

Thesis for the degree of
M.D. (University of Glasgow).

Insanitary Areas and Houses
in Bombay and their re-
-lation to Plague with
schemes for the improve-
-ment of Areas.

by

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Introduction.

I am presenting this thesis for consideration before my respected Senate of my illustrious Alma Mater. I think it necessary to accompany it with an introduction with certain explanatory remarks.

On taking over duties in the Municipality I was asked to make Sanitary Surveys of certain areas the idea of the Municipal Commissioner being to have a general Sanitary Survey of areas with a population of about 10,000. After completion of my first Survey (Kagpada) I was informed by Colonel Weir I. M. S. (then medical officer of Health for Bombay) that the report furnished by me pleased the Commissioner and him very much and so I was put on to do such surveys only. Here I may state that I was informed and saw that some of the surveys as had been done by some of the Native deputy-Health officers were not of much value, and that in doing the surveys as I have done I have followed throughout ideas of my own as to what

Such surveys should embrace — there being no prescribed fixed mode of procedure in such. To make a more detailed survey would involve a longer ^{time} (which was not allowed me) but to get a general idea of the sanitary condition of an area is I think accomplished by the surveys conducted in the manner as these.

A point of some import in the making of these surveys was the remembrance that the surveys would be read by a number of laymen and so technicalities would have to be avoided — these surveys being intended for the Improvement Trust (founded for the sanitary improvement of Bombay).

Thus I considered that a diagram showing the area surveyed would help much to the understanding of the general description of the area, and the showing at a glance the insanitary portions as well as demonstrating the suggestions for the improvement of the area. The surveys after some consideration I determined to make under the following heads:—

- (1) Boundaries. (2) Population of area.
- (3) Class of People. (4) Mortality rate.
- (5) General description of area. (6) General type of houses, insanitary defects and their influence on health, suggestions for improvement etc.

Certain remarks are necessary

on these heads.

- (1) *The Boundaries*: This of course was an essential head showing how much of a Section or sub-section is taken up and this is made clear by the diagram.
- (2) *Population*: The idea is to survey an area of about 10,000 population. Of course it is impossible to be exact in this respect and it is only after the survey that even an approximate guess can be made in this respect as some areas are very much overcrowded and this can only be approximately got at by a systematic house to house inspection at night - an impracticable course especially with natives of different castes. The population is gauged roughly by getting the average number of rooms in the total number of dwellings and allowing so many persons to each room (all rooms in native houses are used as sleeping rooms) according to the number usually found and according to whether there seems to be overcrowding.
- (3) *Class of People*: This is rather an important head as the different native classes vary very differently in their habits and they have an important and direct relation to the sanitary state of the houses and of the area. The lower class Hindus and lower

class Parsees are probably the dirtiest
 in their general habits and usually
 found overcrowding rooms. Next
 come Mahomedans who have strict
 religious views of personal cleanliness
 and who again are very particular
 about Europeans visiting their houses
 owing to their "Purdah" women. Next
 the high class Brahmins are also very particu-
 lar about Europeans (especially) entering
 near any food or drink and so these
 religious views have all to be respected
 in the entrance of houses. In this
 connection I am glad to say no ground
 for complaint has ever been given
 and none ever made to the office
 from the commencement of these
 surveys. Places of religious worship
 are all barred from entrance and
 such places have to be kept in
 view in schemes for improvement.
 All these classes are against San-
 itary reforms simply because
 they are ignorant and do not
 understand them properly nor their
 advantages and view them rather
 with an evil eye as something done
 against their religion. Sanitary
 reforms therefore are not easily
 brought about in a country where
 population look with so much
 suspicion at them, and where the

Municipal Corporation is composed of a majority of Natives whose aim at a seat in the Corporation is to make money by bribery and corruption. Considering all this it is a matter of congratulation that we have made the progress we have in matters Sanitary, and it is a pure question of Educating the Natives, having more Sanitary legislation and by having a majority of Europeans on the Corporation to ensure greater progress.

(4) Mortality rate: It was my idea to get the mortality rate of the area, and of its death rate in respect to certain diseases. Unfortunately these rates were not procurable owing to "red-tape" at the Municipality Offices, but I have at the very last moment after the completion of this thesis only got certain mortality rates of certain areas which I have put in.

(5) General description of area: My idea under this heading is to give a brief geography of the area, the general state of the streets, the houses etc and other generalisations.

* Chawls are buildings of one, two or three stories each storey having a series of separate rooms (single or double) occupied by separate families.

(6) General type of houses, their insanitary State and their relations to health with suggestions for improvement. The heading itself explains its scope and in addition are added any percentage figures and any special description of certain houses or portions of the area. Here I may remark that there are very different classes of dwellings found in the various areas. Thus we have houses with ground floor and one, two, three, four, five or six stories, the height from flooring to ceiling of each story varying much and giving very high buildings in many cases. Then we have a class of dwellings very common with the lower Castes viz; Chawls * (i.e. dwellings of separate rooms let out as lodgings) of ground floor and one two or three stories. Attachment of houses one or both sides is the rule, Gullies run on unattached sides and behind the houses. The general structural and sanitary condition of the house is considered and then the house is entered and its ground floor inspected. The rooms (if any) of the ground floor are inspected also

* The list of houses with sanitary defects is added to the report of the survey when completed for municipal action.

its privies, its beam and the well (if any). Darkness and closeness often prevails. The 1st Storey is inspected throughout and enquiries made as to the other storeys the rule being they are all alike. This is confirmed by visiting occasional houses throughout. Any special bad house is also gone over throughout. The internal inspection of houses in a hot climate is being worn apart from the danger to health from close dark and infected houses. Some passages and rooms are dangerous by their darkness and even a small lamp insufficiently lights the place.

Houses that have sanitary defects which can be remedied are made a list of and their defects noted and the suggestions for improvement given. This list is added to the end of the report but as it concerns private property is excluded from this thesis. Houses very dilapidated, whose situation is bad, whose general condition is insanitary or which have a combination of these conditions are condemned as unfit for human habitation. Certain houses are condemned

for the improvement of the area. A large number of houses have had plague cases in them. These houses are all marked with a red circle or semicircle according to whether deaths have resulted there or not. Very soon however many such marks are white washed over completely or incompletely (by the landlord) and so it is not practicable to merely enumerate such marked houses to get at the total of plague infected ones. But the majority of houses so infected are located and the location of such on the diagram shows the relation of plague infected houses to those condemned and those requiring improvement, or in other words to the sanitary condition of the house; and furthermore this demonstrated how plague has a tendency to infect neighbouring houses and so one finds a number of plague infected houses near each other.

Then as regards the suggestions for improvement of the area, after having gone through the houses and knowing their sanitary state and their disposition, and the sanitary condition of the streets and lanes I determine what portions of the area require opening up and

upon what side or sides the streets should be widened as also what houses singly or in groups would be the better of total demolition. In making up such schemes I advocate the making of streets thro' such portions of the area as contain many insanitary houses taking also into consideration the height of the existing buildings.

In this way not only is the area opened up but also at the same time a number of insanitary houses are attacked and so separate treatment of these avoided and perhaps separate compensation. Furthermore the carrying of any scheme thro' specially plague-infected portions of the area is insisted on but in this connection it must be remembered that a house should not be absolutely condemned simply because it has had a plague case in it.

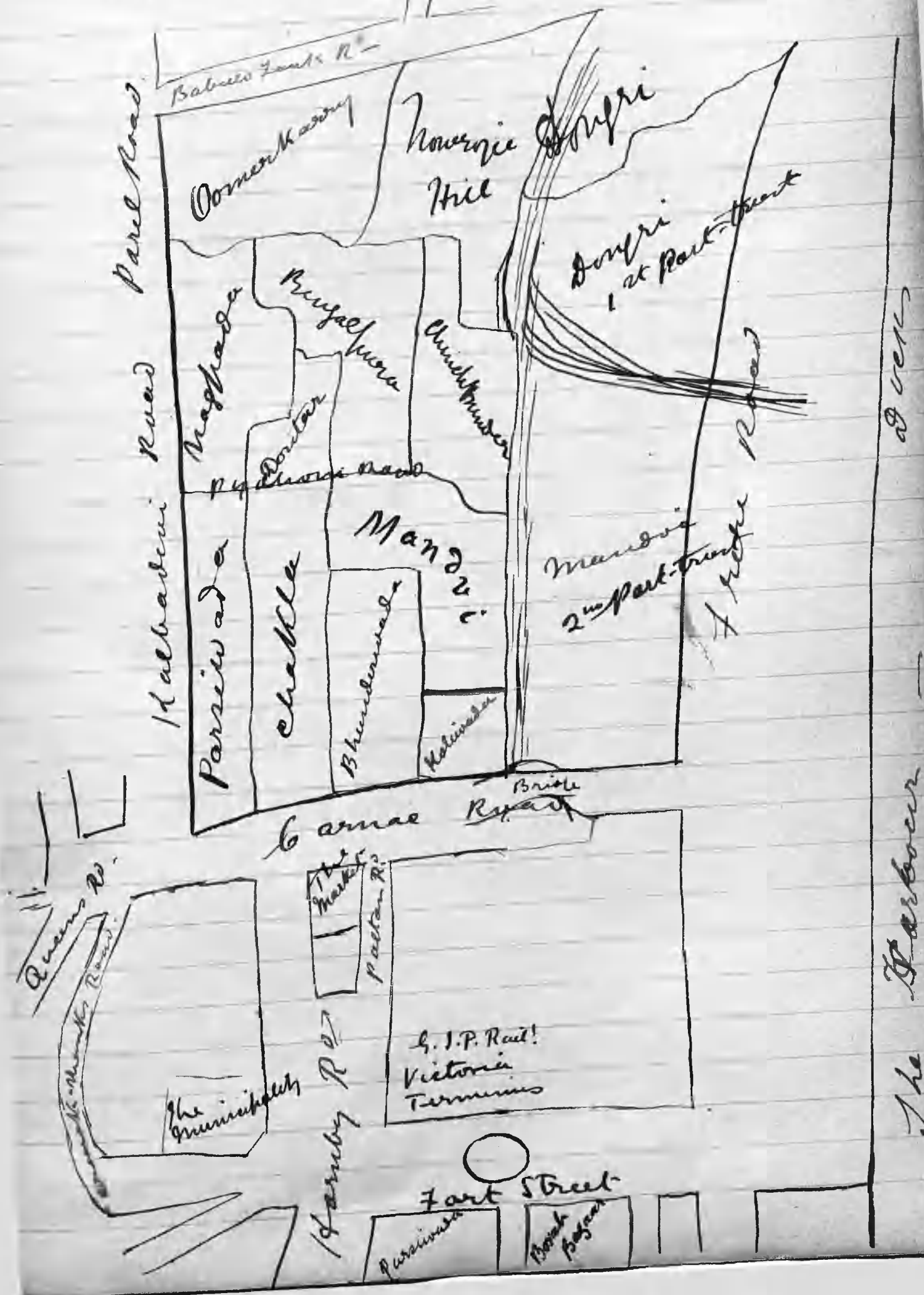
There are many new and sanitary houses which have been plague infected - the infected case having derived its infection from outside source - and the thorough disinfection of such houses can be relied on as

sufficient to completely remove the infection from the house. *Cacteris parvulus* as in such good houses with good light and ventilation plague ferms do not carry and live (as plague bacilli have not much resistance to light and ventilation) and in this connection as in other plague resembles typhus fever.

Furthermore in India all schemes for improvement of an area should avoid the various places of worship of the different native classes and so in a measure lessen the opposition of the natives to such schemes. Lastly the worst areas should be dealt with first.

In conclusion I should state that many of the streets have their names spelt in various ways but I have endeavoured to keep to one spelling.

6 Diagram showing the relation to each other of the areas surveyed.



* Fall showing Number of deaths and death rate from some of the Principal diseases in 1899.

Section Deaths. Cholera. Smallpox. Fever. Typhoid. Diphtheria. Measles. Whooping Cough. Pleague.

No	Number of deaths.	Per 1000 of Popul ⁿ	No of deaths	Per 1000.	No of deaths	Per 1000.	No of deaths.	Per 1000.	No of deaths.	Per 1000.	No of deaths.	Per 1000.		
Mandui	2753	73.81	4	.10	10	.26	230	6.16	478	12.81	173	4.63	848	21.73
Chukla	1965	61.03	3	.09	3	.09	138	4.38	496	15.40	111	3.44	302	9.37
Demakhabli	3576	68.15	6	.11	19	.36	267	5.05	721	13.74	213	4.05	635	12.10
Dongrai	2459	81.10	4	.13	18	.59	300	9.89	406	13.39	144	4.74	732	24.14
Market	2019	45.11	1	.02	4	.89	164	3.66	324	7.24	143	3.19	707	15.66
1 st Nayabara	854	76.70	14	1.25	70	6.38	112	10.06	52	4.67	252	22.63
Total of all sections in Bombay	56434	68.67	111	.13	440	.53	5063	6.16	8650	10.52	4306	5.23	15796	19.22

* As in Annual returns from Health Department for year 1899.

Table showing the number of Houses Condemned and for improvement and the relation to Plague in the areas surveyed.

Section	Houses condemned	Condemned houses with Plague	Total No. of Houses with Plague	No of Houses for improvement	Total No. of Houses in area
Naghada	100	25	x	xx	160
Koliwada	85	28	x	xx	135
Dontar	48	18	18	xx	200
Nowrojee Hill	110	30	45	51	209
N.W. Market	85	30	68	60	400.
Nowrojee Hill N.	77	51	77	42	165
Chakla	300	90	130	60	430
Bhunderwada	108	70	104	43	250
Mandvi	104	20	58	55	365
Comerkerry	45	20	47	15	150
Bengalpura	67	27	82	32	290
Market S.W.	114	76	155	43	385
Market N.E.	28	10	54	32	220
Parsiwada	70	8	30	80	620
Borah Bazaar	60	17	66	36	375.
Total :	1401	520	934	549	4354
Percentage:	32.0%	37.1%	21.4%	12.6%	—

* = These are not at all reliable from most of the marks having been obliterated by being whitewashed

xx = These were not specially enumerated in these districts.

For General Index see page 144.

I. Boundaries:

North: Inmanwad Road
 South: Ghunam Kiln Street and Lane,
 Kambekar Street and small
 part of New Bengalpura Street.
 West: Parcel Road
 East: Boundary Wall of Malomedan
 Cemetery.

II. Population of area:

about 10,000.

III. Class of People:

Chiefly Malomedans

IV. Mortality Rate: 76.70 per 1000 (1899)

V. General Description of Area:

This area with the above boundaries may roughly be stated to be divided into an Eastern and Western half by Inmanwada Road running from North to South. The Eastern half is divided by New Bengalpura Street into a larger Northern portion and a smaller Southern portion. In continuation of New Bengalpura Street in the Western half, is a lane called Parcel Cross Lane which may be said to divide this Western half of this area into equal Northern and Southern halves. Thus the junction of

of New Bengalpura St and Parcel Cross Lane with Memowada Road may be said to be the centre of this area.

In the Western half we have a long narrow lane running parallel to Parcel Road called Felley Gully into which the backs of many of the houses on Parcel Road open. The northern portion of this Gully is separated to the East by a row of insanitary houses from another lane running parallel to it and called Old Nagpada Cross Lane. The Southern end of this lane ends blindly and in the vicinity of several insanitary houses. In the Eastern half of this area we find in its Southern smaller portion Old Nagpada Street running Eastwards from Memowada Road and between Churanam Kilm Lane & New Bengalpura St. In the larger northern portion of this Eastern half we find going off Northwards from New Bengalpura Street a narrow road called Mahomed Khan Pakadi which very soon leads into a small square having several insanitary houses in immediate vicinity.

On the northern side of a house which projects into this square is a very narrow lane which I have called "Mahomed Khan Pakadi Lane" on the diagram and in which are several insanitary houses. The house which projects into the square together with

With these insanitary houses to its North should all be demolished and a large breathing space maintained. Malomed Khan Pakkadi continues north by a winding course and has two narrow lanes leading off westward one on each side of a block of houses near its termination and which unite into a narrow winding lane which is continued West to Meenowada Road. (Named in origin as Malomed Khan Pakkadi off branch). The houses on the East side of the end of Malomed Khan Pakkadi are directly against the Cemetery Wall.

Beyond the influence of the Cemetery on the health of those living in the houses overlooking it there does not seem to be any external prejudicial influence so far as trades and the like are concerned, brought to bear on the health of the community in this district.

VI. General type of houses and insanitary defects and their influence on health:

The general type of the houses in this area is that of a Chawl. There are many typical chawls i.e. buildings with a range of separate rooms on one or two stories, but for the most part we find the principle of a chawl magnified and so we have buildings of two, three, or four storeys of ranges of separate rooms overlooking a

a chowk which separates them from others to the back — in other words a chowk separating two or more chawls.

(A chowk is an internal open space and is now required by Sect 348 of the Bombay Municipal Act of 1888 'to 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 six feet across'.)

Chowks: In a large number of cases the chowk is too small to afford sufficient ventilation to the number of rooms which for the most part depend on the passages for their ventilation. It is not therefore a matter for surprise when we find the passages dark since a chowk which affords imperfect ventilation to the passages will give very little light and since most of the passages are between rows of rooms and entirely dependent on the chowk for light for which windows that ~~may~~ exist are either small or badly situated. In a number of cases the chowk is traversed thro' the centre by a dilapidated staircase and so matters are aggravated. In addition this same chowk has also to provide ventilation for privies on one or both sides of it.

The privies are drained into narrow gullies by the sides of the houses which have

to afford ventilation to the rooms of adjacent houses and in some cases these gullies are extremely narrow. In a few cases a portion of the gully from the privy on ground floor runs along the ground floor passage. The position of the privy is in a large number of cases very objectionable. We find them situated between two living rooms without any chowk or special means of ventilation and only separated by the wall of a room. In one case the privies are raised a few feet above the ground floor and separated by a thin dilapidated wall from a sleeping room. In the majority of cases we find deficient number of privies. In one case there are three privies for about 300 people. In others there are 1 for 10, 11, 15, 22 rooms and in one building we have 46 rooms with only 2 privies! Besides the insufficiency of privy accommodation (and in this connection we must remember in addition that most of the rooms are overcrowded), the unsuitable position for such accommodation we also find them badly ventilated and in every case dirty. Pipes: In a large number of cases the drain water and gas pipes are rotten & cause dampness, and in some cases not only are they incomplete but a portion has also fallen the adjacent building being in a dangerous position.

Nanis: In a number of ~~rooms~~ ^{rooms} nanis are found and should be removed. A nani is a bathing place and the cement wall of about one foot high separating it from the rest of the floor is called the moore. They are frequently a cause of dampness of the rooms. The roofs of many houses are found to be in a dilapidated condition.

The floors of rooms are frequently of earth & cowdung and ~~improper~~ uneven, and where they are simply wooden they are invariably dirty and in some cases in a dilapidated condition. Likewise the walls are invariably dirty & in many cases dilapidated.

The Rooms: In some cases these are large and peculiarly enough when they are of large size the means of ventilation and light are adequate but in the majority of houses in this area we have a large number of small rooms which are poorly ventilated and lighted. It may be the room is ventilated by a window on to a side jully but either the jully is very narrow or the window very small (usually both), so that the room is dark and ill ventilated. Some rooms are entirely dependent on a dark passage for their ventilation and light, and thus again borrow their ventilation & light from another room.

In some cases the passages are so dark and close that one could scarcely find their way even by help of matches and yet there were rooms dependent on these passages for light and ventilation and these rooms are inhabited!

It is no exaggeration to say that the majority of small rooms in this area are insufficiently ventilated and some are found very badly ventilated and lighted to a disgraceful extent. It is obvious since we depend upon the air for proper aeration of our blood for the due performance of physiological processes which go to maintain our stamina and combat disease, and upon sunlight for its bactericidal powers and upon bath for their general purifying influence on the air we breathe, that we must suffer in our health and lower our resisting power and at the same time permit the development of organisms which may be inimical to life by harbouring them in illventilated and dark places by the absence of sufficient air and sunlight. If therefore rooms that are dark and illventilated are occupied with danger to health it is very obvious that the danger is very much increased by overcrowding of these rooms. Overcrowding is very common - in fact exists in a very large majority of the houses. The actual amount of

cubic space per head of course differs in the different houses but we may pass into consideration the cubic space per head of those living in a chawl the gross cubic area of the rooms of which being a fair representation of the majority of small rooms (excluding those very badly ventilated). The rooms under consideration measured 12 feet 8 inches long, 4' 2" broad and 10' high this giving a gross cubic area of $907 \frac{7}{9}$ cb. ft. It is said that four people live in each of these rooms tho' I have no doubt that the number is in excess of this. However let us say four occupy each of these rooms. This would give after deduction of 3 cb ft for each of these bodies an available cubic area of roughly 896 cb ft and this divided by four gives 228 cb ft per head. In some rooms there is perhaps some articles of furniture etc and in others a partition which is not considered in the calculation and which would further lessen the calculated cubic space per head. Now (as in the case of these rooms) the ventilation is not perfect being only ventilated by a door and a grating over it and w the necessary amount of air will not pass in and out of the room; and when in addition the rooms are made smoky

smoky by a fire in them and there is overcrowding then it is obvious the amount of cubic space dwindles down to a small figure and very much below what each individual adult should have viz 300 cu feet.

It is then clear that if we wish to convert an unhealthy area into a healthy one we must remove the insanitary causes which provoke the unhealthy state.

In the first place all dilapidated and otherwise insanitary houses must be demolished and in their place recreated houses with rooms and passages well ventilated and lighted with other sanitary requirements.

Such ~~houses~~ are marked on the diagram with red dots. In addition there are many houses which can be greatly improved short of demolition by remedying the insanitary defects such as illventilation of certain rooms, insufficient privy accommodation, objectionable situation of privies, illventilated and badly lighted passages by absence of chowk etc, and a list of these houses with their defects is appended. (This detailed list pointing out such defects in the individual houses will not be added for the sake of this thesis as it concerns private property and is really out of the scope of this thesis).

Apart from the improvement of the houses it is necessary in order that winds may exercise their beneficial influence to their greatest extent that the narrow gullies or lanes be widened and thus also allow more sunlight to permeate thro' the area. One or two gullies could easily be widened and one or two breathing spaces (bungs so to speak) made thro' the demolition of a number of unhealthy houses situated together.

The parts of the diagram shaded blue are the parts which I would recommend be formed into widened streets or breathing spaces or the case may be.

