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BY

MANCHESTER.



சப்பனிருபுவர் பெயர்

St. Paul, Minn. May 14, 1894.

சப்பனியருடைய தற்காலக் கருத்துகள்

காள்ளிப்பட்ட நாள்

1992

1சப்பனீட்டு முடித்த நாள்

தஞ்சாவூர், 1942.

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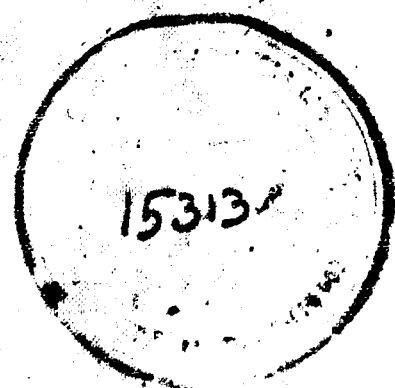
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1918.

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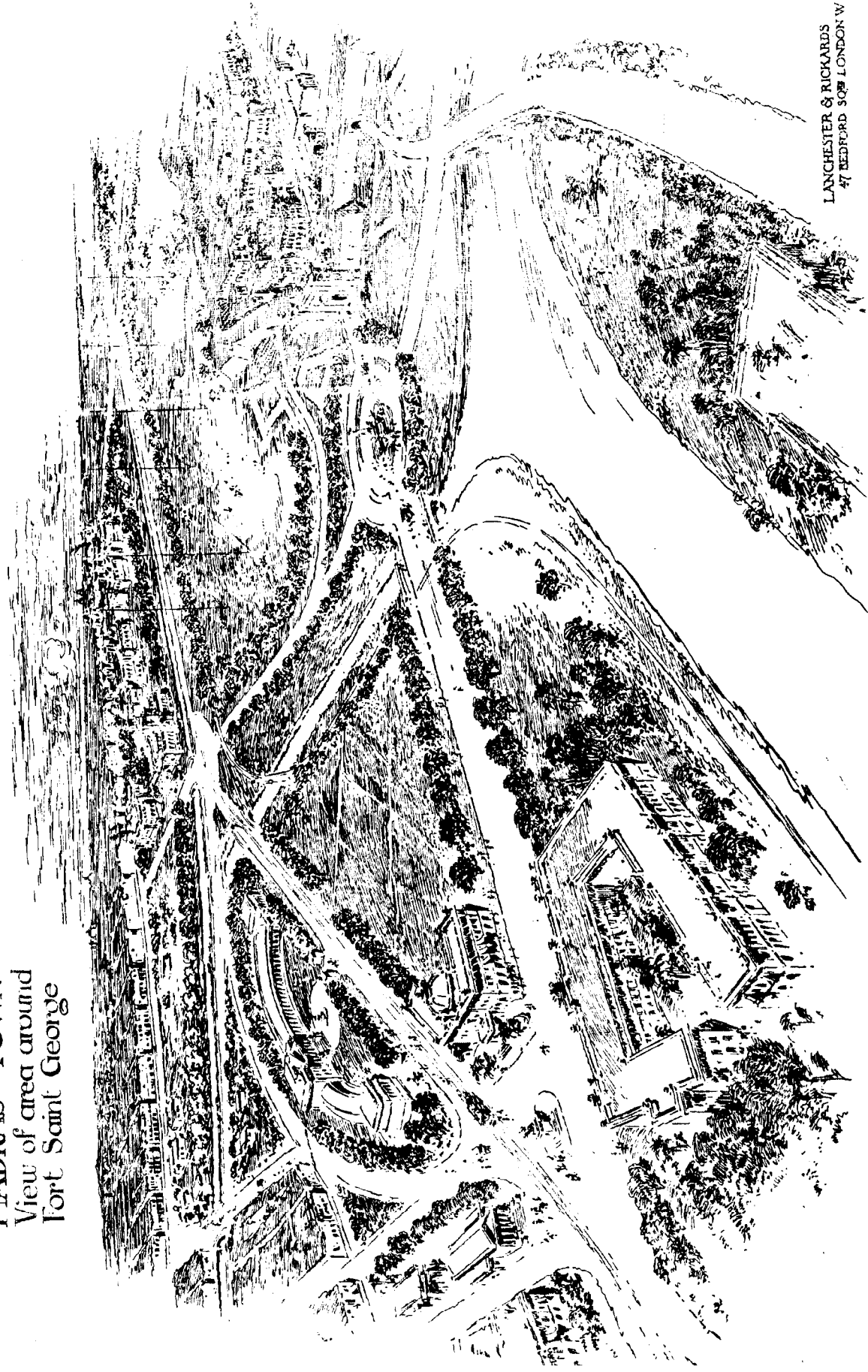
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MADRAS TOWN
View of area around
Fort Saint George



LANCHESTER & RICKARDS
47 BEDFORD SQUARE LONDON W/C



MADRAS TOWN
View from Island looking
towards Banqueting Hall

LANCHESTER & RE KARDJ

REPORT ON MADRAS TOWN

BY H. V. LANCHESTER.

The classification is as under :—

General Topography A	Art J
History and Archaeology B	Environment K
Traffic C	Structural Methods L
Growth and Development D	Hygiene M
Housing E	Economics N
Recreation F	Law and Custom O
Garden Cities and Suburbs G	Administration P
Education H	

Even this list may not be found fully comprehensive and it is quite possible that other groups will need to be added from time to time. We may, however, regard it as a suitable ground-work for our present studies and deal with its sections in detail.

By adopting this international classification we shall assist the general progress of our work, while as the details are only put forward in a tentative form there can be no harm in our reserving the right to simplify and rearrange them, as has been done in the following rendering :—

A (General Topography) includes the preparation of—

1. A geological map.
2. A contoured map.
3. A map showing the nature of the soil.
4. A map showing the original character of the area.
5. Diagrams showing the climate : (a) seasonal temperature, (b) rainfall, (c) prevailing winds, (d) evaporation, etc.
6. Map of water areas : (a) sea and tidal water, (b) rivers with volume, (c) lakes, tanks and reservoirs, (d) levels of ground water.
7. Maps showing the utilization of surface, either natural as forests and wastes, or artificial as buildings, cultivation, etc.
8. Maps showing the sites of mines and allied activities.
9. A map showing areas fully irrigated, partially irrigated, and dry land.
10. Zoological map, distribution of animals.
11. Ethnographical map.
12. Political record with maps.

B (History and Archaeology) : Historical studies should include—

1. A plan showing, by varied tintings or hatchings the extent of the city at various past dates.
2. Plans showing variations in the arrangement and features of the city in the past, such as lines of fortification, water courses, tanks, etc.
3. Notes and diagrams as to periods of stagnation or development with reasons for same.
4. Old maps and views or copies of these should be collected and arranged in order of date.

Reference should be made to those in existing collections.

5. Particulars of popular and religious festivals.
6. Particulars of special customs, ancient and existing, in the locality.

Archaeological studies should include—

7. A map showing the position of all structures, and sites of archaeological interest tinted in accordance with the date to which they belong and numbered for reference.
8. Plans, photographs, and particulars of the structures, and sites numbered above with references to sources from which further information could be obtained.
9. Names of present owner and occupier, details of past and present use, alterations

C (Traffic) deals with traffic statistics, the volume of traffic being shown on plans by the width of the line traced along the routes.

1. Railways : (a) tonnage of goods, (b) number of passengers, fares, and time, by zone maps.
2. Tramways, similarly with fares and time on zone maps.
3. Road vehicles (estimated by units).
Road vehicles should be reduced to a common denomination both on the basis of the degree of obstruction caused and on that of the value of the vehicle with its load.
4. Road pedestrians.
5. Waterways.
6. Notes and drawings should show the construction of roads and other traffic routes.
7. The adequacy or otherwise of existing traffic routes should be dealt with.
8. Special consideration should be given to road intersections and all points where traffic difficulties arise.
9. Illustrated descriptions of bridges classified according to purpose and type of construction. These should also be considered from the aesthetic point of view, especially as to their harmony with the surroundings. (See also section J.)
10. Railway stations and other adjuncts to transport should be similarly dealt with.
11. Vehicles and other plant should be studied in relation to traffic requirements.

D (Growth and Development) comprises the following studies :—

1. Plans of typical cities showing the lines on which they have developed.
2. Plans showing the functional grouping of civic life and the tendencies towards the formation of centres and quarters.
3. Graphic illustrations and maps showing density of population, by hatching or dots, at various times, and in various areas.
4. Plans and diagrams showing how a city has been influenced by considerations of commerce, transit, etc.

E (Housing) deals with dwellings under the following heads :—

1. A plan showing residential areas classified according to type of house.
2. Illustrations showing types of housing referred to in 1, such as (a) block dwellings, (b) terrace, (c) semi-detached, (d) detached houses, further graded as necessary, according to size.
3. A plan showing areas occupied by houses of an undesirable character.
4. Plans showing the zones of distance between residential areas and public institutions as schools, libraries, baths, parks, etc.
5. Plans showing the relative cost of building in various areas.
6. Plans and diagrams showing the cost of the public services, rates, lighting, power, etc., in various areas.
7. Plans and diagrams showing cost of living in various areas.
8. Zone plans showing time taken to reach city centres from residential areas.
9. Zone plans showing cost of transit from these areas to city centre.
10. Studies in social methods, co-operative housing and living, and kindred activities.

F (Recreation) deals with open spaces under the following heads :—

1. Parks, commons, reservations, public recreation grounds, etc., the areas of which should be coloured green on a general plan.
2. Private or semi-private recreation areas shown on plan in a lighter tint of green.
3. Permanent open spaces as cemeteries, reservoirs, etc., not available for recreation, shown in sage green.
4. Waste and unemployed land casually used for recreation, coloured grey.
Origin, history, characteristics, and utilization of these open spaces, as a guide to the principles to be followed in regard to laying out same.
Proportions of population that take part in various exercises or games.
5. Promenades and Avenues.

This section also deals with buildings for recreation and shows on a plan—

- (a) Public buildings for entertainment.
- (b) Libraries.
- (c) Baths.
- (d) Private places of entertainment.

History, character, leading features, accommodation, etc. Diagrams should show graphically the number of visits, annually and seasonally, to 1 to 5.

G (Garden Cities and Suburbs) treats of :—

1. The advantages and disadvantages of this method of development.
2. The financial system on which it may be organized.
3. The planning and organization.
Illustrations may be drawn from examples at present existing.
The suburb and the city should be kept distinct as involving different guiding factors.

H (Education) may commence by showing on plan the following :—

1. (a) Elementary schools (provided) coloured red.
(b) " " (non-provided) coloured brown.
(c) Secondary " coloured orange.
(d) Private schools (non-provided) coloured blue.
(e) Boarding " " green.
(f) University colleges and technical institutes for specialized teaching coloured purple.
2. The plans should be accompanied by statistics graphically expressed as to number of scholars, the areas from which they are drawn, their playgrounds, etc.
3. Diagrams showing the provision of school accommodation relatively to the density of population.
4. Studies in the character of school building, and the accommodation they are designed to afford.
5. Plans, etc., showing educational institutions supplementary to schools as libraries, museums, lecture and concert halls, gymnasiums, etc.
6. Notes as to progress, physique, and circumstances of students.
7. Teaching methods, scholarships, and further studies correlated to other sections.
8. Notes as to subsequent careers of students as related to the education they have received.

J (Art) relates to artistic problems in connexion with civic design—

1. Questions relating to the effect of the city as a whole.
2. Questions of scale, mass, sky-line, solids, and voids, as contributing to general harmony of effect.
3. The relations between the city structure and natural beauty.
4. The embellishment of the city, monuments, accessories, etc.
5. The co-operation of the various arts.
6. The influence of structural methods on artistic expression.
7. Educative influences promoting appreciation of the arts.

K (Environment) is substantially a localized study on the lines of Section A dealing with the protection of all that is best in the natural surroundings of a city—

1. From a social and scientific point of view.
2. From the historical aspect.
3. From the standpoint of beauty.
These cover the considerations with regard to the preservation of typical scenes, buildings, villages, etc.

L (Structural Methods) deals with the influence of materials and constructive traditions on the appearance of the city ; it comprises—

1. Illustrative studies of past and present uses of materials and methods of construction.
2. Economic factors dictating these.
3. Materials used in construction of roads, bridges, etc.
4. Materials used for buildings and their embellishment.
5. Materials employed for accessories, as road and rail vehicles, fittings, etc.

M (Hygiene) deals with the following :—

1. Climatic influences (diagrams).
2. Considerations of site, soil, etc., by plans showing soil, levels, natural drainage, etc.
3. Vital statistics, past and present—
(a) Map showing density of population (see D).
(b) " " death rate.
(c) " " zymotic death rate.
(d) " " infant death rate (per 1,000 born).
(e) " " birth rate.
(f) " " areas specially affected by epidemics.

In each case an average of five years may be taken, and the city may be subdivided.

M (Hygiene) etc.—*cont.*

4. Diagrams illustrating physique.
5. " showing proportions of misdemeanour and crime.
6. Provision of infirmaries, hospitals, prisons, etc., shown on plans with accommodation in proportion to population served—

For the infirm.	For epidemics.
For disease.	For criminals.
For mental deficiencies.	
7. Diagrams showing cubic amount of building and heights of buildings in relation to health.
8. Building regulations and their effect on health.
9. Sanitation, sewerage, and scavenging.
10. Condition of buildings.
11. Disposal of the dead, cemeteries and crematoriums.
12. Other services affecting health.

N (Economics). This section appears, somewhat inadvisedly, to have been limited to communal activities: it should obviously have a more extended scope, comprising the following—illustrated by plans and diagrams:—

1. Industries of city and district—

(a) Large factories.	(c) Home industries.
(b) Small factories.	
 2. Transport—

(a) Import and distribution.	(c) Personal locomotion.
(b) Collection and export.	
 3. Wages in relation to housing and purchasing power.
 4. Public accommodation and services.
 5. Land cultivation.
 6. Comparative studies of decaying and expanding industries.
 7. Seasonal and intermittent employment.
 8. Diagram of unemployment in trades by the week and year.
 9. Methods of financial control.
 10. The value of land in various zones or areas.
- O (Law and Custom) deals with—
1. General regulations for towns.
 2. Rules for Town Planning.
 3. The relation between the laws of the land and local enactments.
 4. The laws relating to the protection of—

(a) Historic monuments.	(c) Open spaces and rights of way.
(b) Natural objects, flora and fauna.	(d) Health and conditions of labour.
 5. Conditions of public employment.
 6. Systems of franchise.
 7. Religion and religious observances.
 8. General and local customs and habits of life.

P (Administration) deals with the methods of control employed in respect to communal services:—

1. The governing bodies for—

(a) The municipal services.	(e) Other official services.
(b) The judicial ..	(f) Regulation of commerce.
(c) Hygienic ..	(g) Religious and philanthropic bodies.
(d) Educational ..	

Including the methods of appointment to these, whether they are compulsory or voluntary, etc.
2. Cost of various administrative services and how these costs are met.

CHAPTER I.

MADRAS CITY.

The consideration of a city should begin with just a little historical sketch. Of course, it must in this case be a very slight sketch indeed, a real historical study of Madras requiring a volume to itself, so that we will only deal with the events which have dictated the structure of the city. We cannot consider the great notabilities of Madras, the eminent people who have taken an active part in its life; we can review only the things that have affected its actual mass and form. In such a study as this, one would naturally begin with San Thomé by far the oldest part of the great agglomeration of towns and villages now included within the municipal limits of Madras, but it is not here possible to review the interesting history of this place. Such an investigation would, by itself, form material for a discourse; and we will therefore pass at once to the period when the first East India Company founded Fort St. George.

Francis Day obtained in 1639 a grant of land here from the Naik Darmarla Venkatadri and the first fort was begun on 1st March 1640, nearly square, 100 yards north to south and 100 east to west. In 1714 it became Fort Square.

Madraspatam was adjacent on the north, that is to say, it occupied the northern portion of the present fort, the area around this, and possibly extended to where the railway station is now located. The rivers Elambore and Cooum ran round this place and entered the sea about half a mile to the south. A little cut was made between these two rivers near where the present General Hospital stands. This cut was referred to as existing in 1696, so that its formation was quite an early episode in the history of the town. Then gradually, Madras increased in importance, owing to the decline of San Thomé, which was occupied by the French in 1672 and by the Dutch in 1674 and, after that, was demolished as a fort. Many of the Portuguese moved into Madras, and San Thomé was reduced to a suburb of the much more important Fort St. George and its surroundings. Triplicane was taken into the Company's estates in the year 1658 and grew from that time onwards as another suburb of Madras. Its growth naturally developed from the temple in the centre and was influenced by the proximity of the Nawab's palace. In 1693 Tondiarpet, Purasawalkam and Egmore were taken over by the Company. In 1700 the European quarter of Fort St. George had begun to be surrounded by gardens. We know that this was the case, because the clearance of these gardens was ordered for safety in order that the fort might not be approached without those likely to attack it being liable to observation. At this time the fort and the town of Madraspatam were still contiguous and they were regarded as White Town and Black Town afterwards becoming one combined city.

About 1705 under Governor Pitt the island was embanked and planted. The planting was not that now existing but was a formal layout of quite another pattern.

A short extract from the Council reports is of interest on the point of early Town-Planning.

In 1707 the Madras weavers, who, in the exercise of their industry, had purchased Mrs. Heathfield's garden at the junction of Washing street, petitioned for certain concessions:—"Here being some Beteelas weavers who have petitioned for leave to build houses and conveniences in order to carry on their trade . . . , but desire to be exempted from all manner of taxes for three years, which is agreed to be granted them. And whereas they have bought Mrs. Heathfield's garden for that purpose, it's ordered that the Gunner lays out the ground, and sees that they build regularly; and that the Secretary accordingly draw them out a cowl."

We do not know if the Gunner went out with a type-design in his pocket. At all events we see they began to build regularly.

Madras at about this date was described by Thomas Salmon as follows—his description is so very graphic as to be well worth quoting:—

"*White Town.*—The fort stands pretty near the middle of the White Town where the Europeans inhabit. This is an oblong square about quarter of a mile in length, but not half so much in breadth. To the northward of the fort are three straight handsome streets, and as many to the south. The buildings are of brick, several of the houses two storeys high, by which I mean they have one floor above the ground floor. Their roofs are flat and covered with a plaister made of sea shells, which no rain can penetrate; and, being secured with battlements, they take the fresh upon them morning and evening. The walls of these houses are very thick, and the rooms lofty; but what seems peculiar to this country is, the upper floors are laid with bricks instead of boards; but there are not many of these lofty houses, and I question whether there be more than a hundred and twenty houses in the whole White Town. By the dimensions I have given of this place, it may be very well concluded there are no gardens or very large courtyards before their houses; and indeed they stand pretty close to the street; but the Governor and people of condition have gardens at a little distance from the town. Over against the west gate of the fort is a barrack, or rather one long room where all the Company's soldiers are obliged to lodge when they are off-guard; and adjoining to it on the north is a very commodious hospital where they are taken care of when they are sick. At the other end of the Soldier's barrack is a mint where the Company coin gold and silver.

"*Black Town.*—To the northward, adjoining the White Town, a much larger, called the Black Town, where the Portuguese, Indians, Armenians and a great variety of other people inhabit. This is built in the form of a square, and is better than a mile and a half in circumference, being surrounded with a brick wall seventeen feet thick, with bastions at proper distances after the modern way of fortification: it has also a river on the west and the sea on the east; and to the northward a canal is cut from the river to the sea, which serves for a moat on that side; so that Madras,

considering where it stands, might now be reckoned a town of strength if the garrison was answerable to the fortifications; but it consists of no more than three companies of fourscore or a hundred men each, and one-third of these Topazes or Portuguese Indians. The Company indeed entertain two or three hundred of native blacks in their service, and a body of men may be formed out of the inhabitants, who are very numerous; but these would be of little service against an European enemy, or even against the Mogul's troops if there was occasion for them beyond their own walls. The streets of the Black Town are wide, and trees planted in some of them; and having the sea on one side and a river on the other, there are few towns so pleasantly situated or are better supplied; but except some few brick houses the rest are miserable cottages, built with clay and thatched, and not so much as a window to be seen on the outside, or any furniture within, except the mats and carpets they lie on. The houses of the better sort of Madras are of the same materials, and built usually in one form, that is, with a little square in the middle, from whence they receive all their light . . . but I must say, notwithstanding all this appearance of poverty, I never was in a place where wealth abounded more, or where ready money was more plentiful twenty years ago . . . In this Black Town stands an Armenian church and several little pagodas or Indian temples; to the latter belong abundance of female choristers or singing women, as well as priests . . . They seem also designed to serve the public in another capacity, and make up part of the equipage of a great man when he goes abroad; for every man of figure in the country I observed, had a number of these singing women run before him; even the Governor of Fort St. George was attended by fifty of them, as well as by the country musick when he went out; but some of our late Governors, out of their excessive modesty, have thought fit to dispense with this piece of grandeur.

