.	.....	.....	20	
76-1 Darmahatta Street ...	do.	9-5-96	0 8	4-7-96	10 0	.....	.....	30	
15 Manick Bose's Ghat Street ...	do.	4-7-96	5 0	11-7-96	3 0	.....	.....	12	
24 Haro Chunder Mullick's Street...	do.	15-11-94	4 0	6-4-95	F. S.	.....	.....	16	
153H Ahireetolah Street ...	302	9-7-96	1 0	11-7-95	Warned	.....	.....	20	
112H Bonomali Sirkar's Street ...	336	28-8-94	5 0	16-4-95	10 0	.....	.....	12	
9H Sobhabazar Street ...	do.	27-11-94	15 0	do.	12 0	11-10-96	40 0	10	
29H Bonomali Sirkar's Street ...	do.	27-11-95	2 0	do.	Struck off	.....	.....	18	
277H Upper Chitpore Road ...	do.	do.	1 0	do.	F. S.	.....	.....	11	
10-1 Baniatolah Street ...	do.	23-7-95	8 0	30-8-95	do.	9-11-95	10 0	9	
42H Sobhabazar Street ...	do.	8-6-95	4 0	12-8-95	10 0	do.	10 0	25	
37H Sankur Haldar's Lane ...	do.	do.	5 0	do.	10 0	do.	10 0	8	
37H Bonomali Sirkar's Street ...	do.	23-7-95	5 0	do.	10 0	.....	.....	5	
Do.	do.	do.	5 0	29-8-95	7 0	.....	.....	3	
97H Ahireetolah Street ...	do.	do.	10 0	19-8-95	10 0	19-10-95	20 0	25	
20H Baniatolah Street ...	do.	do.	30 0	24-8-95	10 0	.....	.....	20	
18H Do.	do.	do.	F. S.	29-3-95	Wd. & D.	.....	.....	9	
1H Mothoor Sen's Garden Lane ...	do.	do.	8 0	do.	4 0	.....	.....	5	
8H Mohamed Ramjan's Lane ...	do.	29-8-95	3 0	18-1-96	16 0	.....	.....	5	
329 Upper Chitpore Road ...	do.	18-6-96	10 0	4-8-96	10 0	28-11-96	10 0	Closed.	
78 Nimtolah Ghat Street ...	do.	31-6-96	15 0	20-8-96	21 8	17-11-96	0 8	40	
14H Mohamed Ramjan's Lane ...	do.	do.	15 0	do.	20 0	do.	F. S.	40	
332 Upper Chitpore Road ...	do.	15-8-96	20 0	23-11-95	Struck off	.....	.....	8	
331 Do.	do.	do.	20 0	do.	4 0	.....	.....	8	
16H Baniatolah Street ...	do.	2-6-96	F. S.	4-8-1896	15 0	31-10-96	20 0	8	
329 Upper Chitpore Road ...	do.	20-8-96	do.	27-10-96	2 0	.....	.....	Closed.	
329 & 330 Upper Chitpore Road ...	do.	4-8-96	5-0	28-11-96	Wd. & Dischd.	.....	.....	16	
41H Manick Bose's Ghat Street ...	do.	do.	5-0	10-8-96	F. S.	.....	.....	60	
40H Do.	do.	do.	20-0	12-9-96	1 0	15-9-96	Struck off	60	
6H Motun Mohan Dutt's Lane ...	do.	do.	Wd. & D.	31-10-95	50 0	.....	.....	30	
112H Baniatolah Street ...	do.	do.	11-0	27-8-96	2 0	.....	.....	24	
Do.	do.	do.	10-0	12-9-96	12 0	24-9-96	20 0	15	
20H do.	do.	do.	16-0	31-10-96	10 0	.....	.....	30	

G. B. HALDAR,
Inspector Ward No 2.

Statement re prosecution for continuing offence.

Locality.	Section of the Act.	Date of 1st conviction.	Result.	Date of 2nd conviction.	Result.	Date of 3rd conviction.	Result.	No. of Animals kept.	REMARKS.
3 Gooloo or Tagur's Lane	302	24-4-96	Fined Rs. 1 0	1-7-96	Fined Rs. Struck off 1 0	.....	.....	.....	.....
179 Cornwallis Street	do.	1-7-96	1 0	26-8-96	Discharged	.....	.....	25 cows	.....
5 Gowalpara Lane	307 & 336	2 & 3-6-96	40 0	26 & 27-7-96	Discharged 1 0	.....	.....	20 "	.....
6 Do.	do.	do.	40 0	do.	Discharged 1 0	.....	.....	20 "	.....
10 Do.	do.	do.	40 0	do.	Discharged 1 0	.....	.....	12 "	.....
14 Do.	do.	do.	40 0	do.	Discharged 1 0	.....	.....	30 "	.....
15 Do.	do.	do.	40 0	do.	Discharged	.....	.....	5 buffaloes	.....
28 Do.	do.	do.	40 0	do.	Discharged	.....	.....	33 cows	.....
15 Goabagan Street	do.	do.	40 0	do.	do.	.....	.....	2 buffaloes	.....
15 Do.	do.	do.	20 0	do.	10 0	.....	.....	16 "	.....
14 Hogulkooria Gully	336	7-8-96	5 0	17-9-96	10 0	.....	.....	12 "	.....
44 Musaidbari Street	do.	28-7-96	25 0	17-11-96	Fresh Summons	.....	.....	3 buffaloes	.....
21 Durga Ch. Mitter's Street	do.	6-8-96	10 0	26-11-96	15 0	.....	.....	30 cows	.....
107 Do.	do.	6-8-96	27 0	do.	5 0	.....	.....	40 "	.....
91 Do.	do.	do.	5 0	do.	2 0	.....	.....	11 "	.....
19 Durga Ch. Mitter's Lane	336	6-8-96	11 0	26-11-96	2 0	.....	.....	6 "	.....
19 Do.	do.	do.	4 0	do.	2 0	.....	.....	11 cows	.....
26 Do.	do.	do.	5 0	do.	Struck off	.....	.....	4 "	.....
25 Do.	do.	do.	8 0	do.	8 0	.....	.....	Removed	.....
25 Do.	do.	do.	7 0	do.	8 0	.....	.....	16 cows	.....
71 Beadon Street	do.	do.	8 0	do.	Struck off	.....	.....	16 "	.....
67 Do.	do.	do.	10 0	do.	do.	.....	.....	Removed	.....
48-1 Kaliprasad Dut's Street	do.	do.	25 0	do.	15 0	.....	.....	15 cows	.....
8 Momeyuddin's Lane	do.	do.	5 0	do.	2 0	.....	.....	65 "	.....
6 Do.	do.	do.	6 0	do.	3 0	.....	.....	5 "	.....
44 Musaidbari Street	do.	8-8-96	2 0	28-11-96	5 0	.....	.....	9 "	.....
44 Do.	do.	do.	2 0	do.	2 0	.....	.....	14 "	.....
22 Do.	do.	do.	2 0	do.	5 0	.....	.....	5 "	.....
31 Durzipara Street	do.	do.	5 0	do.	5 0	.....	.....	14 "	.....
26 Taruck Chatterjee Lane	do.	do.	5 0	do.	5 0	.....	.....	17 "	.....
15 Fakir Ch. Chuckerbatty's Lane	do.	12-9-96	20 0	26-11-96	15 0	.....	.....	29 "	.....
32 Nilmoney Mitter's Street	do.	5-5-96	20 0	do.	25 0	.....	.....	41 "	.....
19 Ramchand Ghose's Lane	348	11-7-96	5 0	5-9-96	8 0	.....	.....	56 "	.....
						21-11-96	Fined Rs. 10 0	.....	.....