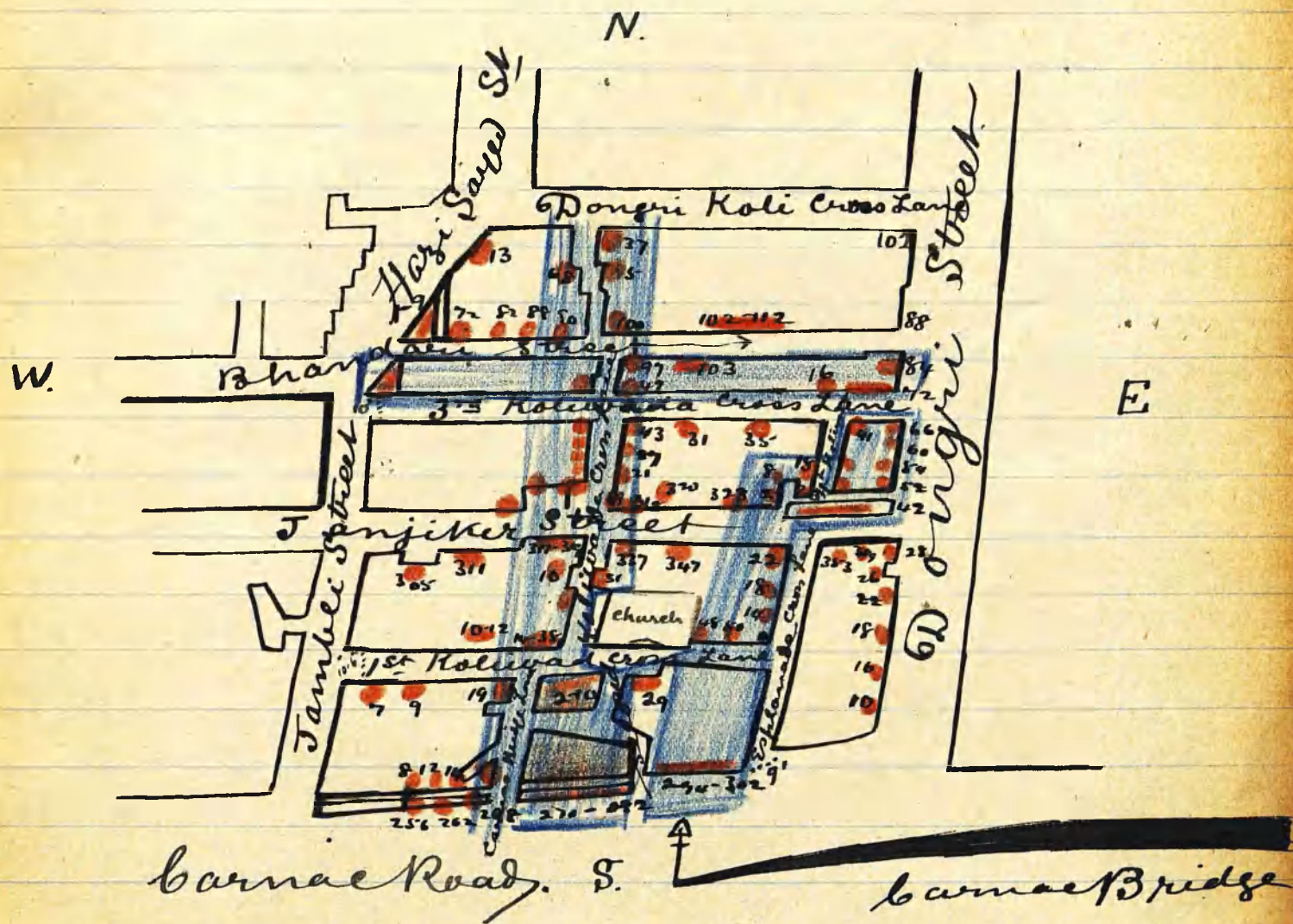
In conclusion one may summarise by stating that it is the want of sufficient light & ventilation & the existence of dilapidated and otherwise insanitary houses together with overcrowding which have a detrimental influence on the health of the inhabitants and so if there exist to any great extent together then the area cannot but form a dangerous focus to the city.

In this area out of 160 buildings 100 are condemned or 62%.

A. Newell

For General Index see page 44.

Sanitary Survey of Koliwada.



Red dots denote houses condemned.

Blue shading denotes the improvement suggested.

1. Boundaries:

N: Dongeri Koli Cross Lane.

S: Barnac Road.

E: Dongeri Street.

W: Jamble St & Part of Harzi Sayed St.

2. Population: about 10,000.

3. Class of People: chiefly Kolies (fishermen), Marathas and a few Boras.

4. Mortality Rate :

5. General Description of Area:

This area may be roughly divided into two areas of about equal size by means of Jinjiker Street which runs across it from West to East and so we may say we have a Northern and a Southern half.

In the Southern half running parallel to Jinjiker St is 1st Koliwada Cross Lane from Jambli St to Dongri St. Going off from the middle of this 1st Cross Lane at right angles is 2nd Koliwada Cross Lane which proceeds irregularly to the Northern boundary. The 3rd Koliwada Cross Lane is found in the Northern half of the area immediately above (and roughly parallel to) Jinjiker Street and like the 1st Cross Lane proceeds from West to East.

Immediately North of this lane is a portion of Bhandari Street which runs thru' this area from West to East.

From the Eastern end of the 3rd Cross Lane there proceeds at right angles in a Southerly direction a small lane which is the 4th Koliwada Cross Lane. Proceeding from a little West of the termination of this lane as tho' in continuation of it is another lane which runs South to Carmel Road and is known as the Esplanade

Cross Lane. Going off from lower end of 2nd Koliwada Cross Lane to Carnae Road is a small lane called Carnae Bridge Lane. These make up all the streets and lanes in this area and they all are narrow and not of sufficient breadth for the proper ventilation of the area & its houses. There are in addition several small narrow alleys which go off from one or other of the above lanes, and which lead to the backs of houses where there may be some small dwelling or perhaps a general washing place in the vicinity of several fullies. These alleys are by reason of their narrowness ill ventilated and by reason of the dampness proceeding from moories and vicinity of fullies and the liability of such narrow places for the deposition of general refuse (skun) they are usually foul smelling.

Obviously any rooms dependent on them for ventilation are both insufficiently and viciously ventilated.

6. General type of Houses and insanitary defects and their influence on health with recommendations for improvement of the Area:

The General type of the houses in this area is that of a chawl of varying size. The larger and higher houses are chiefly

found in the boundaries of the area. The houses in the interior of the area being for the most part one or two storied.

This is an important point in this special area as the houses in this area are all closely packed together and situated in narrow lanes or apologies for streets of 9-10 feet wide. Some houses are extremely badly situated interfering with the ventilation of other houses and receiving little thru narrow galleries of about five feet width.

Chokes: There are few chokes to be found in this area and the passages of many houses are found dark and ill-ventilated, and the rooms dependent on them for ventilation are of necessity ill-ventilated and chokes could with benefit be introduced in some of them.

Privies: Generally speaking the privy accommodation is very insufficient the proportion generally being one privy to ten rooms. In those cases where there is insufficient privy accommodation the proportion is variously 12:1; 14:1; 26:1; 29:1.

There are 32 buildings in this area without privy accommodation and in some of these buildings there are as many as 14, 16 & 20 rooms. The situation of a few privies is objectionable.

The privies empty into gullies in some cases so narrow that proper cleaning of the latter is impossible. Insufficient privy accommodation means the usage of the narrow alleys and gullies for purposes of defecation and in such narrow gullies this cannot but exercise a prejudicial influence on the health of the inhabitants.

Rooms: The majority of rooms are small in size ventilated by small grated windows overlooking narrow gullies and by doors opening on to narrow and dark passages. The rooms besides being dark and ill ventilated are in many cases overcrowded. In some cases the ventilation of the rooms is entirely by the door of the room and the grating above the door.

The general condition of the houses in this area is one of dilapidation. The houses are old (walls & partitions showing the dilapidation in many cases markedly) and are crowded together interfering with the ventilation of neighbouring houses, and are situated in narrow lanes and so are both ill lighted and ill ventilated.

Tho' there are a few houses which can be improved by reconstruction there are too many dilapidated houses

placed together in too narrow lanes for any other course to be adopted for the improvement of the area than that of demolition. There are 135 buildings within this area and of this number 85 are unfit for human habitation being dilapidated buildings with ill ventilated & ill-lighted passages and rooms and badly situated in many cases.

This gives a percentage of at least 62% which are condemned. Of this number of condemned houses we have 17% of them in 2nd Koliwada Cross Lane and Carnac Bridge Lane.

In these lanes which are in continuation we have 25 buildings of which 20 are condemned. The following table shows the proportion of Houses unfit for human habitation to each Street:

Name of St.	Number of Houses	Number U.H.H.	Number houses fit for habitation
Jambli Street.	12.	2.	1
Dongri Koli Cross Lane.	7.	2.	0
Dongri Street.	22.	15.	0
Carnac R ^d .	6.	4.	0
1 st Koliwada Lane.	10.	9.	0
Janjiker St.	20.	14.	5.
3 rd Koliwada Cross Lane.	8.	4.	3.
4 th " " "	3.	2.	1.
Esplanade Lane	8.	6.	2.
Bhandari St	14.	7.	7 (2 not in U.H.H.)
2 nd Koliwada Cross Lane and Carnac Bridge Lane	25.	20.	9.
Total:	135.	85.	28.

It is very clear from this and from the Examination of the Houses themselves that we have in 2nd Koliwada Cross Lane the most, unhealthy portion of the area. The breadth of the lane itself is only $9\frac{1}{2}$ feet.

Another lane which has 6 out of its 8 houses unfit for human habitation (= "U.H.H.") is Esplanade Lane which with its continuation 4th Koliwada Cross Lane make up the chief insanitary portions of the area. These lanes require widening by the total demolition of the houses in these lanes which are "U.H.H."

The suggested improvement of the area is shaded here on the diagram. The other "U.H.H." houses outside of this blue shading should be improved by reconstruction and the houses which require improvements by removal of their insanitary defects as on attached form should have these attended to immediately.

Thus out of this thickly populated area with 62% of insanitary houses a fairly sanitary area can be ensured by the demolition of a number of insanitary houses in two narrow lanes thereby widening these lanes (2nd Koliwada X Lane with Carnal

Bridge Lane and Esplanade Lane), and giving ~~good~~ Ventilation to area and removing dangerous foci since most of the Plague cases in this area have been in these houses in these lanes.

(To this is attached a list of the houses in all the streets which have structural or other insanitary defects pointing them out and suggesting improvement needed. ~~For~~ the purpose of this thesis this will be excluded from all the reports).

2. Population: about 11,000.
3. Class of People: Mamlouks (Mahommedans).
4. Mortality Rate:

5. General Description of Area:

This area of above boundaries is made up chiefly of blocks of high buildings each of which extends half the distance which exists between two parallel streets. There are seven such blocks in this area which are separated by parallel streets. Old Nagpada Street on the North, Paeshoni Road on the South, Kontar and Facedel Streets on the East and Kambekar Street on the West approximately make a square enclosing four of these blocks. To the North of Old Nagpada Cross Street are two of the remaining blocks and West of Kambekar Street extending from Paeshoni & Chumam Kilm Street is the 7th block. The streets are all of sufficient width and we have no lanes in this area. The buildings are for the most part attached to each side and separated to the rear by a gully. Some however have gullies on both sides and in such cases the gullies are invariably 2-3 ft width.

About 100 yards to the north of the Eastern end of Northern boundary is the Saeja Kofa Cemetery and inside the area the only influences likely to be prejudicial to the health of the community apart from the buildings and fannies is the existence of some Buffalo & Bullock Sheds rather near some buildings, and also the existence of two buildings where dirty old rags and paper are sorted out throughout the town. These rag-sorting houses are marked with a red cross on the diagrammatic representation of the area.

6. General type of houses and insanitary defects and their influence on health:

The general type of the houses in this area is that of a large building of great depth and varying from 3 to 5 stories. Each storey is divided into a number of rooms on each side of a central passage or more commonly on one side of a laterally placed narrow passage. Owing to the depth of the building the centrally placed rooms are ill-ventilated even in some of the cases where a chowk is provided as the chowk in these cases is too small.

In the majority of cases there is no chow R and the narrow dark passage leads to the other end of the building where a privy is situated in darkness and ill-ventilation, in these cases not only are the centrally placed rooms ill-ventilated & ill-lighted but also the whole of the back rooms. Owing to the depth of the building there is greater need for the provision of means of good ventilation as the air is liable to remain stagnant in the centre and then ventilation begins to be carried on chiefly by diffusion which is always a slow process and as organic impurities given off by the breath tends to accumulate in the lower strata of air those who live in such places have a very noxious atmosphere which cannot but tell on their general health. Furthermore the organic matter exhaled in the breath promotes the growth of micro-organisms and is present in direct proportion to the amount of CO_2 exhaled. If CO_2 be present in the atmosphere of dwellings in excess it prevents the proper

Exhalation of the gas from the blood and thus causing an accumulation of it in the blood.

Where being in excess there is less oxygen for absorption and consequently retardation of those physiological oxidising processes which eliminate the effete matters from the human system. It is obvious these deep buildings were not built with respect to Sanitary laws.

Many of the houses could be improved by providing a cloak towards the back part of the building but in some cases the removal of a portion of the back of the building is recommended.

(Passages): In a number of cases the passages are too narrow and badly ventilated and lighted, and even where the passage is broad yet owing to the poor means of ventilation and lighting the passage is dark owing to its length.

(Privies): The privy accommodation throughout the area is good there being only one case in which there is no such accommodation and in the large majority of cases it is sufficient. The privies empty generally into gullies lying between the

backs of two buildings. In a number of cases the privies are ill-ventilated and in a few cases they require to be detached.

The pipes, roofs, floors & walls are generally good ~~except~~ in those houses condemned and those specially mentioned on attached list.

Names are found inside a few rooms.

The Rooms are generally speaking of fair size tho' there are a number of houses with small rooms. The ventilation and lighting of the rooms generally speaking are insufficient as owing to many houses being attached on both sides the ventilation in many rooms is either borrowed from other rooms or from the passage which is too long and insufficiently ventilated itself to afford proper ventilation for the rooms. In those cases where ventilation is in addition by windows or to gullies there are very narrow and only give impure air. Windows in many cases are too small. The provision of gratings above doors is recommended in some cases for better ventilation of rooms. The great fault in

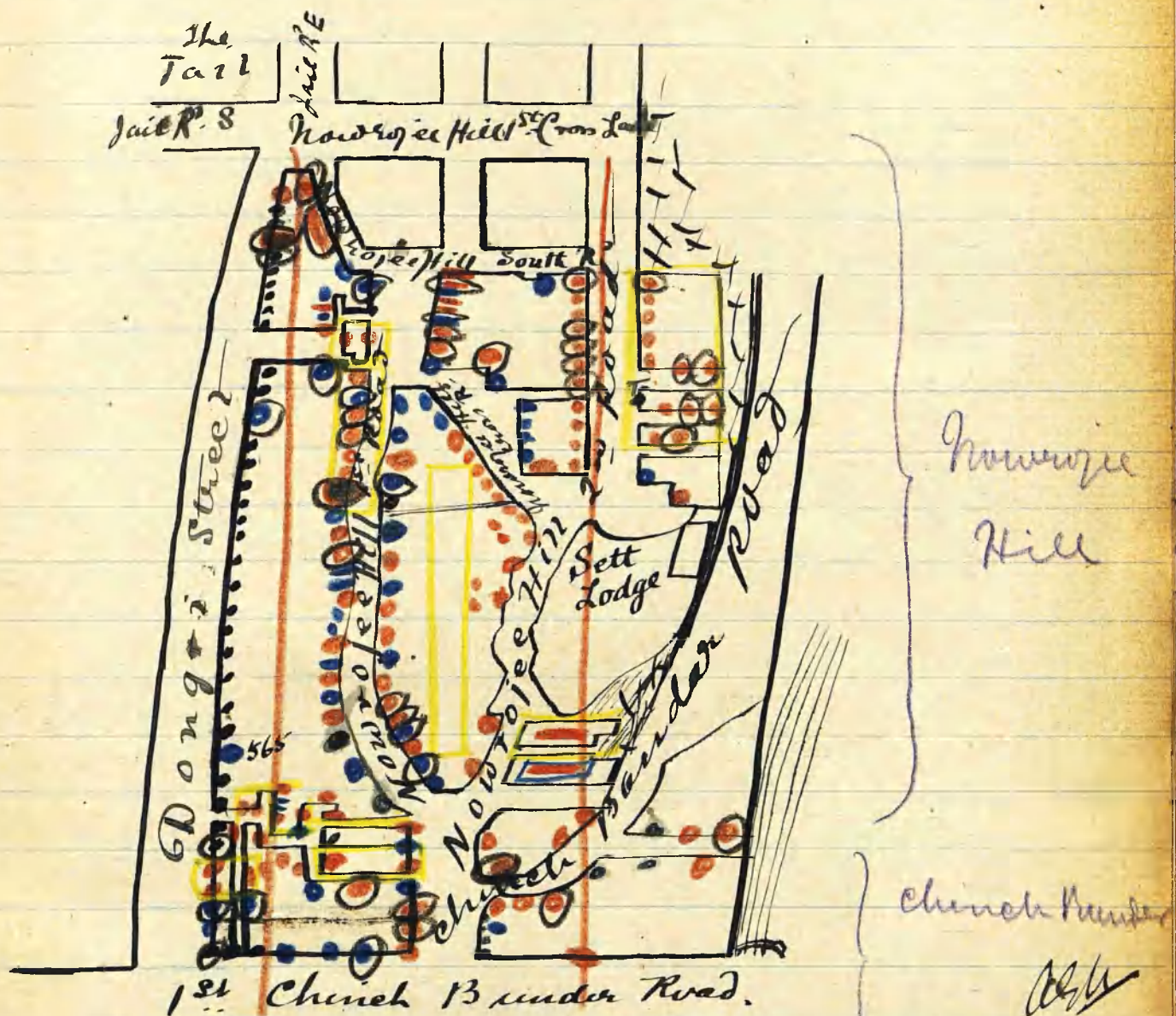
this area to the depth of the building without this being met with proper means of ventilating the passages and the rooms thereof.

For the improvement of the general health of the inhabitants it is necessary to provide better means of ventilating such passages and rooms by chowks or reconstruction.

In some cases the rooms and passages are so dark and ill ventilated and dirty that reconstruction is the only advisable course and such buildings have been included in the condemned list.

There are about 200 houses in this area 24% of which are condemned. There are 18 houses where there have been playu cores.

Sanitary Survey of adjoining portions of Norowjee Hill and Chinch Bunder.



Note: Black dots represent houses which may be left alone
 Blue " " " " " " have some insanitary ^{defect}
 Red " " " " " " are condemned.
 Black circles " " " " have had plague cases.
 Yellow lines " improvement recommended.

1. Boundaries:

N: Norowjee Hill South Road
 S: 1st Chinch Bunder Road
 E: Parts of Railway lines, Chinch Bunder Road,
 Cliff & Norowjee Hill 2nd Road.
 W: Dongri Street.

2. Population: Tho' at first sight one may guess at a given area having a population of about 10,000 yet on examination of the area on detail this calculation may be upset. It is so in this case which is most overcrowded. There are 2927 inhabited rooms in this area and calculating five to a room we get a population of 14,635 which is probably very near the exact figure.
3. Class of People: chiefly Bhardais and Agris (Hindoo) but also a few Marathas.
4. Mortality Rate:
5. General Description of Area:
 This area with the above boundaries is situate on the side of Nowrojee Hill having a general slope from NE to SW. The centre of this area is occupied by a number of houses of various sizes some attached and others separated by gullies running from East to West down the slope of the hill. This block of houses separates the two chief roads of this area viz: to the E is Nowrojee Hill 2nd Road and to the West Nowrojee Hill 1st Road. These roads unite to the South and Nowrojee Hill 1st Road is continued to join Church Baudar Road. From where Nowrojee

Hill 1st road joins Church Bandar Road there is a lane which goes off to the West and which has a tortuous course among several badly situated houses really forming a "Wadi". The lane may be called Church Bandar Cross Lane. This lane is 7 feet wide and it and its branches wind in between 23 houses mostly all insanitary. The main roads of this area are themselves none so wide. The majority of houses of this area are situated in the interior of the area and the majority of these houses so situated are insanitary.

6. General type of Houses, insanitary defects and their influence on health:

The houses on the Western and Southern boundaries are in the main high buildings with 3 or 4 stories whilst the houses in the interior of the area vary much from a hut, chawl, or small house of one or two stories to a few houses of 3 or 4 stories. But the general type of the houses in the interior may be said to be that of a chawl. The general condition of the houses is one of dilapidation and here I may state at the outset that the insanitary condition of this area is the insanitary condition practically of its interior by which is meant all inside the red lines on diagram.

The passages of most of the houses in the interior are dark and ill-ventilated and no house could be a better example of ignorance of sanitation in this respect than number 88 Church Randor Road where the ground floor contains 9 rooms going off from a dark and close passage in which a match will scarcely burn.

Another example is number 17 Church Randor Cross Lane (in the "Wadi").

The ground floors of a very large number of the houses of the interior are either ~~with~~ a small plinth or on the level of the ground (road). In some cases if the whole ground floor is not under the level of the road at least the back portion is. The floors in all these cases are damp and in some cases in a very disgusting state.

The partitions dividing the rooms in chambers are very commonly made of bamboo covered with cowdung which latter also enters into the composition of the floors. In many instances, both these are dilapidated.

The rooms are in most instances small and ill-ventilated by means of small windows or narrow jallies or perhaps entirely by gratings over doors opening on to dark passages. There are many rooms with no

Windows and ventilate by doors only on to ill-ventilated passages.

Every room inside the area is more or less overcrowded. Rooms on ground floors which are on or below level of the road are in addition damp.

Mosses are found in many rooms. The ceilings of many rooms are only 6-7 feet high. The majority of rooms are smoky and dirty.

Privies are generally insufficient. In fifteen cases there are no privies and in other cases the deficiency in proportion to rooms is as follows: 1:9 rooms; 1:10; 1:13; 1:14; 1:16; 1:20; 1:35.

In the majority of instances the privies are detached. In a few the situation is bad.

From the above facts it is obvious we are dealing with an area very much overcrowded - a densely populated area - with houses in a very insanitary state having damp floors, ill-ventilated and ill-lighted passages and rooms, with insufficient privy accommodation and narrow gutters. All these by themselves tend to produce and propagate disease and so it is very clear that existing together they make this area a disease supporting one and so dangerous to the health of the community at large. Density of population and overcrowding besides deteriorating health have been proved to bear a direct relation to phthisis as has also dampness of

ground floors. The ill-ventilation of rooms besides deteriorating the general health also favours the propagation of disease germs in general as does also the deficiency of light. It is not surprising therefore to find that nearly 24% of the houses in this area have had plague cases in them and many houses besides these have had small pox cases. Some of the plague affected houses have had many cases of plague in them.

It would be interesting to know the phthisis death rate of this area as well as that of respiratory diseases generally.

The following figures may be interesting:

The total number of houses in this area = 209.
Of these there are condemned 110 or 52.6%.

for improvement 51 .. 24.4%

for food 48 .. 22.9%.