"Beyond the Black Town are gardens for half a mile together, planted with mangoes, cocoanuts, guavaes, orange trees, etc., where everybody has the liberty of walking, and may purchase the most delicious fruits for a trifle; but I shall give a plan of the place, from whence the reader will have a juster notion of this noble settlement than he can possibly receive from the best descriptions."

We may add a few sentences from the account by Charles Lockyer:—

"The Prospect it gives at sea is most delightful; nor appears it less magnificent by land. The great variety of fine buildings that gracefully overlook its walls affording an inexpressible satisfaction to a curious eye. Towards the land 'tis washed by a fruitful river that every November, half a mile distant, discharges itself into the sea; the Bar being first cut for its passage, which, proceeding from the west monsoon, would otherwise occasion great damage by overflowing the adjacent country. It runs about two months in a year, closes of itself, and forms a Peninsula three miles in circuit, where are kept a great number of sheep and hogs, with a few cows. The soil is so poor, tho' the Company has not spared charges to improve it, that the cattle would starve did not other meat support them.

About 1705 under Governor Pitt the island was embanked and planted. The planting was not that now existing but was a formal layout of quite another pattern.

A short extract from the Council reports is of interest on the point of early Town-Planning.

In 1707 the Madras weavers, who, in the exercise of their industry, had purchased Mrs. Heathfield's garden at the junction of Washing street, petitioned for certain concessions:—"Here being some Beteelas weavers who have petitioned for leave to build houses and conveniences in order to carry on their trade . . . , but desire to be exempted from all manner of taxes for three years, which is agreed to be granted them. And whereas they have bought Mrs. Heathfield's garden for that purpose, it's ordered that the Gunner lays out the ground, and sees that they build regularly; and that the Secretary accordingly draw them out a cowle."

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Madras at about this date was described by Thomas Salmon as follows—his description is so very graphic as to be well worth quoting:—

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Madras at about this date was described by Thomas Salmon as follows—his description is so very graphic as to be well worth quoting :—

"*White Town.*—The fort stands pretty near the middle of the White Town where the Europeans inhabit. This is an oblong square about quarter of a mile in length, but not half so much in breadth. To the northward of the fort are three straight handsome streets, and as many to the south. The buildings are of brick, several of the houses two storeys high, by which I mean they have one floor above the ground floor. Their roofs are flat and covered with a plaister made of sea shells, which no rain can penetrate ; and, being secured with battlements, they take the fresh upon them morning and evening. The walls of these houses are very thick, and the rooms lofty ; but what seems peculiar to this country is, the upper floors are laid with bricks instead of boards ; but there are not many of these lofty houses, and I question whether there be more than a hundred and twenty houses in the whole White Town. By the dimensions I have given of this place, it may be very well concluded there are no gardens or very large courtyards before their houses ; and indeed they stand pretty close to the street ; but the Governor and people of condition have gardens at a little distance from the town. Over against the west gate of the fort is a barrack, or rather one long room where all the Company's soldiers are obliged to lodge when they are off-guard ; and adjoining to it on the north is a very commodious hospital where they are taken care of when they are sick. At the other end of the Soldier's barrack is a mint where the Company coin gold and silver.

"*Black Town.*—To the northward, adjoining the White Town, a much larger, called the Black Town, where the Portuguese, Indians, Armenians and a great variety of other people inhabit. This is built in the form of a square, and is better than a mile and a half in circumference, being surrounded with a brick wall seventeen feet thick, with bastions at proper distances after the modern way of fortification : it has also a river on the west and the sea on the east ; and to the northward a canal is cut from the river to the sea, which serves for a moat on that side ; so that Madras,

considering where it stands, might now be reckoned a town of strength if the garrison was answerable to the fortifications ; but it consists of no more than three companies of fourscore or a hundred men each, and one-third of these Topazes or Portuguese Indians. The Company indeed entertain two or three hundred of native blacks in their service, and a body of men may be formed out of the inhabitants, who are very numerous ; but these would be of little service against an European enemy, or even against the Mogul's troops if there was occasion for them beyond their own walls. The streets of the Black Town are wide, and trees planted in some of them ; and having the sea on one side and a river on the other, there are few towns so pleasantly situated or are better supplied ; but except some few brick houses the rest are miserable cottages, built with clay and thatched, and not so much as a window to be seen on the outside, or any furniture within, except the mats and carpets they lye on. The houses of the better sort of Madras are of the same materials, and built usually in one form, that is, with a little square in the middle, from whence they receive all their light . . . but I must say, notwithstanding all this appearance of poverty, I never was in a place where wealth abounded more, or where ready money was more plentiful twenty years ago . . . In this Black Town stands an Armenian church and several little pagodas or Indian temples ; to the latter belong abundance of female choristers or singing women, as well as priests . . . They seem also designed to serve the public in another capacity, and make up part of the equipage of a great man when he goes abroad ; for every man of figure in the country I observed, had a number of these singing women run before him ; even the Governor of Fort St. George was attended by fifty of them, as well as by the country musick when he went out ; but some of our late Governors, out of their excessive modesty, have thought fit to dispense with this piece of grandeur.

"Beyond the Black Town are gardens for half a mile together, planted with mangoes, cocoanuts, guavaes, orange trees, etc., where everybody has the liberty of walking, and may purchase the most delicious fruits for a trifle ; but I shall give a plan of the place, from whence the reader will have a juster notion of this noble settlement than he can possibly receive from the best descriptions."

We may add a few sentences from the account by Charles Lockyer :—

"The Prospect it gives at sea is most delightful ; nor appears it less magnificent by land. The great variety of fine buildings that gracefully overlook its walls affording an inexpressible satisfaction to a curious eye. Towards the land 'tis washed by a fruitful river that every November, half a mile distant, discharges itself into the sea ; the Bar being first cut for its passage, which, proceeding from the west monsoon, would otherwise occasion great damage by overflowing the adjacent country. It runs about two months in a year, closes of itself, and forms a Peninsula three miles in circuit, where are kept a great number of sheep and hogs, with a few cows. The soil is so poor, tho' the Company has not spared charges to improve it, that the cattle would starve did not other meat support them.

"The streets are straight and wide, paved with brick on each side ; but the middle is deep sand for carts to pass in. Where no houses are, causeways with trees on each side supply the defect ; these being always green render it pleasant to those who otherwise must walk in the sun."

It was about this time Governor Pitt's map was made.

(In October 1734 Chintadripetta was founded as a colony to develop the supply of calico.

"None but spinners weavers painters washers dyers with priests and attendants for the temple will be admitted to the new village, to be called Chintadri Pettah."

The declaration of war by France in March 1744 made the strengthening of the fort an urgent matter. Joseph Smith was brought from Bombay and his plans were sent home on 31st January 1746.

Smith's design for the west front consisted of three new faces, each about 200 yards in length, fronting roughly north-west, west and south-west with as many large bastions. The northernmost bastion was 200 yards from Mint Point, and the southernmost was on the river-bank opposite Charles Point. The whole constituted a line convex towards the west. It was covered by a wet ditch of considerable width, which was intended to carry the water of the river when the original bed had been filled up. At the time of the French attack in September, only the ditch with its escarp and counterscarp walls had been finished ; but the original design was eventually completed after the rendition of Madras in 1749 and before Lally's siege of Madras in 1759.

Activity on the fort from 1770 onward led up to its completion about 1783 in almost its present form except that the southern outworks have been levelled. At the time of the attack and capture by the French, September 1746, and during their occupation, Black Town was levelled to a distance of 400 yards from the fort.

Other clearances north and west of Black Town were afterwards made in anticipation of a Mahratta raid.

Black Town appears to have crept back somewhat, as houses worth pagodas 180,000 were destroyed in the preparation for the French siege in 1758. Later on it was found that land in Black Town was being ingeniously acquired by various tricks and it was decided in 1779 to sell what remained by auction. There was an unoccupied strip down the slight valley termed 'Uttopollam' between Muttialpetta and Peddannaiguetta. An auction was proposed but ultimately an offer by Mr. Stephen Popham was accepted and he afterwards purchased more and laid out a drainage channel. Popham's Broadway runs through the centre of this area.

A strip of ground facing what is now Front Line beach was dealt with about the same time.

The fear of an attack by Hyder Ali resulted in the removal in 1780 of houses and the slight elevation called Hog Hill where the northern portion of the Ordnance Lines now stands.

(The first water-supply to Madras was initiated in 1771 and completed in 1783.)

Lieutenant-Colonel Love's Book on Madras from which most of these notes have been obtained, mentions 'the acquisition by Company's servants of building ground in Egmore and Vepery.' Triplicane, however, was now the favourite suburb, and the map of 1755 shows that several substantial residences bordered the Mount Road near the Government Garden House, which occupied the site of the present Banqueting Hall. How far they extended along this road is uncertain but the most remote building of which mention is made was the house of Doctor Turning. This appears to have been situated on the south side of the Triplicane river, a little above the site of the existing Harris Bridge.

After the siege of Madras, the region which was known as the Choultry Plain was regarded as an eligible locality ; but one or two pioneers discovered the advantages before the French attack was delivered. In Orme's time the Plain embraced the area, to the south of the Triplicane river, which lay between the Triplicane, San Thomé road on the east and the Long Tank on the west.

Quoting from a Fort St. George Consultation,—August 1772 :—In reference to these extensions we read as follows :—

"The board confess themselves much embarrassed in respect to the requests for grants of ground. If they grant to one, why not to another ? Rank in the service cannot be admitted as a determinate line, and where shall we stop, for the applications that have poured in upon us since the receipt of the Company's commands leaving such grants to our discretion give us just cause to apprehend that there will soon be no ground to grant, and thus indeed that embarrassment will cure itself, but it is not fit that all the ground in the environs should thus be given out of the Company's power. The President therefore takes the opportunity of the application now made by one to whom he has been thought partial to put his negative upon his request, as an example that he will do so to every application which shall not be supported with uncontrovertible reasons ; and the board unanimously acquiesce."

Mount Road was widened and remade in 1796. Other roads followed and the fine suburban avenues of Madras belong mainly to the first half of the nineteenth century.

At the same period Madras possessed an exceptionally able architect in De Haviland, the Engineer. His works, the Cathedral, St. Andrews Church, and other buildings show both scholarship and imaginative vigour.

The formation of the Buckingham Canal is the only other development that need be noticed until we come to the railway era.

We cannot consider that Madras has been particularly fortunate in her railway system. Like many another city, the railways have been introduced with insufficient consideration of other interests, and the absence of any appreciable variation in level discouraged the provision of bridges. It was obviously impossible that the lines should be at a lower level than the roads and the cost of forming them at a higher one was probably regarded as prohibitive, so that the only alternative were level crossings or costly overbridges.

Possibly the greatest disaster that has ever befallen Madras was the alignment of the South Indian Railway right across the middle of the city. One can only hope that at some time in the future it may be possible to remove this and substitute a connexion northward joining up with the broad-gauge system.

The story of Madras harbour and its vicissitudes is too recent to need comment here.

It is unnecessary to indulge in a panegyric on the beauties of Madras. They are many and are not always fully appreciated by the majority of its inhabitants. If they were, there would be fewer signs of the neglect that we see only too often.

The critic need not be afraid of making adverse comments provided he offers no criticism without pointing out a means of providing a remedy.

Madras strikes one from the very first less as a fine city than as a city possessing the most exceptional possibilities. A fine city has many features that Madras lacks but few cities on the scale and with the resources of this one could hope to effect so much in the way of beautification.

Many opportunities have been missed in the past but, while with most cities such lapses would be irretrievable, here they do not fortunately preclude the adoption of a remedial programme for the future.

Passing from this general sketch and before considering the measures most desirable it may be well to take up in more detail the consideration of our subject, proceeding by a subdivision of the governing conditions under the various headings set forth in pages 1 to 4 supra. By this course a double purpose is served. We not only analyse the influences which have to be taken account of but also illustrate in a condensed form the practical working of the civic survey as applied to a particular case, in this instance one of more than ordinary complexity.

A great deal of most valuable work in the direction of investigating the conditions in Madras Town has been done by Messrs. J. Chartres Molony, I.C.S., Alfred Chatterton, James R. Coats, and others, whose reports on various aspects are invaluable for the purpose of realizing the nature of the problems before us. Under the appropriate sections quotations from these reports are included, but it should be understood that these represent only a small fraction of a vast amount of work, nearly all of which is of a character justifying its inclusion in a comprehensive civic survey.

Commencing with—

A.—The Topography.

(1, 2 and 3) Madras Town (Long. $80\frac{1}{2}^{\circ}$ E., Lat. 13° N.) is not markedly influenced by variety in geological conditions. The variations in level are slight (see map M. I) ranging only from 27 feet to 48 feet above datum. The soil is a red loam, with stretches of sand towards the coast, along which there is a considerable body of sea sand travelling from south to north. This travel having been interrupted by the harbour, which acts

as huge groyne, there is now continuous accretion to the south and denudation to the north of this point.

As illustrating this action the following extract from the Port Trust Report, 1913-14, may be quoted:—

"Owing, possibly to the large quantities of sand removed from the foreshore for construction purposes, the low-water line of the south sand accretion has not varied much during the past four years; but below water, to the east of the harbour arm, the sand continues to accumulate. Since the closing of the old entrance in 1910, the 4, 5 and 6-fathom contour lines have moved seawards about 100 or 125 feet; and where, 100 feet east of the old entrance, there was 31 to 32 feet of water in 1910 there is now only 17 feet. The 6-fathom line has advanced northward to a point 800 feet from the head of the sheltering arm, an advance of 600 feet in four years. Hitherto the removal of thirty to forty thousand tons of sand annually from under the lee of the sheltering arm has sufficed to maintain the depth in the fairway, but as soon as the 6-fathom line shall have reached the head of the arm, dredging operations on a more extended scale will be necessary—unless, in the meantime, steps be taken to cut off the supply of the north-moving sand, probably by the lengthening, eastwards, of the existing south arm of the harbour."

(4) There seems little doubt that most of the area occupied by Madras was originally cultivated, principally with cocoanut palms and paddy fields, the usual form of irrigation being employed, i.e., large shallow tanks with their collecting areas and from them distributing channels serving the area below the tank level up to the point at which the collecting area for the next tank commenced. Many of these tanks still remain around the city though but little used for the purposes of cultivation.

(5 and 6) The climate of Madras is fairly equable, though somewhat humid, the summer heat being frequently tempered by a cool breeze from the south-east. The rainfall, of about 40 inches, occurs mainly during the months of November and December, and it is only following this that the rivers Cooum and Adyar discharge any volume of water into the sea; for the rest of the year the entrances are closed and the waters stagnant. Owing to the humidity, evaporation is less than in drier parts of India.

It will be seen by the contour map (M. I) that the Cooum drains but a small portion of the town area, which was originally organized to retain and utilize almost all the water falling on it. Now that this system of tanks and irrigation has lapsed, water often accumulates in undesirable places.

As may be imagined the ground water is nowhere very far down, even in the dry season, while during the rains it practically coincides with the surface level over a large proportion of the town area.

(7) Under this head the point chiefly noticeable is the large proportion of unutilized land in the Madras Town area. Apart from the central open spaces which have their value in respect of the congested districts around them, there are also stretches of ground that have ceased

to be used owing to the abandonment of irrigation, but have not been rendered suitable for building sites or gardens, owing to the lack of provision for the disposal of surface water.

The tanks themselves form a large proportion of this area, and in addition there are extensive compounds of which but little use is made and which are only needed as a protection to the houses they surround against undesirable developments that should be dealt with under a town-planning scheme.

Under heading (11) may be included the following statistics prepared by Mr. J. C. Molony in connexion with the census of 1911, for the purpose of showing the proportions classified by religion in the various divisions. It will be of interest to compare this with map No. M. II, which gives approximately the positions occupied by Hindus, Mussalmans, Eurasians and Europeans. Further statistics quoted were prepared to show the proportions of the sexes in racial subdivisions and incidentally give an idea of the ethnographical components of the population of Madras :—

Division.	Popula- tion.	Hindus.	Mussal- mans.	Christians	Others.
I	20,318	13,976	1,015	5,271	56
II	40,635	36,276	3,196	1,151	12
III	15,120	12,502	2,193	327	98
IV	14,564	9,199	4,771	540	54
V	19,179	15,477	965	2,672	65
VI	22,473	15,951	4,087	2,421	14
VII	37,065	33,769	1,357	1,891	48
VIII	28,585	27,625	338	90	482
IX	20,937	19,634	276	962	65
X	24,979	18,981	5,139	815	44
XI	41,523	36,638	643	4,176	66
XII	29,776	22,629	1,798	5,144	205
XIII	23,717	17,399	2,053	4,176	89
XIV	11,751	10,105	270	1,372	4
XV	15,180	11,589	1,384	2,141	66
XVI	26,752	23,023	1,324	2,356	49
XVII	38,643	23,215	14,334	483	11
XVIII	32,851	24,738	7,490	572	51
XIX	34,358	26,006	5,274	2,806	272
XX	20,254	17,178	612	2,446	18
Total	518,660	415,910	59,169	41,812	1,769

CASTE, RACE AND RELIGION IN MADRAS TOWN.

Dealing with Hindus, we get the following figures :—

Caste according to linguistic division.	1901.			1911.		
	Males.	Females.	Total.	Males.	Females.	Total.
Tamil	149,364	147,996	297,360	149,852	143,313	293,165
Telugu	48,123	47,564	95,687	49,757	47,909	97,666
Malayalam	573	100	673	1,270	218	1,488
Kannarese	1,229	949	2,178	1,967	1,504	3,471
Uriya	73	119	192	86	24	110
Other Madras	7,260	6,151	13,411	10,309	8,903	19,212
Other Foreign	593	435	1,028	296	214	510
Not stated	71	48	119	194	94	288
Total	207,286	203,362	410,648	213,731	202,179	415,910

“Now the first point that strikes us in these figures, is the fact that, while Hindus show an increase of 5,262, this figure is reached by a

decrease of 4,195 in the Tamil castes, and an increase of 9,457 elsewhere. Furthermore the decrease in Tamil castes is entirely on the female side : men have increased by 488, while women have decreased by 4,683. The disproportion between the sexes of the Tamil castes, which in 1901 was 1,368, has now risen to 6,539 : and this to a large extent accounts for a sex disparity of 11,552 in the Hindu population, and one of 14,270 in the total population of the city.

“It is not on the whole surprising that this sex disparity should be found in castes other than Tamil ; such are immigrants to the city, and may be expected to leave their women folk behind them ; thus an increasing disparity may be accounted for by increasing immigration. But that this disparity should be on the increase among the Tamils in their own chief city is certainly curious.

“As regards Muhammadans and Christians no question appears to arise.

“Those classified as others (Jew, Buddhist, Parsi, etc.) show a decided increase from a total of 404 (male 272, female 132) in 1901 to 1,769 (male 1,168, female 601) in 1911. As a reason therefor we may assign the presence of some Buddhist missionaries in the city, and an increased immigration of Parsis. The sex ratio of the city has been influenced somewhat by these figures. There is in women a natural slowness to change an ancient faith (on the side of Buddhist conversion) and a natural tendency for immigrants to leave their women folk behind.”

These racial differences are not so specifically located as to be capable of more than general definition on a map (see Map II), though in some parts of the town it might be possible to prepare to a large scale a map showing such locations in more detail.

Reference has not been made to headings 8, 9, 10 and 12, but these might of course be of use in the preparation of a fuller study of Madras, going back to earlier times, as would be usual in the case of places of greater antiquity.

B.—History and Archaeology.

This section has been partially dealt with in the introductory remarks, but these may be supplemented by further details as classified under headings 2, 3, 4, 5 and 6 which would add value to a comprehensive study though beyond the scope of an outline one such as this. As regards 7, 8 and 9, the main feature of Madras is Fort St. George, which has always formed the focus of the town, points of subsidiary interest being found in San Thomé, Chempauk, and the principal temples, mosques and churches. The general defences of the fort may well be preserved, as, though their military value is slight, little is to be gained by their destruction and the loss of traditional continuity would be great. A complete review of all the features of historic and archaeological interest, though not necessary here, would form an essential part of a complete survey of Madras.

C.—Traffic.

That the traffic problems are less acute than in most cities of equal size, is due to the fact that Madras as a whole is spread over a wide area with large open spaces between its congested districts. In these districts

themselves there will be found a certain amount of traffic congestion while the road facilities need amendment with a view to avoiding delays and the provision of more direct routes from point to point.

(1) The railway system of Madras is still developing, but the development is being considered without regard to the other requirements. The main object at the moment is the improvement of the lines of access to the harbour in order to give increased carrying power for goods. There is in addition a growing suburban traffic which only needs encouragement to exercise a beneficial influence in relieving the housing congestion in the central districts.

(2) It is recognized that the tramway system is also ripe for extension and that the routes may profitably be lengthened in several directions. This question must naturally be considered in conjunction with (3) and (4) as it is desirable that some degree of classification should be made with regard to the roads reserving some for fast traffic, to most of which trams can be admitted, while those most used for heavy and slow traffic should be kept as distinct as possible from the first named.