F. DESANTO,
Inspector, Ward No. 3.

10th December 1896.

Fakir Ghosh & Hiramoni Bewah	...	61H Bechoo Chatterjee's Street	...	22-6-95	8 0	7-12-95	10 0	29 & 27-7-96	29 0	...
Mohib Bewah	...	35H do.	...	20-8-95	4 0	...	...	...	...	...
Ramesur Das	...	82H do.	...	15-10-95	5 0	20-8-96	8 0	...	...	...
N. Bhattacharjee	...	80 do.	...	22-6-95	4 0	...	...	...	...	...
Anandomonee Dassee	...	4H Sunkar Ghose's Lane	...	22-6-95	Struck off.	...	...	...	...	...
Gobordhone Kowar	...	13H Manicktollah Road	...	17-7-95	10 0	11-12-95	25 0	3-7-96	Discharged.	...
Nemee Marick	...	Do. do.	...	17-7-95	20 0	11-12-95	40 0	...	...	...
Seetul Marick	...	64-1 do.	...	24-1-96	25 0	...	...	...	...	...
Shoshichurn Shaw	...	71 Manicktollah Street	...	20-7-95	Discharged.	...	...	...	...	...
Umachurn Dity & Mohesh Dity	...	2 Wards' Institution Lane	...	17-7-95	40 0	20-11-95	20 0	30-6-96	20 0	...
Gobordhone Pan & Seetul Marick	...	Do. do.	...	17-7-95	30 0	11-12-95	50 0	30-9-96	25 0	...
Jadob Dhooley	...	do. do.	...	17-7-95	35 0	20-11-95	30 0	12-6-96	30 0	...
Fakirchand Ghosh	...	24 Harl Paul's Lane	...	22-6-95	4 0	18-1-96	8 0	21-7-26	15 0	...
Bamlall Roy	...	21 Shib Narayan Dass' Lane	...	22-6-96	5 0	...	...	...	...	...
Baddynath Bakuly	...	24 Bahir Mirzapur Road	...	8-11-95	25 0	26-6-96	10 0	11-9-96	20 0	...
Heeroo Poalie	...	do. do.	...	8-11-95	12 0	26-6-96	10 0	23-10-96	20 0	...
Rassick Ghosh	...	28 do.	...	24-2-96	10 0	10-7-96	25 0	...	...	...
Puttipabony Bewah	...	28H do.	...	24-1-96	20 0	...	...	...	...	...
Gopal Ghosh	...	28H do.	...	24-1-96	10 0	...	...	...	...	...
Sarojaprosad Mitter	...	19 Kali Dass Singhi's Lane	...	12-3-95	2 0	20-8-95	2 0	16-4-96	20 0	...
Mohendro Ghosh	...	29-7 Muddon Mitter's Lane	...	20-8-95	2 0	...	...	...	...	...
Mohun Khotta	...	16H do.	...	20-8-95	1 0	...	...	...	...	...
Saich Nubbenbuckh & Joymungie	...	2-2-H Badur Begun Lane	...	12-11-96	3 0	...	...	...	...	...
Harriachurn Roy	...	12 Benode Behari Shaha's Lane	...	12-3-95	1 0	20-7-95	5 0	15-10-95	3 0	...
Koyachander Koondoo	...	do. do.	...	12-3-95	2 0	...	...	...	...	...
Gopichander Koondoo	...	do. do.	...	12-3-95	2 0	20-7-95	5 0	...	...	...
Sachchurn Shaha	...	8 Brindaban Mallick's Lane	...	22-8-95	F. S.	2-1-96	0 8	...	...	...
Kalichurn Sen	...	2H Gas Street	...	27-11-95	15 0	...	...	...	...	...
Sikh Jahoor	...	Do. do.	...	13-12-95	20 0	...	...	...	...	...
Kubir Das & Mohammad Reza...	...	...	...	...	...	...	...	...	...	...

19th December 1896.

F. JACOB,
Inspector, Ward No. 4

Statement re prosecutions for continuing offence.

LOCALITY.	Section of the Act.	Date of 1st Conviction.	Result.	Date of 2nd Conviction.	Result.	Date of 3rd Conviction.	Result.	No. of animals kept.	REMARKS.
9H Kalakar Street ...	336	28-6-1894	Fd. Rs. As. " 1 0	23-8-1894	Fd. Rs. As. " 2 0	8-12-1894	Struck off.		
61 Darmahata Street ...	do.	23-8-1894	" 2 0	8-12-1894	" 2 0				
16H Jorabagan Street ...	do.	do.	" 2 0	do.	Struck off.				
Do. do. ...	do.	do.	" 2 0	do.	Fd. 2 0				
Do. do. ...	do.	do.	" 1 0	do.	Struck off.				
Do. do. ...	do.	do.	" 3 0	do.	Fd. 2 0				
29H Sikdarpara Street ...	do.	24-7-1894	" 2 0	do.	" 1 0				
Do. do. ...	do.	do.	" 3 0	do.	" 1 0				
Do. do. ...	do.	do.	" 3 0	do.	" 1 0				
10H do. ...	do.	do.	" 5 0	do.	" 2 0				
38 do. ...	do.	28-7-1894	" 3 0	do.	" 1 0				
373 Chitpore Road ...	do.	do.	" 3 0	do.	" 1 0				
30H Banatola Gully ...	do.	do.	" 1 0	do.	" 1 0				
16H 25 Jorabagan Street ...	do.	do.	" 5 0	do.	Fresh summons.				
16 Do. do. ...	do.	do.	" 1 0	do.	Fd. 1 0				
52 Strand Road ...	do.	do.	" 2 0	do.	" 2 0				
Do. do. ...	do.	do.	" 2 0	do.	" 1 0				
Do. do. ...	do.	do.	" 2 0	do.	" 1 0				
Do. do. ...	do.	do.	" 2 0	do.	" 1 0				
14H Nimitolla Ghat Street ...	do.	23-8-1894	" 10 0	do.	" 5 0				
16H do. ...	do.	do.	" 10 0	do.	" 5 0				
29H Sikdarpara Street ...	do.	24-7-1894	" 2 0	do.	" 1 0	2-5-1895	Fd. 2 0		
Do. do. do. ...	do.	do.	" 3 0	do.	" 1 0	do.	" 2 0		
Do. do. do. ...	do.	do.	" 3 0	do.	" 1 0	do.	" 2 0		

Statement showing continuous prosecution of cowshed in Ward No. 6, Jorasanko.

