A HOUSING PLAN FOR CAMBRIDGE, MASS.

. . .

THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
BACHELOR OF ARCHITECTURE IN CITY PLANNING

JOHN TASKER HOWARD

MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

MAY, 1935

JOHN TASKER HOWARD

Massachusetts Institute of
Technology
Boston, Massachusetts
May 17, 1935

Dean William Emerson
Massachusetts Institute of Technology
Boston, Massachusetts

Dear sir:

I herewith submit a thesis, entitled A HOUSING PLAN FOR CAMBRIDGE, in partial fulfillment of the requirements for the degree of Bachelor of Architecture in City Planning.

Very truly yours,

Signature redacted

PRELIMINARY PROGRAM MARCH, 1935

A HOUSING PLAN FOR CAMBRIDGE

City planners, unlike architects, do not have problems submitted to them as lists of requirements; the biggest part of city planning design, in actual practice, is to determine what the problem is. Similarly, I cannot submit a formal program for the problem I have set myself until the thesis is substantially completed. I can, however, suggest the procedure I intend to follow.

From a series of maps, showing population distribution, rentals, land, values, dwelling conditions, distribution of industrial employment, present zoning, location of schools, parks, and business centers, transportation routes and facilities, morbidity and mortality rates if available, and such other data as seems relevant, it will be possible to show what areas, now blighted, need relief from congestion and wrong land use, and what areas might be appropriate for rehousing in group low-cost dwellings the industrial population now inadequately housed. From this same material and such additional social data as becomes available it will also be possible to determine how many of the present population need rehousing, and what future increase must be accommodated. Since it is impossible to replan the whole city in the time allotted, certain basic considerations will be assumed without proof: namely,

that the present indusry is correctly located and will continue, and that present lines of communication do not need revision.

It will then be possible to choose certain definite sites for low-cost housing projects, enough to house the population estimated as needing such dwellings. These sites will each be adequate to contain an integral community -- or a community which might achieve integration -- big enough to need one elementary school, and properly provided with shopping facilities and adequate open and recreation spaces. It is estimated now that several such developments will be shown necessary.

One of these sites will be selected, preferably one for which physical and economic data as available; and the last few weeks of the thesis period will be devoted to designing, in the rough, one of the housing proposals. A sketchy financial set-up showing costs and rentals will be submitted, with drawings showing the type and disposition of buildings, at such a scale as will not suggest more detailed study than has actually been devoted to this, the less important part of the thesis. It is at this point that the city planner would normally call in an architect and a landscape architect to collaborate in the site-planning and detailed design. It is not my intention wo carry the problem further than I can do with knowledge and assurance.

. . . .

TABLE OF CONTENTS

PART TWO -- THE HOUSING PLAN

T A B L E S A N D G R A P H S

. . . .

PREFATORY NOTE

This thesis bears the relation to a housing survey and plan adequate to serve as a basis for action that a sketch problem bears to a finished projet. However I feel that it has been of more value to me than a less comprehensive subject more completely handled.

It may be well to point out that in this instance, contrary to the usage of architectural theses, the drawings are definitely supplementary to the written report, and have no meaning without it.

I wish to acknowledge the kindness of the Cambridge Board of Health, in permitting me to use their files in the preparation of the spot map of health statistics. (This map may not be reproduced or publicly exhibited without their express permission.)

I wish to express my indebtedness to the Cambridge ERA Planning Project, under the direction of Mr. Isidor Richmond. Access to the files of the Real Property Inventory Survey, and help in collating the raw data therein, were indispensible. However I am entirely responsible for this analysis and presentation of the data, and for the conclusions drawn from them. The assistance granted me can in no sense be construed as "criticism", or as contrary to the spirit of an independent thesis. In addition to this help I have spent of my own time almost exactly the scheduled amount, three hundred hours.

. . . . .

PART ONE

GENERAL SURVEYS

SOCIAL SURVEYS

PHYSICAL SURVEYS

INTRODUCTION

Every American city has a housing problem. Millions in Federal funds, available to be applied to housing, has made each city eagerly aware of its problem. Too often projects have been proposed, in the rush for these funds, without studying the problem behind, simply to provide employment, stimulate the construction industry, and restore real estate values -- in other words, as emergency recovery measures. And like so many recovery measures, though they are proposed in the name of the consumers of housing, they are engineered for the benefit of the producers. But whatever is built will last longer than the emergency. Structures that expect to endure half a century must rest on a firmer basis of diagnosis and prognosis. The nature and extent of the housing problem must be completely investigated, the future of the community must be gauged, and ultimate plans and ideals formulated. It will be necessary, in dealing with the present emergency, to compromise with those ultimates, to accept partial solutions of fragments of the total problem; but nothing must be done that will block the ultimate achievement. The value of any single project is measured not only in its own proper worth, but in its effect on the future of housing in its whole community. So no rash slum clearance and rehousing project must "peg" speculative land prices in a blighted area and commit that district to residential use for the next fifty years, until the costs have been counted, the alternatives considered, and the sacrifice to expediency fully recognized.