Footpaths are not very general in Madras; were they provided on the main roads pedestrians would soon become accustomed to using them and a great source of obstruction to traffic would be removed.

A detailed traffic census on the main lines of route in Madras would be of value, but there are certain areas where improvement or diversion is obviously required, namely, Georgetown, Chintadripet and Triplicane, while some of the numerous level crossings cause at times considerable obstruction and delay.

(5) Waterways are represented by the lower reaches of the river Cooum and the Buckingham Canal which passes right through the town from north to south. Comparatively little use is made of this means of transport, and it may be assumed that this is to some extent due to the fact that there is no connexion between these waterways and the harbour. Should it be practicable to extend the system of waterways such a course would help to solve the problem of storm water disposal, which is unusually difficult owing to the very slight variations of level.

(6, 7 and 8) The construction of roads, their adequacy, intersections, etc., afford opportunities for more detailed study.

(9 and 10) The treatment of bridges, railway stations, etc., introduce matters of special importance in the improvement of Madras.

(11) Public vehicles and kindred matters may be passed over at this stage.

D.—Growth and Development.

(1) The growth of Madras has taken place under conditions so abnormal that comparison with other cities is of less value than in most cases. The area within the present boundary includes no less than three distinct towns, namely, Georgetown, Triplicane with Chintadripet and San Thomé, while numerous other villages are distributed around these according as land was found suitable or available for building purposes. To the west and south the remainder of the ground is mainly occupied by large houses

and their compounds. To the north and north-west will be found the larger factories, while the unoccupied land is either cultivated or unused.

(2) These circumstances have resulted in the formation of a number of subsidiary centres, in many cases too accidental to be mutually convenient. While retail trade can accommodate itself to subdivision, the administrative and commercial functions of a large city demand more organization as to locality than is at present to be found. A reference to the plan of Madras will show that the Government and administrative buildings are widely scattered, while the commercial centre around the harbour lacks good communications with the districts where many of those engaged there reside. Map M. III shows the widely distributed quarters where various occupations are carried on.

(3 and 4) Map M. IV shows the relative density of population and indicates very clearly how congestion is due less to scarcity of land than to failures in providing for an ordered city growth. Immediately to the west of overcrowded Georgetown is an area but little occupied owing to its having been cut off by the railway and the Buckingham Canal, which have at the same time put difficulties in the way of adequate surface drainage. In other directions want of good access has militated against the natural development of suitable sites, while the lack of powers for the allocation of areas for special classes of development has caused the holding up of land as a barrier against extensions regarded as undesirable.

The following extracts from the report on the 1911 census give some idea of the distribution and movement of the population:—

Division of Madras.	Persons.			Division of Madras.	Persons.		
	1911.	1901.	1891.		1911.	1901.	1891.
I	20,318	21,190	21,705	XII	29,776	26,960	24,499
II	40,635	46,512	36,984	XIII	23,717	21,954	18,084
III	15,120	16,454	13,086	XIV	11,751	9,546	8,880
IV	14,564	*17,856	12,017	XV	15,180	14,297	12,710
V	19,179	*17,557	20,409	XVI	26,752	28,624	22,823
VI	22,473	26,550	27,031	XVII	38,643	35,779	29,970
VII	37,065	38,403	36,287	XVIII	32,851	31,451	28,495
VIII	28,585	28,668	26,462	XIX	34,358	36,114	26,057
IX	20,937	22,304	21,636	XX	20,254	16,798	15,052
X	24,979	23,223	17,488	Miscellaneous.	...	...	1,878
XI	41,523	37,106	30,965	Total ...	518,660	509,346	452,518

* Figures doubtful.

The movement of population in the City of Madras for the past forty years can be seen thus—

1871	...	...	...	...	...	...	397,552
1881	...	...	...	...	...	...	405,848
1891	...	...	...	...	...	...	452,518
1901	...	...	...	...	...	...	509,346
1911	...	...	...	...	...	...	518,660

The decennial increase has been—

	Absolute.	Per cent.
1871-81	8,296	2'1
1881-91	46,670	11'5
1891-01	56,828	12'6
1901-11	9,314	1'8

"Thus the increase, absolute and proportional, for the past decade is immeasurably below that of the preceding two decades. Although the absolute increase is slightly greater than that of the decade of 1871-81, in which occurred the great famine of 1877, the percentage increase is lower.

"It cannot be denied that these results have to a large extent falsified expectations.

"I think then we must look for explanation in what I shall call 'mechanical' or 'natural' causes.

"By 'mechanical' causes I understand removal of large defined bodies of men from city limits, cessation of large industries, or completion of large temporary works, removal of people to suburbs outside the city area, emigration and immigration, by 'natural' a diminishing fecundity of the people.

"The Gun Carriage Factory in Poonamallee Road, which at the census of 1901 was employing some thousands of hands, had been closed down by the census time of 1911. There has been a total increase of 6,013 in certain residential quarters outside the city municipal limits.

"No doubt all these causes may have contributed to the detriment of increase in the city. Yet even if we suppose their value to have been 15,000 in the decade, and add such number to the actual ascertained increase, we only get a total increase of 24,314 (or 4.8 per cent), which still contrasts very unfavourably with the figures of the two preceding decades.

"Figures seem to indicate that between 1891 and 1901 it was becoming increasingly worth a man's while, if he was born in Madras, to remain there, while for the decade 1901-11 the conditions seem to have been reversed. Women born in the city seem to be leaving it in increasing numbers: possibly owing to the rate for sons-in-law ruling lower in the mufassal than in the city; possibly because for caste and other social reasons the daughters of immigrants are given away in marriage at their ancestral homes.

"Immigration figures show that the city is losing its attractiveness. An increase of 12,720 immigrants between 1901 and 1911 compare poorly with one of 33,415 between 1891 and 1901.

"But it is very questionable whether this drying up of the stream of immigration to the city is any cause for lamentation. It may be a sign, and I think it is a sign, that industry is spreading surely, if slowly, throughout the Presidency, instead of being confined to its capital town; that the labourer is growing more assured of a decent life in his own home-land, and more distasteful of the huddled dreariness of the city of slums.

"Finally we may glance at the question of extra-Indian emigration. For Burma, where, I am informed by Dr. Nayar, mills are run well nigh entirely by Madras labour, 1,200,000 left the Presidency in the decade 1901-11. Of these some 325,000 sailed from the Port of Madras. Less than one million have returned in the same period, the nett loss to the Presidency being over 270,000. It is but fair to assume that a certain

proportion of these emigrants were inhabitants of the city, while many more from outside districts, had they not gone to Burma, would have drifted into Madras."

The proper complement to these and further statistics would be a map showing the extent of the town at various dates. The exceptional variations in density and types of land occupation would, however, in this case render such a map quite illusory in effect. For many decades the increase has been confined to areas very small relatively to the whole of the occupied districts.

E.—Housing.

(1) Almost every grade of house may be found in Madras beginning at the huts of the fisher village and the parachcheri and rising stage by stage to the mansion in its own park.

One of the chief difficulties lies in the fact that every class of house is wanted everywhere, and though in all districts likely to be closely built on, kutchra building cannot be permitted, it will be long before all the inhabitants of the town will be able to afford solidly built houses. The present kutchra villages will have to remain for some time to come, and where they are isolated, drained, and their buildings not too closely compacted together, no great practical harm should ensue, little as one would desire to see these developments as part of an important city (see Map M. IX).

The types of house most lacking are the good small house and the small bungalow with a limited amount of garden. There is at present a tendency towards the subdivision of large compounds which may facilitate such a provision, but this procedure urgently demands a comprehensive town plan so that all roads so formed should link up into an orderly road system.

(2) Illustrations of typical Madras houses would form a useful adjunct to this section.

(3) While it may be claimed that all kutchra houses are undesirable, it is clear that their destruction can only be advised where building is, or tends to become, congested. Even more in need of attention are the closely packed and overcrowded dwellings to be found in the south-west portion of Georgetown and in some parts of Triplicane.

(4) Zone plans form part of a fuller survey than this can claim to be. If prepared, they would show, in the case of Madras, marked deficiencies in the distribution of schools, parks, etc. Of the remaining headings (5), (6) and (7) apply generally to larger cities, while (8), (9) and (10) might be of service in the case of Madras and its suburb.

F.—Recreation.

(1) The central part of Madras is well provided with parks and playgrounds, as in addition to the People's Park the open ground around Fort St. George and at Chopauk is much used for this purpose.

These positions are convenient for the principal colleges by which they are chiefly used, but the taste for open air games is rapidly extending and Madras will need recreation areas much more widely distributed.

(2) Private recreation grounds are mainly of public value as securing the reservation of open space and with this in view it is important to ascertain as to how long they are likely to be maintained as such. Grounds belonging to colleges, clubs, and other institutions come in this category.

(3) Other open spaces may be permanent but not available for recreation as in the case of cemeteries, reservoirs, tanks, etc., they should be taken account of as influencing the density of building permissible in their neighbourhood.

(4) The use of waste land for casual games, etc., is of value in forming an opinion as to the need for a permanent park in the locality.

(5) Madras possesses a number of very fine avenues, some of which are suffering from neglect in replacing trees, and a promenade of quite exceptional character in the marina extending from Fort St. George to San Thomé.

(6) Public buildings for recreative purposes are few in number though possibly sufficient for the present needs of the city. In considering these and also 7 and 8 we have to take into account that the needs of India are not those of Europe, though there are signs that in the future there may be some degree of approximation.

(7) Private places of entertainment are mainly clubs, theatres and cinema halls. It is needless to dwell on the popularity of the club with Europeans and the Indian is following suit. The theatre is not quite fully developed in India and has yet to adapt itself to the conditions of the country. Much might be learnt from the type of building and entertainment in vogue on the European Continent. The same remarks apply to a less degree to the cinema hall.

G.—Garden Suburbs and Cities.

Development on these lines has as yet hardly begun around Madras, though a small co-operative housing society has been formed. It may be anticipated, however, that the areas outside the municipal boundary will give opportunities for housing of this type if regulations are framed to encourage it and to discourage the haphazard developments now general.

H.—Education.

Primary and secondary education have yet to become fully recognized in India and consequently a systematic survey under (1) would not be very illuminating. At the same time schools are provided wherever the demand makes itself felt and for more advanced studies Madras is a notable educational centre. (2, 3, 4 and 5) are certainly worth including in a survey of educational resources.

As a contribution to these studies the following extracts may be included :—

“On a general view the progress of education (or at least literacy) in the city would appear to be satisfactory. The standard of literacy

adopted at the census and that of 1901 was ability to write a letter and to read the answer to it. A brief comparative statement is subjoined :—

Year.	Hindus.				Muhammadans.				Christians.			
	Literate.		Literate in English.		Literate.		Literate in English.		Literate.		Literate in English.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1901	70,399	12,179	24,947	534	9,457	1,049	2,202	17	12,310	9,828	8,853	7,079
1911	86,630	19,681	34,592	1,089	11,674	2,135	3,056	74	13,045	10,516	10,143	7,424

“The vitality of progress of education may, generally speaking, be judged by the variation in the proportion of educated children to educated adults. If the proportion falls, then an uneducated generation is growing up: if it rises, then we may look for improvement among the coming adults, who are to be the strength of the community. The following figures show the proportion of literates aged 0—15 to 1,000 literates aged 20 and over :—

	Males.		Females.	
	1901.	1911.	1901.	1911.
All religions	181	166	450	385
Hindu	175	162	496	423
Muhammadan	133	136	341	320
Christian	258	221	409	333

“Now these figures look discouraging, but a little reflection shows that the bogie set up may very easily be knocked over. These figures are, I believe, the result of that falling off in the total number of children to which reference has already been made. This fact is indeed made abundantly clear by the following statement :—

Religion.	Proportional increase or decrease of population at age 0—15.		Proportional increase or decrease of literates at age 0—15.	
	Males.	Females.	Males.	Females.
	1901 to 1911.	1901 to 1911.	1901 to 1911.	1901 to 1911.
All religions	— 3·8	— 5·4	12·8	26·8
Hindu	— 4·9	— 6·4	15·3	45·0
Muhammadan	— 2·8	— 1·6	25·0	95·9
Christian	— 4·3	— 3·5	— 6·0	— 7·1

“Thus we see that while children have decreased in numbers, they have improved in education. For we cannot draw the improving but improbable conclusion that Heaven kills off the naughty children, who will not attend to their lessons. The figures in regard to Christian education

are worth consideration, as they may tend to show that the Christians are losing ground, while Hindus and Muhammadans are gaining. Especially is this the case with regard to female education, but the figures may be taken with some reservations. For when absolute numbers are very small, proportional figures are easily influenced, and are apt to be misleading."

Headings (6), (7) and (8) are extensions of this subject which can only be dealt with after full and systematic study of these aspects.

J.—Art.

Under this section Madras offers great opportunities.

(1) The city, while affording many features of undeniable beauty, lacks the cohesion of more compactly built towns, and consequently fails to convey the impression of dignity that might be expected from its size.

To many it is one of its charms that one can stand in the middle of Madras and see nothing suggesting that there is an important city around the wide maidan. This attitude may justly be challenged. After all it would not diminish but rather add to the dignity of this central park if the city presented a good face to it instead of a fringe of mean and unimportant buildings.

Again Madras suffers from the extraordinary variety of type in structures placed in juxtaposition to each other. There is not a single main thoroughfare but lapses at places into absolute squalor, a variation typical of the city structure throughout. To some extent this is inevitable, as the social needs call for groups of all grades in nearly every part, but the city is, in conjunction with a generally higher standard in housing, capable of very definite improvement in this aspect.

Madras being almost flat depends on three things for its elements of beauty: buildings, water, and trees. The last of these only has been at all fully exploited by the formation of parks and avenues. Water areas there are in plenty but they have never been re-organized to suit town conditions and only the magnificent sea frontage and the sweeping curves of the Cooum and the Adyar enhance the beauty of the areas adjacent.

There are many dignified and important buildings, though few, that have been judiciously placed with a view to the general effect either in respect to each other or to the natural features.

Again for nearly a century there seems to have been no definite view as to the style of architecture best suited to the conditions and the principal buildings exhibit so many experiments in treatment as to destroy the unity that should characterize a great city.

(2) The value of axial planning and of the vista has been ignored; none of the important avenues possesses a terminal feature. These effects of mass, skyline and balance have been left mainly to chance: in the placing of the buildings and their surroundings there are few signs of considered artistic effort. For example, the compound of the Victoria Technical Institute is opposite Monteith's Road and nothing could be more obvious than that the building should form a terminal to this road;

placed as it is about 80 feet from the axial line, it is not visible from Monteith's Road at all. Again the Railway Station, Moore Market, Victoria Hall, and Municipal offices are strung along in a line regardless of their mass and proportions, forming a very unsatisfactory group.

(3) Madras possesses such great natural beauty that it is the more to be regretted that the growth of the city has been to conflict with rather than to enhance it. All the original features of the site, such as tanks, water-courses, and palm groves are capable of adaptation to the modified conditions and had this been done many defects, practical as well as artistic, would not have appeared.

(4) The same criticism that has been made in regard to buildings also applies to the few monuments scattered over Madras, most of which are just dropped down, as it were, where space permitted. A monument should form part of a considered layout.

The general appearance of the roads suffers from the almost universal neglect of the compound walls, many of which are allowed to become very dilapidated. This is largely due to the size of the compounds, the proper upkeep of which is often beyond the means of the occupier.

(5, 6 and 7) are branches of this section beyond the scope of our present brief review, but which might profitably be taken up in a more extended one.

K.—Environment.

(1) The influence that Madras extends over the surrounding country has several aspects, but the one most important at the present moment is that leading to the formation of suburbs outside the municipal area. Several such districts have better communication with the city centre than the less accessible parts of the town itself; coupled with this the lower taxation and the absence of building regulations tend to promote developments that, owing to the last named inducement, often take very undesirable forms. Land is sold and houses are built without provision for roads, or any arrangements to ensure proper sanitary conditions. These districts may easily develop into slums if measures are not taken to put them on the same footing as those within the town.

As Madras is outgrowing the boundaries, many of the town's problems, such as those of traffic and health, should be dealt with in conjunction with the outside districts into which the population is flowing. Whether it is desirable to extend the boundaries or not is a matter for consideration, but it is at any rate clear that a city survey should take account of all areas influenced by the city.

(2 and 3) The historical factor may be of some importance in the case of St. Thomas' Mount, while that of beauty demands study in regard to the possible provision of open spaces accessible from the town. To the north-west the margins of the Red Hills Tank are especially suitable for development as a public park, and with the probability of improved access by road and rail this may be regarded as part of a system of outer parks, for which other sites may be sought for to the south and south-west.

L.—Structural Methods.

There is an unlimited supply of earth suitable for brickmaking around Madras, and brick has always been the main building material. The bulk of the output is, however, of poor quality, and the standard might with advantage be greatly improved.

Formerly brickwork was always faced with chunam; and this is the general practice at the present time, though the quality of the chunam has greatly deteriorated.

The uniformity of practice and the good material used was of value in enhancing the impressiveness of the city. Chunam at its best takes a polish that gives it almost the effect of marble, and it suffers from only one drawback, namely, that where exposed to wet it becomes covered with a black fungoid growth which cannot be removed. Possibly treatment with silicate of soda might discourage this. Whitewashing is often employed, but the effect of a whitewashed building is not comparable with that of one finished in good chunam.

Owing to the heavy rainfall, buildings are less liable to dilapidation when placed on a low plinth of impervious material, and parapets suffer if not protected by hard stone or tile.

Stone was generally used for temple work and tank walls, usually the gneiss or charnockite which is the general rock formation in Southern India.

During the last fifty years buildings have been carried out with brick facing and several kinds of stone have been employed. This has been rather destructive to unity of effect, especially where a number of buildings in close juxtaposition have been constructed with differing materials. In the south-east portion of Georgetown this is particularly noticeable.

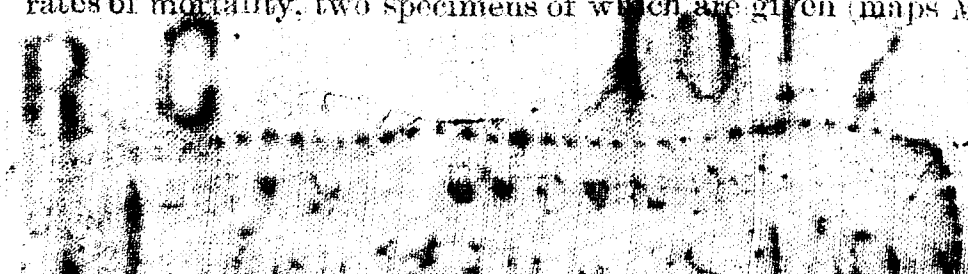
The adoption of terraced roofs in preference to tiling was formerly more general in Madras than in most southern cities, and the alternative was mainly between the terraced house and the thatched hut. At the same time, tiles have always been in use and there seems to be an increasing tendency to employ tiling, using Mangalore tiles for the better class work. Galvanized corrugated iron is also used, though this is both practically and aesthetically unsatisfactory unless covered with tiles. Asbestos tiles have not, so far, been much used in Madras.

The traditional mud building is much in evidence in the paracheries and kuppams included in the town area. It has its merits and for a one-storey house placed on a hard foundation and well roofed, it is not a bad method. It ought nevertheless to be discouraged in all areas that may possibly be closely built over.

M.—Hygiene.

(1 and 2) are practically covered by section (A), though the results there may be transferred to this in order to indicate their effect on health.

(3) As in (D) there is a map provided showing the density of population. This should be referred to here in connexion with those showing rates of mortality, two specimens of which are given (maps M. V and VI).



As an indication of present conditions in Madras the following extract from the Administration Report of 1914-15 is of service :—

“Before men can exercise their minds about finance, education or politics, they must live, and statistics prove that the Madras citizen too often fails to live. In other words the city, or its inhabitants, or both, are unhealthy. For this a good many causes can be assigned, some, I fear, practically irremediable, some remediable partially if not entirely so. Chief among the former causes undoubtedly is the city's extreme flatness, which renders efficient drainage difficult. Poverty is theoretically remediable, but for a long time it will constitute a formidable obstacle in sanitary reform. A large proportion of the population houses itself abominably for the simple reason that it cannot afford to house itself better. A man's roof should be sound, his floor impervious, his room ventilated and of a certain spaciousness. But when food and the scantiest measure of clothing have been provided, there remains but little out of Rs. 15—20 per month towards securing these accommodations.

“Cleanliness, however, promotes health, and Madras undoubtedly might be a great deal cleaner than it is. This is not a discovery; for thirty years and upwards there has been hot recrimination about the failure of ‘the executive’ to do its duty and ‘sweep ye towne cleane and wholesome.’

“What were the conditions of thirty years ago I cannot say, but the blame for Madras' present unsavouriness may, I think, be apportioned fairly equally between ‘executive’ and ‘people.’