Locality.	Section of Act.	Date of 1st conviction.	Result.	Date of 2nd conviction.	Result.	Date of 3rd conviction.	Result.	Date of 4th conviction.	Result.	REMARKS.
1895-96.										
Jadub Dholay, 2H, Chanebagan Lane...	336	27-10-1894 Hony. Magistrate	5 0	19-12-1894 Hony. Magistrate	15 0	8-2-1895 Chief Magistrate	100 0	12-7-1895 Chief Magistrate	354 0	Daily penalty of Rs. 3.
Mohesh Murick, 10-2, Rudha Madhub Saha's Lane ...	336	27-10-1894 Hony. Magistrate	2 0	19-12-1894 Hony. Magistrate	5 0	7-2-1896 Chief Magistrate	100 0	10-8-1895 Chief Magistrate	100 0	
Gopee Ghose, 2H, Manicktola Street ...	336	14-2-1895 Hony. Magistrate	4 0	11-7-1895 Hony. Magistrate	3 0	28-1-1895 N. D. Magistrate	10 0	...	...
Hurry Ghose, 2H, Manicktola Street ...	336	19-2-1895 Hony. Magistrate	2 0	11-7-1895 Hony. Magistrate	4 0	...	...	...	...
Sam Manick, 2H, Manicktola Street ...	336	19-2-1895 Hony. Magistrate	6 0	11-7-896 Hony. Magistrate	3 0	...	...	...	...
Fokir Ghose, 56, Boloram Dey's Street...	336	14-2-1895 Hony. Magistrate	4 0	11-2-1896 Hony. Magistrate	4 0	...	...	...	...
Tuto Bisal, 11, Kristodas Pal's Lane ...	336	9-4-1895 Hony. Magistrate	3 0	28-1-1896 N. D. Magistrate	18 0	...	...	...	...
Bane Dore, 1H, Bysack Bagan Lane ...	336	10-1-1896 N. D. Magistrate	5 0	17-2-1896 N. D. Magistrate	5 0	...	...	...	...
Kedar Ghose, 1H, Bysack Bagan Lane...	336	27-10-1894 N. D. Magistrate	2 0	19-12-1895 N. D. Magistrate	5 0	11-7-1895	4	...	...
Solgaolla, 29, Boloram Dey's Street} ...	336	9-4-1895	3 0	10-8-1895	5 0	...	...	...	...
Gosto Ghose, 2H, Manicktola Street ...	336	9-2-1895	1 0	11-7-1895	3 0	...	...	...	...
Sone Bawa, 2H, Manicktola Street ...	336	23-2-1895	4 0	11-7-1895	3 0	...	...	...	...
Bhebo Bawa, 6H, Asootosh Dey's Lane	336	2-3-1895	4 0	9-7-1895	2 0	...	...	...	...
Sam Mone Bawa 6-2, Rambagan ...	336	10-11-1894	2 0	29-8-1895 N. D. Magistrate	10 0	24-1-1896 N. D. Magistrate	15	...	...
Mote Eaknolee, 39H, Manicktola Street	336	19-2-1895	6 0	9-8-1895 N. D. Magistrate	10 0	...	...	...	...
Kedar Ghose, 6H, Asootosh Dey's Lane	336	2-3-1895	8 0	9-7-1895	10 0	...	...	...	...
Disco Ghose, 2H, Manicktola Street ...	336	19-2-1895	1 0	9-7-1895	4 0	...	...	...	...
Rholoy Murick, 29, Manicktola Street	336	19-2-1895	5 0	9-7-1895	10 0	...	...	...	...
Nabin Murick, 72, Mooktoram Baboo-Street ...	336	23-7-1895	2 0	19-11-1895 N. D. Magistrate	15 0	...	...	...	...
Sagour Ghose, 8-1, Bambagan Lane ...	336	2-12-1895	10 0	19-2-1896 N. D. Magistrate	10 0	...	...	...	...
Boma Bawa, 1H, Rambagan Lane ...	336	23-12-1895	4 0	28-1-1896 N. D. Magistrate	10 0	...	...	...	...
Basom Matco, 84, Mooktoram Baboo-Street ...	336	11-11-1895 N. D. Magistrate	15 0	26-2-1896 N. D. Magistrate	15 0	...	...	...	...
Panchoo Ghose, 51, Boloram Dey's Street	336	19-2-1895	1 0	11-3-1896 N. D. Magistrate	10 0	...	...	...	...

1896-97.

Rusick Mutay, 1H, Basack Bagan Lane	336 & 307	8-6-1896 N. D. Magistrate	15 0	11-8-1896 Hony. Magistrate	10 0	8-12-1896 Hony. Magistrate	10 0	.....	.....	On 8-12-1896 the Honorary Magistrate refused to grant daily penalty.
Preo Koley, 5H, Bysack Bagan Lane ...	336 & 307	8-6-1896 N. D. Magistrate	15 0	11-8-1896 Hony. Magistrate	10 0	8-12-1896 Hony. Magistrate	10 0	.....	.....
Sam Marick, 2H, Manicktola Street ...	336 & 307	8-6-1896 N. D. Magistrate	15 0	11-8-1896 Hony. Magistrate	10 0	8-12-1896 Hony. Magistrate	15 0	.....	.....
Golaal Murick, 1H, Bysack Bagan Lane	336 & 307	8-6-1896 N. D. Magistrate	15 0	11-8-1896 Hony. Magistrate	25 0	8-12-1896 Hony. Magistrate	20 0	.....	.....
Jodoo Ghose, 40, Ramtonoo Bose's Lane	336 & 307	8-6-1896 N. D. Magistrate	15 0	11-8-1896 Hony. Magistrate	10 0	8-12-1896 Hony. Magistrate	15 0	.....	.....
Chinebath Ghose, 48H, Ramtonoo Bose's Lane.	336	20-8-1896 Hony. Magistrate	25 0	8-12-1896 Hony. Magistrate	25 0	.....	.....	.....	.....	Case for continuing the offence filed in North Division Magistrate's Court on 4-8-1896, 21-8-1896 fixed for hearing warrant issued for arrest for non-attendance surrendered on 4-9-1896 and informed the Court that cows will be removed and cowshed will be closed, adjourned to 9-9-1896, did not appear, warrant for arrest again issued, cowshed closed 15-12-1896 and shed sold.
Bame Ghose, 56H, Mooktoram Baboo's St.	336 & 307	2-7-1896 N. D. Magistrate	25 0	.....	.....	.....	.....	.....	.....