In Dargi and 1st Church Bazaar Roads there

are food houses 32

condemned 6

for improvement $\frac{6}{44}$

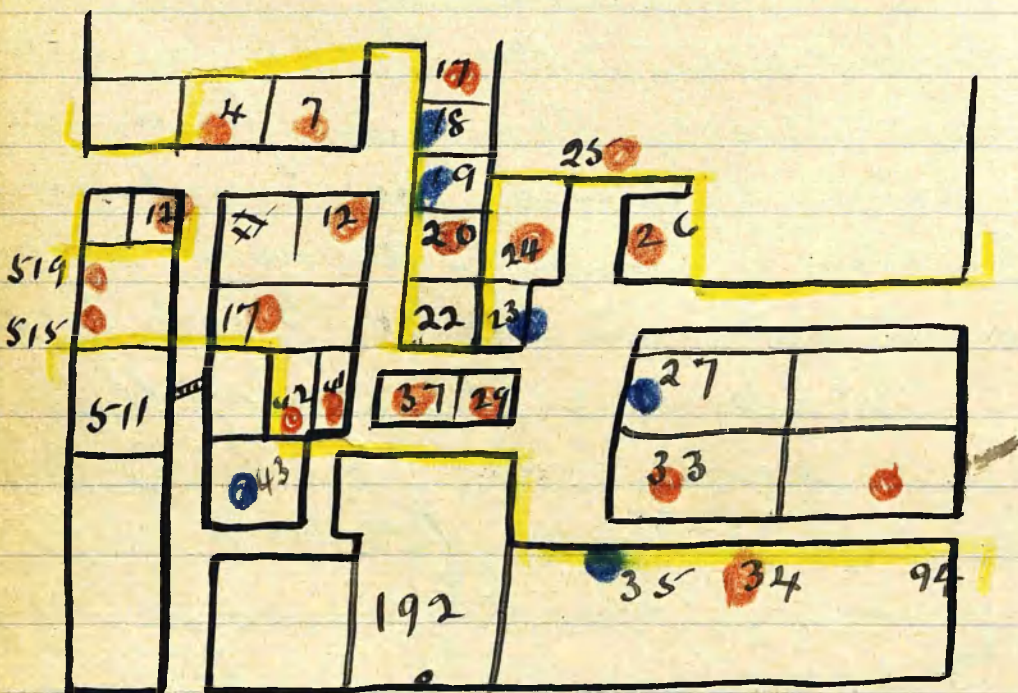
Of all condemned houses in this area 30 have been plague infected.

Total No houses = 209

In Dargi & 1st Church Bazaar Roads = $\frac{44}{209}$

Total in interior of area = 165, and of these there are condemned 104 or 63%.

Going off from Church Bazaar Road is a narrow lane of 7 feet wide

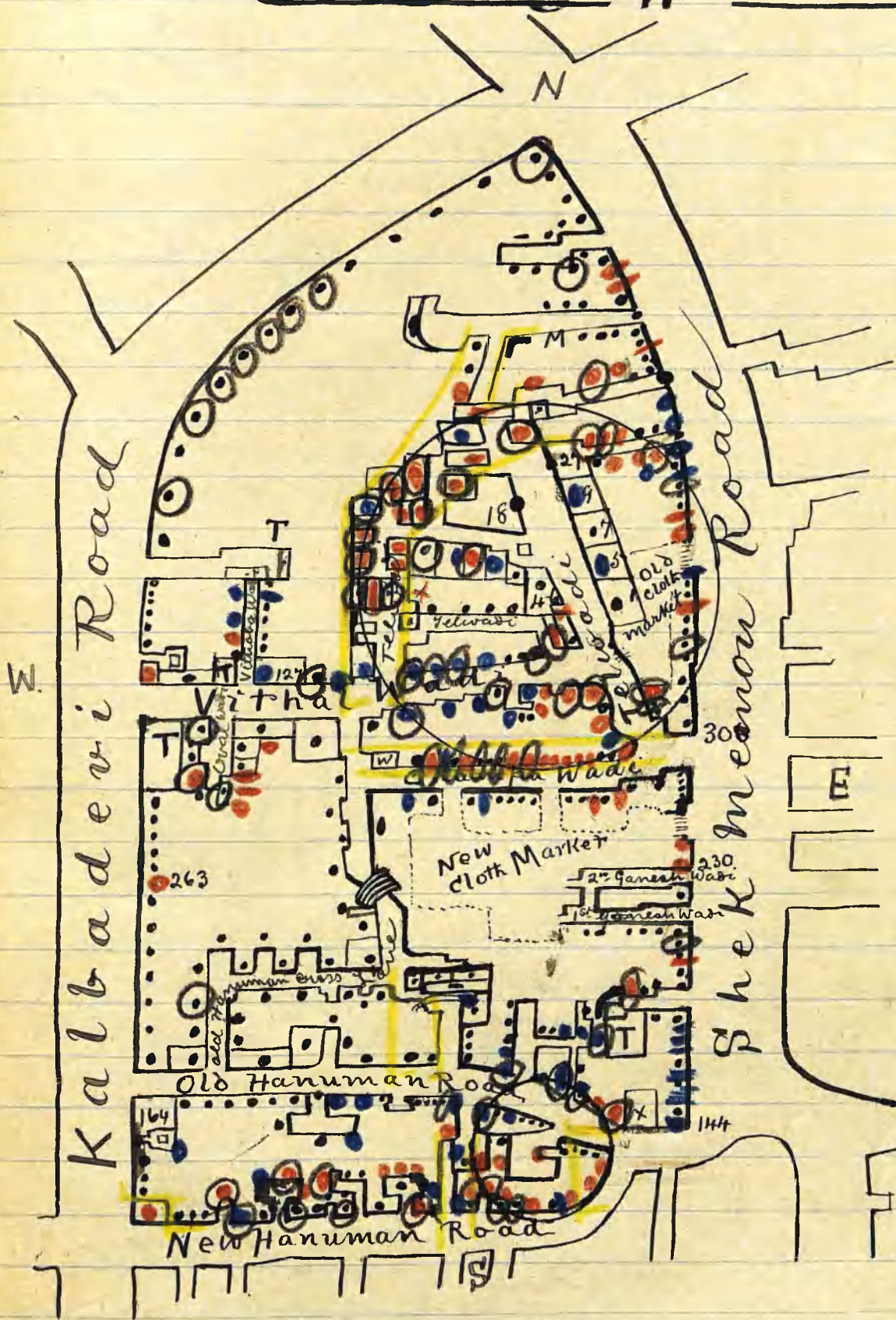


Boundary after improvement represented
by yellow lines.

which winds among misbuilt any houses
 and then emerges by narrow lanes on
 to 1st Church Kunder Road or on to
 Dongri Street. There are 23 houses
 packed together here forming this
 "wadi" and of these 16 are condemned.
 These houses are badly situated
 and are really very insanitary and
 overcrowded. This area requires
 opening out and several houses
 must be demolished and a proper
 street made between Dongri St and
 Church Kunder Road. This could
 easily be effected since there are
 houses which must be demolished
 and whose site can be utilised for
 this purpose as represented in yellow in
 the enlarged diagram of this portion.
 This spot together with the portion
 between 1st & 2nd Howrojee Hill Roads
 form the worst parts of this area.
 Of 40 houses between 1st & 2nd How-
 rojee Hill Roads 25 are condemned
 and 5 require improvement. As both
 these roads are too narrow and in
 bad condition and as from the
 above figures a good majority of
 the houses require reconstruction to
 be fit for human habitation I
 would suggest that all these
 houses should be demolished
 and just a single row of houses

erected on a certain extent of the
 center of this portion of land. It
 is only by having well ventilated
 and well lighted buildings and rooms
 and the suppression of overcrowding
 together with good drainage that
 a given area gets a chance of
 remaining a healthy one coeteris
paribus. All inside the yellow lines
 is recommended to be demolished.
 Musk rats abound in this area.

Sanitary Survey of N.W. portion of Market Section.



- Black dots represent houses in good condition.
- Blue " " " requiring some improvement.
- Red " " " condemned
- Brown circles " " infected with plague at some [time]
- Black " " worst parts of this section.
- Yellow lines " improvement recommended.

Ally

1. Boundaries:

N: Kalbadevi Road
 S: New Hanuman Street
 E: Shesh Inman Road
 W: Kalbadevi Road

2. Population: On a rough calculation there are 5079 rooms and presuming 4 persons in each we have a population of 20,316 which probably is near the minimum figure.

3. Class of People: Almost entirely
 Baniyas

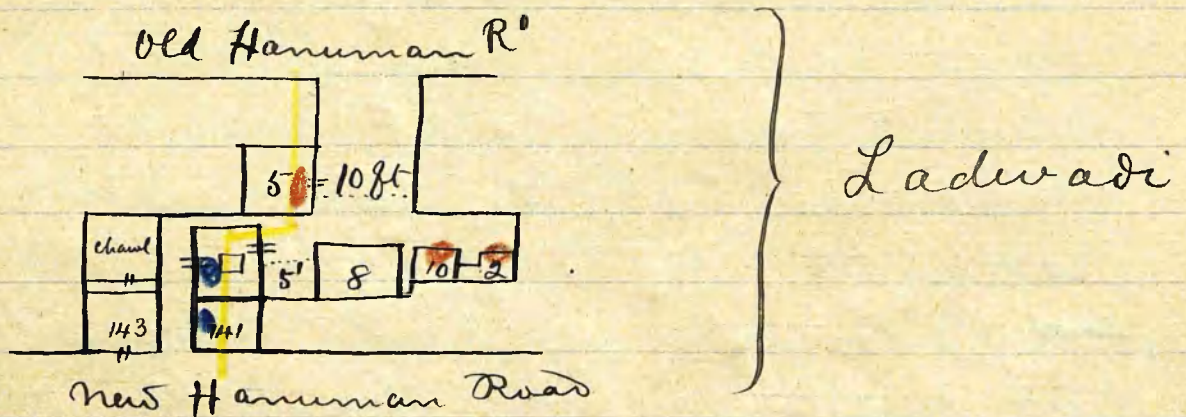
4. Mortality Rate:

5. General Description of Area:

The area with above boundaries may be said to be cone-shaped having its base at New Hanuman Road. Immediately north of New Hanuman Road is old Hanuman Road and these two roads form the sides of a smaller coneshaped area whose base is at Kalbadevi Road.

There is only one road besides these two which extends from West to East and that is Vitthal Wadi a little to the north of the centre of

"X" The term "Wadi" is applied to a collection of numbers of houses with a lane entwining among them,



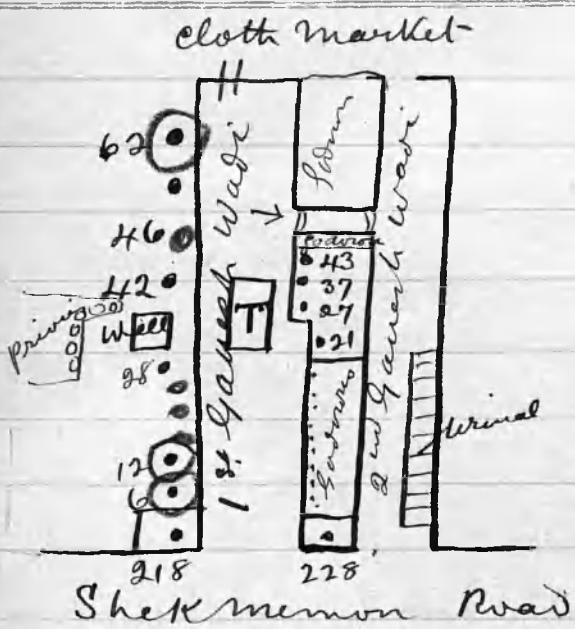
the area. The interior of the area is made up of narrow lanes and Wadis in which are a number of houses unfit for human habitation.

Going off Sheik-Memon Road are the two Cloth Markets - the old and the new - the latter being of considerable size. In the southern part of Sheik Memon Road are a number of shops which are only occupied during the day and many of them have no privies connected with them. A large majority of the houses have a well at their rear and in many cases these are objectionably situated. (The details are in appended list).

Some of the "Wadis" ^{"x"} require a special description and we will commence with Ladwadi.

Ladwadi (old Hanuman Road):

This "wadi" goes off old Hanuman Road by a lane about 10 feet wide which leads to five houses closely packed together interfering with the ventilation of each other and that of neighbouring houses. These are dilapidated and should be demolished and the ground on which they are built should be left as open spaces. House No. 9 interferes with the ventilation



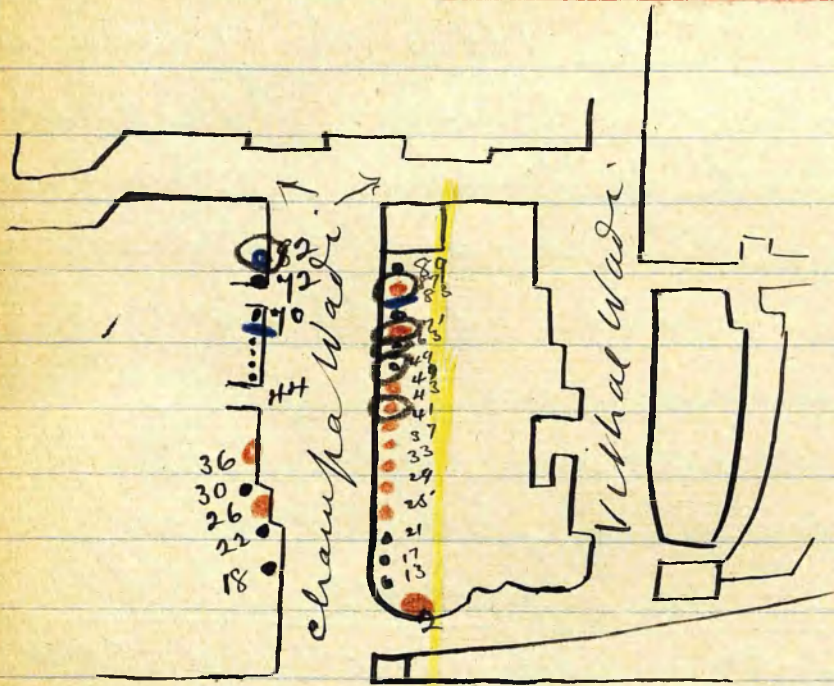
1st + 2nd Ganesh
Wadis.

of a chawl behind 143 Neoptanuman Road a narrow gully of $3\frac{1}{2}$ feet breadth separating them. a portion of No 9 should be demolished as well as a part of Godown 141 Neoptanuman Road so as to make a broader lane of approach.

Next going off Shik-Memnon Road we have 1st and 2nd Ganesh Wadis.

These lead at their upper or west end into the New Piece Cloth Market and are separated for the most part by one block of houses, and with the exception of the backs of these houses there are no houses in 2nd Ganesh Wadi which is simply a stone paved lane leading to the above market (and therefore not a true "wadi"). There are however a number of urinals in this lane the flushing of which might be improved.

In 1st Ganesh Wadi are 13 houses and a number of godowns and three of these houses have been infested with plague. In the centre of the wadi is a temple. There are two houses with a well in a bad position and near privies. The rest of the houses are fairly satisfactory. There is also a public well in close proximity to which are a series of



Sheet Memun Road.

foul-smelling privies.

Immediately above 2nd Ganesha Wadi is Champa Wadi. This wadi goes off westwards from Shell-memon Road opposite Mirza St. At its upper extremity has a branch at right angles with so that it may roughly be described as "T"-shaped the northern end of the branch leading to Vitthal Wadi and the Southern end to Old Haccuman 1st Cross Lane. In the main portion (the perpendicular part of the "T") of this wadi are 32 houses (six of which have had plague cases in them) and twelve of which should be demolished, and of these twelve there are ten all near each other on same northern portion of this lane. They with the few good houses between them should all be bought up and demolished and the lane made wider as there are lofty houses opposite both the fronts and backs of these houses. The horizontal part of this "T" shaped wadi contains several large and lofty buildings and apart from height require no special note. This portion of the wadi is fairly broad.

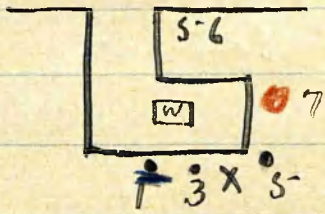
"Vithal Wadi": This wadi may broadly be likened unto a golf club in shape. The lower or club portion commencing at the Eastern end of the main part of Champa Wadi, and curving at the back entrance of the old cloth market is continued westwards till it reaches its termination in Kalkadevi Road.

The lower portion is only 15 feet in width. There are 37 houses in this wadi (12 of which have had plague cases in them) and 7 should be wholly or partly demolished and of these six are situated at the curve of this wadi. Ten houses have deficient sanitary accommodation and some of them require other improvements.

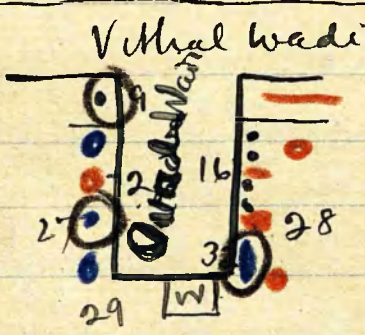
Going off from this "wadi" on the left (proceeding westwards) are Shakady Lane and Oval Wadi and nearly opposite this on the right is Vithoba Lane.

Shakady Lane: This lane proceeds by the side of and behind 56 Vithal wadi.

In it are four houses and a well. Between Nos 5 & 3 a



} Shekady Lane.



} Oval Wadi.

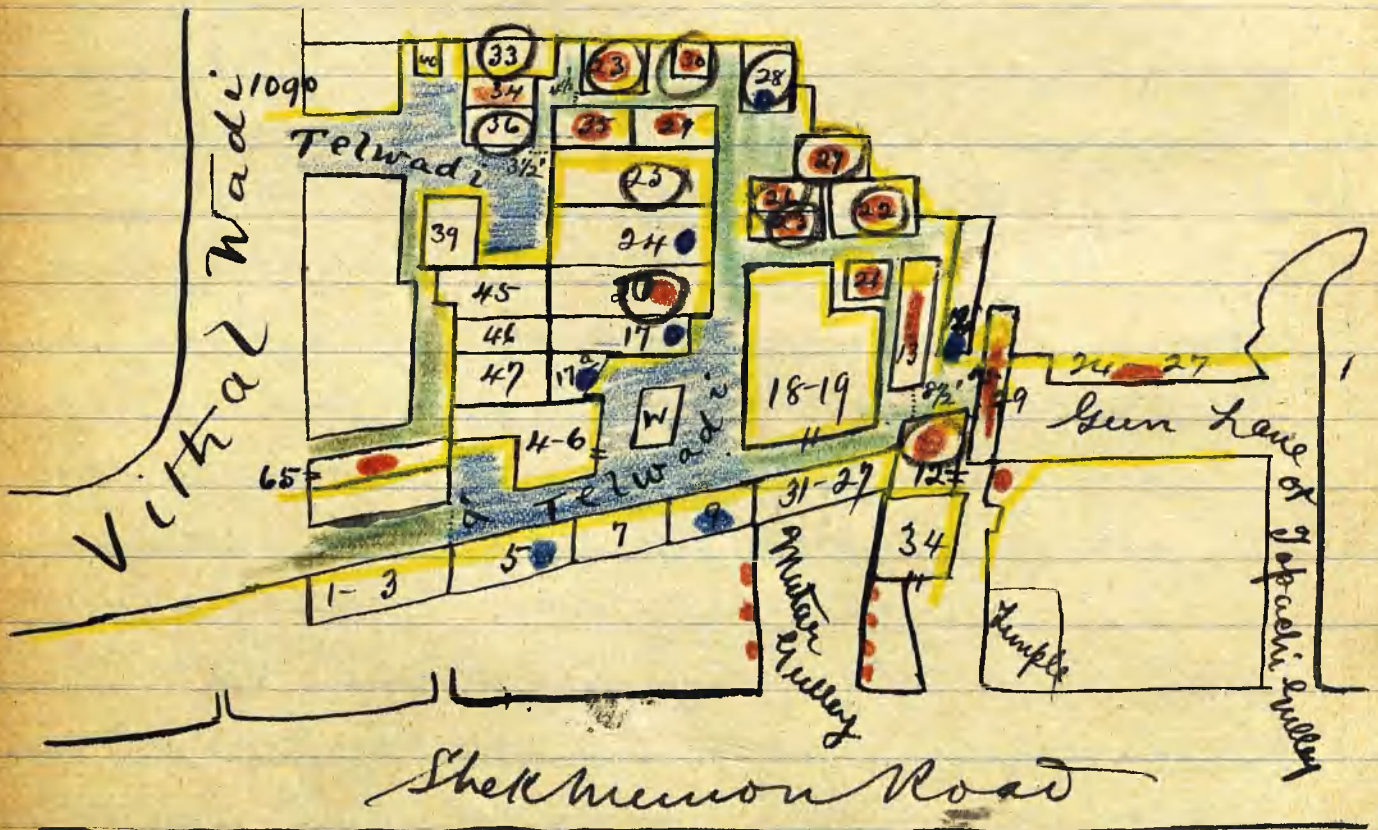
house is being built which will inter-
-fere with the Ventilation of these
houses being only separated from
them by narrow gullies of 3 feet width.

No 7 should be demolished and
No 3 requires improvement of the
ground floor which is dark
and illventilated, and the privy
position must be improved.

Oval Wadi: This is a short
and broad wadi with Eleven houses
in it - three having had plague
cases in them. Two houses in the
Wadi proper require demolition
(28 and 21) and two others also which
are situated behind Nos 16 and 32
occupying what should be open
spaces behind these houses.

Vithoba Lane has ten houses and
a temple. The houses are all
very high with four or five
stories of varying height. Two
houses have had plague in
them. Four of them have
wells to their rear. The privy
accommodation of half of them
is insufficient and in one case
objectionably placed. A small
hut at the back of 14-16 should
be demolished as likewise a
chawl next the temple. The ground

Telwadi.



floor of 14-16 must be improved as the rooms are dark and ill-ventilated. The lane narrows to its upper end where it opens into Kalbadevi Compound the chief entrance of which is by Kalbadevi Road.

The last "wadi" which requires special notice is the most important of all the "wadis" in this area since it is made up for the most part of ill-ventilated houses closely packed together and separated by narrow passages and lanes. This wadi is known as Telwadi and it goes off northwards from Vithalwadi by three separate entrances and is directly concerned with 35 houses separated by narrow gullies and passages or lanes of $3\frac{1}{2}$, $4\frac{1}{2}$ and $8\frac{1}{2}$ feet width. The disposition of these lanes is shown in light blue & the parts where the lanes are wider are represented by a deeper blue shading. There are fifteen houses which are unfit for human habitation by reason of their dilapidated and dirty condition and by reason of their ill-ventilated rooms. There

houses must be demolished and the ground occupied by ~~them~~ ^{these} houses (represented by ~~green~~ ^{yellow} dots) should be utilised for making a sufficiently wide street thro' this area to afford proper ventilation of the area and its houses. Ten houses have had plague in them not including 65 Vithal Wadi. This densely populated wadi with its dilapidated and illventilated houses is a dangerous focus to the health of the community and requires early consideration. Improvement is suggested by yellow lines on the diagram showing the new boundary after improvement and the communication with Gun Lane and Topachi Gully. The other houses should be reconstructed or improved as the case may be as represented on the diagram by red and blue dots respectively.