“At the bottom of the executive scale come the sweepers and scavengers. The prejudice of India has assigned to these worthy men a social position rather beneath that of a dog; and when a man has been treated consistently as a dog, it is hardly surprising if at times he exhibits certain doggish characteristics. The sweeper I have found in his lighter moments a companionable soul, but of responsibility or interest in his vocation he has no idea. For a meagre wage he will sweep fairly well so long as he is watched, but no emolument will induce him to sweep if left to himself. He has little or no instinct for cleanliness; probably it does not strike him that, apart from the capricious whim of his paymaster, there is any real reason for removing dirt from the street.

“On the side of ‘the people’ the fault lies in failure to perceive the necessity for co-operation. A man cannot keep well simply by paying fees to a doctor if he disregards all ordinary rules of health; if half a million people heedlessly render the streets unnecessarily dirty eleven hundred scavengers, though paid, cannot possibly keep those streets clean.

“Of special importance to the health of the city is the attempt to stamp out malaria. Malaria, as is now generally agreed, is disseminated by mosquitoes; and for these mosquitoes the tanks with which Madras is honeycombed afford ideal breeding grounds.

“Though all tanks cannot be abolished, there are a great many which serve no useful purpose, and which, in the general interests of the city, should not be allowed a continued existence. The filling of tanks costs

money; the Corporation cannot possibly pay for all the work that is done, and it is only natural that the private citizens should be reluctant when called on to execute a sanitary improvement which may cost him from three hundred to three thousand rupees. The first efforts of the Corporation were met by a blank wall of opposition; it is encouraging to note that a very considerable breach has been made in this wall. The Corporation and the public are advancing towards each other; tank owners are beginning to recognize that it is for their own and for the general good that useless ponds and pits should disappear; they expect, and with justice, some municipal aid but the old attitude of refusal to incur any private expense is largely a thing of the past."

A paragraph from a Sanitary Report by Mr. J. A. Jones may also be included here:

"In Madras there are abundance of tanks, but their regulation is extremely difficult owing to their being mostly in the hands of private parties. There are also many low-lying places full of water during part of the year and during the other portion dry; these are used for many purposes, such as washing cattle, clothes, etc., and thus while they are drying up poisonous matters are evaporated into the air and when dry they send forth from their beds the exhalation of the solid filth collected during the rainy season. Even in few of the masonry tanks connected with pagodas, etc., is any change of water possible. These are ordinarily fed by springs in their bed, and the only change of water which takes place is caused by evaporation; the solid matter, however, accumulated from day to day is by the passage of the people being constantly stirred up and no doubt carried off in considerable quantity in their clothing to their houses."

Under the remaining headings of this section there is a large mass of information available, which only needs to be put into ordered form to go far towards completing the record demanded.

The question of hygiene has for long been regarded as one of crucial importance and while, through lack of funds, action has been delayed, the steps necessary to bring about an improved state of affairs are either being taken or are clearly recognized as desirable.

Under heading (8) it may be noted that until the objects of building regulations are more generally appreciated, great difficulty lies in the way of their enforcement, and while amendments would be advantageous, even in their present form they are apt to be regarded as oppressive and evaded where possible.

The same ideas prevail in regard to (10), the effect of insanitary and dilapidated building on health being but little understood, so that such defects are regarded in far too tolerant a spirit.

N.—Economics.

(1) Madras possesses numerous industries mainly carried on a small scale either at or close to the homes of those engaged in them. The

general distribution of these is shown on map (M. III) which gives the location of the people pursuing various avocations.

There are several large factories, the most important being the Carnatic and Buckingham Cotton Mills—it would be useful to have another map showing these and including the positions of industries outside the town such as the Perambur Railway Works, Brickfields, etc., with diagrams added showing the numbers employed.

A hint as to the industrial position is given in the following extracts from a report by Mr. Alfred Chatterton:—

"Although Madras is, in respect to population, the third city in India, it is, from an industrial point of view, of small importance. Founded as factory of the East India Company in the year 1640, it owes its growth to political rather than economic causes. Before the advent of railways and steamers it was as conveniently situated as any other town on the surf-bound Coromandel Coast for trading, and, as the centre of the East India Company's administration, it gradually grew into commercial importance, and ultimately, as the capital of the Southern Presidency, it became a city with a large population. In the middle of the nineteenth century it was relatively a town of greater importance than it is now, and in those days indigenous industries flourished, and there was a number of important Government factories. When the East India Company ceased to carry on trade, the foreign business passed almost entirely into the hands of European houses of Agency, and although they displayed considerable enterprise in endeavouring to establish industries on a large scale in the country, their efforts met with little success, and up to the present day trade has proved more remunerative than manufacture. The reasons for this may be summarized briefly—

"(a) The natural poverty of the country and the lack of raw materials as a basis for manufacturing operations.

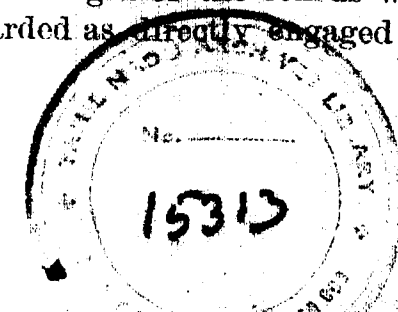
"(b) The indigenous industries were of a very primitive type and entirely in the hands of uneducated artisans.

"(c) The non-official European community has drawn more from the commercial than the manufacturing classes, and their natural inclination was rather to finance agriculture and develop trade, than risk their capital in industrial work, of which they had but little practical knowledge.

"(d) The limited market for specialized manufactures, due to the poverty of the people and the want of facilities for transport.

"In respect to fuel, a large and cheap supply of which is essential to the establishment of modern industries, Madras is severely handicapped. The nearest coal field is at Singareni in the Nizam's Dominions, but the bulk of its output goes west, and the coal supply of Madras is mainly obtained from Bengal either by rail or sea.

"The total population of Madras on the night of the census was 518,660, and of these only 48,088 can be regarded as directly engaged in productive industrial work.



"The following figures show in detail the number of persons engaged in the various industrial occupations pursued in the city :—

Description of occupation.		Workers.		
		Males.	Females.	Total.
Order VI	Textiles	10,800	1,136	11,936
" VII	Hides and skins, etc.	292	15	307
" VIII	Wood	4,399	114	4,513
" IX	Metals	3,306	42	3,348
" X	Ceramics	470	183	653
" XI	Chemical products, etc.	458	20	478
" XII	Food industries	1,478	2,694	4,172
" XIII	Industries of dress	5,163	772	5,935
" XIV	Furniture	150	9	159
" XV	Building industries	4,340	707	5,047
" XVI	Construction of means of transport	361	6	367
" XVII	Production and transformation of energy	369	13	382
" XVIII	Industries of luxury, bookbinding, jewellery and games.	10,633	127	10,760
Total		42,219	5,869	48,088

"From this it will be seen that there are 42,219 men and women engaged in industries. Female labour is almost entirely confined to the textile trades, the food industries and those connected with clothing. The returns of building industries also include a considerable number of females who really belong to the coolie class, as their labour is entirely unskilled.

"Examination will show that during the last ten years there have been considerable changes. There has been a great diminution in the number of rice pounders and basket makers, doubtless owing to the large number of rice mills which have been established during the decade, so that rice instead of paddy is now brought into Madras. For reasons probably similar the amount of cotton ginning done in Madras has decreased to an even greater extent. During the last ten years only one cotton mill has been established, but there has been a considerable expansion in the output of those already established, necessitating a large increase in the number of people employed. It is interesting to note that the number of hand-loom weavers is practically the same as at the previous census, and that apparently they are able to hold their own against the competition of power-loom factories. There has been some slight increase in the number of metal workers, and a considerable increase in the number of carpenters and jewellers, which may be taken as a not unfair indication of increased prosperity.

"As might be expected in a capital city with a large population, there are a vast number of miscellaneous industries carried on, but none of them have obtained any considerable development and in the main they only serve to supply the local needs. The cost of living in Madras is distinctly higher than other parts of the Presidency, and the pressure of foreign competition is therefore the more strongly felt by the indigenous artisans in the city than elsewhere. Moreover, in a seaport indigenous industries do not enjoy the small measure of protection afforded by the cost of transport to inland centres of population. It may be taken,

therefore, as certain that the decay in the old industries of the country is more complete in Madras than elsewhere, and that the industrial future depends entirely upon the advantages offered by the city as a distributing centre for manufacture conducted on a large scale and on modern lines.

"The following is a complete list of the organized industries using power in Madras and carried on in workshops employing more than twenty hands :—

	No.		No.
(a) Cotton mills	4	(k) Baling presses	4
(b) Iron works	9	(l) Carpenter's shops	7
(c) Engineering shops—		(m) Leather { Tannery	1
Public Works Department		Warehouses	3
Harbour		(n) Technical and Industrial Education workshops	3
Municipal	6	(o) Chemical works	1
South Indian Railway		(p) Rice mills	2
Trainway Company		(q) Soda water factories	6
Arsenal		(r) Ice factories	2
(d) Electric generating stations—		(s) Tobacco and cigar factory	1
Public	1	(t) Oil mills	2
Private	7	(u) Bulk oil installations	4
(e) Garages	3	(v) Cement works	2
(f) Printing presses	23	(w) Coach builders	5
(g) Tin-plate works	2		
(h) Aluminium works	1		
(i) Glass works	1		
(j) Saw mill	1	Total	101

"By far the greater number of these are engaged in supplying the local needs of the community and are such as could be found in almost every large city : in fact, from an industrial point of view, only the four cotton mills, the cement works, two or three iron works, and the aluminium factory are of commercial importance. The bulk oil installations, however, which do a very large business and are of great economic value, deserve attention. They are the direct outcome of the harbour works without which it would have been impossible for them to have been established. During the last ten years the consumption of mineral oils has increased enormously in India and especially in the Madras Presidency, where very large quantities are now used in the numerous oil-engines which have been set up. In regard to the supply of liquid fuel, which is the residue left after the lighter oils have been distilled from crude petroleum, Madras compares not unfavourably with most other parts of the world which have not oil fields in their immediate neighbourhood. This is an industrial asset of no small importance, and will tend in the future to counterbalance largely the disadvantages, from which in other respects Madras suffers, in the matter of fuel supply. Although there is only one tannery, and that of a specialized character, within the municipal limits, Madras is really a very important centre of the leather trade, and outside the municipal limits in the Chingleput district there are a large number of tanneries, mainly engaged in the preparation of hides and skins for export to Europe and America."

CHAPTER II.

THE IMPROVEMENT OF MADRAS CITY.

The preliminary study of Madras in its present state, incomplete though it may be, brings forcibly before us the main points towards which our efforts for improvement should be directed.

SURFACE DRAINAGE.

Apart from the work of sewerage and sanitary improvement at present in hand, the foremost need is for an organized system of surface drainage for storm water, with adequate channels following the natural lines of drainage and, where possible, the linking up of the tanks, which would be reduced in area so as to take their proper place in the city plan. In conjunction with this the improvement of the river Cooum and the development of the system of waterways is dealt with. A tentative sketch is given in Map M. VIII showing suggested lines for main drainage channels and waterways (as well as railway developments dealt with subsequently).

In the first place the north-western area demands consideration. This part of the town lies so low that it is still largely undeveloped in spite of its proximity to the business and industrial quarters, and where portions have been occupied, conditions are most unsatisfactory. If a really adequate scheme for surface drainage were provided, this district would become of value for extensions. Such a scheme is outlined on the plan with a main channel large enough for use in transporting goods, thus assisting commercial developments.

In the centre and western portions of the town the river Cooum forms the natural drainage channel and this may be linked up with the north-western channel so that both may be carried to outlet sluices delivering into the proposed outer harbour.

During the rainy season the Cooum breaks through the sand bar at its natural outlet and this would still take place, while if a groyne were provided on the south side of the temporary outlet it would be kept open to the tides for some time longer than is at present the case. This groyne would also hold up a body of sand in front of the marina, that would otherwise flow on to the harbour breakwater.

In the south-western portion of the town there is at present a gradual development and as the fall eastward is very slight it is most desirable that some good channels should be formed for draining this area. Suitable lines for these are shown on the plan.

In all these cases the ground excavated and also the useless spoil banks along the Buckingham Canal would be of value in filling lowlying ground and arranging the surface levels to fall systematically toward the lines of drainage.

RAILWAY DEVELOPMENT.

Madras is served by both broad and metre gauge railways, the former coming in from the north and west, and the latter from the south.

go

It is proposed to introduce another metre gauge line from the north-west and a route has already been plotted for this. This route, by reason of the number of level crossings involved, is most undesirable from the point of view of general convenience and even if the alternative one shown on the map (No. VIII) is initially slightly more expensive, which is uncertain, it would more than save any increased cost in subsequent convenience.

The introduction of this new metre gauge line from Rénigunta introduces another problem, namely, its connexion with the existing South Indian Railway. Up to the present the only near connexion foreshadowed is in the port area, a position too much valuable for marshalling purposes. Moreover any increase in traffic on the line crossing the maidan is to be deprecated.

It is clearly desirable that a link line should join the southern and north-west metre gauge more or less on the route shown on the map. This would enable the northern portion of the harbour to be allotted to metre gauge services leaving the southern to the broad gauge.

THE ROAD SYSTEM.

As the system of roads forms as it were the framework of the city it is convenient to deal with this before considering the allocation of areas, although the latter factor must of course influence the provision of main roads and will dictate the scheme of minor roads.

Main roads fall into three classes—those within the built-up districts designed to improve traffic facilities, those carried into more open areas in order to develop these, and those providing for improved communication between the town and surrounding country. Many roads combine more than one of these functions.

In consequence of the extreme variation in the speed of vehicles the Indian town demands a more liberal provision of roads than the European one, in proportion to the total amount of traffic. The only means of minimizing this is the allocation of roads for slow and fast traffic, a course that in the case of Madras could only be adopted to a very limited extent on account of the lack of specialization in the use of the various areas throughout the city.

The plan proposed provides, however, for the selection of some main roads which could be formed with a view to encouraging fast vehicles and eliminating slow ones. It will be seen from the map (No. M. IX) that alternative main routes are available in almost every direction.

One of the chief difficulties in the existing communications of Madras lies in the impossibility of passing between the north and south sections of the city except by one of the level crossings over the South Indian Railway. In some cases it would not be difficult to provide overbridges and three of these are shown on the improvement scheme.

The roads around the open maidan have been rearranged partly to facilitate the provision of these overbridges and partly to provide good sites for important buildings intended to enhance the dignity of this central area by a ring of fine façades looking on to it. Advantage has

been taken of the proposed reconstruction of the Mount Road bridge to shift its position so as to secure a dignified entrance to Government House with the approach vista terminated by the Banqueting Hall.

Another point to be considered is the limited provision of good frontages for important business premises on Front-line Beach. By opening up squares running back from this road further good sites may be secured and suggestions are made with this object in view. Again the proposed thoroughfare running west from the harbour gates gives good opportunities in this direction, and as a new Custom House will become a necessity in the near future, the existing one may well be removed to the sites provided immediately north of the present building.

In the outer parts of the town many of the larger compounds are likely to be divided up to meet the need for smaller and less expensive bungalows and the road system shown provides for this as part of an organized scheme, not destroying useful buildings, while giving frontages for plots of half an acre upwards. Of course such a scheme would only be carried out by degrees, but if determined from the start it ensures a good layout, instead of a series of makeshifts, at no extra cost.

In some areas roads are shown more closely placed, as would be necessary for houses of a smaller class, and the widths and construction of the roads would be proportioned to the probable traffic needs.

The suggested treatment of the sea front demands a brief note. The accumulation of sand is gradually transforming the marina from a coastal into an inland route, and at some future date it will evidently be possible to form a new drive further east, which with its extensions north and south will be even more magnificent than the present road, while the latter can then become a main artery with buildings on both sides in its way no less attractive than its newer rival along the shore.

TRAMWAYS.

In conjunction with the general road system that of the tramway has to be considered.

Now the trams are at present largely used and are increasing in popularity as a means of locomotion, so that it is urgently necessary to provide that extensions shall not be haphazard but shall tend towards the completion of a clear and simply organized system that shall meet the traffic needs of the wide area of the town.

Most of the lines have been laid by the side of the road, a method generally recognized as erroneous except in special cases, but a commencement has been made in shifting these and it may be assumed that the general lines of existing routes should be maintained. Extensions are planned to serve the areas at present most populated or likely to become so, while with regard to the working system the adoption of a central circuit may be strongly advocated. The suggested routes are numbered and cars on all these from 1 to 11 would pass round this circuit which runs near most of the important centres.

At any point on this circuit it would be possible to change on to any other car (with the exception of route 12 which is an outer ring

route to link up suburban areas). This scheme is much the simplest and more quickly grasped than that of a number of through routes crossing various points (see Map M. X).

GROUPING OF THE PRINCIPAL BUILDINGS.

One of the most important steps towards the re-organization of Madras consists of a more logical grouping of the buildings that house the different branches of activity appertaining to a city exercising such varied functions.

Madras is a seat of Government, a commercial centre, an educational centre, and a social nucleus. All these ought to define themselves clearly in the city scheme and while it is desirable to disturb as little as possible it is none the less essential to endeavour to rectify the present accidental distribution of the buildings falling under these varying heads.

The Government buildings are widely scattered through the town and there is no definite administrative centre. Two points seem to be in competition for this position, Fort St. George and Chepauk, their claims might be fairly equal but for the fact that education is a strong competitor for the Chepauk area and this fact turns the balance in favour of Fort St. George. Now within the fort itself there are no sites suitable for Secretariats and other official buildings, but around the maidan to the west there are a number of positions that demand large and important buildings, while to the east of the fort the reclaimed area now practically unemployed could be laid out to a great advantage to accommodate a group of Secretariats in proximity to the Council Hall, which is the natural centre around which Government offices should be located.

The development of the commercial quarter already firmly established in the eastern part of Georgetown has been dealt with elsewhere, and the adoption of Chepauk as the educational centre is referred to under the head of Education.

The social centre cannot be clearly defined, but Government House is obviously the point around which it would group itself. The Madras Club and the principal shops and hotels have already placed themselves a little way to the south-west of the Government House but northward towards the Central Station there are sites that might be developed to advantage as they are at present either unused or employed for purposes relatively unimportant. By placing on the upper end of the island good European and Indian hotels and between them a suitably designed theatre and opera house (see Map M. XI) the route from the station to Government House and the social centre would be rendered more dignified and interesting. The failure of Madras to convey any impression that it is an important capital and dominant city would by such a course be in a large measure remedied.

HOUSING DEVELOPMENTS.

Now the interdependence of housing and transport facilities is so obvious that the railway and road schemes are in great measure determined by their utility in opening up areas suitable for housing developments.