N. P. SANDEL,

Inspector, Ward No. 6.

COWSHEDS.

Statement re-prosecutions for continuing the offence.

Locality.	Section of the Act.	Date of 1st conviction.	Result.	Date of 2nd conviction.	Result.	Date of 3rd conviction.	Result.	No. of Animals kept.	REMARKS.
65H, Cross Street	336	11-4-95	F. S.						
61-1H-3, Do.	336	11-4-95	4 0						
61H-5, Do.	336	11-4-95	6 0						
51H-21, Do.	336	9-4-95	4 0						

H. P. WILSON,
Inspector, Ward No. 7.

Exhibit

Report of the Bustee Clerk on the bustees recommended by Health

NAME OF BUSTEE.				Date of recommendation by H. O. to be improved.	Under Section.	Date when condemned by Commissioners.
Radha Mullicks Bagan	...	...	...	30-1-88	280 (Old Act)	2-8-95 (B. C.)
Koomedanbagan	...	...	...	27-1-88	do.	24-3-88
Narkel Bagan	...	...	...	31-1-89	257	13-5-89
West of Leper Asylum	...	...	...	5-9-89	do.	8-6-90
Kaloo Ghose's Bagan	...	...	...	5-9-89	do.	8-1-91
Shampukur	...	...	...	27-9-90	do.	8-1-91
Dixon's Lane	...	...	...	23-12-90	do.	4-6-91
Nimtola	...	...	...	23-12-90	do.	2-7-91
Burtola	...	...	...	2-9-90	do.	8-1-91
Sundriaputty	...	...	...	24-3-90	do.	12-6-90
Machooa Bazar Khalasytola	...	...	...	24-2-90	do.	12-6-90
Nebutala Ooryapara Lane	...	...	...	23-12-90	do.	21-4-91 (B. C.)
Nilmoney Mitter's Lane	...	...	...	1-4-91	do.	4-6-91
Sham Bazar Moochapara	...	...	...	21-4-91	do.	4-6-91
Kidderpur Goalapara	...	...	...	1-8-91	do.	19-12-93
Bibee Bagan	...	...	...	31-10-92	do.	19-12-93
Set Bagan	...	...	...	29-3-92	do.	1-11-95
51, Kally Pershad Dutts Street	...	...	...	5-9-92	do.	19-12-93
Napit Bagan	...	...	...	19-12-93	do.	.....
391, Upper Chitpur Road	...	...	...	27-2-93	do.	.....
Gorastan	...	...	...	16-2-93	do.	.....
Imambag Lane Nos. 31, 34 & 39	...	...	...	27-2-93	do.	.....
Between Currie's Church Lane and Machooa Bazar Road	...	...	...	19-2-93	do.	.....
244, Upper Circular Road	...	...	...	24-8-95	do.	.....
Smith's Lane	...	...	...	15-8-95	do.	.....
Manick Bose's Ghat Street	...	...	...	5-5-96	do.	.....
154, Baranaussy Ghose's Street	...	...	...	16-6-96	do.	.....
Nawab's Lane	...	...	...	16-6-96	do.	.....

1. On 15-9-93 Chairman's order was "These bustee
2. The bustee projects are placed before the Bustee

12th January 1897.

D.

Officer to be improved with their dates and the action taken on them.

Date of inspection by Medical Officers.	Date, of final consideration by Bustee Committee.	Final orders passed by the Commissioners in Meeting.	RESULT.
.....	.....	.....	Proof copy of report sent to Dr. Cobb for approval. (a) Taken up <i>de novo</i> .
27-5-88	30-1-91	Passed	In these blocks improvements are nearly completed, 4th block action taken <i>de novo</i> .
24-6-89	25-8-90	do.	3 roads completed—others pending.
6-7-91	.....	.....	Consideration of improvements in abeyance.
6-7-91	.....	.....	Do. do. do.
31-3-91	.....	.....	Final orders passed—File with ward commrs.
11-10-91	.....	.....	Action in abeyance.
24-9-91	24-1-95	Passed	Consideration of improvement in abeyance.
31-1-91	13-12-95	27-2-96	Steps are being taken to commence work.
11-10-90	.....	.....	Do. do. do.
21-8-90	13-12-95	27-2-96	Kept in abeyance for opening of Harrison Road.
11-10-91	17-2-96	9-4-96	Steps are being taken to take up works.
26-9-91	.....	.....	Further objections are being considered.
6-7-92	1-11-95	2-1-96	Consideration of improvements in abeyance.
15-10-94	19-6-95	9-12-95	Further objections are being considered.
.....	.....	.....	Steps are being taken to take up works.
.....	.....	.....	Engineer has been requested to prepare a plan of the Busty.
.....	.....	.....	Report sent to Dr. Crombie (in England) for his signature.
.....	.....	.....	Kept in abeyance under orders of Chairman there being no funds.
.....	.....	.....	Kept in abeyance for want of Funds as directed by the Chairmau,
.....	
.....	
.....	
.....	
.....	.....	.....	Included with Bahir Simla Bustee. Engineer has been requested to prepare plan.
.....	.....	.....	27-2-46 Engineer has been requested to prepare plan.
.....	.....	.....	October 1896 Plan sent to Medical Officers for report under Section 257.
.....	.....	.....	B. C. 19-12-96 Proceedings Bustee Committee remain to be confirmed first.
.....	.....	.....	B. C. 18-7-96 Plan is being prepared.

projects must remain in abeyance for want of funds."

Committee several times to dispose of objections from owners.

G. DEY,

Bustee Clerk.

Exhibit E.

Report by Superintendent, North Division, on the specific instances mentioned in the Sanitary Officer's report and the action with dates taken by the Health Department on them previous to the Sanitary Officer's inspection.

Overcrowding of huts at 81, Grey Street, and in Russick Lall Ghose's Lane.—Section 320 provides against overcrowding of buildings, but not of huts. Then there is also difficulty as to what would constitute overcrowding, the Act having not defined the same. This was brought to the notice of the Chairman by a letter from the Municipal Pleader when the Health Officer wanted to institute prosecution in one case. The matter was placed before the Bye-laws Committee in 1893, and has not yet been settled. There is also difficulty in ascertaining the extent of overcrowding. The municipal officers cannot enter an occupied house without giving 24 hours' notice except with the consent of the occupier; and they can make no inspection at night, which is the only suitable time to ascertain the number of inmates of a house. When the Health Officer inspected the huts on 23rd December, 1896, he did not find overcrowding.