Mutar Gully off Shekumore Road has 9 out of its 11 houses unfit for human habitation. It is a lane of 7-12 feet width and houses should only be permitted on one side of this gully.

VI. Type of Houses in the area and the chief insanitary influences with recommendations as to the improvement of the area:

This is a large area and it is impossible in a short time to visit every house and every room but with the exception of Kalebadevi Road this has been done to a very great extent and I can say that in this area houses with three, four and five stories predominate having varying depths with rooms going off from centrally or laterally placed passages, and having in many instances a well to their rear at varying distances but more usually close to the house and near the privies. Inside the area we have a portion of Champa Wadi, a good portion of Vitthal Wadi as well as oval Wadi of good breadth, and old Hanuman Road of 16-20 feet width whilst the remainder of the lanes and Wadis are narrow and require widening.

The ground floors of many of these large houses are used as godowns but in other cases they are inhabited and the rooms are dark and illventilated by reason of the depth of the building and the existence of narrow galleries as the source of light! Leading from

the ground floor we come to the space behind the house which is entirely taken up in the majority of cases with a well, a space for bathing and washing, and the privy accommodation in whole or part.

Wells: The position of these in many cases is objectionable, some being covered over by parts of the building and near the privies, others in a chawk and near the privies, whilst others again are set at varying distances from the house. Some of these will have to be closed up owing to their situation and as they are easily polluted and become a nuisance and injurious to health. It has been laid down that no well should be situated within 20 feet of a dwelling.

Privy Accommodation:

With the exception of some shops in lower part of Shree Memon Road and a few houses which are not provided with any privy accommodation it may be said that this accommodation is on the whole sufficient. The deficiencies to be only to the extent of 1 privy to 8 rooms; 1:12, and in one case 1:16 rooms. In a

few instances the situation of the privies is bad and in a few too the ventilation is imperfect.

The rooms: With the exception of the front rooms generally speaking the houses cannot be said to have ^{large} rooms, and generally speaking the ventilation is imperfect by reason of small windows opening on to narrow gullies, and doors on to long passages.

In some cases the rooms borrow their ventilation from other rooms. As the houses are in most cases either attached or separated on the sides by narrow gullies, and behind by narrow gullies (making them practically "back-to-back" houses) or by a space in which is a well it is obvious the ventilation is, to say the least, poor and vicious. With some houses (and this chiefly applies to houses on Kaebadevi and Sher-Memou Roads) there is a compound behind which unfortunately does not exist in the cases of the houses of the interior.

The partitions are generally speaking in good condition tho' many require linewashing or painting, but in most small

houses and chawls as exist in the area and which are in a dilapidated condition we find partitions of rotten wood or bamboo sticks covered with cowdung.

From the above facts and with reference to the diagram it is seen we are dealing with an area which has two dangerous foci. One dangerous focus lies in the northern part in vicinity of Telwadi and is represented by a circle whose centre is house No 4-6 Telwadi and whose diameter extends from No 2 Vithalwadi to 14 Telwadi.

This would include about 43 of the condemned houses.

The other dangerous focus is about the top of the cone between New & Old Hanuman Roads and would include fully 10 condemned houses so that these two "foci" include the majority of the condemned houses of the area.

These two dangerous foci require early attention. The improvements for the first have been pointed out when dealing with Tel and Champa-Wadis respectively. As regards the lower

dangerous focus I would suggest that the houses at the top of the cone be removed as represented by yellow line on the diagram. The other condemned houses should be demolished and new and smaller houses erected if the position be favourable. Houses represented in blue should be improved or their living accommodation made better or sufficient as the case may be. As an additional suggestion it would be better if nos 33 and 27 1st Old Hamman Cross Lane and Godson St & Stable 114 Old Hamman Road were demolished and a road made through this as represented on the diagram as the situation of nos 27 & 23 is none too favourable and an opening here is much to be desired.

There are on a rough calculation **5079** living rooms and giving four people to each we have a population of **20316** which I feel confident is not below the actual population. Now when we consider that a good portion

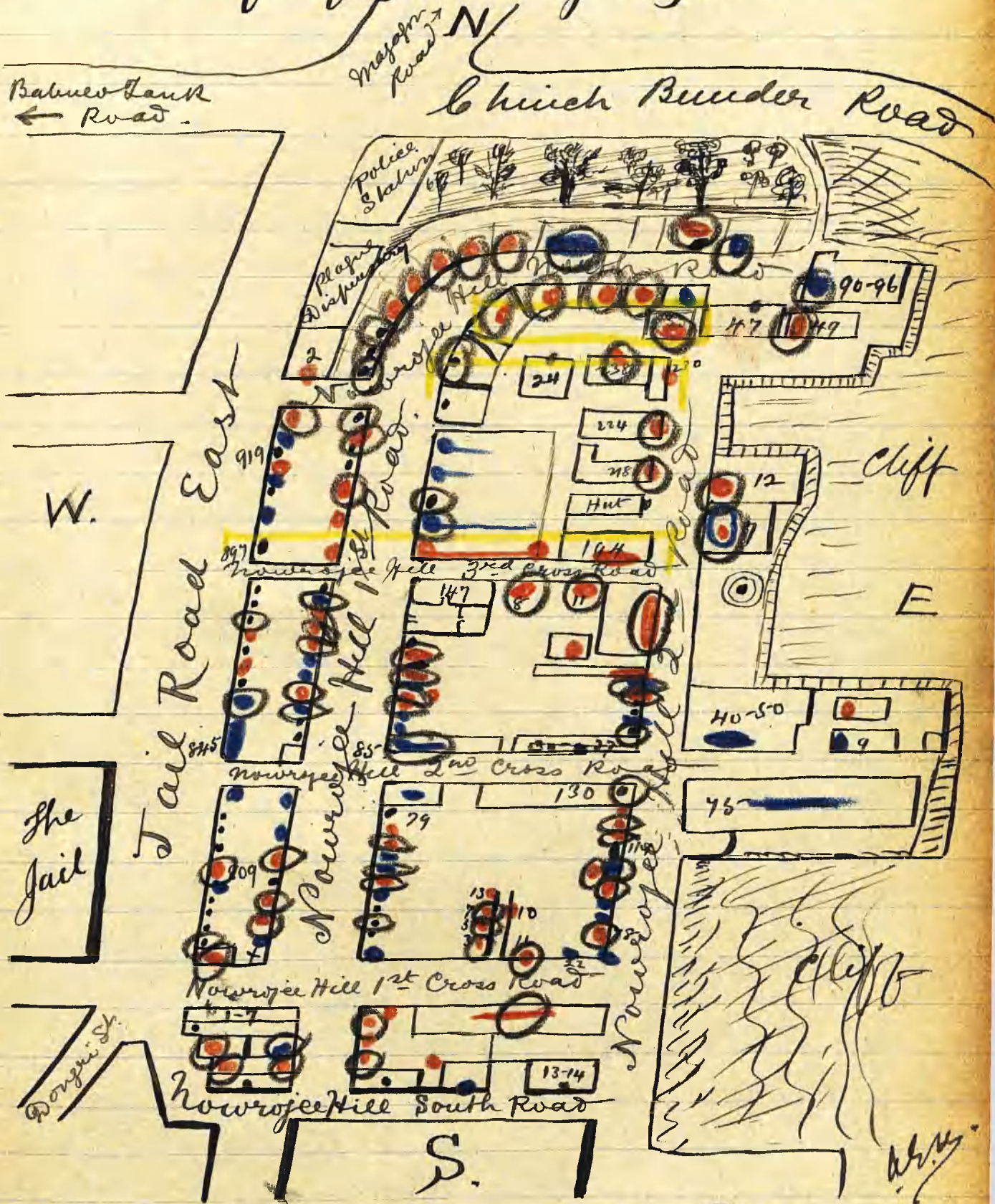
of the area is taken up by the cloth markets, a few compounds and temples, and several large private houses we see that we must have density of population in certain parts and this undoubtedly exists in and around the above "dangerous foci" so that here again density of population goes hand in hand with lowered vitality and disease breeding areas since these "foci" together contain over half the total number of houses infected with plague and where plague mortality has been greatest.

Approximately in round numbers there are 400 houses in this area of which 85 are condemned or nearly 22% and 60 require some improvement leaving 255 family habitable. Altogether 68 houses have been infected with plague and 43 are in and near the "dangerous foci" alluded to.

On the whole it is a matter for congratulation that so large an area has its worst houses situated more or less in two definite areas and which can be so easily improved, and it is to be

hoped that owing to the decentrat-
-ization of the worst houses at
two given foci increasing the
danger to health that re-
-medial measures will be
hastened thereby.

Sanitary Survey of Northern half of Nowrojee Hill.



Black dots denote houses fairly sanitary
 Blue " " " " requiring some improvement
 Red " " " " condemned
 Brown circles " " which have had plague cases
 Yellow lines " " improvement suggested.

1. Boundaries:

N: Ghinch Bunder Road
 S: Nowrojee Hill South Road
 W: Jail Road East.
 E: 2nd Nowrojee Hill Road.

2. Population: There are 2895 living and fixing 4 persons to a room we get a total of 11580 persons which is probably much under the exact figure. Giving 5 persons to a room we get 14,475 which is probably much nearer the exact population of this area which is undoubtedly overcrowded.

3. Mortality Rate:

4. Class of People: Chiefly Bhardaris and Agris (Hindoo).

5. General description of Area:

This area with the above boundaries roughly approximates in shape to that of a parallelogram and has one street running thro' its greater length in its interior which is crossed by three cross roads named respectively Nowrojee Hill 1st 2nd + 3rd cross Roads. The area is situated on the side of the northernmost half of Nowrojee

Hill and there is a general slope in the area from N.E. to S.W. Gullies run between the houses for the most part so that they are mostly all detached. A great many houses have no plinth being on the level of the roads which are in a very bad condition with irregular surfaces. Nowojee Hill 3rd Cross Road is the narrowest of the roads and requires widening.

6. Type of Houses; insanitary defects; Suggestions as to improvement.

Chawls of one, two or three stories and houses of one or two stories form the greater class of houses in this area. The majority of houses are dilapidated and dirty, with small rooms illventilated and overcrowded and a great many have no plinth. Thus we find a large number of the houses have had plague cases in them. Out of 165 houses in this area there are

in fairly sanitary condition	46	
condemned	77	or 46.6%
and requiring improvement	42	
	165	

There have been 77 houses infected with plague and of these 51 are

*Note: As an additional suggestion
houses 15, 23, 27 & 29 Howsepie Hill
North Road should be reconstruct-
-ed further back and a road
made behind them.

among those condemned.

The insanitary influences which have been found in lower Nowrojee Hill as already reported are found in this area viz: the absence of a plenty of many houses, dilapidation of the houses, dirty state of the houses, small and illventilated rooms, overcrowding and deficient privy accommodation - and all these amount to a serious extent and make this area a dangerous one to the health of the community. All the condemned houses must be abolished and sanitary houses reconstructed if the position is favourable, and I may remark that in this insanitary area exists one building which may be taken as the type of dwelling which is most suitable for the class of people as found in this area and this is No 30-38 Nowrojee Hill 2nd Cross Road.

Houses requiring improvement should have these done, and Nowrojee Hill 3rd Cross Road should be considered and the condition of the roads improved.* The remarks made on Nowrojee Hill South and Church Bunder generally apply here.

* Note:

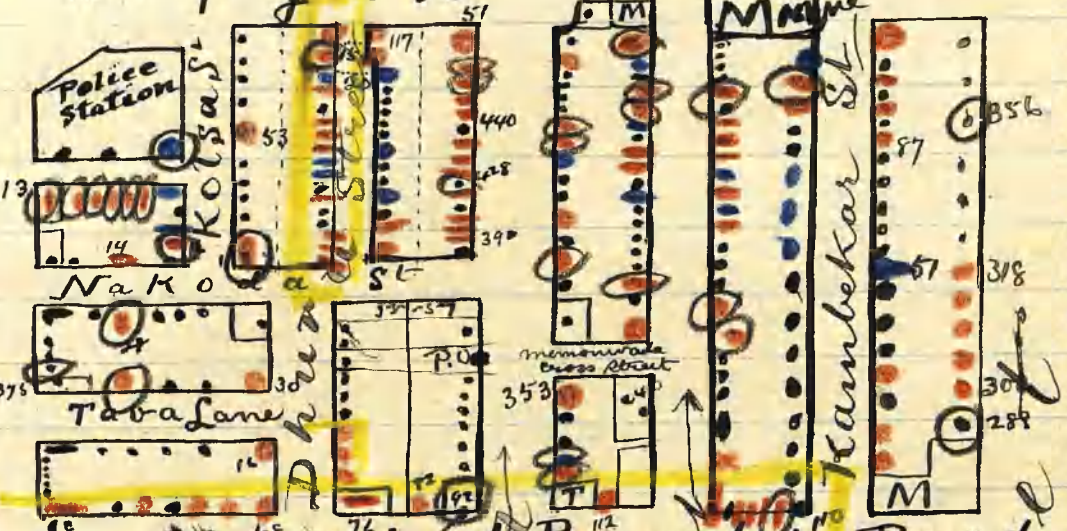
- Black Dots denote Houses which may be left alone
Blue " " " " to be improved
Red " " " " Condemned.
Brown Circles " " which have had
Mague Cases in them.
Yellow lines " extent of widening of
street recommended.
Yellow Squares " all inside the
square to be removed
in toto.

** Pydhoni means to wash the feet
and is so named because the
natives used to come here to
wash their feet the sea being
formerly as far inland as here
before it was reclaimed.

Chakla Section.

** Pydhoni Road.

Kamalapur R



Musjid Bunderi Road

Rehman Street



Carnac Road

Chakla

1. Boundaries:

N: Pydhoni Road.

S: Carnac Road

E: Chakla Street

W: Abdul Rheiman Street.

2. Population: about 30,000 at the least.3. Class of People: Upper portion of section chiefly occupied by Mahomedans; lower portion by Marathas.4. Mortality Rate: 61.03 per 1000.5. General description of Area:

This area with the above boundaries is made up of two sub-districts known as Parsiwada and Chakla proper, lying respectively on the western and eastern sides of Nagdevi Street which runs from South to North through the centre of this area dividing it into an eastern and western half.

Parsiwada and Chakla proper are each two long parallelogram-shaped areas made up of blocks of 16 blocks of buildings placed for the most part parallel to each other. There are four main cross streets which extend from West to East through both these sub-districts and these are (from the north downwards)

Musjid Bunder Road, Bibijan Street, Bhaji Pala Street and Jaingiker Street. The Streets which run from north to south in each of the sub-districts are either brought to an end or deflected from a straight course by blocks of buildings which are placed between Bhaji Pala Street and Nagdevi Cross Lane to its north end which are approximately situated in the centre of this area. Thus we have Narayan Shum Street in the north separated from Serang Street in the South by a block of buildings which extends thro' the whole width of this Sub-district; and on the other hand in Northern Chakla proper we find Memonwada Road deflected slightly to the East round one of these blocks on the East side of which is Shobi Street which is practically continued northwards by Kambekan Street.

Most of the blocks are made up of a row of buildings on two streets with a gallery running in between at their backs and having most of the houses attached to each other, the remainder having a gallery on one or both sides. Some blocks however are made up of a number of large houses

which extend the whole width of the block, whilst a few blocks are made up of a mixture of these two varieties having some houses extending the whole width of the block and at other parts having two houses with a gully between.

There are several places of worship in this area.

The worst streets are Memonwada Road, Janjiker Street & Kala Cross Lane and the upper part of Narayan Dhuru Street which considered by itself as will be seen from the following table:-

Street.	No. of Houses.	No. Condemned	No. Plague Infected.
Memonwada Road.	112	50	28
Janjiker St.	30	29	5
Musjid Kunder R.	30	24	8
Kala Cross Lane	8	6	6
Upper part Narayandhuru	33	14	1
Whole of Narayandhuru St.	85	26	10.

There are 430 houses in the area of which 300 are condemned, 60 require improvement and 130 have been infected with plague. Of the ~~the~~ condemned houses 90 have made plague cores in them or about 30%. Some houses have had very large numbers of plague cases in them -

6. Type of Houses, insanitary defects and Suggestions for improvement of the area:

For the most part the area is made up of large buildings of great depth and with three or four or five stories rising to great height. Interspersed among them are smaller houses of one two or three stories as well as a number of chawls chiefly of one or two stories.

The chief insanitary conditions found in this area are the dilapidated condition of many large houses and practically all the chawls and small houses, and the bad position of a few, together with the existence of dark ill-ventilated rooms with crowding floors and overcrowding. The privies in many cases are badly ventilated though the number seem sufficient.

Near many privies are objectionable wells which require closing and in one case part of the well is built over by the house. What gutters that do exist between the sides of houses are very narrow and in one case only one foot broad. In addition to all this we have these houses in narrow

Streets so that even if they were new houses with adequate means for ventilation and light yet their ventilation and lighting would be interfered with by the houses opposite. A good example of this is found in the upper part of Narayan Dhore Street. The state of some of the chavols and small houses is nothing less than disgusting and it is not surprising that they have had many plague cases in them.

Where there is dampness, dirt, dilapidation and filth, the crowding floors and partitions, and ill-ventilation and inefficient lighting, the bad position and small windows to the houses then we have all the necessary conditions for the propagation of disease germs; and so long as such houses are permitted to exist there so long will plague continue to exist in Bombay as no amount of good drainage of the city or purity of water supply or widening of the streets alone will ever remove plague when such excellent hotbeds for germs propagation exist - and in this connection we must remember that plague is essentially a filth disease.

I cannot insist too much

* This survey was wanted at an early date from its commencement by the Municipal Commissioner and as these three streets were at first excluded, when however the report could not be completed in time for a special meeting of the improvement trust the meeting I believe was postponed and I was thus able to finish the survey completely and do the above named streets. Beyond the addition of a number of hours for demolition & reconstruction & those for improvement the suggestions given were adhered to, and there was no necessity to enlarge on what was already stated in this report.

on the total demolition of all houses I have condemned, and whilst some of them could be reconstructed and the ground space of some made into gardens, on the other hand the ground space of others must be utilised for the widening of several streets which is urgently required.

With the exception of Nagdevi and Carnac Roads and part of Abdul Rahman Street all the other streets had their houses inspected. It is impossible in a short time to go thru every house nor is this necessary for a general survey.* All the interior has been examined and from that I give my suggestions for the improvement of the area laying stress upon what I consider to be a most important point viz: that in the making of a new Street much is to be gained by taking it thru the worst portions as thereby you gain the double purpose of improving the area generally and attacking the worst houses besides in addition giving compensation to the poor land lords who from their circumstances would most appreciate the boon.

The improvements I suggest are:

1st: The total demolition of all the houses in the block between Dhobie and Memonwada Streets, and Nagdevi Cross Lane and Bibijen Street. This is the very worst spot in the whole district. It is made up of 18 buildings every one being unfit for human habitation and eight of which have had plague cases in them. It is practically the heart of this area and is mostly composed of dilapidated Chawls, and there must be no hesitation in clearing this spot in toto and making an open space with a small garden perhaps.

2nd: Bhaji Pale St between Chokla and Nagdevi Streets needs widening. This in part is remedied by the first suggestion but must be completed by the demolition of the very bad houses at the Eastern end of the street as represented by yellow lines on the diagram.

3rd: The part of Narayan Dhoni Street between Pydhoni and Nakoda Street must be widened. Here the houses are very high indeed and have ill-lighted and ill-ventilated rooms, and the

Street here is from 15-20 feet wide only. The reason why I suggest the total removal of the Western portion is because the worst houses of the whole street are on this side there being no less than 10 houses of the 17 that are on the West side unfit for human habitation and further more the removal of these would make the street a straight one throughout.

4th: Widen Bibijan Street between Chakla & Nafdevi streets. The eastern end of this street is a lane of 10 feet wide which after it crosses Dhobie street opens into a wadi of workshops and a number of most dilapidated houses. The whole of these houses must be removed and a respectable street made here.

5th: The whole of Janjiker street requires widening and as it has 30 houses in it (in this section) of which 27 are condemned the urgency of widening this street should be obvious.

6th: Widen Muzjid Bunder Road throughout this area by taking

the dilapidated houses down on both sides and permitting smaller houses to be re-erected.

7th: Make a garden of the space occupied by houses 300-318 Chakla Street which are condemned. The reason for an open space here is because all around here there are very high buildings and it would be very beneficial. A garden is also recommended at 99-107 Serang Street for the same reason.

8th: Demolish all condemned houses and permit reconstruction with suitable gullies on both sides and an open space behind.

9th: Improve the condition of the houses on list attached.

10th: As an additional suggestion which is not pressed Serang Street and Narayan Dhoni Street may be united by demolition of houses through the condemned houses 40-46 Bhaji Pala Street.

11th: Abdul Rheinman Street should be widened by setting back of reconstructed houses from no 239 to corner of Janjiker St as these are all condemned.

In like manner widen Narayan
Dhuru St from opposite Tavata
to Masjid Sunder Road.

12th: 271 Abdul Rahman St and
blaw behind it should be
removed in toto.

In conclusion I have to
say that there are a number
of wells in this area some of
which should be closed and
these are localized on attached
list.

1. Boundaries :

- N: Masjid Bunder Road,
 S: Carnac Road,
 E: Northern part of Samuel
 St and Isaji and Jambli
 Streets.
 W: Chakla St.

2. Population: about 11,000.3. Class of People: Beni-Israelites
 and Battias (Hindoo).4. Mortality Rate:5. General description of area:

This area maybe said to be oblong shaped with a curve inwards in the centre of the Eastern boundary. It is composed of 17 blocks of buildings of various sizes and of various and irregular shapes between which blocks narrow and irregular streets and lanes are made to travel. An idea of the disposition of these blocks and streets would be more easily attained by a glance at the diagram than by a description in words. Bhandari and Janjiker Streets in the Southern portion of the area are the only two

Streets which run thru the area and they run from East to West and are of fair breadth except at certain spots which are considered in the suggestions for improvement. Going off Chakla Street opposite Bhazi Pale St is Chakla Cross Street which is a narrow lane of at first 7 feet breadth and which soon opens into ~~Wharada~~ — a lane or alley between the backs of some houses on Chakla & De Souza Streets as well as a few overcrowded dilapidated chalets — which opens again a little further south into Chakla Street by a lane of 10 feet width.

The blocks of buildings are made up for the most part of rows of houses opening on to Streets bounding the blocks and having a alley running between the backs of these houses and between the sides of some of them. Other blocks are made up entirely of one row of houses opening on to two streets. There are several narrow parts of the area which are represented in yellow on the diagram. There are in a great many dilapidated houses in this area.