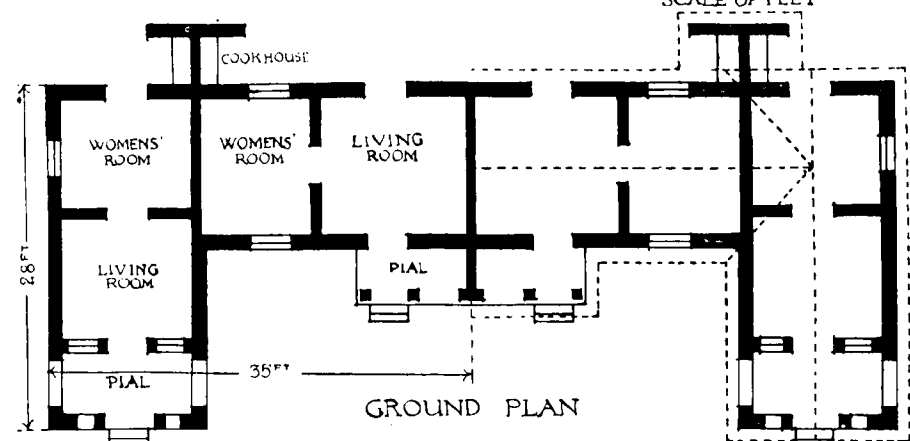
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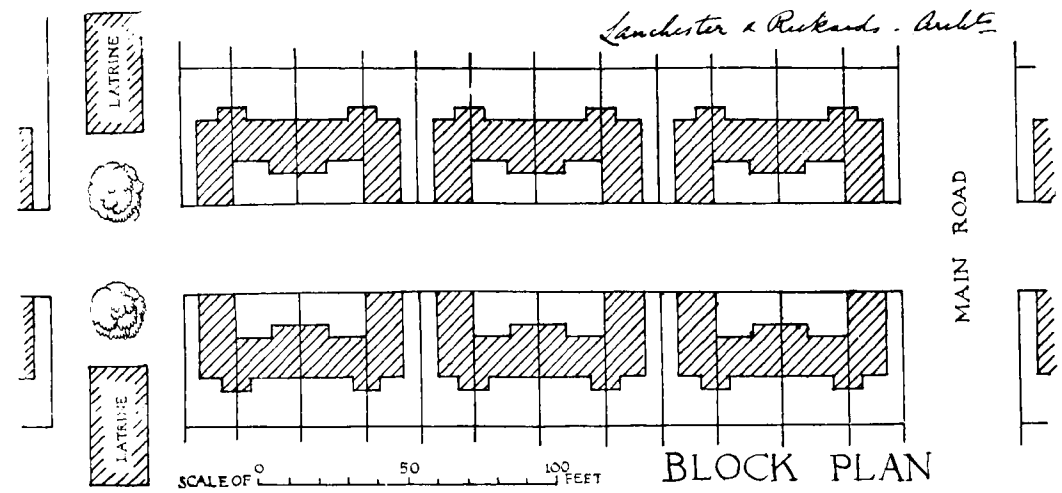


ELEVATION

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SCALE OF FEET



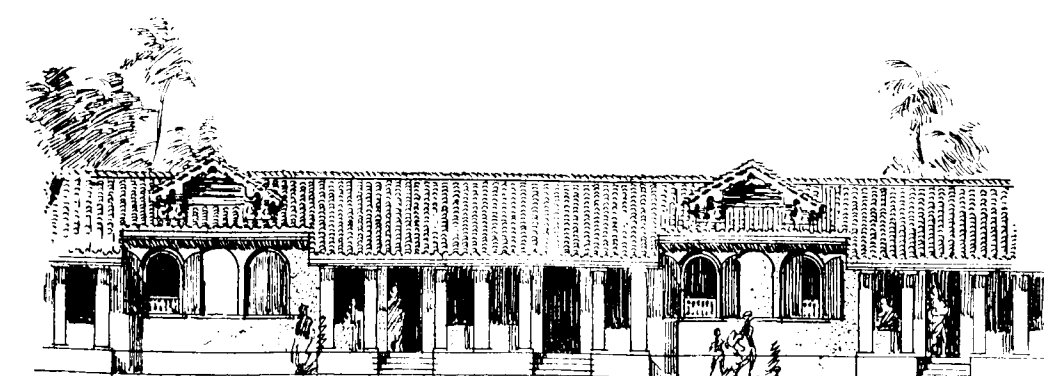
GROUND PLAN



Lancaster & Richards, Architects

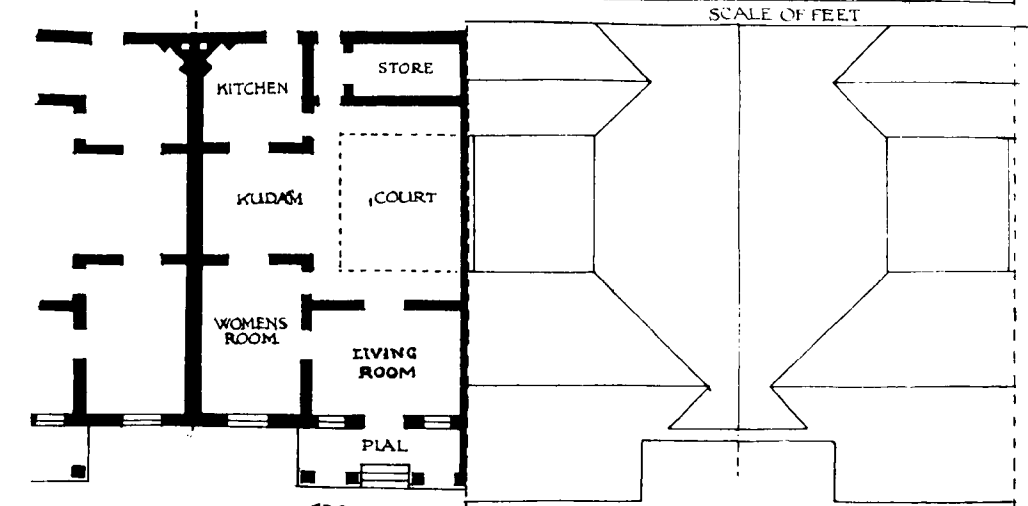
BLOCK PLAN

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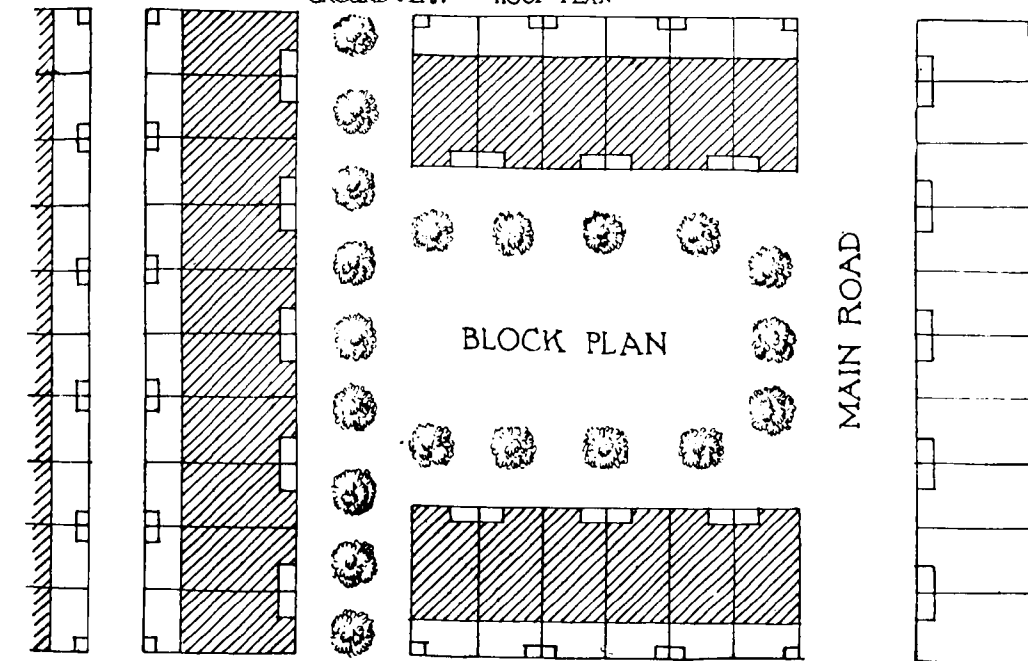


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GROUND PLAN ROOF PLAN



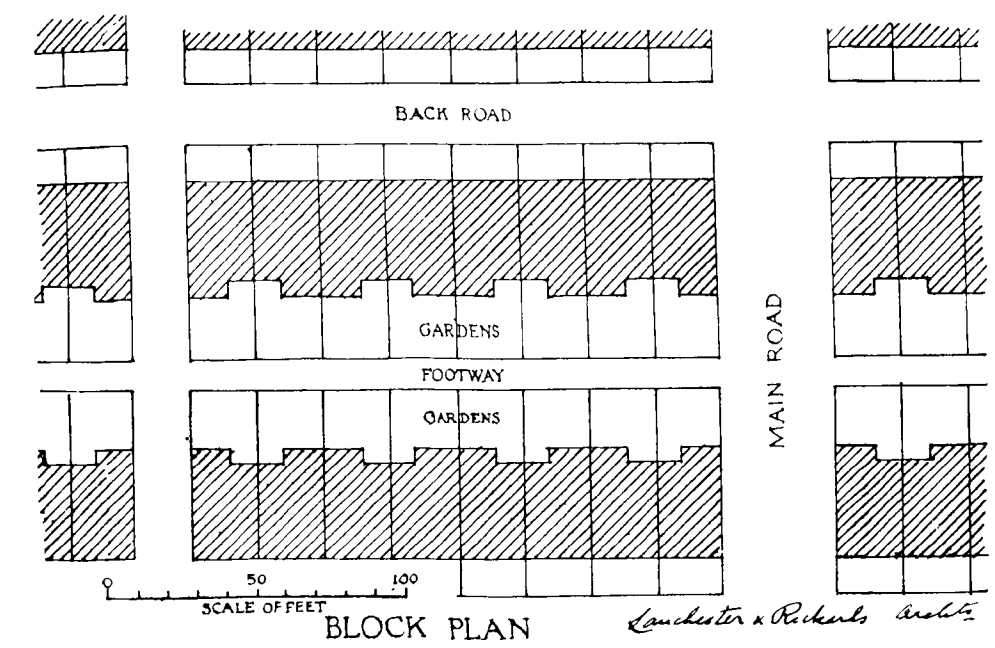
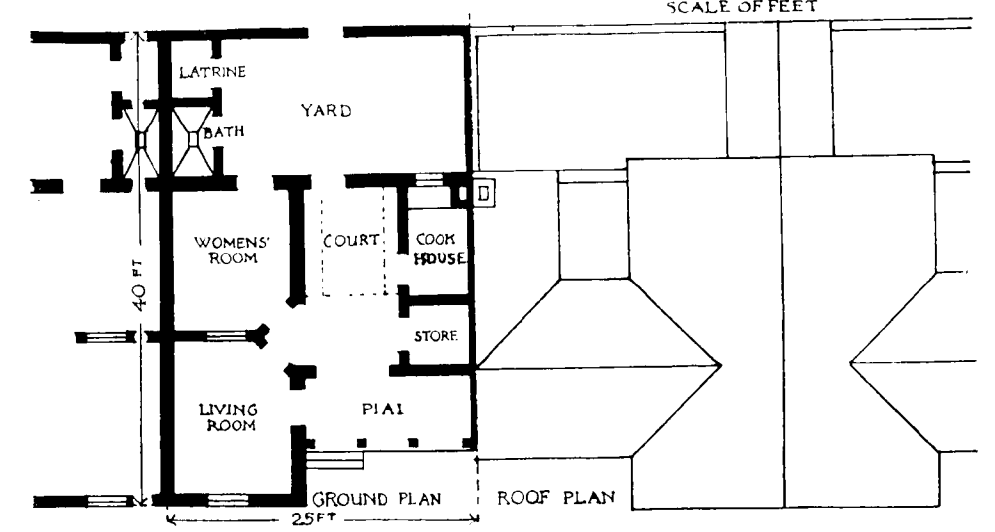
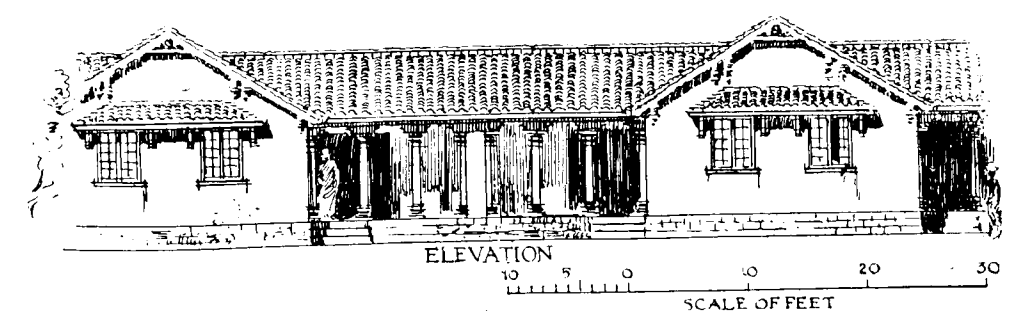
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Langdon & Richards Archts

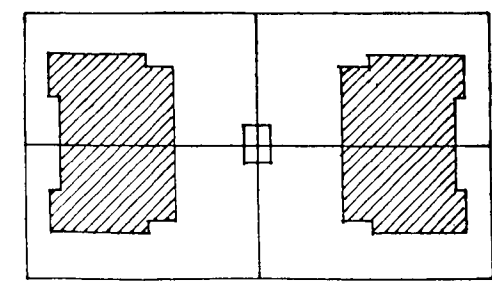
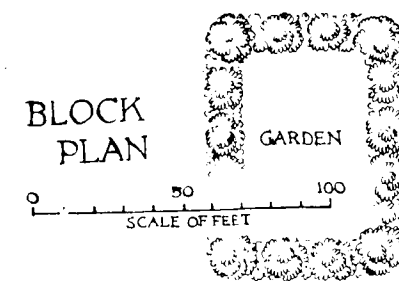
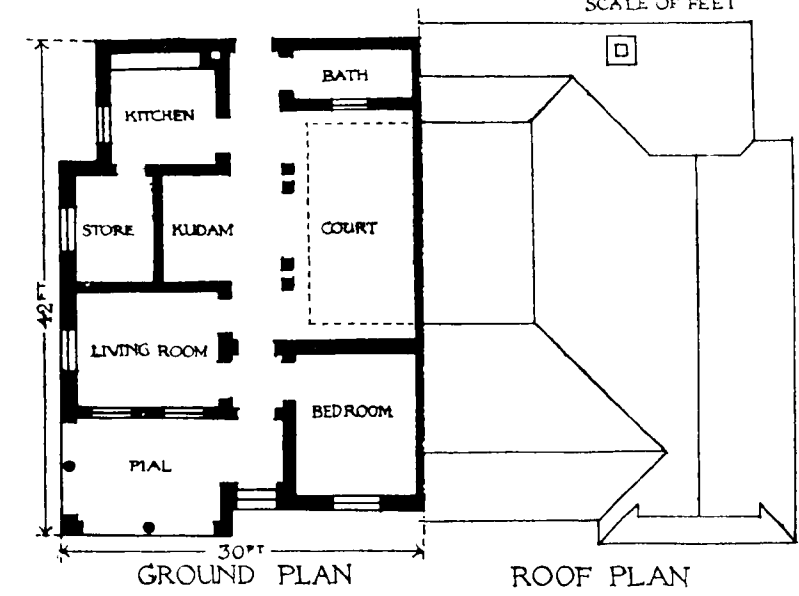
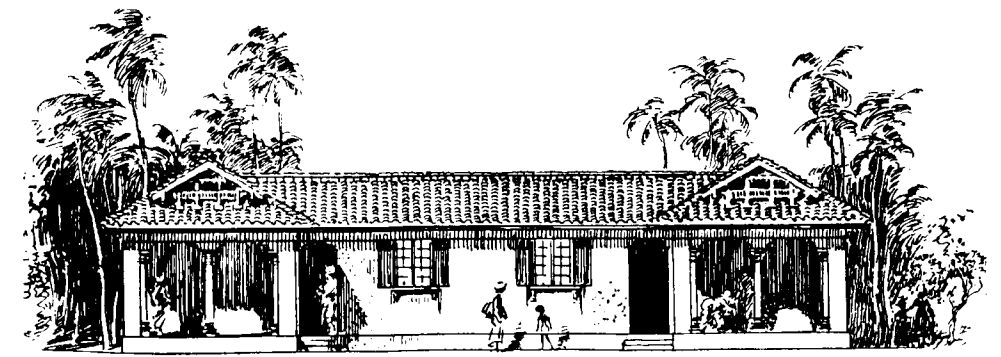
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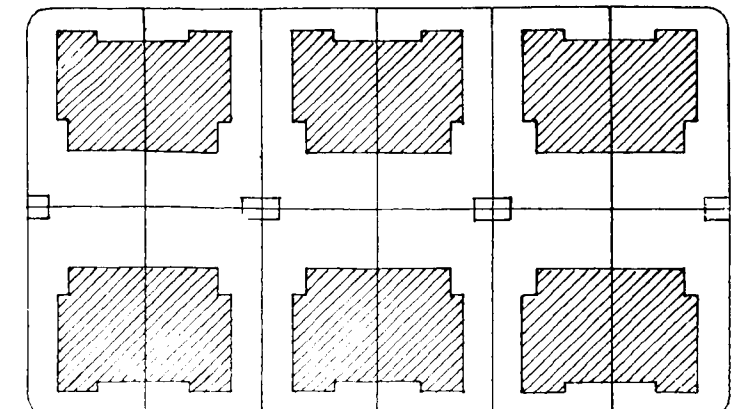
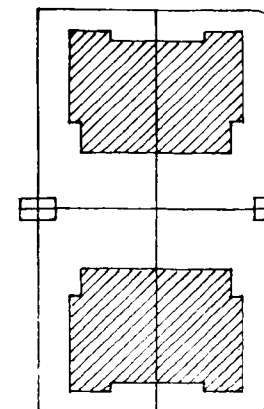


BLOCK PLAN

Lawrence & Richards Architects

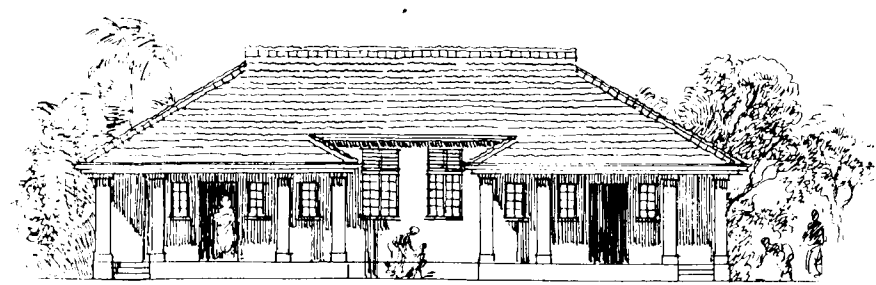


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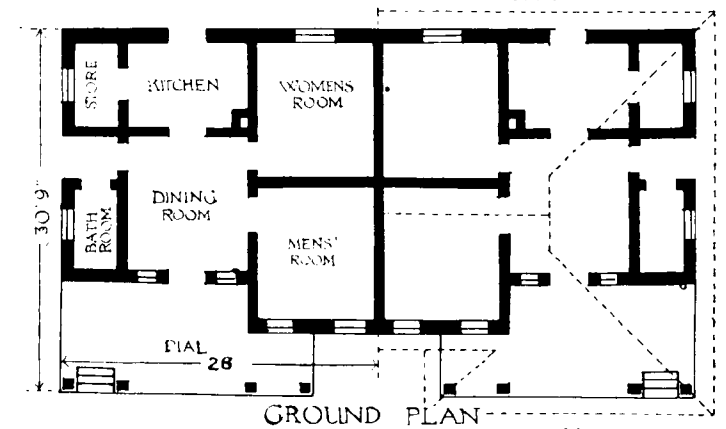
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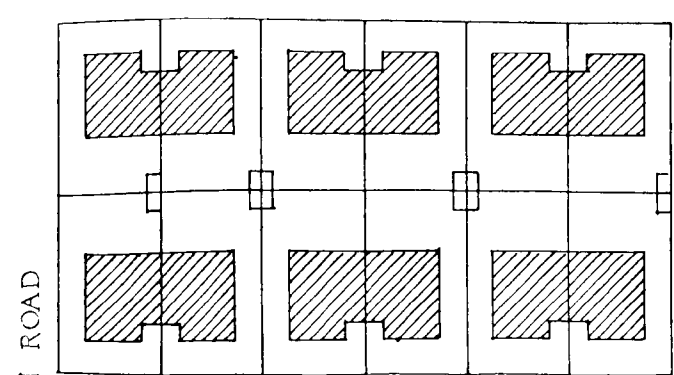
ELEVATION

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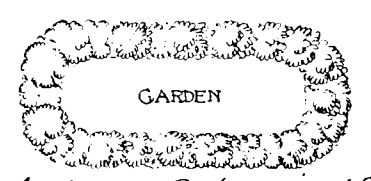
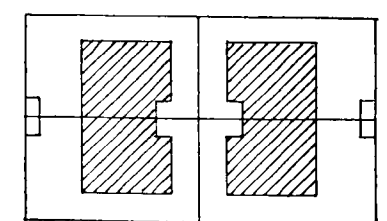


GROUND PLAN

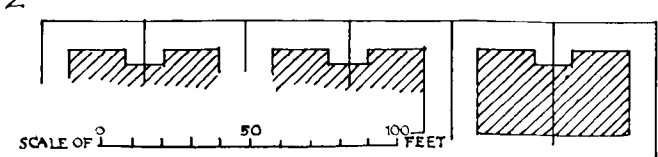
BLOCK PLAN



MAIN ROAD

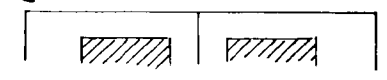


GARDEN



SCALE OF 0 50 100 FEET

Leicester & Richards archt.



classes owing to the high expenditure on roads and sewers. A few examples showing various types of grouping are appended (see illustrations A, B, C, D, E and F attached hereto).

Areas suitable for this class of development are also to be found on the road map. Where the roads are more widely spaced it may be assumed that building would take the form of detached houses in compounds of varying size.

PROVISION OF OPEN SPACES.

It has been pointed out that the centre of Madras has liberal allowance of open space. In fact there is so much that a few sites could well be spared from it on which to place important buildings that would enhance the effect of this area. On the other hand, outside the centre the city is spreading without the provision of good parks and recreation grounds. It may be imagined that the cost of providing and maintaining these would be prohibitive, but this would not be the case, as all that is necessary for the movement is the reservation of areas of little value, which in large measure need not be diverted from their present uses, and would only be taken up for public use as the requirement arises.