17, Durpo Narain Tagore Street.—The Chairman approved the plans for improvement of this bustee in 1886. Only a 6 feet road was made on the east, but other improvements suggested were not carried out.

93, Upper Circular Road (Latrine).—The Health Officer first drew attention to the bad condition of this latrine and adjoining N. S. Depot on 15th June 1893. Since then it has been reported from time to time, and during the current year on 18th May 1896, 28th July 1896, and again on 17th November 1896.

46, Mondol Street.—No such premises in Mondol Street. Perhaps 47, Durmahatta Street is meant. In this case the House Drainage Department was requested to get the privy connected with the sewer on 12th February 1896, *vide* column 58, file 83. (In Mondol Street, 44 is the last number.)

228, Mondol Street.—No such premises in Mondol Street. It may have been intended for 228, 228-1, or 229-1, Durmahatta Street.

Re No. 228.—Notice served on 25th August 1896, party prosecuted, and privy demolished on 17th September 1896.

Re No. 228-1.—Notice served for improvement, and the owner failing to carry out the same, the takeed made over to Engineer's Department on 3rd August, 1895, to execute the work in default.

Re No. 229-1.—Similar to above, the takeed having been sent on 12th August, 1895, to Engineer's Department to execute the work in default.

162, Ahecretolla Street.—In this case I find that no action has been taken by this department.

32-3, Burtolla Street.—The passage and drain are paved and cement plastered. Objection was raised to the sanction of the adjoining building at No. 40. Had the bye-laws been enforced, this narrow lane would have been improved by having another 2 feet width added to it. But the case is still pending before the Buildings Committee, which appointed a sub-committee in 1894 to report on this case. The report, however, has not yet been made.

169, Manicktolla Street.—No defect in the body spouts of this house. The inspector of the ward informs me that he was with the Deputy Sanitary Commissioners when the inspection was made, and that the body spouts of the adjoining houses Nos. 168 and 167 are meant. In these cases warning notices Nos. 84 and 85 were served on the 12th May, 1896, and the House Drainage Department was requested to get the work done.

70, Baniatolla Street.—The drain is in a respectable house. It is clean now. It is the duty of the occupier to keep it clean, and he has got a sweeper of his own to sweep and clean the drains and the compound.

50, Boloram Mozoomdar's Street.—Notice No. 662 served on the party on the 26th November 1895 to improve the privy and the drains. The party has taken the work in hand; but the progress is slow, as Health Officer has himself seen.

33, Mooktaram Baboo's Street.—Temporary obstruction by leaves, &c., on the grating. The obstruction was removed by the party's own servant immediately after the inspection by the Deputy Sanitary Commissioners. In fact, the man was attending to the drains when, on seeing the Sanitary Commissioners, he stood at a respectable distance and stopped his work. Further, whether connections are trapped or not cannot be ascertained from outside inspection. It is the duty of the house drainage inspectors to see to these defects, and not to allow them to exist. I do not think that the Sanitary Commissioners took the trouble of getting the road surface dug up to see whether the connection was trapped or not. *The connection when opened up and examined was found to be trapped;* only the grating over the yard gully was broken, and the same has since been replaced.

73, Grey Street, 156, Upper Circular Road, 13, Rajendra Nath Sen's Lane, and 66 Sukea's Street.—Surface drains are all along allowed to carry urine and privy washings; they are preferable in bustees having scanty water-supply, on the ground that they can be kept more clean than underground sewers, which if provided in bustees would get choked up in no time.

For the repair of the drains in bustee No. 73, Grey Street, notices Nos. 80 and 171 were served on 15th September, 1894, and 28th September, 1894, and takeeds sent to Engineer to execute the works in default. Similarly for bustee No. 156, Upper Circular Road, notices Nos. 81 and 389 were served on 15th September, 1894, and 20th December, 1894, and takeeds sent to Engineer's Department for executing the works in default.

Jorabagan Bustee.—I think the bustee on the north side of Jorabagan Street and between it and Nimtolla Ghaut Street is the one meant. This is called Nimtolla bustee. Its improvement was suggested long ago. In fact, the improvements have already been started. The Health Officer has seen that a road is already under construction. The huts in its line have been removed and the sewer is being laid. The Health Officer recommended the improvements on 23rd December 1890.

21 & 22, Durmahatta Street is practically a bustee, with two pucca buildings amongst the clusters of huts. One of these buildings is under repair, hence a large quantity of debris has to be removed every day; so there is no wonder if 10 cartloads were seen on one day, as 10 to 15 cartloads are daily removed from this place. The Health Officer has himself seen 5 cartloads being removed one morning.

45 & 46, Burtolla Street.—This is in Jorabagan, and has been dealt with by the special cleansing staff appointed on 26th September. Notices served on 29th October 1896.

Buildings cleansed out and defects in the drains and body spouts remedied. The whole of the narrow passage has been paved and cement plastered.

67, *Ramkanto Bose's Street* is a large dwelling-house occupied by the family of a late barrister-at-law. There is no cowshed in the premises. Perhaps the one at No. 66-1 is meant. Regarding this shed action has already been taken under sections 336 and 307 with following results :—

On 11th April 1895 the party was fined...	...	...	Rs. 20
On 27th August 1895 ditto	...	...	" 25
On 23rd November 1895 ditto	...	...	" 25
On 28th November 1895 ditto	...	...	" 30
On 15th August 1896 ditto	...	...	" 20

On 12th December 1896 the party was warned simply, and another case instituted on 22nd December, 1896, is pending.

10, *Ramkanto Bose's Street* is also a dwelling-house, and perhaps the cowshed at No. 9-1, *Ramkanto Bose's Street*, is the one referred to. In this case also action has already been taken under section 336 with following results :—

On 23rd November 1895 fined	...	...	Rs. 20
On 28th November 1896 do.	...	...	" 30

Another case is pending.

It is not possible to trace out what cowsheds are referred to, as there are so many of them in *Raja Bagan*. Regarding the closing of cowsheds I pointed out the difficulties on 9th August, 1895, and suggested the service of notices under section 387, and then prosecuting under sections 388 and 389. The Chairman approved of this suggestion and directed the prosecuting officers to press for heavy fines *vide* his orders dated 21st August 1895. We served some 250 notices in the North Division between 31st May 1895 and 8th April 1896. But in most cases we could not prosecute, as the medical evidence wanted by Court could not be produced in all cases. It had not been anticipated that such evidence would be required. In those cases that were placed before the Court with the medical evidence, no order to close the sheds was issued. The parties were simply fined.

83, *Grey Street*.—The drain referred to is of the bustee No. 81, *Grey Street*. The temporary obstruction was due to the collection of materials by the Drainage Department for improving the public latrine and nightsoil depôt at 83, *Grey Street*. The improvements were suggested by the Health Officer long ago, prior to the year 1889.