6. Type of Houses; insanitary defects and Suggestions for improvement:

In the main this area is composed of high buildings of 3 and 4 stories either attached to adjacent houses on one or both sides or separated by narrow gullies from them. There are also several high buildings of 4 and 5 stories extending from one street to another and there are also several chawls of one and two stories.

In the main the interior of the house has a passage centrally or laterally placed with rooms going off from both or one side respectively.

The rooms ventilate on to narrow gullies by small sized windows which are about three feet from the ceiling and the passages are usually illventilated. What chowks that are found in this area are all small and inefficient for their purpose. In a number of cases the chowk is placed about the centre of the house around a well, and in two or three instances the privies are situated by the side of the well.

The ventilation of the rooms in this area is, sadly neglected.

The privies are usually sufficient

in number but in several instances they are either in bad positions or are ill ventilated, there are a great many wells (used for drinking purposes) too near privies.

A great many of the houses are dilapidated and damp and Old Bengalpura Street has majority of its houses dilapidated to varying extents besides other insanitary conditions. Plague has infected a large proportion of the houses in this area and at present there are evidences of 104 houses out of the total of 250 houses in this area (about 41%) of having been so infected. Whilst I am aware that some houses have had their plague marks painted over yet any general conclusions that may be drawn from the number found during this survey is only intensified by this knowledge; the main idea in my mind of painting out on the diagram the plague infected houses found during the survey is to give a general idea of the infection of the area by plague and its relation to condemned houses - and this is certainly accomplished.

even though a few houses be not marked. Out of 250 houses in the area there are condemned 108 (= 43.2%) and for improvement there are 43.

De Souza Street has the majority of its houses infected with plague and Old Bengalpura. It has most of its houses dilapidated.

The worst parts of this area may be enumerated as follows:

- ① De Souza Cross Lane
- ② Chukla Cross St and Sherwada.
- ③ Block of five houses between Garibdas and Samuel Street.
- ④ Gaubli Cross Lane
- ⑤ Dilapidated houses in old Bengalpura Street.

I give the following suggestions for improvement of the area in the order of their importance pointing out that such improvements are represented on the diagram by brown shading: —

- 1. A Street is desirable thro' the centre of this area and I suggest that Bhazi Pala St be continued thro' this area by way of Chukla Cross Street and Baritan Street.
- 2. The houses in De Souza Cross Lane

must all be demolished and an open space is recommended here.

③ Dherwada Lane leading to Chakla Street must have its few chawls demolished and De Souza Street might conveniently be brought through into Chakla St; or Chakla St and Samuel St joined through here.

4/. Open Spaces or Gardens are desired at the following places, a) at small block between De Souza and Garibdas Streets and Khumberwara 1st Cross Lane. b) at the space occupied by 5 houses between Garibdas + Samuel Streets. c) at the space occupied by 4 houses between Samuel + Bhandari Streets. d) Jamblis Cross Lane.

5/. Widen certain Streets or parts of Streets by demolition of the condemned houses, and setting back the reconstructed smaller houses, viz:

a/. De Souza Street from corner of Khumberwara 1st Cross Lane to De Souza Cross Lane.

b/. Old Bungalwara Street - the whole length of West Side.

c/. Samuel Street from Masjid

- Bunder Road to No 62 Samuel St.
 d. Isaji Street (West side) from numbers 32-2; and
 e. Misjid Bunder Road from Chakla Street to Dariussthan St.
6. Connect Bhandari and Janjiker Streets thro 17 Bhandari Street & 258 Janjiker Street which are respectively a small house and a stable situated between two high buildings.
7. Demolish and leave as open spaces the following:
 52 Bhandari Street
 48 " "
 31 " "
8. Demolish houses condemned and reconstruct smaller houses on sanitary principles.
9. Improve the houses requiring improvements according to attached list.
10. Close certain wells as per attached list.

1. Boundaries: N: Paedhori Road

S: Part of Bhandari Street
and Dongri Koli Cross Lane

E: Railway lines and Masjid
Station

W: Jaakeria Masjid Street
and thence by way of Masjid
Bunder Road to Samuel and
Isaji Streets.

2. Population: about 10,000.

3. Class of People: Kolis (Hindoos)
Kojas (Mahommedans)
and Beni Israelites

4. Mortality rate: 73.81 per 1000.

5. General description of area:

This area may be regard-
ed in two portions — one portion
extending from Paedhori Road in the
North to Bhandari Street in the South,
and Dongri Street on the E to Jaakeria
Masjid, Samuel & Isaji Streets on
the West (forming practically the
whole area) and is shaped like the
figure **7**; the other portion being the
houses on the East side of the greater
portion of Dongri Street as well as
a block of houses behind those in the
Southern third of this portion.

Dougrri Street - the main street of the area - separates these two arbitrary divisions, Masjid Bunder Road is situated half way between the northern and southern boundaries. Between Masjid Bunder Road on the south and Paedhori Road on the north with Dougrri Street on the east and Jakeria Masjid St on the west is enclosed the upper part (or "head") of the main "seven-shaped" portion of this area, and in the centre of this portion is found a number of narrow lanes entwining around irregularly situated houses. Extending south from Masjid Bunder Road and forming half of the western boundary of the "tail" of the figure 7 is Samuel Street from which is continued Isaji Street to form the lower half of the western boundary of the "tail". Samuel Street is also continued north to Pydhori Road. Kazi Sayed St runs thro' the centre of the tail of this "7-shaped" portion extending also for a short distance into the upper portion as well and terminating in Samuel St. Pydhori Road degenerates into a lane at its termination at the N.E. corner of this area.

Yellow colouring denotes the narrow parts of this area.

6. Type of Houses; insanitary defects;
Suggestions for improvement:

This area is composed of 453 buildings of which 88 are "godowns", and in addition there are seven places of worship (mosques, Synagogues, & Temples). Of the 365 dwelling houses the very large majority are 3 and 4 storied and a few five-storied, and the buildings are for the most part of great breadth and extend from one street to another in some of the blocks of buildings; but in other blocks two houses occupy the width of the block.

The majority of the houses are attached on one or both sides and the gullies are from 1-3 feet wide as a rule. Only two or three chawls exist in this area.

The General State of the houses is unsatisfactory for a good proportion show dilapidation in one or many parts. A very large majority of the godowns are dilapidated.

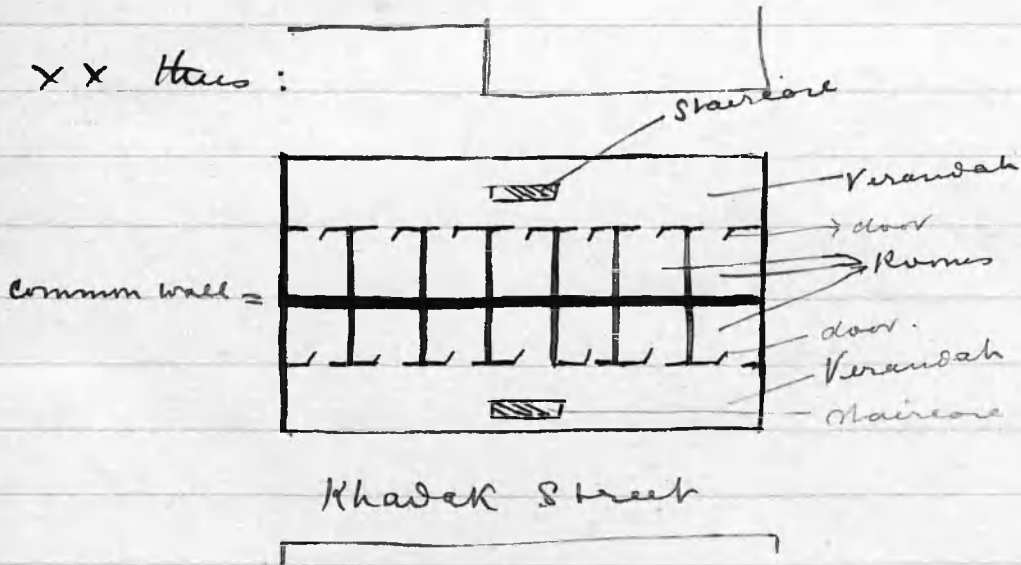
The interior of the houses is in the main composed of a central passage with rooms on both sides of it, and a chawk is found in some on one or both sides about the centre (depending on the width of the house which in some cases extend 182 ft 5 inches and

having from 26-28 rooms on each storey.

The rooms are of fair size on the whole but unfortunately the window space is too small and so they open (or are supposed to open) on to narrow gullies, impure and inefficient ventilation is the result.

Some rooms have the portion near the door partitioned into a loft and as there is no grating above the door and the window does not reach the height from which the loft is created it is obvious the sleeper's respiration is dependent upon diffusion for the purifying of the air near him and which is so slow a process that life is endangered if it be entirely depended upon. The rooms which are on the attached side of the house have either borrowed ventilation (i.e. from another room) or are ventilated by gratings on to the passage. There is in such cases very little ventilation; in some cases there are no windows made and ventilation not even thought of. A typical "back-to-back" class of house (but in this case it is two chawls which are "back to back") is No 1-12 Khadak Street. The rooms ventilate by gratings above the doors on to the verandah and

x x Haus :



a common wall runs between the rooms of the two adjoining shawls. ^{xx}

Through Ventilation must be ensured and as the street requires widening here it may be suggested that the part overlooking Khadak Street be demolished. This class of houses cannot be too strongly condemned.

The Privies are usually sufficient tho' the situation and ventilation of many has been overlooked. I cannot say ^{whether} there is overcrowding in this area or not with absolute exactitude, but it would seem to me that there is a fair distribution of persons to rooms, and overcrowding does not exist to any great extent if it does exist.

Of 453 buildings in this area 104 are condemned (nearly 23%).

55 require some improvement leaving 282 as fairly sanitary.

There are 58 houses showing plague marks out of 365 dwellings.

Suggestions as to improvement:

- ① The chief improvement for the area is the necessity of opening up the centre of the head of the "7-shaped" portion of this area. In this connection I would suggest that Khadak Street be widened on the West (passing thro' the worst houses in

the street) and continued up thro' the space where No 8 Doutar Cross Lane used to be into Paoloni Road.

- ② Then Israel Mohalla should be widened by demolition of No 31 Kathak Street and godown behind it (Nos 7-9) and Chawl 6-12 Israel Mohalla.

This opening up of the area here should be continued by making a street thro' Nos 26 (Opposite 7-9) and also thro' Nos 17, 10, & 2 and then thro' 174 Samuel Street.

- ③. Next Murchi Street requires widening the whole length on the South part,
- ④ as also does Bardan St thro' its Northern Road line.
- ⑤ An opening should be made at Chumberwada Cross Lane by demolition of 220-226 Samuel St.
- ⑥. Masjid Bunder Road requires widening between Israel Mohalla and Dongri St by setting back houses on Southern part and total demolition of the houses shops on the Northern part of this portion of the road.
- ⑦ The "Apex" of the "tail" at Bhandari Street should be cut away.
- ⑧ Dongri Keli Street may be widened by demolition of dilapidated workshops, there - number 22 perhaps may be left alone.

- (9) Seven spots marked with red cross are strongly recommended to be preserved as open spaces for ventilation of adjoining houses.
- (10). Houses condemned must be reconstructed and those marked blue must have their defects attended to.

Red lines denote the above suggestions on the diagrammatic representation of the area made by me.

Peculiarly this area is "7" shaped and there are 7 wide streets the rest are narrow, 7 urgent recommendations, 7 open spaces to be made; the area is composed of 3 parts ("head", "tail" & the 7 + the side portion) $4 \times 3 \times 7 = 21 =$ No. of blocks in the area; and the number of days in the year (365) = number of dwellings in this area.

1. Boundaries :

N: Babulo Tank Road
 S: Imamwade Road + Jail R^o South.
 E. Jail Road East.
 W: Parel Road.

2. Population : About 5,000.

3. Class of People : Marathas (Hindoos)
 and Moguls (Persians).

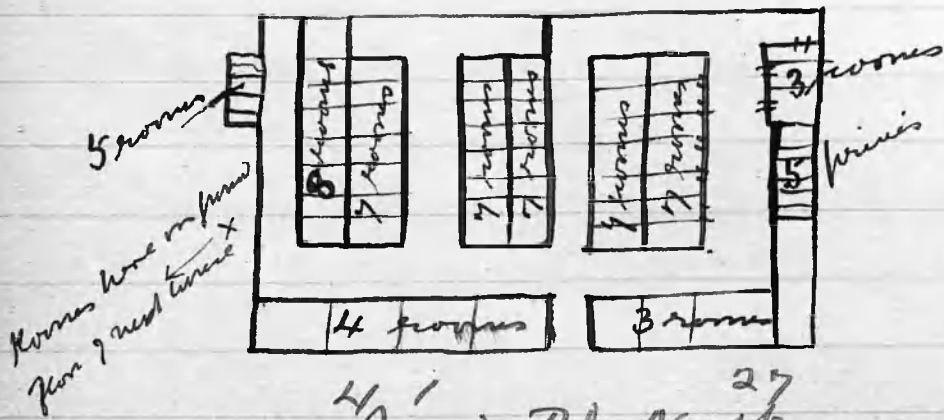
4. Mortality Rate : 68.15 per 1000.

5. General description of area :

This area is a parallelogram having its extent from East to West little longer than from North to South. Jail Road North goes off from Babulo Tank Road about midway dividing the area into Eastern and Western halves. Two-thirds of the Eastern half is densely populated the remaining Southern third of this Eastern half being taken up with the jail. The Eastern half of the middle third of this densely populated part is made up of a number of narrow lanes entwining between many dilapidated and badly situated houses. The above two thirds of the Eastern half and the South-West

XXX

27-41 Jail R^o. North: (ground floor plan).



41
27
Jail R^o. North

quarter of the Western half are the inhabited portions of this section — most of the Western half being taken up with the Babulo Tank and the adjoining compounds. All the houses on the North Side of Umar-Kadi Road are in a very insanitary condition and Jail Road North is the most insanitary spot of the area and should be urgently dealt with. ^{xxx}

Behind seven rooms facing the street (a little above its level) are three main blocks each of two rows of seven rooms each which rooms are back-to-back and only ventilated by doors. The passages between the blocks are narrow and all the blocks are damp, dirty and dilapidated and the rooms are all ill-ventilated and overcrowded.

There are 58 rooms with 5 privies for about 300 people. It need hardly be added that numerous cases of plague have infected this small village. The whole place should be demolished and one good sanitary chawl or other building erected. The portion adjoining should likewise be dealt with.

The narrow parts of the area are represented by yellow colouring.

6. Type of Houses; insanitary defects;
Suggestions for improvement:

There are about 150 houses in this area and a great many shops. The houses are chiefly build-ings of two or three stories with a central passage with rooms off each side of it; and with narrow galleries on each side of the building. Only a very few exist; chawks exist in a few of the houses.

The general state of the interior of the houses is dirty and there exists earth and cowdung floors and partitions in many cases. Even where such do not exist the walls are dirty in the main.

The rooms vary much in size but are all more or less ill-ventilated the windows being too small and thro' ventilation is not established and in those cases where there are gratings over or near the doors the passages are ill-ventilated owing to the depth of the building (60-80 feet) and chawks being unprovided.

Priny Accommodation is generally insufficient this being in the proportion of 1:7 rooms; 1:8; 1:9; 1:10; 1:12; 1:14; & 1:17 rooms. Most of the houses with such insufficiency are condemned.

Of 150 houses there are 45 condemned, 15 requiring some

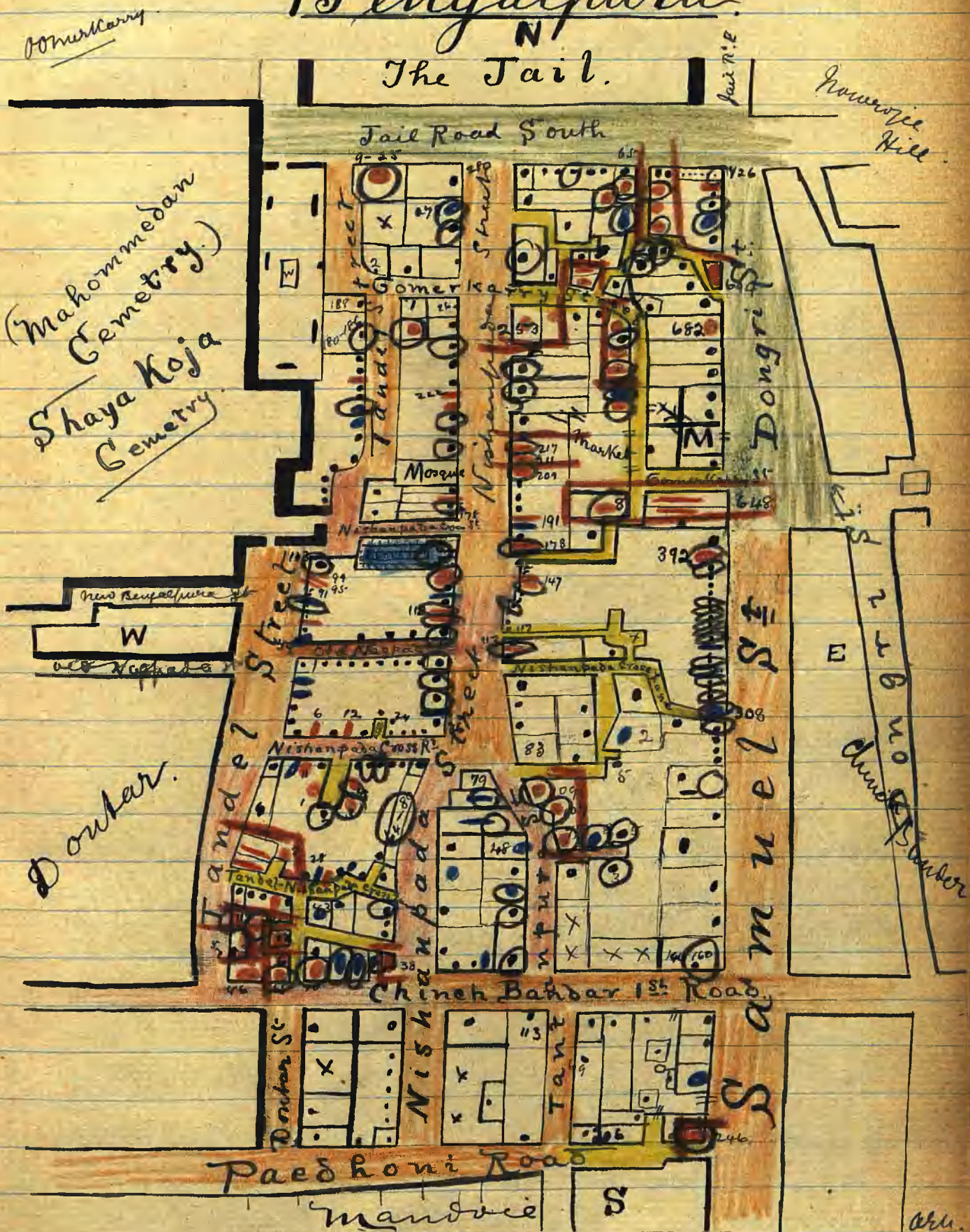
improvement leaving 90 fairly good.
Of 47 found marked as plague
infected 20 are among the condemned.

Suggestions for improvement of area:

- (1). 27-41 Jail Road North should be urgently demolished.
- (2) An opening should be made thro' 75 Umar-kadi road and 36 Umar-kadi 1st row thereby widening latter row.
- (3). Near this open up area by demolition of numbers 1, 2, & 3 Umar-kadi 1st row.
- (4) Widen Umar-kadi 2nd row by demolition of no 28 and no (1) next it
- (5) Widen Umar-kadi 1st row at its entrance into Jail Road East by demolition of 756 Jail Road East and no 56 next it in the row.
- (6) Make a road connecting the 2nd row to Jail Road North by demolition of numbers 1, 2, & 3 of this row.
- (7) Demolish no 90 Umar-kadi Road and house behind it and widen entrance into Halalcore Chawl there and erect one smaller building as also a better chawl.
- (8) The houses in the dead lane joining off at 68 Umar-kadi Road are badly situated and should be demolished and some improvement made here.

- (9) Going off Inmanwada Road above Pine Lane is a small lane with three dilapidated buildings all to be demolished.
- (10) Reconstruct all condemned buildings and improve those requiring some improvement as per attached list.
-

Sanitary Survey of Bengalpur.



Black dots signify houses fairly sanitary
 Blue " " " " for some improvement.
 Red " " " " condemned.
 Black Circles " " " " which have had plague in them
 Shading done according to approximate widths - yellow
 being the narrowest lanes, pink narrow streets, brown fairly
 broad & blue wide streets. Red lines represent the
 improvements suggested.

1. Boundaries:

N: Jail Road South.

S: Paedhoni Road.

E: Dongri and Samuel Streets

W: Shaya Kojia Cemetery, Tandel
and Dontaer Streets.2. Population: about 12,000.3. Class of People: Suni, Shir^a, Bori
and Julai (weaver) castes of
Mahommedans; also a few
Seedis (negroes).4. Mortality Rate:5. General description of area:

If two parallel lines with a slight slant to the West were drawn South to Paedhoni Road from the ends of Jail Road South - one from the corner of Jail Road South and Dongri Street (no 726), and the other from the junction of the Shaya Kojia Cemetery Wall with the wall of no 1 Jail Road South - we would then have a parallelogram with its greater extent from North to South including the whole of this subsection. Proceeding South from the middle of "Jail Road South" is Nishanpada Road which a little beyond half the length of the area parts into two the western limb of the park

being the continuation of Nishanpada Road to Paedhoni Road whilst the Eastern limb is known as Tantanpura Street which proceeds also to Paedhoni Road. Both these streets before reaching Paedhoni Road cross Chinch Bandar 1st road which is separated in this subsection from Paedhoni Road by three blocks of buildings. At the spot where Nishanpada Street forks there goes off Westwards Nishanpada Cross Road to join Tandel Street, and Eastwards there proceeds the Southern opening of Nishanpada Cross Lane which is continued to Samuel Street.

Where Samuel Street joins Dongri Street we have Cornerkerry Street which leads to the Dongri Market (a misnomer as it is not in Dongri Section at all) and then divides into a Southern limb (a lane of about 9 feet) ending at Nishanpada Street and a Northern limb which proceeds by a longer winding course to Tandel Street before reaching which it is however joined by a narrow gully to Jail Road South Cross Lane and then gives off a Cross Lane of its own name which is continued into Nishanpada Street. Number 694 Dongri Street is a dilapidated building which stands beyond the road line and behind it there

proceeds a narrow lane which ends in Jail Road South (between numbers 65 & 67) and which lane I call "Jail Road South Cross Lane" and it contains a number of insanitary houses close together. Another narrow lane with insanitary houses in it is a lane which proceeds from Taudel Street (by the side of no 17) and having a prolongation to Chinch Bandar 1st road and two branches to Nishan-pada Street. This lane I have called Taudel-Nishanpada Cross Lane.