The main group of outer open spaces for Madras is best secured by the reservation of a broad belt to the west of the town comprising Mambalam and Nungambakam tanks to the south-west, then running north-westward outside the municipal boundary to Periyakudal, and from there northward to the west of Perambur workshops, joining up with an open strip including and running west from the Vyasarpadi tank about a mile north-west of Peravallūr. From this point it would be desirable to provide an open strip running north-westward to link up with park reservations around the Red Hills tank (see small scale Map M. XII).

Inside this belt a number of smaller parks will be needed in order to provide playgrounds, etc., near the homes of the people. Suggestions for the sites of these will be found on the road Map M. IX. These form a ring of open spaces around the more densely populated areas. The mode of use for these small parks would be dictated by the requirements of those living near them. Probably they would combine playgrounds with small groves for rest and quiet.

EDUCATIONAL FACILITIES.

It is not at this stage that detailed proposals for the location of primary and secondary schools can conveniently be introduced, beyond recognizing that these should be fairly proportioned to the needs of the present and probable population, and the requirements of the various classes. Sites of suitable size to provide for both outdoor and indoor educational exercises should be reserved under a general scheme.

With respect to the more advanced studies, Madras is naturally the centre for a large area, and great developments may be expected in both the University and its allied colleges. Every effort should be made to form these into a group, both by reason of economy in control and the advantages of mutual proximity as regards playgrounds, etc. Now such a group is already partially established at Chepauk, though at present it

is mixed up with Government Secretariats here. These Secretariats should be given up and turned over to the collegiate institutions.

The Christian College is not well placed at present, occupying a cramped site obviously more suited to commercial purposes. It is worthwhile to consider whether it also should not be transferred to Chepauk.

Exceptions to this grouping must be admitted in the case of the Law College which is properly placed in proximity to the Courts and the Medical College which must inevitably be run in conjunction with the General Hospital.

In regard to the removal of the Engineering College to Guindy there appear to be arguments both for and against such a course, but these already having been dealt with by those competent to judge, it is perhaps hardly desirable to re-open this question.

If the spare land in Chepauk, and along the marina, is skilfully made use of, it should provide for all the needs of the Madras collegiate group, and some of the area now in process of reclamation between the marina and the sea will provide excellent recreation grounds for the students.

HYGIENIC CONSIDERATIONS.

So much has been done and is at present in hand towards the improvement of general condition of Madras in respect to health, that, though the need for improvement is great, the remedies may be regarded as, understood and, as far as means will permit, being put in operation. Without doubt a more comprehensive organization of the city as a whole would facilitate these measures and this is a potent reason for advocating such a course. Incidentally the improved surface drainage previously dealt with would be of great service, but the most important factor is the general low standard of living and housing. While there is a noticeable tendency towards improvement in this respect the movement is very slow and an active propaganda is needed to induce better ideals. It may be thought that the people are living as well as they can afford, but this is untrue; the fact is that being content with little they do not trouble to earn more. Anyone who found his needs expand could soon increase his earning capacity.

Again it is not by any means entirely a question of money; life in a town demands a continuity of effort with regard to ordered and cleanly living, if disease is to be combated, and this effort must become habitual with town dwellers. So far this has not been the case, but it may be hoped that such a requirement will gradually become better realized.

The medical services of Madras are good and improving. The main question at the moment is that of the reconstruction of the General Hospital. Without doubt the present building is obsolescent and its site inadequate, besides being not very suitably placed. The proposed removal of the hospital to the Spur Tank seems the best course, and in the road scheme this has been accepted, the south-west portion of the tank area being allocated for the hospital with the north-west portion for the new Medical College.

This leaves the present hospital site free for the central remodelling of the roads, etc., while the existing Medical College would be taken over for other purposes.

In connexion with the hospital services a good convalescent home would be of value and it may be suggested that a suitable site in proximity to the outer park system might be provided.

COMMERCIAL DEVELOPMENTS.

Despite the increasing importance of Madras as a commercial centre it may be doubted if the possibilities of the future in this respect have yet been fully realized. The large area for which, given good harbour facilities, this is the natural outlet, is at present far from reaching its maximum output; this is for the moment not so much limited by its inherent productiveness as by the competition of other districts in an even less advanced stage of cultivation. With competition of this character extending as it does from Africa to Japan, it can easily be realized that development may not be rapid and that there may be periods when it is almost at a standstill. At the same time, the improved conditions of life in southern India, fostering an increase in the population, will bring pressure to bear on agricultural and kindred activities that will result in a greater productivity.

This alone would have some effect on commerce, but there is in addition the increasing extent to which exchange and barter is found advantageous in the world's economy and the consequent increase in the business of transport relatively to the energy devoted to initial production.

On these grounds it may safely be predicted that the trade of Madras will exhibit a steady increment and that therefore an improvement scheme must provide for a gradual growth of facilities to meet these conditions.

The harbour takes the primary place in such a programme and forms, as it were, the key controlling such subsidiary requirements as railways, warehouses, factories and other business premises. Now Madras Harbour has had a short but vigorous life: its structure is now, by the completion of the land wharf, only just reaching its most efficient form, and there is good ground for believing that this will not do more than meet the needs of the near future.

The difficulty of the sand accretion has been recognized (see the Port Trust Report, 1913-14, previously quoted) and the problem before the Trust appears to be the extension of the harbour on the seaward side in such a manner as to provide for this and at the same time utilize the works for possible future commercial requirements. Furthermore there is the trouble caused by denudation immediately to the north of the present harbour, a point where land would become of value for commercial purposes. Taking these several matters into account, it seems worth while to lay down general lines for an extended harbour (see map M. IX). Of course this question is primarily one for the expert advisers of the Port Trust, but in a comprehensive improvement scheme it is hardly

practicable to avoid including, in sketch form, some indication of possible harbour extensions, in which the matter of accretion, denudation and transport facilities have been borne in mind.

The suggested eastern basin enables the inland waterways to be connected with the harbour without disturbing the existing works and would also permit the present eastern arm being used as wharfage. The northward extension would cover the foreshore now being denuded at a point where railway access is most easily secured.

It cannot be claimed that denudation will not continue still further north, but at all events the cost of protecting three quarters of a mile of the more valuable frontage would be saved, while further on the effect of denudation might be mitigated by the deposition of sand dredged from the harbour channel. Even if this were not done the loss would be less owing to the lower value of the land.

Turning to the other questions relating to commerce and industry, the development of the railway system has already been outlined while in close connexion with this would be the allocation of sites for the larger factories which demand railway and sometimes water facilities. Suggested positions are marked on the railway map (M. VIII).

The improvement and extension of the area for business premises has been touched on under the suggestions for a road system, but it may also be pointed out that should the harbour be extended northward the sites at the northern end of Front Line Beach would be of enhanced value for this purpose. Having regard to the special value of these frontages for business premises, sites here should not be employed for other classes of building that could with almost equal convenience be placed elsewhere.

FINANCIAL RESOURCES.

In advocating a programme so extensive in its scope, even if it be formulated with the idea of its taking a long term of years to carry out, the objection must be anticipated that the cost would be too great for the resources available.

Even if all the proposals be accepted as desirable in a greater or less degree, it would be futile to put them forward without some hope of their being financially practicable.

The first impression would, undoubtedly, be that not a tithe of the suggested works could be undertaken, and it must be frankly admitted that unless all the authorities interested are prepared for a combined effort this would be the case.

To begin with, the Municipality is not, on the present basis of taxation, in a position to do more than the ordinary maintenance services: for special expenditure of any kind it has to rely on subsidies.

It is probably undesirable to raise the scale of municipal taxation, and the extension of the municipal boundary, while it would increase the income, would increase the expenditure to an equal extent.

The position of Madras as a capital city with corresponding special responsibilities gives it a claim to a more than an ordinary subsidy from

Government funds: this claim has been recognized and liberal grants have been made for various purposes.

These grants will however be required for some years to come for the works at present in progress and this is not a time at which large increase in expenditure can be demanded. It will be at least five years before a really adequate annual grant can be allotted to city requirements.

Clearly then although perhaps capital may be available, the earlier stages of the scheme must be such as will show some return in order that the funds needed may be raised as a loan and not demanded as a grant.

Now the suggestions contained in the improvement scheme come under three heads—

(1) Works undertaken by a public authority from which a reasonable return is anticipated.

(2) Works undertaken by a public authority from which little or no direct return is expected.

(3) Works that can be demanded of private owners under the by-laws or under a Town Planning Act.

Under the first head may be placed the Harbour and Railway extensions, any building estates that may be developed by the authorities, and, to a limited extent, new streets in occupied areas (in Calcutta some of these are showing a profit). The Tramway may also be included, but as it is in the hands of a company, new concessions should stipulate for lines that will assist the development of public properties.

Under the second would come most of the road improvements in the central area, where these do not assist in developing new sites. Contributions may be obtained from the South Indian Railway and the Tramway Company to the extent of the benefit they receive by the abolition of level crossings and improvement of routes. It is clear that much of the work under this head can only be carried out in instalments spread over a number of years.

Surface drainage and waterways also come into this section, except in so far as they are of value in developing inferior land areas.

The third covers most of the roads and other improvements in and around Mylapore. Most of the land being in private hands and the resources available not admitting of large land purchases the proper course here is to lay down a scheme such as is suggested on the maps and to require that all developments should be in accordance with such a scheme.

The next procedure is to take stock of the assets that can be placed at the disposal of the Improvement Authority. Now there is a fair amount of public land in Madras, under the control of either the Municipality, the Madras Government or the Government of India. These lands are shown on map (M. XIII). Leaving out of account these areas that ought to be kept as permanent open spaces, there still remain considerable blocks which could be developed. Systematic developments cannot, however, be undertaken without the purchase of other lands which separate these holdings. Fortunately most of this land is cheap and the cost of it would eventually be more than recouped. With regard to

the Government of India (Military) lands, some difficulties may arise, but it ought to be possible to secure a grant of the Nedumbarai Workshops, the Ordnance Lines, and the Fort St. George foreshore in view of the fact that these are used for no purpose at all proportionate to their value. Other suitable sites of less inherent value might be offered in exchange.

The map showing these areas also shows those that should be acquired to render possible a comprehensive development scheme.

Thus may be secured a large area which can be developed to meet the steady demand for better housing, and which may reasonably be expected to bring in sufficient to repay the costs of the necessary purchases and works.

Therefore it would not be unsound to borrow from time to time sufficient to meet these costs until the return from sales or leases should reach a point that would cover, first the interest on borrowings, and subsequently the expenditure.

Assuming that the Improvement Authority could obtain on loan some 15 lakhs of rupees annually for a term of ten years, it should at the end of this time be able to balance income and expenditure, or alternatively, if this be too optimistic an estimate, drawings of 10 lakhs per annum for fifteen years should place things in a similar position.

The suggested loan would not obviate the necessity for an annual grant of say 8 to 10 lakhs per annum which would be a reasonable contribution from the Madras Government towards improvement of its capital, but, as has been pointed out, it is unlikely that such a sum will be available for some years to come.

It is believed that the financial programme here sketched out will, with the aid of a Town Planning Act, enable the scheme laid down to be regarded as a basis for prompt action in respect to the improvement and embellishment of the City of Madras.

ADMINISTRATION AND CONTROL.

European practice places the control of improvement schemes in the hands of the municipality, and this would in the ordinary way appear to be the logical course, as the work of development connects up at so many points with the normal municipal activities. In India such a course has not so far been found advantageous. Owing to the more recent organization of municipal control in the larger cities the machinery does not run so easily as in Europe and the Corporation usually has its time fully occupied in properly maintaining the permanent services. If the additional burden of remodelling and supervising the working of a Town Planning Act be placed on it, this administrative body will certainly be overweighted, and progress could only be made by means of a drastic reorganization of its structure and methods. Possibly a strong executive committee with a special staff might be successful, but it would be impossible to form this committee from the Corporation as at present constituted without denuding other committees which are carrying on useful work. Moreover the confirmation of the committee's decisions would bring about lengthy

discussions and take up time that cannot be spared. Either the personnel of the Corporation would have to be increased to provide for the additional work or an *ad hoc* body must be formed that could devote itself solely to the work of city improvement.

Now this latter course is the one that has been more generally adopted in India, and the 'Improvement Trust' working independently of the Corporation is the accepted method in Calcutta, Bombay, Baroda, Gwalior and other cities. To one accustomed to European methods it seems a pity to divide control in this manner but undoubtedly it has not been done without consideration and may perhaps be the best way of meeting difficulties such as have been cited above.

The decision between the possible alternatives can only be arrived at by those intimately connected with the various interests of Madras, and possibly a special committee might be formed to report to the Governor in Council as to the course calculated to secure the best result.

GENERAL CONCLUSIONS.

The foregoing proposals are of the nature of a broadly conceived sketch with the details left for filling in after closer study. They are submitted for criticism in this form, with the idea that they will emerge from it, possibly with numerous emendations and revisions, but still with many features on which the more detailed work can be built up.

Briefly, this scheme aims at being provocative rather than conclusive, it is based on such information as could be gathered from municipal and other officers who most disinterestedly added this labour to their already strenuous duties. It will, therefore, be easily realized that many points would require closer study before a final decision could be arrived at and that the reasonable course was to make proposals of a general character rather than attempt a degree of detail for which the bases of information might be found inadequate.

Many, in reviewing these suggestions, will be inclined to regard them as too drastic, but it must be borne in mind that they are not intended to represent the work immediately possible or necessary, but are more of the nature of a forecast of appropriate developments in the course of the next fifty years or so.

The formulation of a programme on these lines may naturally be challenged as being impracticable without much more information than has been accumulated, or indeed than it is possible to secure at the present moment. This may be true to some extent. It may be admitted that such a forecast cannot do more than give a general impression, but the weakness of the usual civic programme is always that the issues of the moment obscure more remote developments, so that there is a constant patching up without a comprehensive scheme in view. The value of an imaginative forecast, even if, as is inevitable, it is not entirely successful, is in drawing attention to the larger possibilities so that when there is a movement in any direction its ultimate development may be more easily recognized.

This brief explanation is necessary in order to make the fact clear that what would otherwise look to be sins both of omission and commission, are deliberate efforts to treat the subject in a broadly generalized and imaginative fashion, this appearing to be the course most needful at the present stage of the programme.

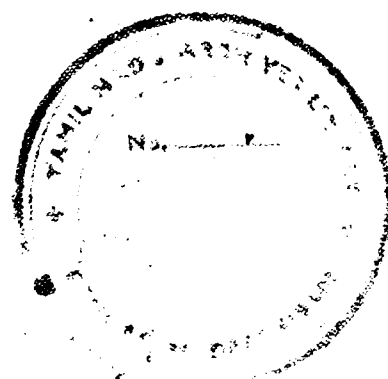
NOTE ON MADRAS SUBURBS.

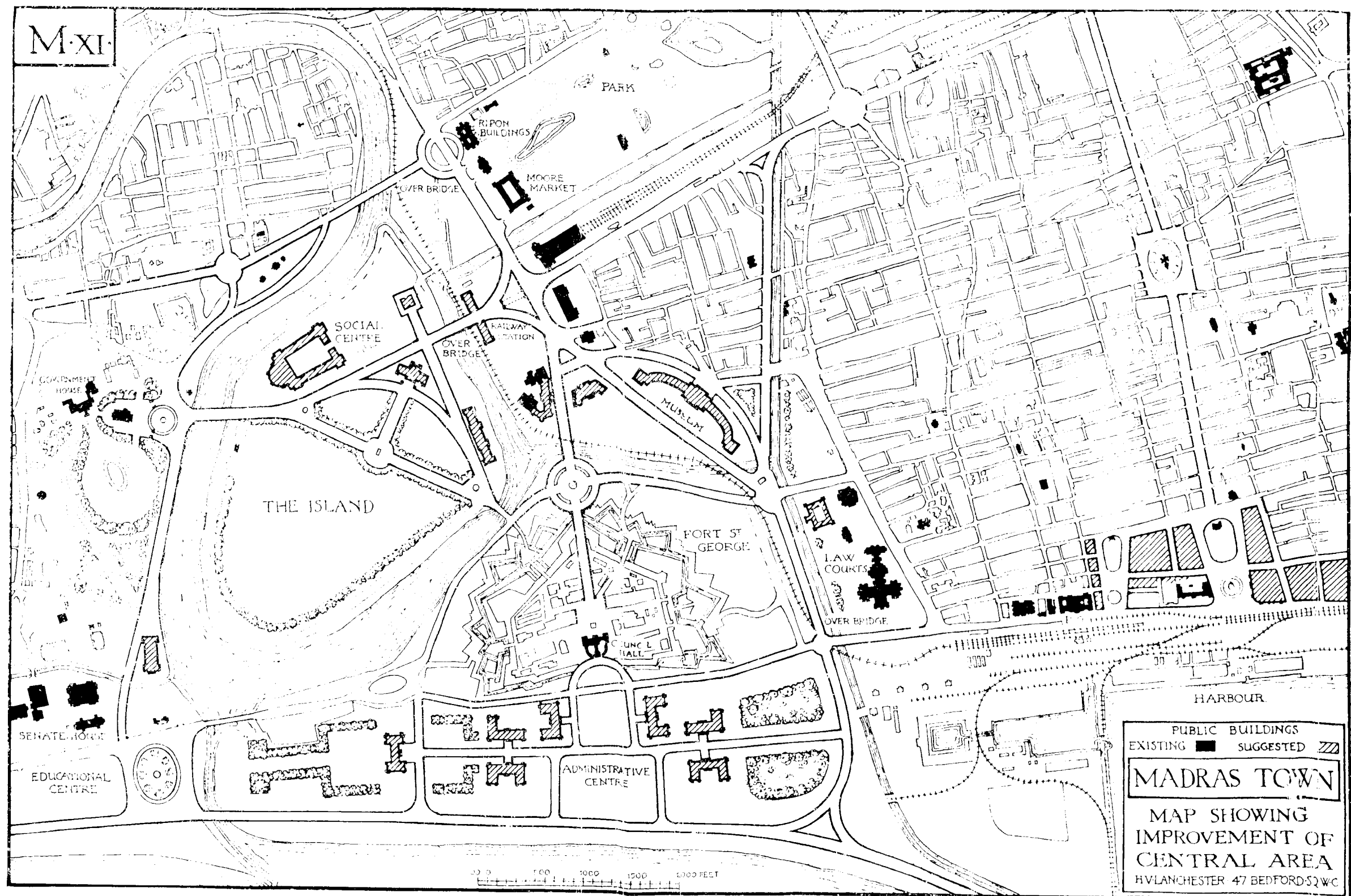
I have found that the information at my disposal is insufficient for the preparation of a comprehensive scheme for the suburban areas around Madras even if such a scheme could be made sufficiently definite to be of permanent value, which is doubtful.

Many of the defects in these areas could be rectified by the adoption and enforcement of suitable regulations, while those where extensions are at present taking place should be brought under the operation of a Town Planning Act as soon as practicable with a view to the laying out of a road system and the limitation of the amount of building permissible.

As specimens of what is economically practicable in the provision of roads, I have prepared two sketch schemes, one for the Mambalam extension, where a number of houses have been built without regard to access by road (this plan is in the hands of the Collector of Chingleput), and another showing a suggested road system for Siruvallur, etc. This latter being based on a survey made some time back must be regarded as a suggestion only.

If all the areas around Madras were to be definitely dealt with, some months should be devoted to survey and investigations, but it would probably be preferable to depute some competent officer to deal with problems as they arise from time to time, in order to avoid the elaboration of schemes that changing circumstances might render nugatory.





M.VII.