Stables in Armenian Street.—Notice No. 765 served on 27th March, 1895, and taked sent to Engineer Department for executing the work in default on 15th May 1896. Also notices No. 340 and 341 served on 11th June 1896 and 27th June 1896 for the improvement of these stables. The stables are used partly for keeping private animals, partly for hackney carriage ponies, and partly for cart bullocks. There is a well, but with a parapet wall all round within the compound. On 24th March 1890 the Health Officer suggested a road through these stables.

Tank at No 73, Grey Street was dewatered and cleansed out in January 1895. Under the Health Officer's order notices are being issued to stop washing of grains in tank-water.

Side drains of public roads are in charge of the Engineer's Department, which constructs and maintains them. On 21st July 1895 the Health Officer drew the attention of the

Engineer's Department to the defects in such drains in Lal Bagan bustee (161, Upper, Chitpore Road), and suggested their being replaced by kurb and channel stones. The attention of the Engineer's Department was drawn to the bad condition of such drains in Ramdhone Khan's Lane on 29th April 1896.

Bad condition of such drains around and near Marcus Square was brought to the notice of the Engineer's Department on 1st May 1896.

Bad condition of such drains in Hari Pal's Lane was brought to the notice of the Engineer's Department on 14th May 1896.

Bad condition of such drains in Radha Bazaar Street and Old China Bazaar street was brought to the notice of the Engineer Department on 3rd June 1896.

Bad condition of such drains in Bhoobun Mohan Sircar's Lane was brought to the notice of the Engineer's Department on 8th June 1896. Similarly, whenever such defects are noticed by this department, the attention of the Engineer's Department is drawn to them.

M. GHOSH,

8-1-97.

Report on the special defects in Southern Division reported by Sanitary Officers and the measures taken on these previous to the report.

1. *Overcrowding Houses.*—No definite address is given. Speaking generally, section 320 does not clearly define what might be considered overcrowding. To take action on this section would necessitate house-to-house inspection by night, which is not permitted by the Act, and a separate establishment of inspection employed for the purpose. This section of the Act is therefore defective. Section 393 gives power to inspect houses during the day only after 24 hours' notice.

2. *Re 11, Hulodhur Budden's Lane.*—In this case the body spout is connected with the sewer by means of yard gully, and was temporarily choked, causing the water to overflow the lane at the time when inspected by the Sanitary Officer of the Medical Board. The obstruction was removed in his presence. No action was necessary.

3. *Re 43, Ooriapara Lane.*—This is an old existing privy, and the washings flow into the surface drain attached to the privy in connection with the house drain connected with the sewer. The privy is in good order.

4. *Re Goongapara Lane (i.e., Goomghur Lane).*—In this case no definite address is given. The privies in this locality are of long standing, and the surface drains provide for carrying off the washings connected with sewer by means of yard gullies. The drains are daily attended to.

5. *Re Urinals in Chandney Bazar (over Surface Drains).*—In this case on 4th and 27th November 1894 the bazar was inspected, and at the request of the Health Department the Secretary wrote letters bearing Nos. 4308 to 4316 on 22nd December 1894 to the several owners, drawing attention to the extremely insanitary condition of the market, and to carry out improvements suggested by the Health Department. On 11th January 1895 some of the owners expressed their willingness to carry out the improvements suggested in their own portion of the market; but as they did nothing in spite of several reminders, the Health Officer pointed out to the Chairman on 30th March 1895 that as no notice had been taken of the Secretary's letters no further time should be allowed but improvements at once insisted. On 2nd April 1895 the Chairman ordered a plan to be prepared, showing the drains, urinals, &c., and the Health Department on 18th May 1895 asked the Engineer Department to put up a complete plan as called for by the Chairman. Since then the Engineer Department has been dealing with the matter in communication with the Chairman. On the 29th of November 1896 notices were served on owners by that department.

6. *Rajah's Lane.*—No action had been taken previous to the Sanitary Officer's inspection. In this case notice was served to repair and put the privy in order on 27th of November 1896. Departmental action could not be taken earlier, as the takeed establishment was executing works in other wards.

7. *Rag Depôt at 157-158, Bowbazar Street.*—In this case prosecutions under section 348 have been instituted against the owner of the depôt, as will be seen from the following:—

On 1st February 1896 the party was fined Rs. 5.

A second prosecution was filed in Court on 8th August 1896, the party was fined Rs. 15 on 7th January 1897.

8. *Re Depositing Refuse after hours.*—The following statement will show the action taken.

28th August	1896	one prosecution: fine	Rs. 1 on 3rd January	1896.
28th August	"	one prosecution: fine	" 1 on 3rd October	"
30th September	"	one prosecution: fine	" 1 on 3rd December	"
1st October	"	one prosecution: fine	Rs. 2 on 3rd December	"
7th October	"	one prosecution: fine	As. 4 on 5th December	"
7th October	"	one prosecution: fine	" 4 on 5th December	"

The fines imposed on this section are so nominal that the results are not beneficial.

9. *Re Stables in Chowringhee Lane.*—In this case the stable is a private one attached to premises No. 9, Chowringhee Lane. There is only one horse kept for private use, the property of the gentleman occupying the house. The stable is fairly lighted and ventilated, floor *pucca*, with satisfactory drainage arrangement. When inspected by the members of the Medical Board, the yard gully was found temporarily obstructed with straw, &c. This was removed after their inspection.

10. *Re Hackney Carriage Stand in Wellesley Square and Wellesley Place.*—The attention of the Engineer Department was drawn on the following dates, *viz.*, 17th January 1896, 4th January 1896, 12th January 1896, 5th February 1896, 23rd July 1896, and 30th September 1896, to the condition of the stands and necessity of their being paved with stone sets and hydrants provided for flushing.

30-12-96.

R. MARTINDALE.

Exhibit G.

Report by Superintendent Suburbs—Ward 22.

II. *Surface Drains.*—These drains are cleaned by the Engineer's Department, and that department has carts for the removal of the excavations. It is no part of the duty of the Conservancy Department to remove anything taken out from these drains; this department has not, and never has had, any carts for the purpose, though at times, when it can be done without interfering with the conservancy work, some of the stuff is removed by conservancy carts to assist the Engineer Department and abate nuisance.

A suggestion was made to place the cleansing of these drains and removal of excavations under the Health Officer, and an estimate, amounting to Rs. 73,140 yearly, was prepared for Wards 19 to 25 and sent to the Chairman on 9th January 1896, but no orders have been passed yet.

III. *Public and House Latrines.*—The two latrines at Kalighat were erected at the urgent recommendation of the Health Officer, and replaced one of a most insanitary type, similar in every respect to that now in existence at Dalhoia bustee at Watgunge, referred to by Dr. Pilgrim in his report on the condition of that ward.