All the lanes are represented in yellow, the narrow portions of the streets in pink, and the wider portions in light-brown whilst light-blue represents wide streets.

6. Type of Houses; insanitary defects; Suggestions for improvement:

With the exception of about six Chawls and a few more large buildings of 4 and 5 stories the majority of houses are 2 & 3 storied, detached with narrow jullies on each side and having internally a laterally placed passage with rooms proceeding therefrom.

The general state of the houses in this subsection, considered as a whole is not as bad as one would expect tho' all the condemned houses are very

* Plague Bacillus seems to grow best
in an alkaline medium. "an
alkaline solution of Peptone 2% with from
1-2% gelatine is the best nutrient medium for
its cultivation". (Mitra, Medical Annual 1898 p420).
Stafford uses neutral or faintly
alkaline peptone broth to get the
characteristic stalactite growths. (B.M.J. p 1237.
Oct 27. 1900).

insanitary being dilapidated with decay and ill ventilated rooms, and in many of them we have overcrowding as well as bad situation.

The rooms on the whole are fairly well ventilated and of fair size but this statement excludes in both these respects all those condemned and some of those for improvement.

The privies on the whole are sufficient but in a few cases they are very badly situated and in a few instances they are insufficient.

Cowdung floors and partitions do not exist to such an extent as we find in other areas. Cowdung consisting as it does of ammonia and other alkaline substances must form a suitable medium for the growth of those organisms which grow best in alkaline media (E.g. of Cholera & perhaps plague*) and the presence of albuminous & other material ensure it a suitable nidus. Moisture from spilling of water and urination on floors complete the conditions necessary for the propagation of germs the temperature necessary being present ordinarily and further the rooms are often close & ill ventilated.

One can easily imagine the spread of Cholera, plague and even typhoid cases in such places as the recreation from such patients find their way on to such floors - the habits of the people and their ignorance of sanitation not requiring any case of such. Apart from any such cases I certainly think that such material as crowding must exercise a prejudicial influence on the general health (not so much from itself as from its coexistence with the above circumstances in ill-ventilated rooms) and a clause in the Municipal Act preventing the usage of such would do much for the general hygiene of house and inhabitants as well as the health of the community and the lessening of epidemic diseases.

The total number of dwellings in this area is 290 of which 67 or 23.1% are condemned and 32 or 11.0% require some improvement. There are 82 houses (28.2%) found marked as plague infected of which 27 are condemned making the percentage of condemned houses infected with plague at least 40.2%. In addition there are 25 godowns and stables and a few shops not used as

X a chawl occupied by Halaleeres (their families) who are men who work after the refuse of Street & Pullis.

dwellings as well as one Mosque and one temple. A point of much import is that the condemned houses form the chief insanitary foci of this area. All of them are very bad and the overcrowding seems entirely confined to them. Furthermore since the majority of them are placed together in narrow ill-ventilated lanes and gullies the danger to the area is enhanced and the chief improvement rests in dealing with these narrow lanes and their houses. Another point of some importance is the fact that next to a public market exists an insanitary halabore chawl* inhabited by a dirty and careless class of people. The chawl is ill-ventilated & overcrowded.

Such a structure in my opinion should not be allowed to exist next a public market and it behoves the municipality to do away with this and protect as much as possible the place where the food supply is bought and where the possibilities for spreading disease are so many. This chawl should be totally done away with and the market enlarged and the entrance (Domekharry St) should be

widened and another entrance to it should also be made from Irishan-pada Road by utilising present vacant space behind the market.

Thus an insanitary focus would be taken away from the market and by the additional entrance less congestion and more ventilation of it would be ensured.

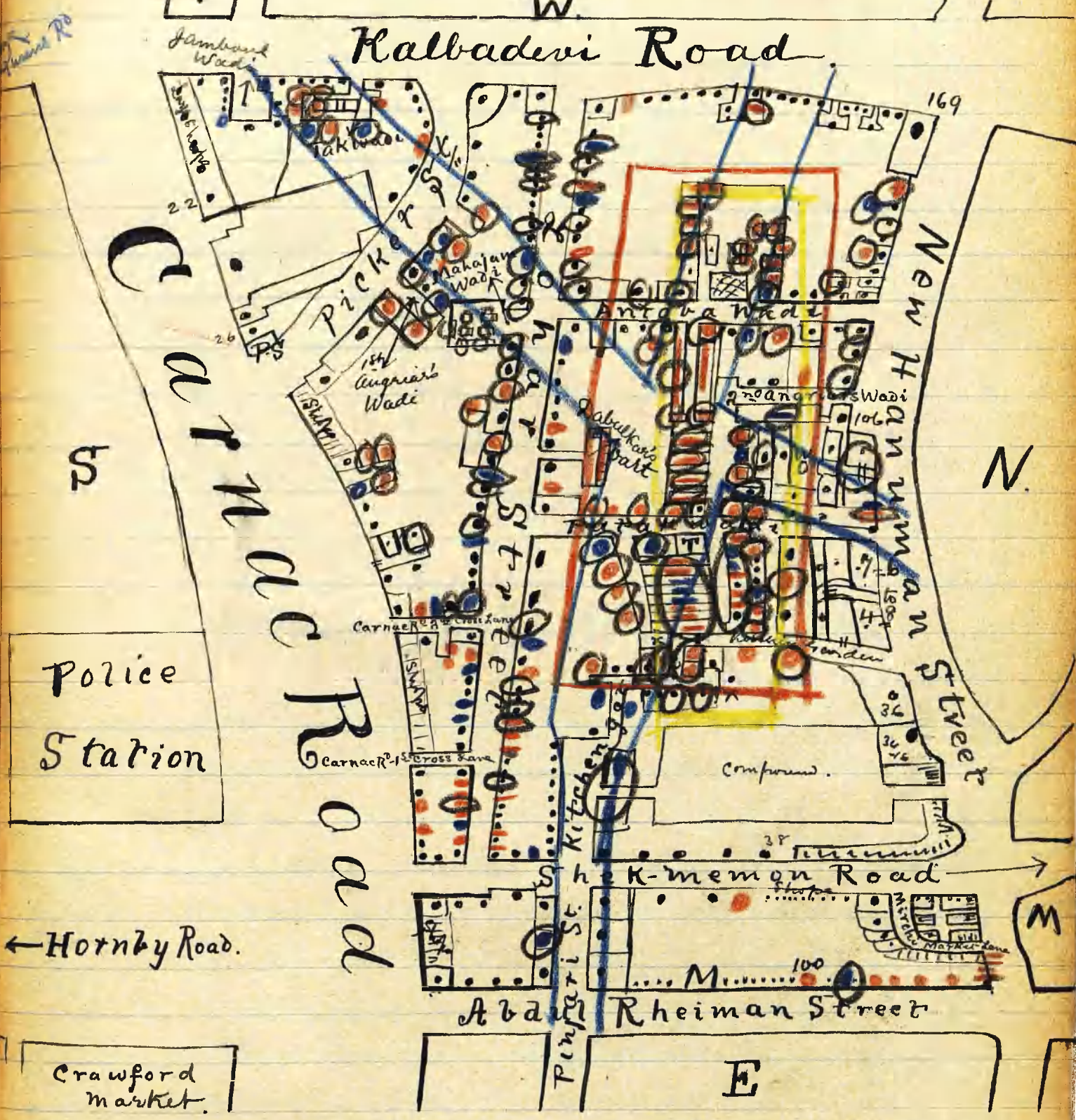
The suggestions for improvement there are:

- ① All condemned houses be demolished.
- ② The Halaleore chawl next ^{to the} market be demolished and market enlarged.
- ③ Cornerkarry Street be widened by demolition of two small houses on South Side between Samuel Street and the market.
- ④ Tail Road South Cross Lane should be widened and house 694 Dongri St demolished and its site should not be built upon - being a part of the street.
- ⑤ Cornerkarry Street should be widened by demolition of corner house 253 Nishanpada Street and one behind it, as well ^{as} of No 1 Cornerkarry Cross Lane and the house (unnumbered) by its side which projects into Cornerkarry Street. Cornerkarry Street should also be widened by setting back of new houses to be built between 68-5-0

(inclusive) Bomerkavy Street these being condemned.

- ⑥ Tandel - Nishanpada Cross Lane should be widened by demolition of houses numbered 2, 4, 8, 16 & 6 and a road should be made thro' No 28 here and No 11 Tandel St.
- ⑦ Numbers 42 & 68, Church Bazaar 1st road should be reconstructed, and No 68 totally demolished as also should be number 38 Nishanpada Street for purposes of widening their respective lane and street.
- ⑧ Houses 95-109 Tantanpura St should be demolished and the reconstructed houses set back.
- ⑨ Number 246 Samuel Street should be demolished for ever to widen Pydhoni Street here.
- ⑩. Improve those houses requiring such as per attached list. -

Sanitary Survey of the South-West third of Market Section.



- Black dots signify houses fairly sanitary.
- Blue " " " requiring some improvement.
- Red " " " condemned.
- Black circles " " which have had plague cases.
- Red lines show dangerous focus of area requiring urgent attention.
- Blue " " suggested new street.
- Yellow " " easiest method of improvements.

am.

1. Boundaries:

- N: Nuv Hanuman Street
 S: Carnac Road
 E: Abdul Rheiman Street.
 W: Halbadevi Road

2. Population: about 20,000.

3. Class of People: Marathas, Brahmins (chiefly Buniyas & Lohanas) and some Mahommedans.

4. Mortality rate:

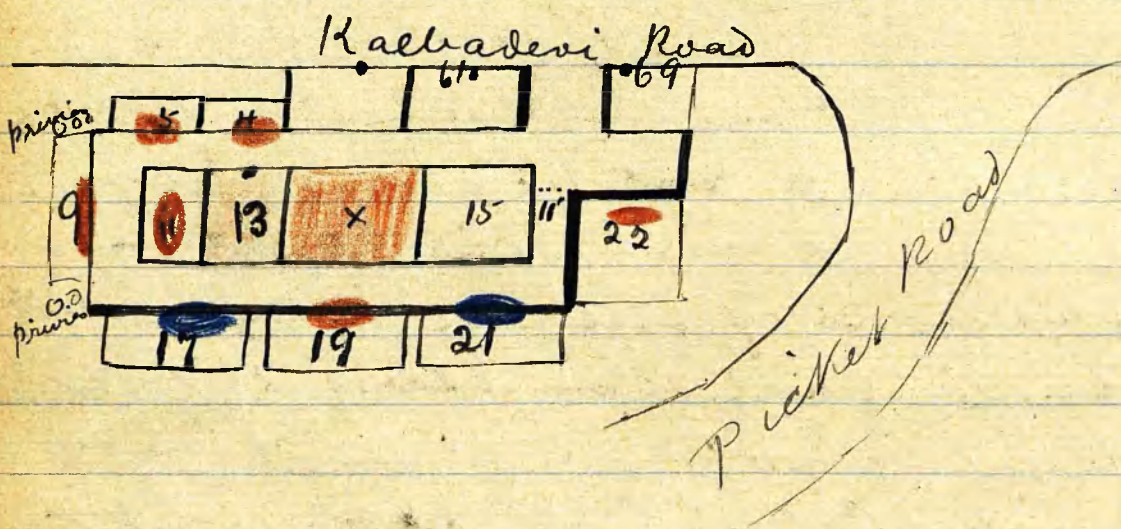
5. General description of Area:

This area with the above boundaries is longer from East to West being about one and a half times as long as its breadth at its Eastern end, and it gradually widens from its Eastern to its Western boundary forming a gradual general curving of its Northern & Southern boundaries. Viewed from East to West the area is seen to have a general resemblance to the half of the back of a coat having an irregularly triangular block of buildings inserted into the curved portion where the sleeve would be attached, with Picket road forming the line of junction between the two.

The area may be said to be composed of Eleven main blocks of buildings separated by three main streets and several lanes ~~of~~ some of which latter enter into the formation of a "Wadi". The three main streets inside the area are ① Picket Road running from Carnac Road (towards its Western end) to Kelbadevi Road; ② Lohar Street running from Kelbadevi Road (immediately north of Picket Road) to Shek Memon Road; ③ Shek Memon Road which extends from Carnac Road to New Hanuman Street immediately West of Abdul Rheiman Street from which it is separated by two main blocks of buildings. There are Seven "Wadis" so named and half of "Kitchen Garden" is in reality a "Wadi" and one must not be misled by the name into the imagination of even a fairly Salubrious Spot and this is all the more worthy of note since its 'wadi part' is immediately next to one of the worst spots in the area and one of the worst Wadis. The Wadis by name are (and in this I include 'Kitchen Garden') :-

- (1) Jamboul Wadi; (2) Takwadi; (3) Anguaries' Wadi (Picket Road); (4) Mahajan Wadi; (5) Antoba Wadi; (6) 2nd Anguaries' Wadi;

(1) Takwadi :



(New Hanuman St); (7) Patakwardi and (8) Kitchen Garden; and some of these require detail notice since they contribute much to the insanitary portions of the area and its general unhealthiness and mortality.

Janeboul Wadi, Augjars Wadi (Pickel Road) and Mahajam Wadi don't require such notice.

We will first consider

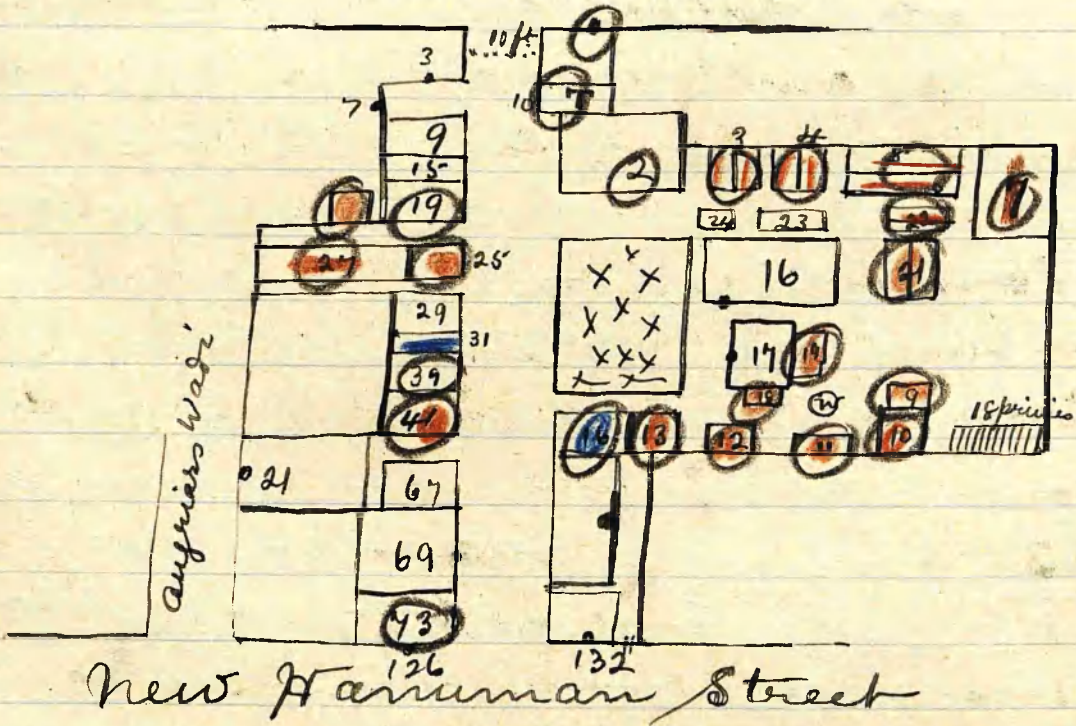
- (1). TAKWADI which goes off between 61 & 69 Kabbadevi Road. It has ten houses, the backs of two houses of Kabbadevi Road, and an open space which should not be built upon.

Of the ten houses six are condemned for reasons of general dilapidated state, general insanitary state, ill-ventilation of rooms, and bad situation and these facts together with overcrowding render this an unhealthy spot demanding opening up. Seven (probably eight) have been infected with plague.

Houses numbered 4, 5, 9, 11 & 19 must be totally demolished and no houses erected on their sites. House 22 is badly situated and the best treatment for it in my opinion would be demolition. (An enlarged diagrammatic representation of these wadis found on opposite page).

(2) Antoba Wadi :

Lohar Street



35- separate dwellings

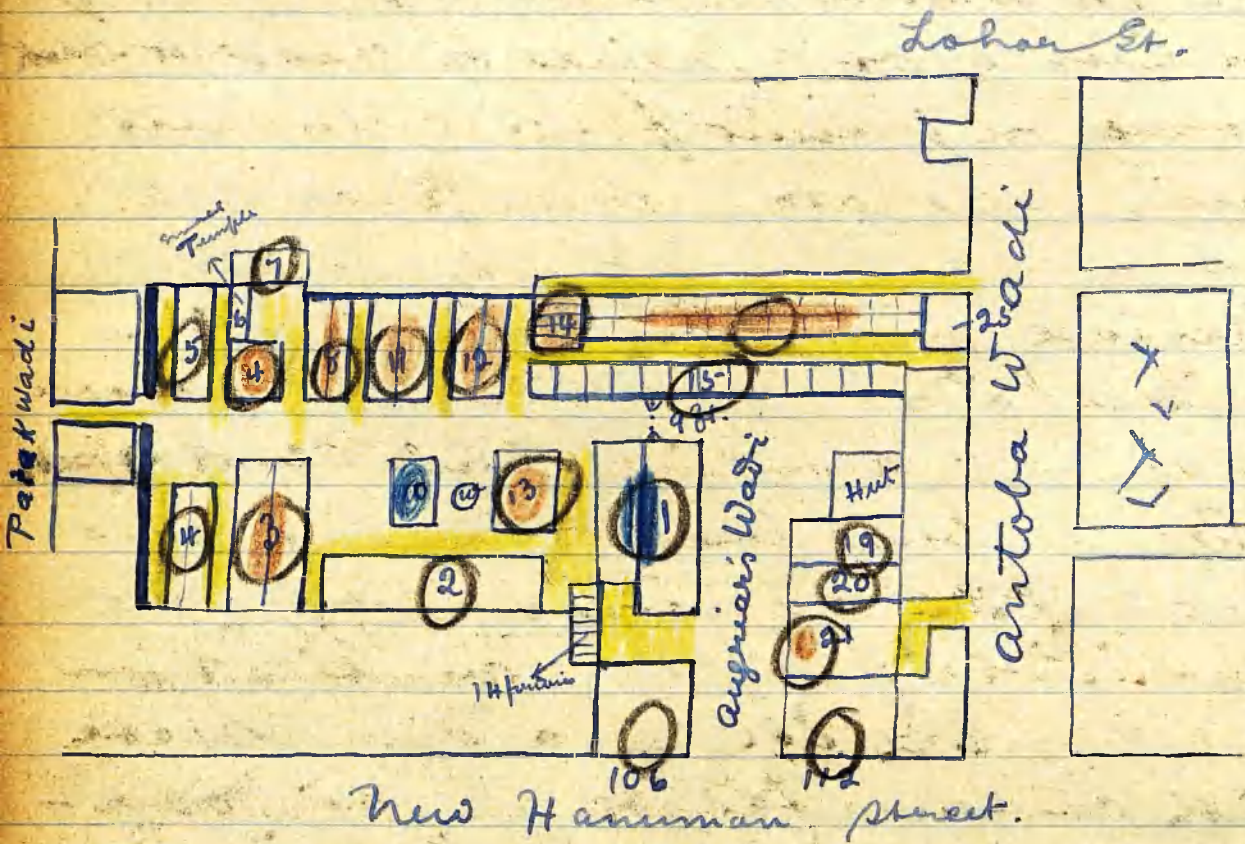
23 with plague

17 condemned.

(2) Antoba Wadi: This "Wadi" is made up of a lane which extends between Lohar and New Hanuman Streets and having about the centre of its Western side the true Wadi of its name which is composed of 16 dwellings with three attachments to three of them. The whole Wadi is concerned with 35 separate dwellings of which 17 are condemned and 23 have been infected with plague. Numbers 3, 4, 21, & 22 are made up of back-to-back rooms. There are 18 privies in connection with the houses in the true Wadi. House no 27 is composed of a series of ground floor rooms back-to-back and overlooking a gully. By the side of number 67 is a narrow passage which leads to the back of number 21 Angriar's Wadi. All the condemned houses here must be dealt with without exception. This Wadi has had 108 cases of Plague in three years.

(3). Angriar's Wadi (New Hanuman Street): This Wadi goes off Southwards between houses 106-112 New Hanuman Street and consists of a narrow lane which after proceeding South for about 120 feet turns for the most part to the East terminating in a gully which goes between two houses in Patalkwadi

(3) Augriar's Wadi (new Hanuman St.):



18 building

8 condemned

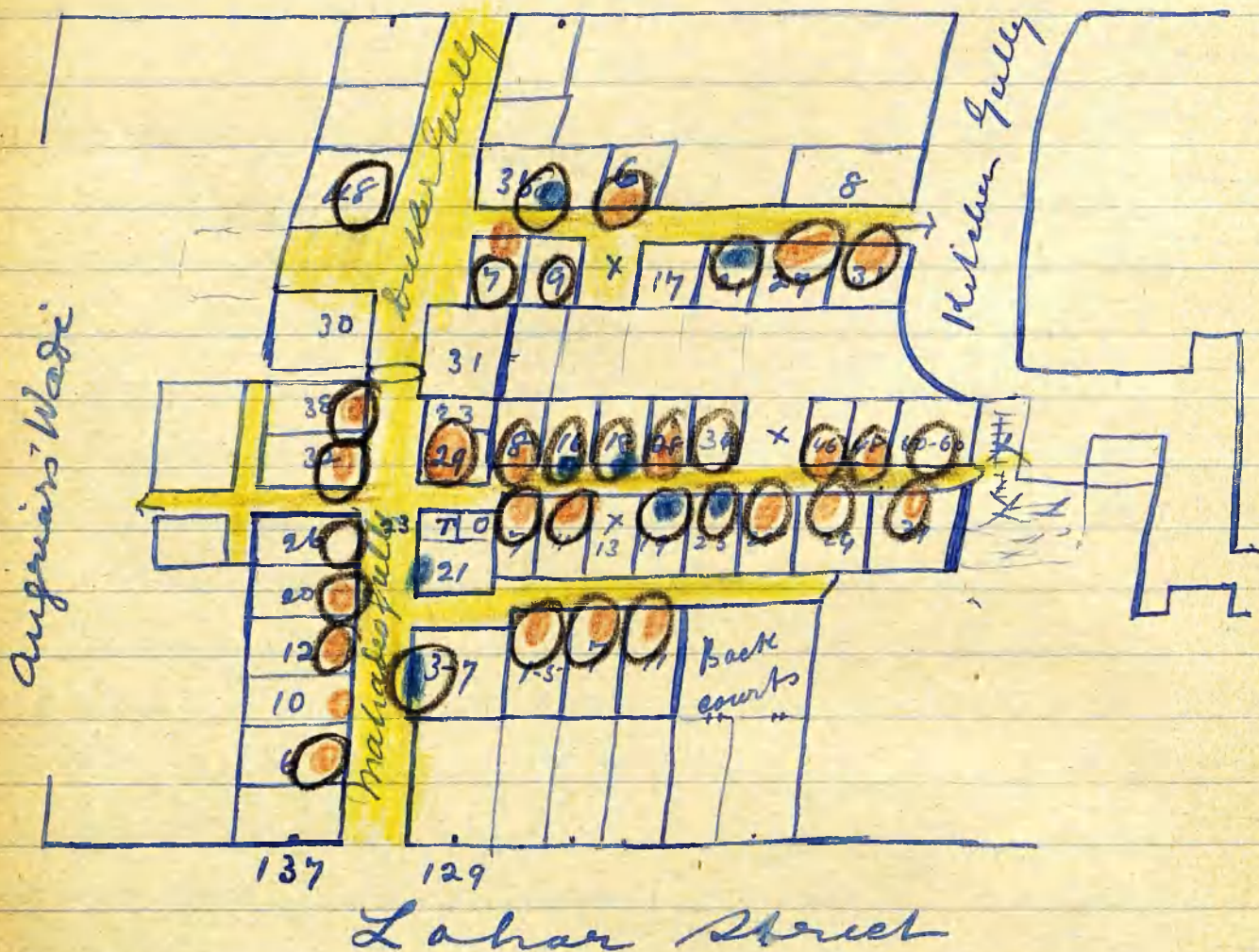
16 with plaque marks.

with which it thus has a connection. It has 18 inhabited buildings mostly consisting of a series of back-to-back rooms on framed floor only and being separated from each other for the most part by a narrow passage of about 4 feet - the widest part of the lane between any two dwellings being about 9 feet. Besides being back-to-back for the most part the rooms have no provision for proper ventilation and they are all in a dirty state with cawding floors and all over-crowded. Consequently it is not surprising to learn that they have all had plague in them more or less. Fifteen are found to be marked (some with a great many cases). Eight of these dwellings should be totally done away with and their ground space left free if there is any intention to convert this Wadi into a Sanitary condition. Behind no 14 is a long chawl (no 27 of Antoba Wadi) and by the side of no 14 is a gully which leads down into Antoba Wadi. This wadi thus is situated between the northern ends of Patak- and Antoba-Wadis.