MADRAS TOWN

1 INCH = 1 MILE

SKETCH MAP SHOWING
GROUND VALUES

RS PER GROUND	
0 TO 100	
100 " 250	
250 " 500	
500 " 1000	
1000 " 1500	
1500 " 2000	
2000 " 5000	
OVER 5000	
18-15 GROUNDS=1 ACRE	



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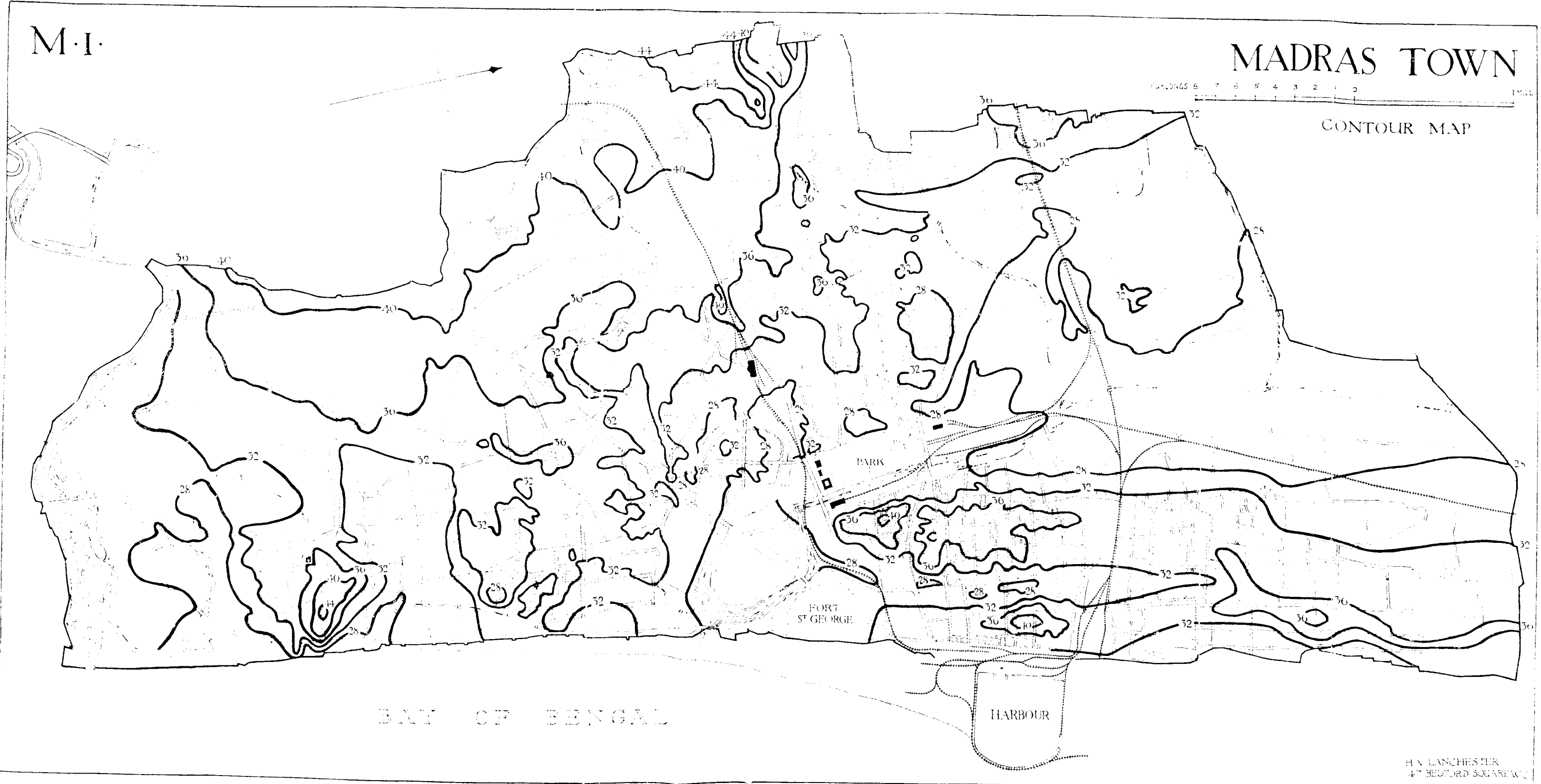
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M.I.

MADRAS TOWN

CONTOUR MAP

Scale in Fathoms 8 7 6 5 4 3 2 1 0



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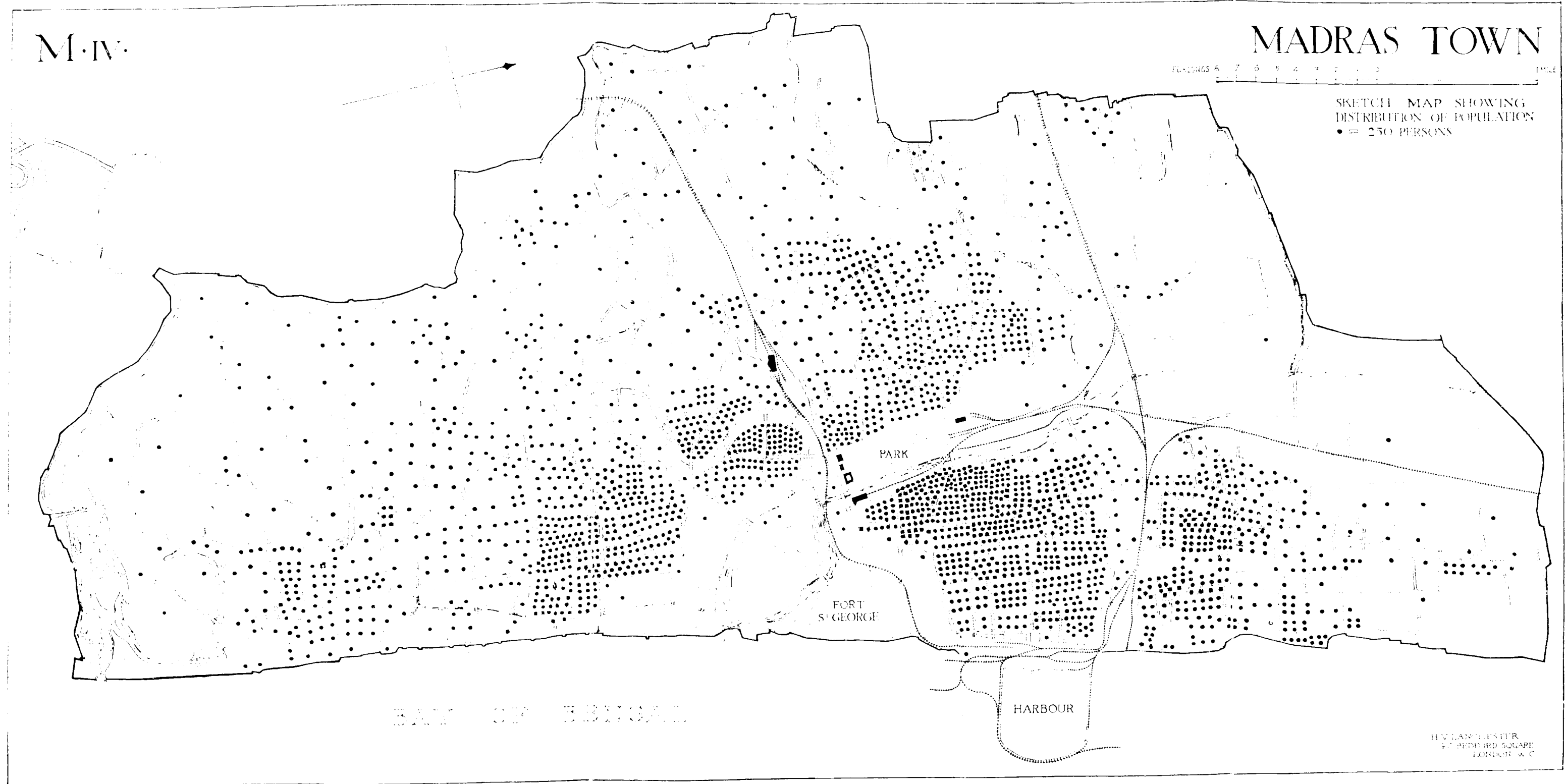
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M. IV.

MADRAS TOWN

FEET 1000 900 800 700 600 500 400 300 200 100 0

SKETCH MAP SHOWING
DISTRIBUTION OF POPULATION
• = 250 PERSONS



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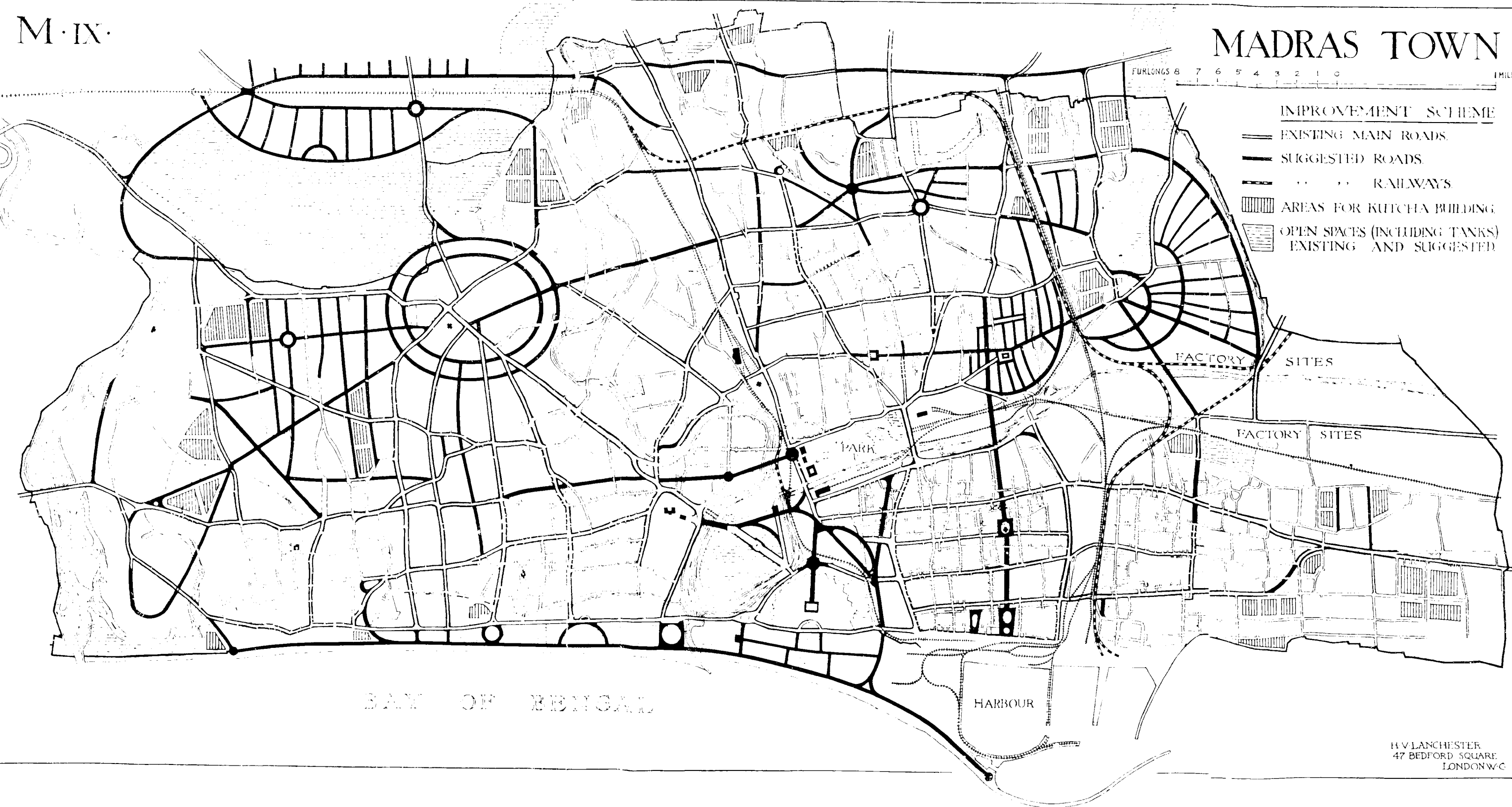
M·IX·

MADRAS TOWN

FURLONGS 8 7 6 5 4 3 2 1 0 1 MILE

IMPROVEMENT SCHEME

- EXISTING MAIN ROADS.
- SUGGESTED ROADS.
- RAILWAYS
- AREAS FOR KUTCHA BUILDING
- OPEN SPACES (INCLUDING TANKS)
EXISTING AND SUGGESTED



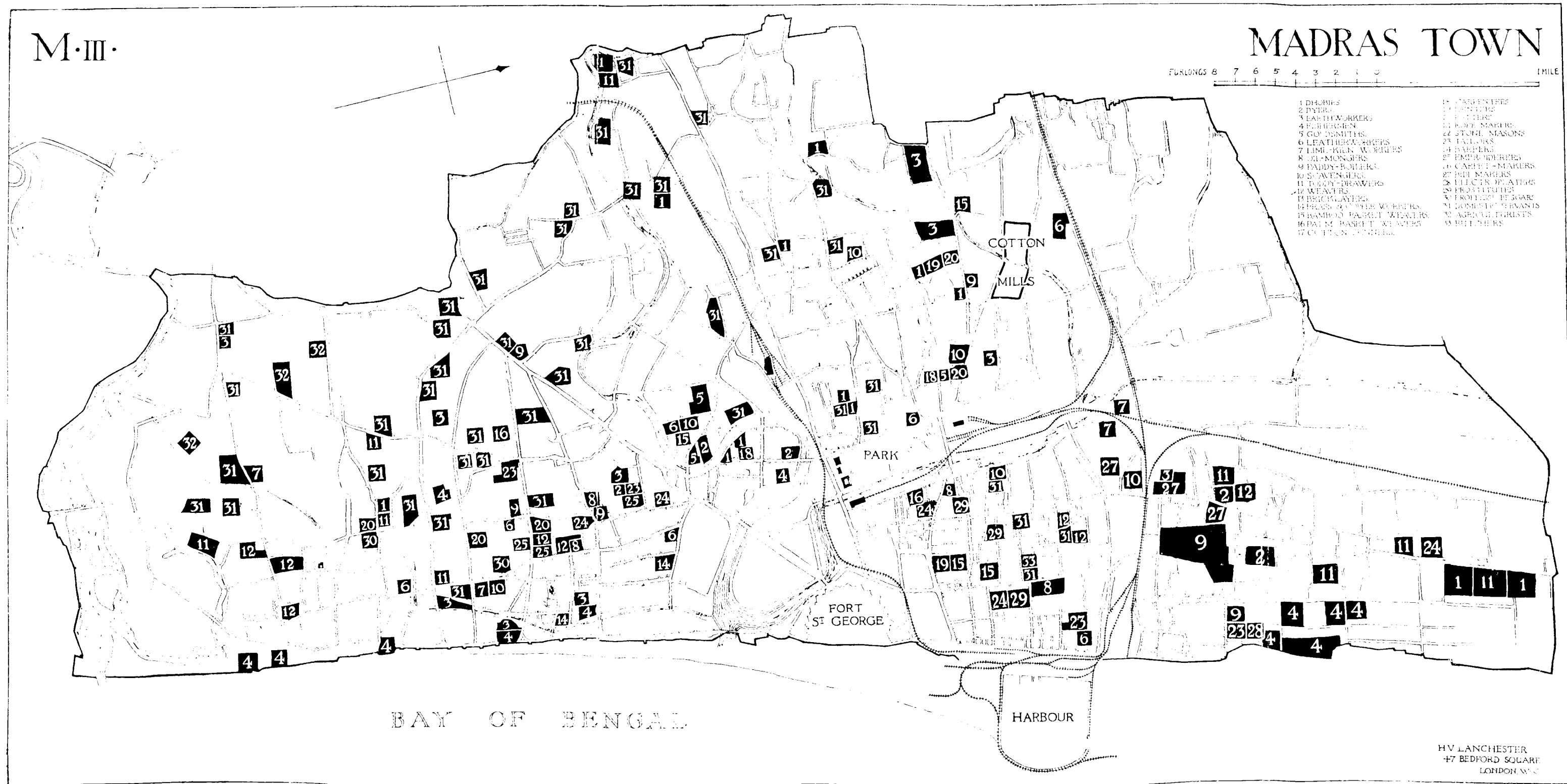
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M. III.

MADRAS TOWN

FURLONGS 8 7 6 5 4 3 2 1 0 MILE

- | | |
|--------------------|---------------|
| 1 DHOBI | 15 CARPENTERS |
| 2 DYER | 16 COINERS |
| 3 BATH WORKERS | 17 COINERS |
| 4 COBBLESTON | 18 COINERS |
| 5 GOV. DENTISTS | 19 COINERS |
| 6 LEATHERWORKERS | 20 COINERS |
| 7 LIMB. WORKERS | 21 COINERS |
| 8 JEWELLERS | 22 COINERS |
| 9 PAINTERS | 23 COINERS |
| 10 SADDLERS | 24 COINERS |
| 11 TOBACCO DRAWERS | 25 COINERS |
| 12 WEAVERS | 26 COINERS |
| 13 BRICKLAYERS | 27 COINERS |
| 14 BRICKLAYERS | 28 COINERS |
| 15 BRICKLAYERS | 29 COINERS |
| 16 BRICKLAYERS | 30 COINERS |
| 17 BRICKLAYERS | 31 COINERS |
| 18 BRICKLAYERS | 32 COINERS |
| 19 BRICKLAYERS | 33 COINERS |
| 20 BRICKLAYERS | 34 COINERS |
| 21 BRICKLAYERS | 35 COINERS |
| 22 BRICKLAYERS | 36 COINERS |
| 23 BRICKLAYERS | 37 COINERS |
| 24 BRICKLAYERS | 38 COINERS |
| 25 BRICKLAYERS | 39 COINERS |
| 26 BRICKLAYERS | 40 COINERS |
| 27 BRICKLAYERS | 41 COINERS |
| 28 BRICKLAYERS | 42 COINERS |
| 29 BRICKLAYERS | 43 COINERS |
| 30 BRICKLAYERS | 44 COINERS |
| 31 BRICKLAYERS | 45 COINERS |
| 32 BRICKLAYERS | 46 COINERS |
| 33 BRICKLAYERS | 47 COINERS |
| 34 BRICKLAYERS | 48 COINERS |
| 35 BRICKLAYERS | 49 COINERS |
| 36 BRICKLAYERS | 50 COINERS |
| 37 BRICKLAYERS | 51 COINERS |
| 38 BRICKLAYERS | 52 COINERS |
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| 40 BRICKLAYERS | 54 COINERS |
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| 57 BRICKLAYERS | 71 COINERS |
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| 70 BRICKLAYERS | 84 COINERS |
| 71 BRICKLAYERS | 85 COINERS |
| 72 BRICKLAYERS | 86 COINERS |
| 73 BRICKLAYERS | 87 COINERS |
| 74 BRICKLAYERS | 88 COINERS |
| 75 BRICKLAYERS | 89 COINERS |
| 76 BRICKLAYERS | 90 COINERS |
| 77 BRICKLAYERS | 91 COINERS |
| 78 BRICKLAYERS | 92 COINERS |
| 79 BRICKLAYERS | 93 COINERS |
| 80 BRICKLAYERS | 94 COINERS |
| 81 BRICKLAYERS | 95 COINERS |
| 82 BRICKLAYERS | 96 COINERS |
| 83 BRICKLAYERS | 97 COINERS |
| 84 BRICKLAYERS | 98 COINERS |
| 85 BRICKLAYERS | 99 COINERS |
| 86 BRICKLAYERS | 100 COINERS |



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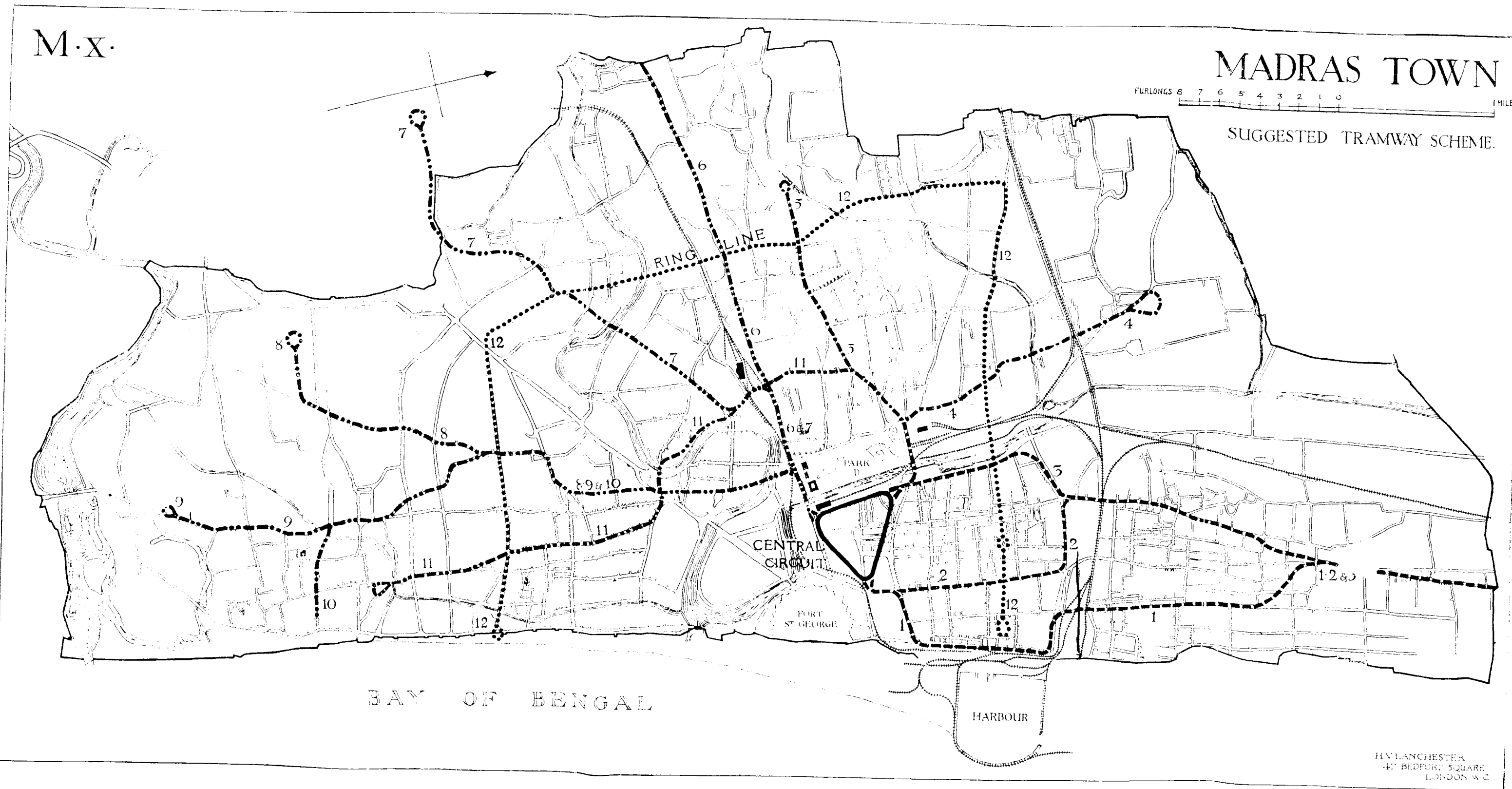
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M.X.