The dilapidated latrine at Kassia or Woolfut Bagan bustee has been the subject of correspondence for over three years. The Health Officer recommended that it, together with the disused nightsoil depôt adjoining, should be done away with, and a new latrine and depôt constructed 200 feet further off the road. This matter is still *sub judice*.

The keeper of the Jamadar latrine in Jodu Babu's Bazar has recently been prosecuted twice and fined Rs. 5 and Rs. 8 on the 21st August 1896 and 8th December 1896 respectively, and will be prosecuted until he puts his latrine in such order as to admit of its being licensed.

House Latrines.—Until the underground sewers are introduced in the suburban area, it will be difficult to deal effectually with the washing of the compartments in which *gumlahs* are placed, the disposal of sullage being a very big question. There is a small establishment of carts for the removal of sullage, but it is considerably short of the requirements.

Additional carts have been asked for by the Health Officer, and the estimate, amounting to Rs. 4,875 monthly for 300 additional carts for removal of nightsoil sullage and liquid cowdung for Wards 19 to 25, was considered by the S. I. Commissioners on the 15th November 1895 when the Chairman stated that the 300 carts were necessary. The matter was postponed and is still in abeyance.

A large number of insanitary privies, both *pucca* and *kutchra*, have from time to time been removed, the worst being dealt with first, and a number are at the present time under notice for improvement or demolition. One hundred and seventy-eight notices under section 286 have been served in this ward alone since 1st October 1895, and all new privies are to be on Donaldson's plan.

IV. *Compounds and Courtyards.*—There is no establishment for house-to-house inspection of compounds and courtyards; hence their insanitary condition cannot be known to the conservancy inspectors, unless some special inspection duty takes them to the premises.

Dustbins are placed in public streets when suitable sites can be found, but this is not an easy matter, as in nearly all cases there are doors or windows of dwellings so close to proposed sites that they have to be abandoned.

Dustbins must be at a distance of not more than 50 yards from premises before the occupiers of such premises can be called upon to use them.

Dustbins cannot ordinarily be placed in bustees, as being private property the owners object, being generally under the impression that whenever the Commissioners' place any property belonging to them on any land, that land in the natural course of events becomes the property of the Commissioners.

VI. *Tanks*.—There are 30 tanks under notice to be dewatered and filled up, and cases referred to the Engineering Department for action departmentally in default of compliance with notices by the owners.

Several tanks have been filled up or cleaned by owners.

VII. *Wells*.—The water of these wells is never, so far as has been ascertained, used for drinking or culinary purposes, but for washing and cleansing, and as a reserve in case of fires. It has therefore not been considered necessary by the Health Officer to fill them all up, but only to deal with such as may be within premises used as dairies.

VIII. *Stables and Cowsheds*.—The condition of most of the cowsheds and stables in this ward are such as to render it impossible to grant licenses; their sites are in very many instances objectionable.

Section 336 is freely applied, and in some cases animals are removed, but are brought back again, necessitating fresh prosecutions. One case in point is given as an example—that of Roghu Nundun *gowala*, of 109, Russa Road, who was last convicted and fined Rs. 100 and Rs. 3 costs on the 7th November 1896, and the animals turned out and the shed closed on the 9th November 1896: the animals were found the next morning to have been brought back.

The application of section 286 has been found unavailable, as the owners of the stables and sheds will seldom make any improvements, and there is great risk of recovery of costs should the Commissioners execute the work in default of compliance with notices. There should be a penal clause attached to section 286 by which those persons called upon to make improvements can be fined for default; this would have the effect of enforcing improvements or causing the people to remove. The fine imposed should be fixed, and not left to the discretion of Honorary Magistrates.

Report on Ward 25.

(2.) See para II. for Ward 22.

(3.) *Latrines*.—There is only one municipal latrine in this ward, situated at Dalhoia bustee; that at Sonai market is a jemadari latrine.

So far back as 1894, the Health Officer recommended that the public latrine at Dalhoia bustee be remodelled, and asked for Rs. 2,000 in the loan budget for this.

(4.) *Courtyards and Compounds*.—Answered by para. IV for Ward 22.

(6.) *Tanks and Wells*.—Answered by paras. VI and VII for Ward 22.

(7.) *Stables and Cowsheds*.—Answered by para. VIII for Ward 22.

(8.) *Markets*.—Kali Bazar market is only newly opened, and is not yet completed. Another *pucca* range is to be added, when the *kutchra* place will be done away with. Babu Bazaar market was burnt down about a year ago, and the owner has been called on to rebuild it.

H. VINCENT.

27

No. 6385.

FROM

H. C. WILLIAMS, Esq., I. C. S.,

Chairman of the Corporation of Calcutta,

TO

THE SECRETARY TO THE GOVERNMENT OF BENGAL,

MUNICIPAL DEPARTMENT,

Dated Calcutta, the 28th January, 1897.

SIR,

IN acknowledging the receipt of your letters No. 323 of the 21st January and No. 365 of the 23rd, I have the honour to forward the copy of a letter from Dr. Simpson, the Health Officer, on the subjects alluded to therein. There seems to be some misapprehension on the part of Government as regards the sanction of any extra establishment by the Commissioners, because for the reasons pointed out by Dr. Simpson no application for extra temporary establishment for cleansing the town was made until the 21st, and when the matter came before the General Committee on the 22nd, the first day it could be brought, that Committee although then refusing, on what I consider good grounds, to sanction the establishment asked for, gave a grant of Rs. 30,000 towards a temporary establishment for cleansing the town. In consequence of this sanction orders have been issued to the Superintendent-in-Chief to entertain a staff amounting to 1,300 coolies including the necessary sweepers and 283 carts with the necessary superintendence, which will be distributed in nine gangs over different parts of the city.

2. With reference to the Government of India's letter No. 46 of the 19th January forwarded with your letter No. 323, I would venture to remark that although it is possibly within the power of this Municipality to prevent the spread of the plague when it reaches Calcutta, the Commissioners are powerless as regards its introduction into the city, and I would bring to your notice that it is a most important question as to whether the Government of India and the Local Governments should not do more to prevent the introduction of the disease than has been hitherto done. Possibly more has been done than is generally known, but the fact remains that even still passengers are daily arriving from Bombay, and that although medical examinations may take place on the way, it is believed that they are not in all cases thorough, and that passengers can avoid them by breaking their journeys and coming on by different trains. It will be observed that Dr. Simpson states that at present there is only one Hospital Assistant at Howrah, and none at Sealdah, although passengers from Bombay can easily come into Calcutta by that route. I would therefore suggest that a thorough quarantine be established as far as possible, as from the newspapers it appears that wherever plague has appeared it has been distinctly traced to refugees from Bombay.