(4) Patak Wadi: This wadi begins at Lohar Street between nos 137 & 129

(14) Patakwardi:

New Hanuman Street.



(1) Mahadeo Gully: 28 houses.
 19 condemned
 6 for improvements
 1 new godown being created,
 26 have had plague cases.

(2) Daker Gully: 10 inhabited dwellings
 4 condemned
 2 for improvement
 8 have had plague.

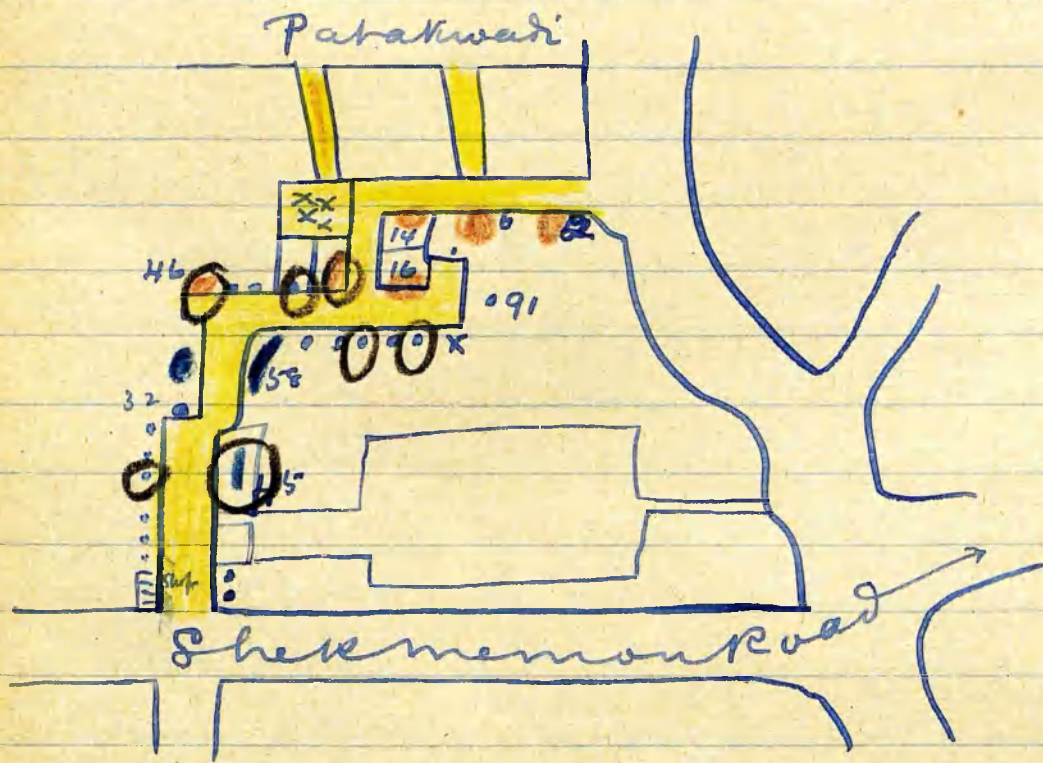
One house 23-29 Mahadeo Gully has had
 26 cases of plague in it.

and extends to New Hanuman Street. It is made up of two portions (a) Mahadeo Gully and (b) Duker Gully the former being the main portion. The whole Wadi has 38 dwellings and 4 godowns and small Hindu temple. Twenty three houses are condemned and thirty-four have had plague in them. This Wadi has had 203 Cases of plague in it lately.

(a). Mahadeo Gully starting from Lohar Street gradually narrows to the passage into Duker Gully which passes at the latter Gully is only four feet wide. Before reaching this passage however it gives off two off-branches to the right which are very narrow lanes in which the majority of the houses of this part of the Wadi are situated irregularly. The condition of the houses in Mahadeo Gully are in a very bad condition and of 28 dwellings 19 are condemned, 6 require some improvement and 26 have had plague cases in them. Between numbers 26 and 32 is a narrow passage which leads to Angriar's Wadi. House 23-29 has had 26 cases of plague in it.

(b). Duker Gully after commencing at Mahadeo Gully by a passage of four feet width soon widens and gives a branch to the right after which

(5) Kitchen Garden: This street goes off Shekmemon Road —



- 25 buildings - 5 being fadawans
- 6 condemned
- 3 for improvement
- 7 with plague marks.

it terminates in New Hanuman Street. It has ten inhabited dwellings four of which are condemned and eight have had plague cases.

(5) Kitchen Garden. This street goes off Sher Memon Road being practically a continuation of P. Injari Street. From its commencement to a short distance it is fairly wide but at no 32 it degenerates into a lane and is continued as such irregularly to New Hanuman Street being in this irregular portion a number of insanitary houses.

There are 25 buildings 5 of which are godowns and shops. Six houses are condemned and three require some improvement - one house having no privy; and there are seven houses marked as having been infested with plague. There are two connections with Patalkwadi. The open space behind behind no 62 should not be built upon.

VI. Type of Houses; insanitary defects; Suggestions for improvement:

In this area we have several very large houses and fully a dozen chawls as well as many dwellings consisting of a series of rooms back-to-back on the ground.

floor only, and these exist entirely in the Wadis. But the majority of houses may be said to be medium-sized houses of two or three stories; and the large majority of the houses are detached on both sides by narrow gullies. In addition there are a large number of shops.

The General State of the houses in the various wadis is very bad indeed but apart from there the proportion of houses condemned and requiring improvement is small. In the five wadis taken up in detail there are Sixty Condemned houses out of a total of 126 and there 87 of these plague infected.

In the whole area there are 385 houses of which

114 or 29% are condemned

43 .. 11% require improvements

leaving 228 .. 59.4% as fairly sanitary.

In the whole area 155 houses (at least) have been infected with plague (i.e. 40%) and of the condemned houses 76 have had plague cases in them (i.e. 66.6%).

Besides the general state the situation of the majority of the houses in the Wadis is bad and some of them tho' not so insanitary as others yet owing to their position

receive little ventilation and prevent the proper access of light and fresh air to others thus forming what are known as "Obstructive buildings".

Furthermore the drainage in some of these Wadis seem to be very defective and the ground itself is uneven and strewn with rubbish in many parts.

The rooms of the majority of houses in this area are fairly well ventilated but those of the dwellings in the Wadis are far from so by reason of small windows opening on to narrow gullies and narrow lanes as also by the crowding together of the houses and by "obstructive dwelling".

As regards the Wadis we find many "back-to-back" rooms in which many persons live. These rooms are only ventilated for the most part by doors and in a few instances by a hole above the door in addition.

One of the fundamental principles of Ventilation is the establishment of thro' Ventilation and of Windows of sufficient size according to the size of the room - which I have previously touched upon. Through

Ventilation must be established between ^{back to back} ~~the~~ rooms which should therefore be made one and windows of sufficient size also made. The evil effects of back-to-back houses and rooms cannot be too strongly insisted on. In their report to the Local Government Board on back-to-back houses Dr Barry and Mr. Gordon Smith showed that there was little doubt that the want of thorough ventilation per se gives rise to an increased mortality from phthisis, lung diseases and diarrhoea. I believe a very intimate connection between back-to-back houses and phthisis has been found at Glasgow by Dr Russell the late Medical Officer of Health.

All such houses and rooms must be totally prohibited to exist.

Privies on the whole seem sufficient tho' there are several instances where there is deficiency in this respect.

The prominent insanitary condition in this area is the existence of five very insanitary Wadis four of which are in direct contact with each other in the centre of the northern half of this area. Thus we have a dangerous focus consisting of Autoba,

Angriar's and Patak-Wadis and Kitchen Garden in this area which requires very urgent attention. This "dangerous focus" therefore ^{must be} the first and most important part of any scheme for improvement of the area. The easiest mode of improvement would be simply to make a wide street running from East to West thro' the centre of the focus as represented in yellow lines on the diagram and by widening the approaches thereto.

Takwadi and Angriar's Wadi (Picket^R) require much improvement and a large Buffalo Shed behind No. 11-21 Picket Road should not be permitted. All the houses represented by red dots should be demolished and reconstruction of Sanitary houses permitted if there be no objection by the site, but houses condemned in the lane between 46-32 Carnarvon Road and those in 2nd Carnarvon Cross Lane should not be rebuilt in order to widen the lane. If it is intended generally to improve the whole area by the making of a new road such a road should take the course as indicated by the blue lines on the diagram, but the

carrying of such a road beyond
Picket road is not considered
by me to be absolutely essential
for such a line of improvement.

(There is a proposal before the
improvement trust to make a road
from Queen's Road by Kalbadevi
Road and continued into Lohar
Street demolishing the houses
on the South side of Lohar Street.

I cannot agree with this proposal
because in the first place the
houses on the North side of Lohar
Street are more insanitary and
they are near the 'dangerous
spots' I have described. Secondly
the new road would be very
near Cerna Road which is a
very wide road with gardens
& open spaces on the South side of it.
A new road should be
made 'thru' that side of a street
which has most insanitary
houses).

1. Boundaries:

N: Kalbadevi Road
 S: Janjiker Street.
 E: Abdul Kheiman Street.
 W: Shek Munon Road.

2. Population: about 10,000 at the most.

3. Class of People: Mohammedans, Parsees and Bunnias.

4. Mortality Rate:

5. General description of Area:

This area is composed of eleven main blocks of buildings, two small triangular blocks in the N.E., and a quadrangular portion in the N.W. composed mainly of Mumba-adevi Tank, temple and shops. The majority of the streets run from West to East there being only two streets running from N to S viz: Dhanji and Agiary streets — the former running from Mirza Street to Mumba-adevi Tank Road and the latter joins 1st & 2nd Agiary lanes.

There are five places of worship in this area the chief of these being the large Jumma Masjid at Janjiker Street and the Parsee Fire temple at Agiary Street. The streets are

all of fair width except portions of the three Agrary lanes.

VI Type of Houses; insanitary defects; suggestions for improvement: The majority of buildings in this area are houses of ground floor and three stories of a side passage and rooms going off each from before backwards. The majority are attached on one side and nearly 32% of them are attached on both sides and if the depth of the houses were greater this would necessitate in all these cases the provision of better means either for ventilation of the rooms. The majority of the houses in Dhanji Street are attached on both sides. The fallies thus are mainly situated at the backs of the houses and there are no less than five side fallies which are built over by the attachment of one house to another.

Roughly calculated there are fully 220 houses in this area of which 28 are condemned, 32 require some improvement and 70 are attached on both sides in some of which cases side fallies should be made.

There are 54 houses marked as having been infected with plague of which 10 are among the condemned.

In addition there are a large number of shops and several godowns.

The rooms are of fair size on the whole but the ventilation of some is thro' other other rooms.

The priny accommodation on the whole is sufficient.

The main insanitary feature in this area is the existence of many houses attached on both sides in some of which cross side gullies should be made to provide better means of ventilation for the rooms.

Apart from this the houses that are condemned should be early dealt with and the structural or other improvements of those given in attached list should be attended to. This area does not call for any scheme for improvement of the area generally such as that referred to in previous reports.

The narrowest part is the Western end of 2nd Ajay Lane which should be widened.

* There are fully 120 "godowns" of various sizes - some extending from ^{one} street to another. Natives probably in many cases get infected at these godowns thro' inhalation of particles of infected grain dust or thro' abrasions of the skin of the feet. A.S.H.

Sanitary Survey of Mandvi (Port Trust) and of Dongri (Port Trust) have been made by me but for the purposes of this Thesis they will be excluded as they are for the most part made up of godowns, wide streets, open spaces with huts for cattle, and railway lines; and neither of these sections call for scheme of improvement.

In Mandvi (Port Trust) there are 80 dwellings of which 42 have been plague-infected. Four dwellings have been condemned besides a number of huts. Twenty-two houses require some improvement.

In Dongri (Port Trust) there are 25 dwellings + a large number of huts. Two dwellings have had plague in them. There are five very insanitary huts.

These areas have an importance of their own owing to the presence of so many "godowns" where grain is stored and the relationship existing between plague and rats which are found abundantly near "godowns."

Sanitary Survey of Parsiwada (Subsection of Fort M.)

N. Garden.

Fort Street

Hornby Road

Borah Bazaar Street

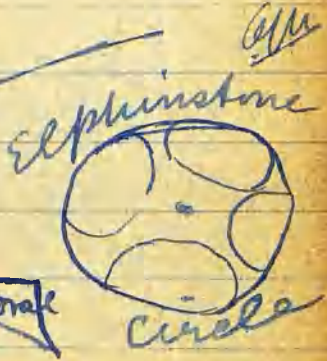


Church Gate Street

Cathedral

faintly Sanitary
for improvement
condemned
which have had borne cones
improvement suggested.

Black dots signify
Blue
Red
Brown circles
Yellow lines



1. Boundaries:

N: Fort Street

S: Church Gate Street.

E: Boreh Bazaar Street

W: Hoarby Road.

2. Population: There are 620 dwellings with an average of eight-living-rooms and giving three persons to each room we get a total of 14,940 persons. The population is probably 15,000 at the least.

3. Class of People: chiefly Parsees Hindoos and Mahomedans in numerical order but there are also some Europeans in the lower Southern portion of the area.

4. Mortality rate:5. General description of Area:

The whole area with the above boundaries may be considered as having the shape of a right-angled triangle with its base formed by Hoarby road and having its Northern and South-Western angular portions cut off — the right angle being at the South-Eastern corner. It consists of

22 blocks of buildings of Square triangular and oblong shapes. There are 620 dwellings in this area and besides some large offices, several temples and some small shops. Gunboat Street running from West to East lies a little to the South of halfway between the Northern and Southern boundaries and approximately separates the area into a Northern and a Southern half. The Northern half has a right-angled triangular shape and has Jijibhoy Dadabhoy Road running from West to East thro' its middle. The Southern half has an oblong shape being about one fifth longer from North to South than it is from West to East. Kavoji Patel Street goes off in the middle third of the Southern boundary (Church Gate Street) and runs northwards to Gunboat Street. It is continued in the South-Western portion of the Northern half as Raghunath Dadajee Street terminating in Hornby Road and giving off at this termination Police Court Lane which ^{runs} eastwards into Borah Bazaar Street (Eastern boundary). Maruti Street also running to the Eastern boundary is given off before Police Court Lane. There is only

one street which runs from West to East thro^o the Southern half and this is Ghoga Street which runs from the middle third of the Western boundary of this half.

In the Southern half too there is Pitha Street which goes off from Western end of Gumbard Street (at its junction with Hornby road) and runs south to Ghoga Street.

With the exception of Gumbard Street, Ghoga Street, Kavasji Patel Street and Maruti Street none of the streets in this area are of any great width and in addition to these streets there are several lanes running irregular courses and varying in width from seven to fifteen feet.

6. Type of Houses; insanitary defects; Suggestions for improvement etc.

The majority of the houses are either three or four storied altho' there are a great many with five stories and several with six stories. The majority have either two or three rooms on each storey in addition to a cookroom and the majority have a Well at the rear.

The Storeys of such houses are made up one room at the front

then the landing which leads to the
 backroom from which goes off the
 cookroom (or a third room in which
 case the cookroom is practically a
 part of the room). Posteriorly is a
 gully. The sides of the house are
 usually attached to adjacent
 houses. Out of 620 houses there
 are no less than 235 which are
 attached on both sides i.e. 37.9%.

The majority of the remainder
 are attached on one side the
 unattached side being separated
 by a gully from the next house.
 In a number of cases (17 in all)
 a side gully is built over by a
 portion of the house. The
 resultant of this method of
 building houses is that the
 front room is the only one
 which has a fair amount of
 ventilation - the amount of
 light it receives being dependent
 upon the height of the building
 opposite and the width of the
 street. The rest of the house
 is ill ventilated and dark there
 being no provision for sufficient
 light and air. The rooms on
 the whole are small the front
 room usually being the largest.
 The privies are in a great many

instances objectionably situated being really a portion of the caskroom detached off and so leads and ventilates into it. Sometimes there is no other ventilation of the privies. On the whole the privies are sufficient in number. In a fair number of cases there is insufficient privy accommodation.

Out of 620 buildings 70 are condemned (i.e. 11.2%) and 80 require improvement structurally, for better ventilation of rooms or as to the situation of the privies. Thirty houses at least have been infected with plague. Chawl 318 Borah Bazaar Street has had 12 cases of plague and is the house with the highest mortality in this area.

The chief factors in consideration for the improvement of the area are the attachment of each other of many narrow houses with illventilated and illlighted rooms in narrow lanes. If among such houses there are some condemned it is a matter for mature consideration whether such should be rebuilt at all. By leaving the ground-

space

space of some such free better ventilation would not only be made possible to the houses on either side of it but also to the houses to the front and rear of them. Furthermore the demolition of an occasional house among a group of well-ventilated houses would accomplish the same object.

There are several lanes which require widening at certain parts chiefly Bhoiwar Lane,

Bhamaaji Street and Police Court Lane and such suggested widening is shown in yellow on the diagram. Police Court Lane is suggested to be widened in conjunction with the demolition of houses 244 to 258 Borah

Bazaar Street which are a series of nine narrow dwellings attached on both sides overlooking an alley five feet wide going off from Borah Bazaar Street and running to their rear a very narrow gully.

If this be followed out then a street of fair width would be made from Borah Bazaar Street and so open up this portion of the northern half.

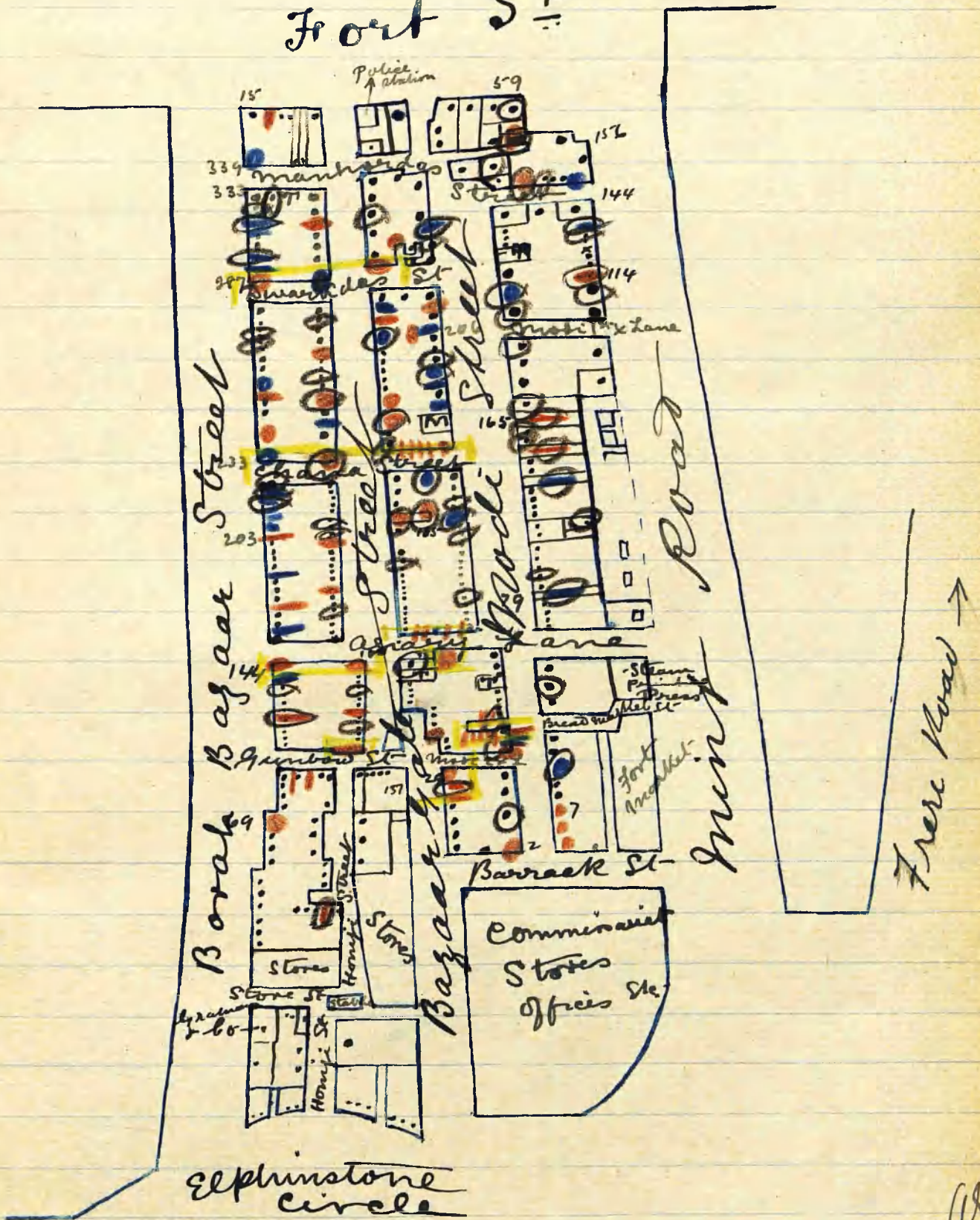
A street is also suggested to be made thro' a number of condemned houses from Manuti Street to Gunbow Street following the course as shown on the diagram.