MADRAS TOWN

FURLONGS 8 7 6 5 4 3 2 1 0 1 MILE

SUGGESTED TRAMWAY SCHEME.



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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILE

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

BAY OF BENGAL

HARBOUR

MARSHALING YARD

TO BENGALETTA

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILES

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

BAY OF BENGAL

HARBOUR

MARSHALING YARD

TO BENGALURU

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILE

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

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HARBOUR

MARSHALING YARD

TO BENGALURU

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILE

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

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TO BENGALURU

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILE

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

BAY OF BENGAL

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILE

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILES

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILES

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

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MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILES

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

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M·VIII·

MADRAS TOWN

0 1 2 3 4 5 6 7 8 MILES

— SUGGESTED RAILWAYS
— CANALS & WATERWAYS

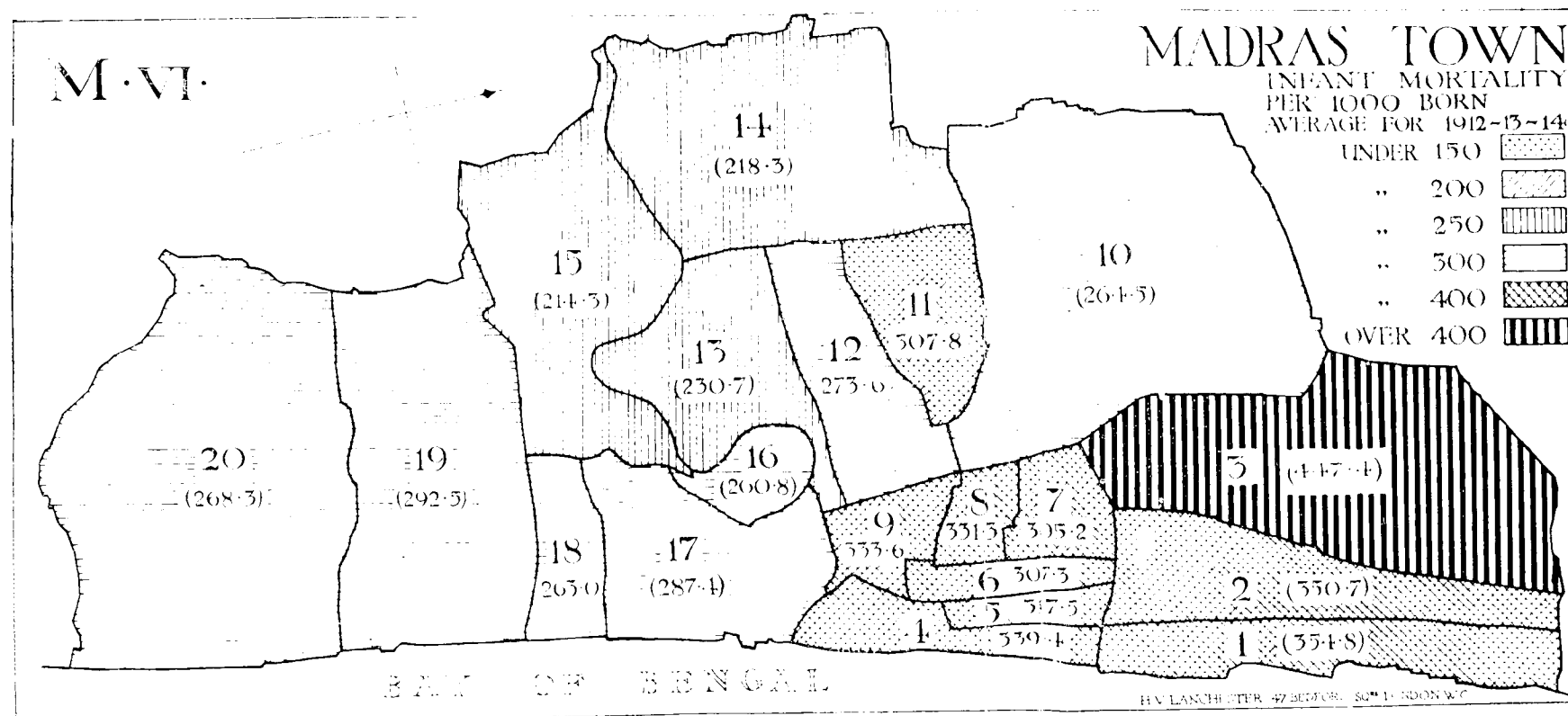
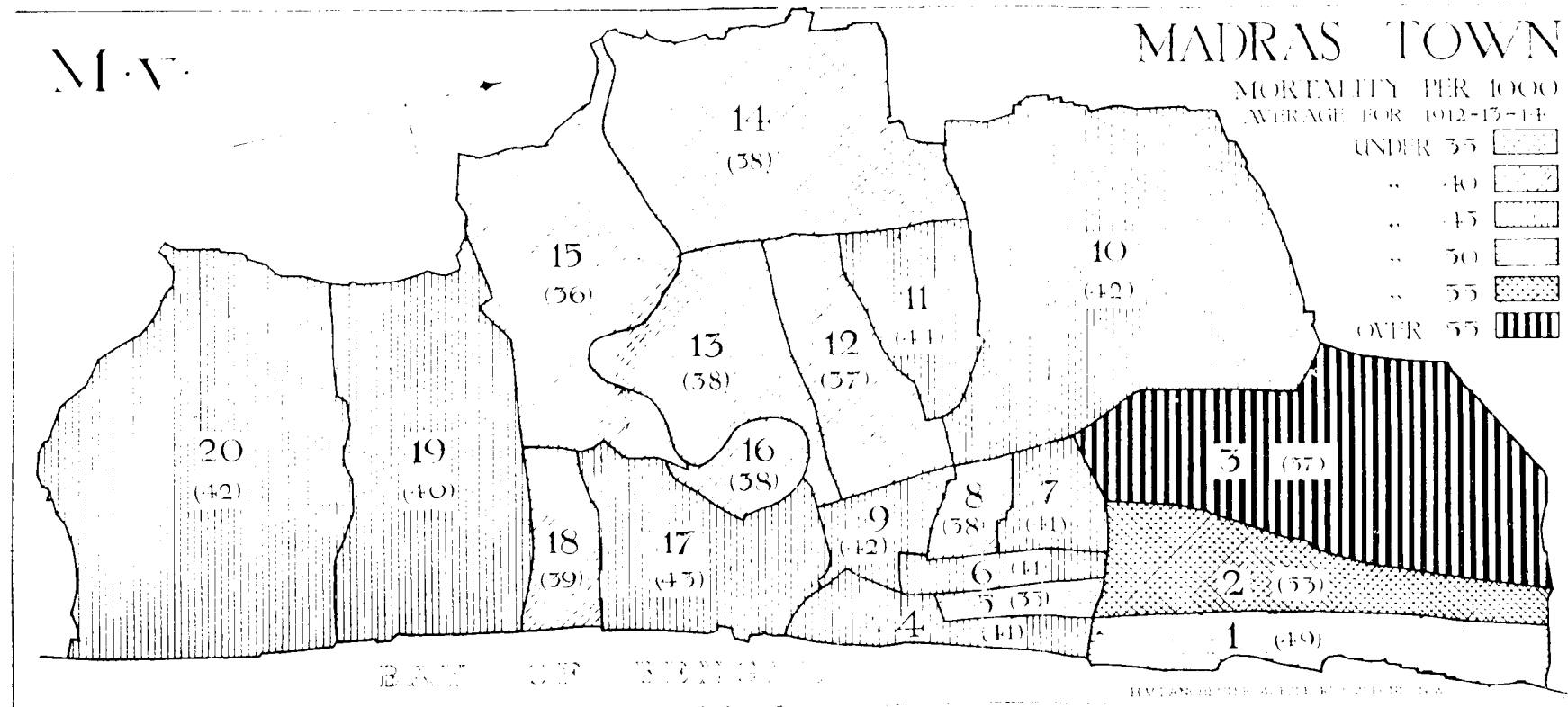
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HARBOUR

MARSHALING YARD

TO BENGALURU

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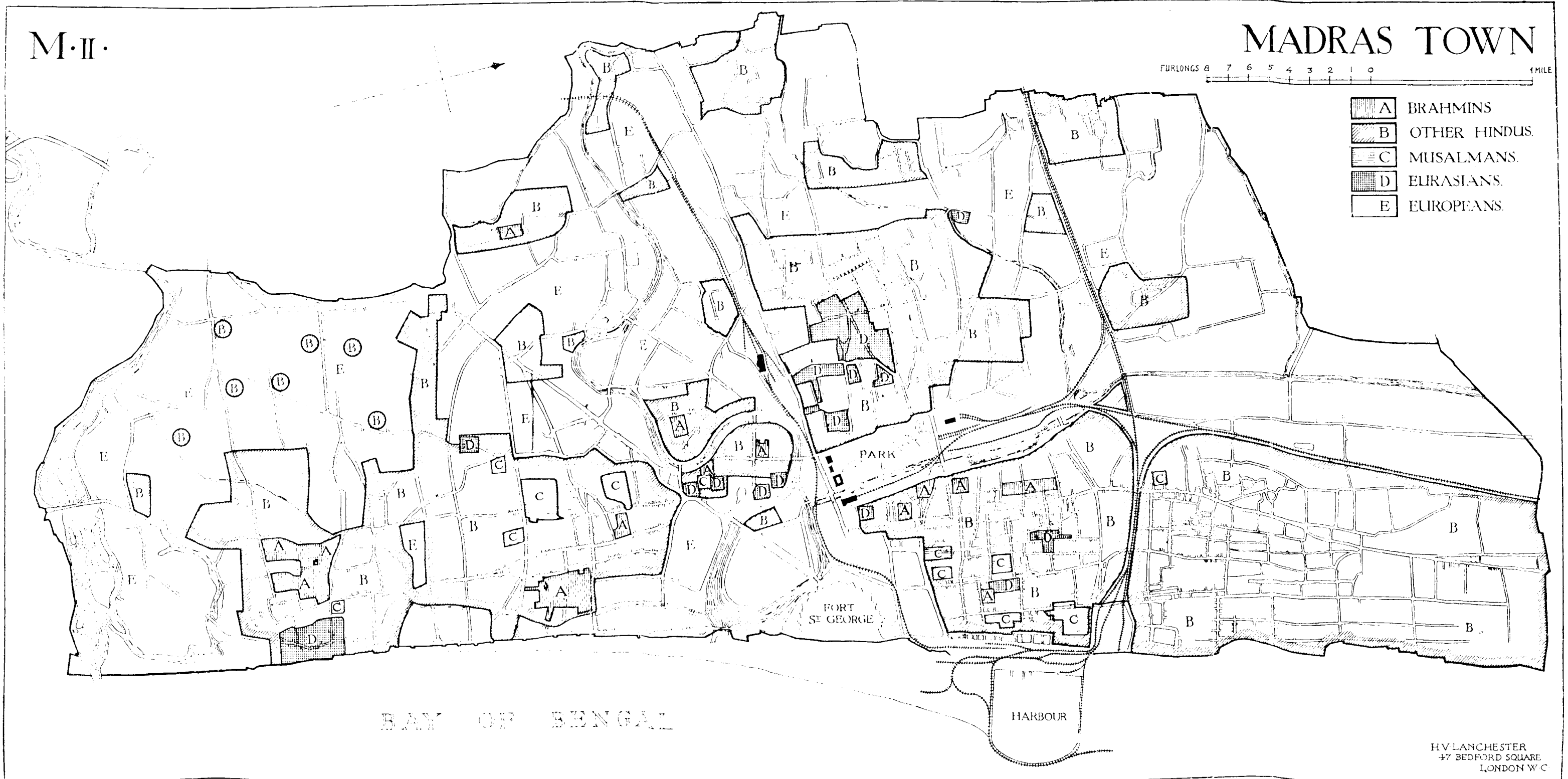
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M. II.

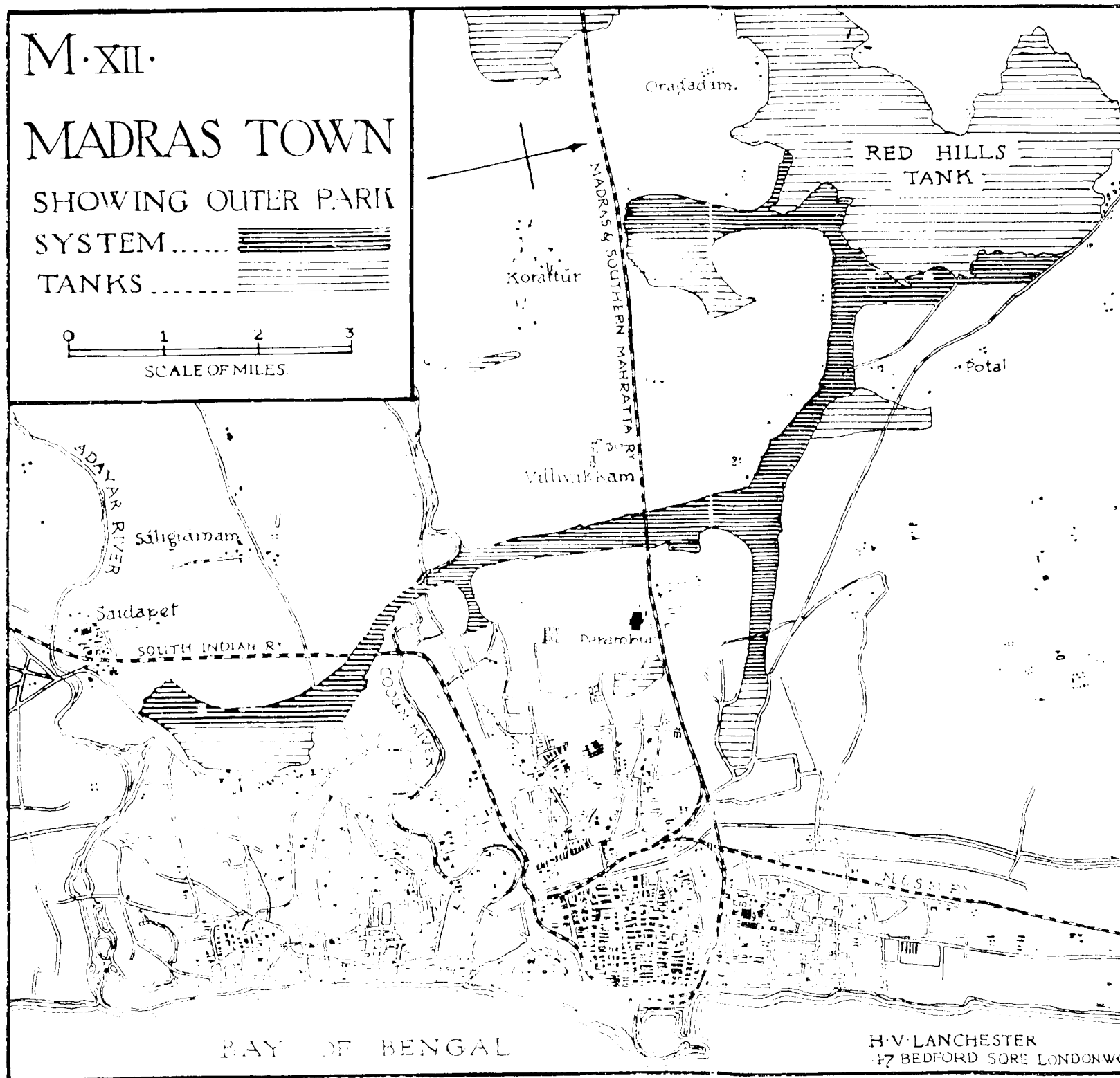
MADRAS TOWN

FURLONGS 8 7 6 5 4 3 2 1 0 1 MILE

- A BRAHMINS
- B OTHER HINDUS
- C MUSALMANS
- D EURASIANS
- E EUROPEANS



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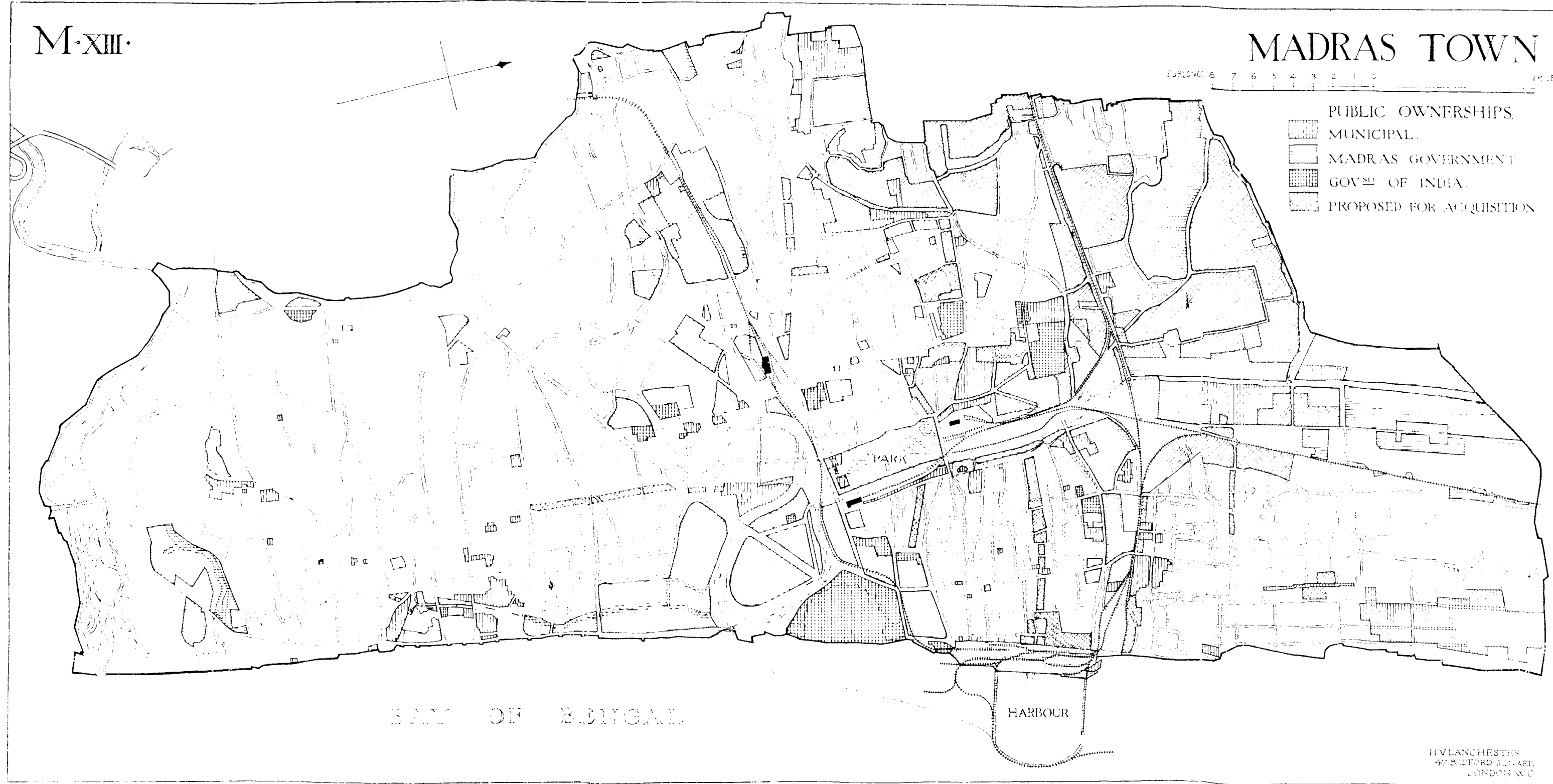
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M·XIII·

MADRAS TOWN

FURLONGS 8 7 6 5 4 3 2 1 0 MILES

- PUBLIC OWNERSHIPS
- MUNICIPAL
 - MADRAS GOVERNMENT
 - GOV^T OF INDIA
 - PROPOSED FOR ACQUISITION



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