3. In my letter No. 6055 of the 11th instant I have already pointed out that although it is perhaps right to stop pilgrims proceeding from Bombay or Kurrachi, yet such a prohibition must lead to more pilgrims going via Calcutta, and would again suggest that if the prohibition cannot extend to Calcutta, most stringent measures should be taken to prevent any pilgrims entering the city.

4. As regards the special establishment for cleaning the Burra Bazar, it has been found that the work to be done there is considerably more than was originally anticipated, and accordingly another gang of 200 coolies will be allotted to Wards 5 and 7 out of the 1,300 men now sanctioned.

5. Some of the cost of the establishment is being recovered from the owners of the premises now being cleansed, but it is feared that a very large amount will be irrecoverable.

I have the honour to be,

SIR,

Your most obedient servant,

H. C. WILLIAMS,

Chairman.

Inclosure

TO THE CHAIRMAN OF THE CORPORATION.

IN reply to the letter of the Government of Bengal, dated 23rd January, enclosing letter from the Medical Board, I have the honour to state that Rs. 30,000 was recently sanctioned by the Commissioners for the cleansing of the city over and above that applied for by me in my Note, dated 1st October. The extra establishment consists of 1,300 men, 283 carts, 12 Sub-Inspectors and 1 Superintendent.

2. With reference to the report of the sanitary officers referred to in the letter it should be remembered that the inspections of these officers were made at a time when the extra establishment recommended by me had recently commenced work, and immediately after a Superintendent-in-Chief had been appointed for the supervision of the cleansing of the town. Since then a large amount of filth has been removed from the town and a very large number of filthy houses have been cleansed and lime-washed in different parts of the town.

3. After the appointment of the new staff in addition to the existing establishment it was necessary to see how far they were capable of dealing with the work and as soon as the Superintendent-in-Chief was satisfied that he required an extra establishment and had determined after careful consideration what that establishment should consist of no time was lost in placing the matter before the Chairman. And on seeing that there would be a possibility of delay in obtaining sanction for the full staff required from the Commissioners, I urged on 13th of January the immediate entertainment of a staff based on Dr. Banks' requisition and in addition to this applied for extra supervision. As I have mentioned Rs. 30,000 have been sanctioned for an emergent cleansing-staff.

4. It should be stated that there is some misconception on the part of the Medical Board as to the extent of accumulated filth in the city. There are no wards like Burra Bazar and Jora Bagan as pointed out in my Note of October 1st, and although only 600 houses have been cleansed and lime-washed in these two wards this does not mean that they are the only houses which have been attended to either in those wards or in the town. Precisely similar precautions have been taken by a great many house-owners themselves. Further, although the 8 wards mentioned are undoubtedly dirty there is not the accumulation of filth as found in the two wards mentioned above.

5. There is one point which in my opinion the Medical Board have not adequately realised, namely, that there are other precautionary measures against Plague besides cleansing. The importance of cleanliness is undoubted, but recent experience in Bomhay—an experience which is only confirmatory of that

derived in other cases of infectious disease, has shown that cleansing *per se* is not all that is necessary to safeguard a place against Plague or cut short an epidemic when it has broken out. In other words cleansing is only one of several precautionary measures which must be taken against the epidemic, and in order to prevent the disease effecting an entrance into a locality other measures are to be adopted, or more cleansing will prove of little value.

6. It will be seen from the following precautions recommended and taken by me that every endeavour has been made to guard the city against invasion as a preliminary measure, and that attention has been directed to the weak points by which Plague is likely to effect an entrance and lodgement in Calcutta. The recommendations made by me since September last are as follows :—

(1) Medical examination of passengers from Bombay to Calcutta, and precautions to be taken by Railway authorities against the spread of disease by work people and goods. These recommendations were sent to Government and the Railway authorities by the Corporation. The safety of the city in this direction depends largely upon the action taken on these recommendations and whether the precautionary measures are efficiently carried out and in proportion to the urgency of the danger.

I may state that I have recently learned that there is only a Campbell School Civil Hospital Assistant at the Howrah Station and none at Sealdah, and though I know that Medical inspections are made at certain intermediate stations I would take this opportunity of stating that the time has arrived for the authorities to take very stringent and more adequate precautions on the lines of railway and on a scale commensurate with the gravity of the danger.

(2) Quarantine in the Port.

(3) Increasing the number of Medical Inspectors, and the formation of sanitary circles which has been carried out.

(4) The erection of a Plague Hospital and the selection and securing of another site for a second Plague Hospital.

(5) Provision for ambulances. Two have been provided.

(6) That the provisions of Sections 321 and 334 of the Municipal Act should be enforced—

(a) The application of power conferred for the isolation of the sick.

(b) The application of power for cleansing and disinfecting houses.

(c) For preventing rag-picking in the streets and power to destroy rags in rag-pickers' houses or rag-stores.

(d) The power to prohibit and destroy infected articles coming from Bombay.

(e) Power to enter and carry out sanitary measures during the day or night.

7. The selection of sites for special burning and burial-grounds.

8. Advertisements inserted in the daily papers.

(a) To advise householders what to do to exclude Plague. 1,00,000 copies of these instructions were issued to householders in Urdu, Bengali, Hindi and English, and another 50,000 are being printed for the same purpose.

(b) Advertisements giving the chief symptoms of Plague were published and addressed to all Medical Practitioners, and similar papers were sent to the East Indian Railway medical men.

9. Suggestions have been made to the Postal and Telegraph Departments to prevent the conveyance of infection by disinfecting at the places of despatch letters, parcels and telegraphic copies which may be sent to Calcutta from infected districts.

10. A communication was sent to the Local Government advising the control of the traffic of pilgrims to Mecca, and to prevent them from lodging or staying even for a few hours in Calcutta or Howrah, but to arrange to conduct them direct from the station to the steamers.

11. The sites for the temporary erection of encampments for healthy people from infected houses are being considered.

12. The recommendation for the appointment of a special Health Officer for Howrah and the adoption there of the same precautionary measures as in Calcutta.

13. It has been recently suggested that the Medical Inspectors should be doubled in number. Their duties consist in visiting crowded lodging-houses, taking notes of recent arrivals and reporting any suspicious case of sickness in town.

14. In addition to the above (a) several cases of illness which in my opinion and other medical men were cases of plague were immediately isolated and the infected houses and articles thoroughly disinfected.

(b) Two grain-depôts in which rats were sick with bubonic swellings and dying in large numbers were thoroughly cleansed and disinfected and the rats were destroyed. One of these depôts has been closed and the inhabitants removed and the other was disinfected and an application has been made to the Magistrate to close it.

I have gone rather fully into what has been done because while great prominence is given to measures for cleansing the town it does not seem to have been realised that a careful watch has been kept over the city and that a great deal has been done to prevent the entrance and lodgment of the Plague. I believe these measures have up to now proved effectual in keeping this city free from Plague.

26th January, 1897.

W. J. SIMPSON, M.D.,
Health Officer.