In the Southern half Bhoi-war Lane is strongly recommended to be opened up the lane being for the most part only 9 feet wide and having several houses which I have condemned. In the Southern half to the entrance to Pitha Street into Ghoga Street should be widened and this should be continued into Manabloy lane by opening up the covered passage which exists between that lane and Ghoga Street.

The above suggestions and the improvement of the houses and opening up of covered gullies would convert this area into a sanitary one as far as it can reasonably and practically be expected.

Sanitary Survey of Borah Bazaar (subsection Fort North)

Fort St



Black dots denote houses fairly sanitary
 Blue " " " " for improvement
 Red " " " " condemned
 Brown Circles " " infected with plague during 1900.
 Yellow lines " improvement suggested.

A.M.

1. Boundaries : N: Fort Street.
 S: Elphinstone Bazaar Mint Road
 E: Mint Road.
 W: Borah Bazaar Street.

2. Population : There are 375 houses with an average of 12 rooms thus giving a total of 4500 rooms in the area and presuming three persons occupy each room we have a total of 13500 persons. The population is fully 12,000 in my opinion.

3. Class of People : Hindus and Mahomedans chiefly but also a few Parsees.

4. Mortality Rate :

5. General description of Area : Agiaary Lane runs from West to East slightly to the South of half between the Northern and Southern boundaries of this area, and may be taken to divide the area approximately into a Northern and Southern half. The Northern half is a parallelogram with its length from North to South almost twice that from West to East. It is composed of 12 blocks of buildings

which lie in three sets of four each, separated from each other by Bazaar Gate and Modi Streets which run from North to South thro' the area -

the former thro' the whole length and the latter ending at Barrack St.

Running between North Bazaar and Bazaar Gate Streets are two narrow streets which require widening viz: Dwaradas and Chana Streets.

The Southern half is a little lower than it is broad and gradually widens to the South on both sides.

In the South Eastern part are a number of Store houses of the Commissariat Department. Gumbow Street and Modi 2nd Cross Lane (practically continuous with each other) run from West to East thro' the upper third and are narrow and require widening.

The lower half is made up of ten blocks of buildings. There is also the Fort Market in the middle of the Eastern boundary of the Southern half.

There are 375 dwellings; a number of offices; Commissariat Stores and several separate shops in this area which also includes four small temples. In addition there are a few stables and a Steam Printing Press.

6. Type of Houses; insanitary defects;
Suggestions for improvement:

The majority of houses are four storied with an average of three rooms on each storey. The rooms go off each other from before back-wards. There are 160 houses which are attached on both sides (i.e. 42.6%) and in these cases the central rooms are mostly badly ventilated. Of the remainder the large majority are attached one on one side. There are 20 side gullies which are built over.

Of 375 dwellings

36 require improvement

60 are condemned

and there are 66 which have been infected with plague during the present year of 1900 and of these 17 are among the condemned.

The houses that have been condemned are so condemned chiefly thro' their general de-lapidated and insanitary state and bad situation.

One or two are condemned for purposes of widening streets.

The privy accommodation is generally sufficient and in only two cases are such en-tirely absent. The situation

is usually off the Cook room by detachment.

The Chief improvements required in this area are:

- ① The Side gullies that are built over should be opened up.
- ② Houses condemned should be demolished and such as are not occupying spaces for the improvement of streets as suggested should be reconstructed on latest sanitary principles.
- ③ Agiary Lane, 2nd Modi Cross Lane, Chana Street and Dwarikdas Street should be widened for the most part of their length on one or other side as suggested on the diagram; and Gurbaid Street should be widened near Bazaar Gate Street.

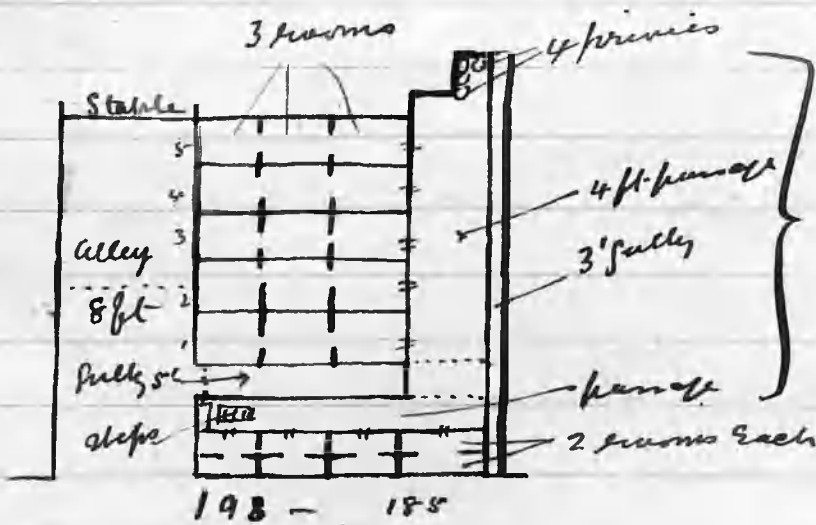
In conclusion I give a rough plan of one or two where there has been a high mortality.

(1). 193-185 Bazaar Gate Street:

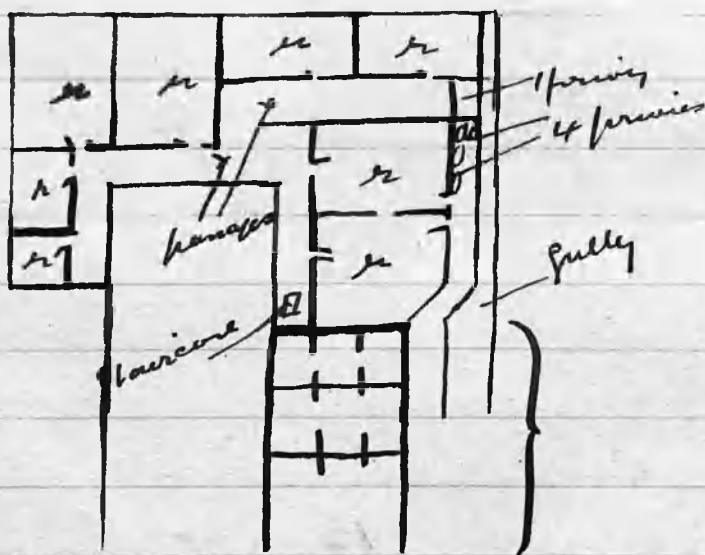
This house has on ground floor four shops and above are two rooms which are entered by a passage at the back which has its entrance by steps from a side alley 8 ft wide to the North side of the house.

Behind this house is a chawl of ground floor of one storey. The

193-185 Bazaar Gate St:



Chawl
behind
193-185 Bazaar
Gate Street.



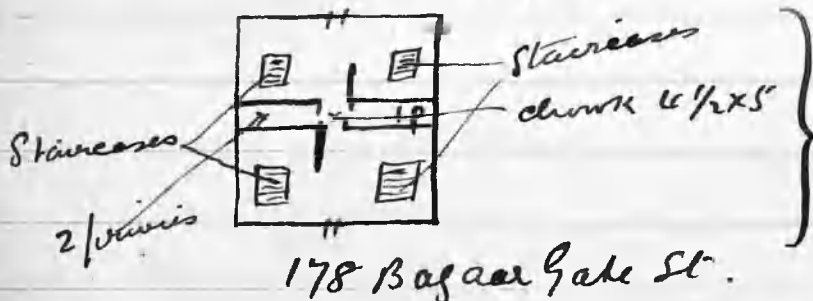
Plan of
1st and 2nd
floors above
stable

ground floor has five carpenters shops. The entrance to this chawl is by the same passage noted above which is continued to the back of the chawl over a gallery 5 ft wide which separates the side of the chawl from the passage. The Storey of the chawl is made up of five dwellings of three rooms each the rooms group off from each other with partitions between and having in consequence the central rooms illventilated. At the Western end of the passage of the chawl are four privies which empty in a fully 3 feet wide which runs at the back of the chawl. The privies are badly situated ill-ventilated and near rooms of the chawl attached to the West.

The building is in part dilapidated and its situation is bad and so it is recommended to be demolished.

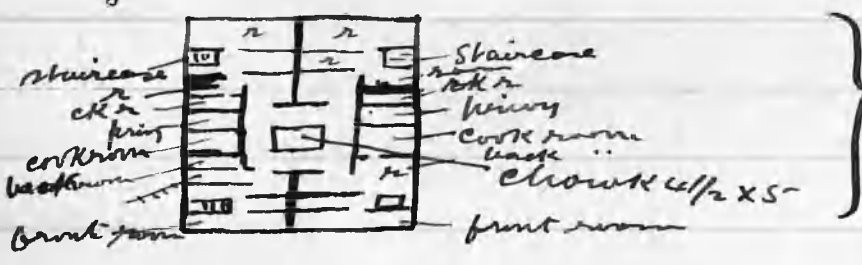
To the West of the chawl is a stable on ground floor and above it dwelling rooms on two stories. All the rooms ventilate only by the doors - there being no windows which are recommended. The privies of the chawl are near two of the eight-rooms on each storey and are badly situated illventilated.

199 Borah Bazaar St



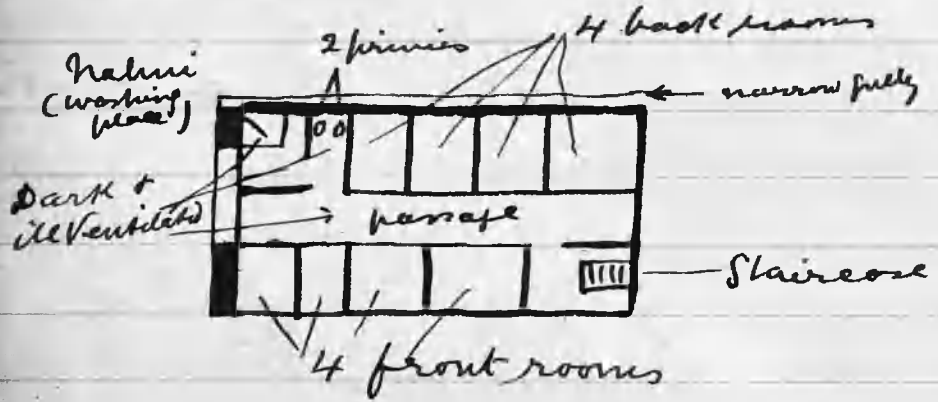
Ground floor plan.

178 Bazaar Gate St.



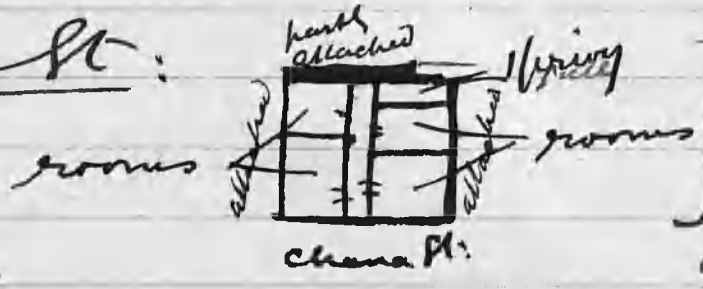
Plan of 1st & 2nd floors.

25-41 Chana St:



28 Chana St:

Ground and one storey alike



2 back rooms ill-ventilated also privy. House dilapidated

(2) 178-182 Bazaar Gate Street and 199-201 Borah Bazaar Street are really four houses "back-to-back" separated by a small chowk $4\frac{1}{2}' \times 5'$.

The ground floors have 2 privies each and each storey (3) has two rooms, a landing, a cook room and a privy (in common with the dwelling of same storey on same side).

The privies ventilate on to narrow chowk by a door only & are next the cook room which also ventilates by door on to chowk & by another door into the back room. The front room is the only one fairly ventilated and the rest are dark close and badly ventilated. The diagram opposite shows the relation of the rooms etc.

(3) 25-41 B. Lane Street. The front faces the North. It has ground floor & 3 stories. Ground floor made up of carpenter's workrooms. Each storey made up of 4 front rooms & four back rooms with a passage from E to W between. Fully to East is built over. The passage is dark and ill ventilated. The back rooms have windows on to a narrow alley behind but are dark & ill ventilated. Likewise the privies near the end of the passage.

General Conclusions.

From a consideration of these various surveys it is seen (vide page (13)) that at least 30% of 4354 dwelling houses in fifteen Subsections are condemned (or unfit for human habitation), and that a fair number require various improvements. The houses that are condemned are found dilapidated, with small small illventilated rooms into which little or no sunlight ever enters, and often with ^{un}condemning floors and partitions and invariably overcrowded. Such houses cannot but favour the development of germs and we have proof of this statement in connection with tuberculosis (to take only one example) and the clearness of this connection is shown by Dr. J. B. Russell (late M.O.H for Glasgow) in his "Vital Statistics of Glasgow" in which we see that the death-rate from phthisis in a slum-district like Cowcaddens is nearly double what it is in a respectable district like Blyths-

wood; while the death rate from acute diseases of the respiratory system in these two districts stand in the relation of 4 to 1.66. And furthermore the same author points out in his "Evolution of the Function of Public Health Administration" in Glasgow how the general death-rate and death rates from phthisis and acute respiratory diseases have gradually decreased in the city of Glasgow since the Sanitary Department and the Improvement Trust began their operations. Thus in the ten years 1855-1864 the general death rate was 30 per 1000, in the next ten years 1865-1874 it was still 30.5 while in the succeeding ten years 1875-1884 it fell to 26.9 when the work of the above two departments began to tell.

In the returns of the Medical Officer of Health for Glasgow for 1899 we find (to give one example) the relation of congestion of an area to death rate. Thus:

	Persons per acre	Death rate per 1000
Kelvin-side	9	6.47
Hill-head	12	9.66

* Of the sections reviewed these are probably the worst in this order.

(continued)	Persons per Acre.	D. R. per 1000.
Blythwood	107	15.60
High Street (West)	242	26.66
Cowcaddens	280	32.66

Now let us compare in like manner the areas surveyed as far as plague is concerned and we find that at least 21.4% of the houses have been so infected. The mortality from plague alone during year 1899 for Bombay was 19.22 per 1000 (in two of these subsections it was over 22 per 1000 (vide page (12)) and in this connection we have to remember that during certain months of the year plague is very much in abeyance. In many of the areas surveyed congestion of the area generally is so much evident. Any one who has gone through such subsections* of Bombay as Kowrozie Hill, Koliwada, Mandvi, Chakla, Nappada, South West third of Market section, Bhunderwada can see that they are all overbuilt and overcrowded. In such areas at least the truth of Dr Farr's axiom "That the nearer people live to each other

the shorter their lives are" must be very true indeed. Thus in most of these areas we have to deal not only with insanitary houses overcrowded but also too many houses in the area with narrow lanes, gutters and streets. It is not too much to say that the Native part of Bombay is overbuilt.

If congestion of areas and overcrowding perpetuate or fanisms of disease it is not surprising then that plague has been found prevalent in such areas. Not only this but we have to consider the condition of the soil upon which the houses are built.

A good portion of the ground of such areas has been reclaimed from the sea and is composed of "made up" soil, and there are also many wells and pools that have been covered over. In a word to speak the truth Bombay is a water logged city and since the foundation of many houses is imperfect or the ground floor is the earth of the soil impure moist from air

* Ordinary alkaline bouillon agar
seems to be the best medium for
plague bacillus cultivation (Delepine
B.M.J. Oct 27. 1900 p. 1241). also
page 422 Medical Annual 1898.

gains entrance easily to such houses which already being close are thus made more unhealthy to the inhabitants as well as better breeding grounds for germs. Add this combined with narrow streets, high buildings, ill-ventilated and ill-lighted rooms and stinking gutters, greatly enhances the unhealthiness of an area. In addition we often find in these ill-ventilated and dark rooms that a layer or two of cow dung is put over the floors and the partitions, and the nature of this material with dampness affords an excellent medium for germs propagation especially those which grow best in an alkaline medium as plague (*Causis albas* have little effect on *Bacillus pestis*; Quick lime 1% takes 30 minutes to have an effect p 1238 B.M.T. Oct 27. 1900). Hence the material must assist in the development of such germs - the other conditions being present. One of the most necessary of these other conditions is the presence of moisture - in fact it would seem to be a sine qua non

according to some opinions (and I am inclined to hold this opinion) as Col. Waters I.M.S. has found that at the Bombay Jail where moisture was allowed on the floors that plague at once developed and that when the ground was kept dry that plague did not develop. He points this out also as regards relapsing fever (vide Glasgow Medical Journal for September 1900). This opinion is supported by the statement that the plague Bacillus is more readily killed in a hot dry climate than in a moist temperate one (vide Dr Rees B.M.J. p 1238 Oct. 27. 1900). Bombay has a moist climate and plague usually goes up when the cooler season begins. Now it is a curious fact moisture is most frequently found in most of the native houses as the natives are very careless and let the water taps running (and so waste water and hence the necessity for water meters having been adopted). Furthermore a great many of the sleeping living rooms have bathing places

(called *Nahnis* or *Moris*) in them and so the floors are frequently found damp. In this connection we must also remember the moist ground air and the moisture of the breath. If moisture thus could be excluded from such houses a great desideratum would be removed. But here we have to face the fact that the ground air is moist and in order to overcome this the houses must have concrete or other impervious foundations. Having removed moisture as far as is possible the presence of sunlight will do much to combat plague or the *Bacillus Pestis* has little or no resistance to sunlight as has been proved (the *B. Pestis* dies in 4 days at a dry heat: *Mitra Med. Journal* 1898 page 422; also *B. M. J.* p 1238 Oct 27. 1900). Thus the want of sunlight and fresh air does much to the up-keep of plague in the city, and though plague may become less virulent in type and inoculation do much to lessen its prevalence

Yet the disease I feel sure will not be thoroughly expunged from the city so long as the insanitary houses are allowed to exist. As I have pointed out in the survey reports the most elementary principles of hygiene have been ignored, and only a course of demolition of all insanitary houses and the opening up of the areas will bring less disease, better physique of the people, and a lessened mortality; and such precedents have followed the opening up of areas in Glasgow as is shown in Dr Russell's literature above alluded to.

Thus it is not surprising that out of 1401 condemned houses at least 37.1 per cent have been infected with plague - I say at least because as already pointed out many houses so infected are not included in this estimate since they have had their plague marks rubbed out or limewashed over and so the percentage this year is ever so much greater.

* wide page (13).

In some areas a third or a fourth of the condemned houses have
 * been so infected (eg. Nagpada, Koliwada, Nowrojee Hill, S.W. Market, Chakla, & Mandvi — which are about the worst areas in Bombay), and in some also a third or fourth of the total number of houses have been plague-infected (eg. Nowrojee Hill, Chakla and probably also Koliwada and Mandvi). Also having gone thro' these areas I feel convinced that the more insanitary a house is the greater seems its chance of becoming so infected and we find a very large number of cases in very insanitary houses. Furthermore on going thro' the area and on looking at the diagrams one sees a tendency for plague infected houses to be near each other, but this does not mean necessarily that the houses are all insanitary as is also shown on the diagram. This would seem to show a

limited power of infection of the *Bacillus Pestis* as in typhus tho' this can't be absolutely established owing to the various modes of infection of Plague but of the infection thro' inspiration must be regarded as a very common one this limited infecting power is with great probability true. In this connection we must remember how easily such infection could be conveyed from one house to another thro' the air since many houses are separated from each other only by very narrow gullies into which the adjacent windows of the ill-ventilated rooms open.

From the above it is evident that not only must the insanitary houses be demolished and the areas opened up but also that the building regulations must be stringent. Such unfortunately does not exist - and a carriage-d'pair can easily be driven thro' such insanitary legislation as exists.

The buildings must be limited in height, a sufficient space should exist between adjacent buildings, the rooms should be well ventilated and lighted, and the passages of all wide houses should be well ventilated by chowkhs (or internal openings free to the sky). Privies should be detached and well ventilated.

The Water closet system now coming so much in vogue should not be enforced in all native houses as natives do not understand the system and will throw all sorts of refuse down the closets and create frequent blockings and constant expense.

What I would advocate is a flushing automatic tank in connection with each privy and connect the privy to the sewers and thus there will be no such blocking up by refuse and at one stroke all the sweepers (Bhungies) and carts necessary for the present system would be done away with and its necessary expense. This

* Nether + Fother's Hygiene; Wilson's Hygiene;
de Chaumont's, Parkes etc.

System I feel convinced would work satisfactorily and a more sanitary state of the privies would be ensured as also the extinction of the tendency the sweepers have of emptying the privy contents into the side gullies - a frequent cause of complaint and needless to add of ill-health and disease.

Whilst the streets and lanes must be opened up and houses permitted to have more light and ventilation to their rooms it must be remembered that such improvements will not altogether bring ideal results if the cubic space per adult be not sufficient and overcrowding not suppressed.

Three hundred cubic feet of air-space per adult is generally regarded sufficient for a healthy individual. De Chaumont and Parkes have contended that the cubic space for a healthy adult ought to be not less than 1000 cft.

* In the Metropolitan lodging houses the allowance is as little as 240 cft; in the Dublin registered houses it is 300

cub ft while in the Board Schools
 the Education Department re-
 -quire only 100 cub ft. as a
 minimum. The Barrack
 Commissioners on the other hand
 recommend a minimum
 space of 600 cub ft for a Soldier.
 If a Soldier requires 600 cu
 ft why should the working
 class and ignorant natives
 have to do with less? Natives,
 who have such a tendency
 to overcrowd rooms and
 shut their windows and
 live in dirt seem to me to
 require much more cubic space
 per head and this especially
 in a hot climate. Therefore
 I strongly advocate a
 much greater cubic space
 per head than is at
 present found and for the
 reasons above stated think
 that 600 cub ft. per head
 would be a minimum.
 Hundreds of rooms in Bombay
 at the present moment have
 little over 100 cub ft per head
 the rooms being small &
 overcrowded, and in my
 first report (Naffada) I
 found that in some chawls

(not the worst) the cubic space per head did not exceed much over 220 cu ft.

In a word more light, more sun around and in the houses is wanted and more stringent building regulations and to enforce this a more educated Corporation; and it behoves the Corporation to build sanitary dwellings for the poorer classes.

These are some of the thoughts that have occurred to my mind regarding insanitary areas and their houses and their relation to Plague with measures for improvement, and I need hardly state that the subject is a most important one involving as it does the lives of thousands yearly in this great city, and the improvements of the Native portions consequently cannot be begun too early especially when we consider the relationship existing between insanitary houses and Plague.

Alfred Newell

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