MINIMUM HOUSING STANDARDS QUOTED FROM MODERN HOUSING
BY CATHERINE BAUR

REQUIREMENT	MINIMUM STANDARDS
D E C E N C Y	
Shelter unit suited to population groupings	One structurally separate dwelling for each family or other natural unit.
Subdivision of unit for carrying on ordinary functions	Enough bedrooms so that parents, boys, girls can sleep separately. In addition, a living-room and a kitchen, or a living-kitchen.
Possibility of privacy	Relatively sound-proof walls.
	No windows looking directly into windows of other dwellings.
H E A L T H	
Facilities for cleanliness and sanitation	Running water and flush toilet within each dwelling. Toilet ventilated.
	Bath or shower either in the dwelling, in the building, or in the neighborhood (depends as much on local habits as on absolute standards).
Adequate air and cross-ventilation	No dwelling more than two rooms deep in any part, which in apartment-buildings ordinarily means no more than two dwellings per landing, if the stair-halls are also to be adequately ventilated.
	As large a glass area as climate and heating provisions make practical.
Purity of air	No noxious industrial or other fumes nearby.
	No heavy-traffic streets immediately adjacent.
Maximum light and adequate sun in all rooms and public corridors	No small courts. Definite proportion between height of buildings and open space between them.
Facilities for outdoor recreation	Play-spaces for small and larger children. Walks, parks, athletic provisions, gardens conveniently located for adults.

A M E N I T Y

Attractive outlook	Lawn and gardens visible from all windows.
	Preservation of natural features of site in the plan.
	No paved inner courts.
	No blighted or run-down areas adjacent.
Moderately prepossessing architecture (note that these are minima)	Buildings which more or less obviously fulfill their purpose, of good materials, and simple and direct design.
	Grouped harmoniously.
	Plan clear and simple to follow, both physically and with the eye.
Quiet	Adequately insulated walls.
	No major traffic street immediately adjacent.
	No noise-amplifying courtyards or side alleys.

C O M F O R T & C O N V E N I E N C E

Domestic	Rooms designed to accommodate furniture and living habits and to facilitate circulation and cleanliness.
	Closets, cupboards, kitchen equipment (especially apparatus for cooking and hot water).
	Laundry and drying facilities, either within the dwelling, within the building, or, if with additional labor-saving devices, centralized within the community.
	Electricity.
	Not too many stairs to climb. Say, no more than four stories or three flights.
	In cold climates, adequate heating provision.
	In hot climates, high enough ceilings.
Communal	Immediate or easy access to schools, necessary shops, cafés, and social centers.

	Work, let us say, not more than thirty minutes away at a maximum.
	Some facilities for choice of dwelling and location on part of tenant and therefore possibility of natural population groupings.

S A F E T Y

Firmness of construction	Adequate and workable building codes.
Play-space for small children without crossing a through street	Use of super-block, dead-end street, or large open block-interior.
Passably fireproof	Regulations against predominantly wood construction except for isolated low dwellings.
	Stairs and corridors wide and directly accesible to outside.
Permanent immunity from partial or total neighborhood "blight"	Communities planned, constructed, and administered continuously as a functional unit.

. . . . . .

(Note: These three pages are quoted verbatim from Modern Housing, by Catherine Bauer, pp. 142,143,144 -- Houghton Mifflin Company, 1934.)

I have inserted here a list of minimum standards for modern housing, quoted from Catherine Bauer. Judged by these standards, ninety-five percent or more of the population of America is inadequately housed. No program for immediate action can consider bringing all existing housing up to this level. We must begin with that part of the population whose present standards are lowest, who because of their living conditions are costing the cities untold thousands in tangible and intangible expenses. And we must build nothing that fails to meet rational minimum standards, or we may as well not build at all.

The study of a city's housing problem, to the end of providing large-scale, government-aided low-cost housing, falls roughly into two parts: a social survey, and a physical survey. The social survey tries to determine from present living conditions and social and economic trends what population needs new housing, now and in the future, and what sort of housing it needs. The physical survey tries to determine what areas now used for housing should be cleared, whether there should be rehousing or a change of use for these areas, and what new sites are suitable for other new housing.

This thesis consists of such a study of the Cambridge housing situation, with proposals for a definite skeleton housing plan, into which specific projects should be made to fit.

The social survey includes: an estimate of the course of population growth, and the amount and kind of new population

that will have to be housed; an estimate of the number of the present population that needs rehousing, based on the number now living in overcrowded or unhealthy conditions; an estimate of the rentals that must obtain in the new housing, based on industrial and social data.

The physical survey includes: an estimate of what blighted areas should be cleared or drastically rehabilitated, based on cost to the city in terms of health protection, police and fire protection, poverty, and tax delinquency, and on the intangible but no less important social costs; a choise of sites, on cleared land or new land, for possible housing projects, based on land costs, convenience to work or transportation, and the probable ultimate and desirable use and control of neighboring land.

Needless to say, the time allotted to this thesis has permitted me to make only a skeleton survey, a mere indication in each field of the sort of investigation it would be desirable to make. But it is enough basis of fact to induce certain strong conclusions, and to suggest certain tentative propositions.

. . . . .

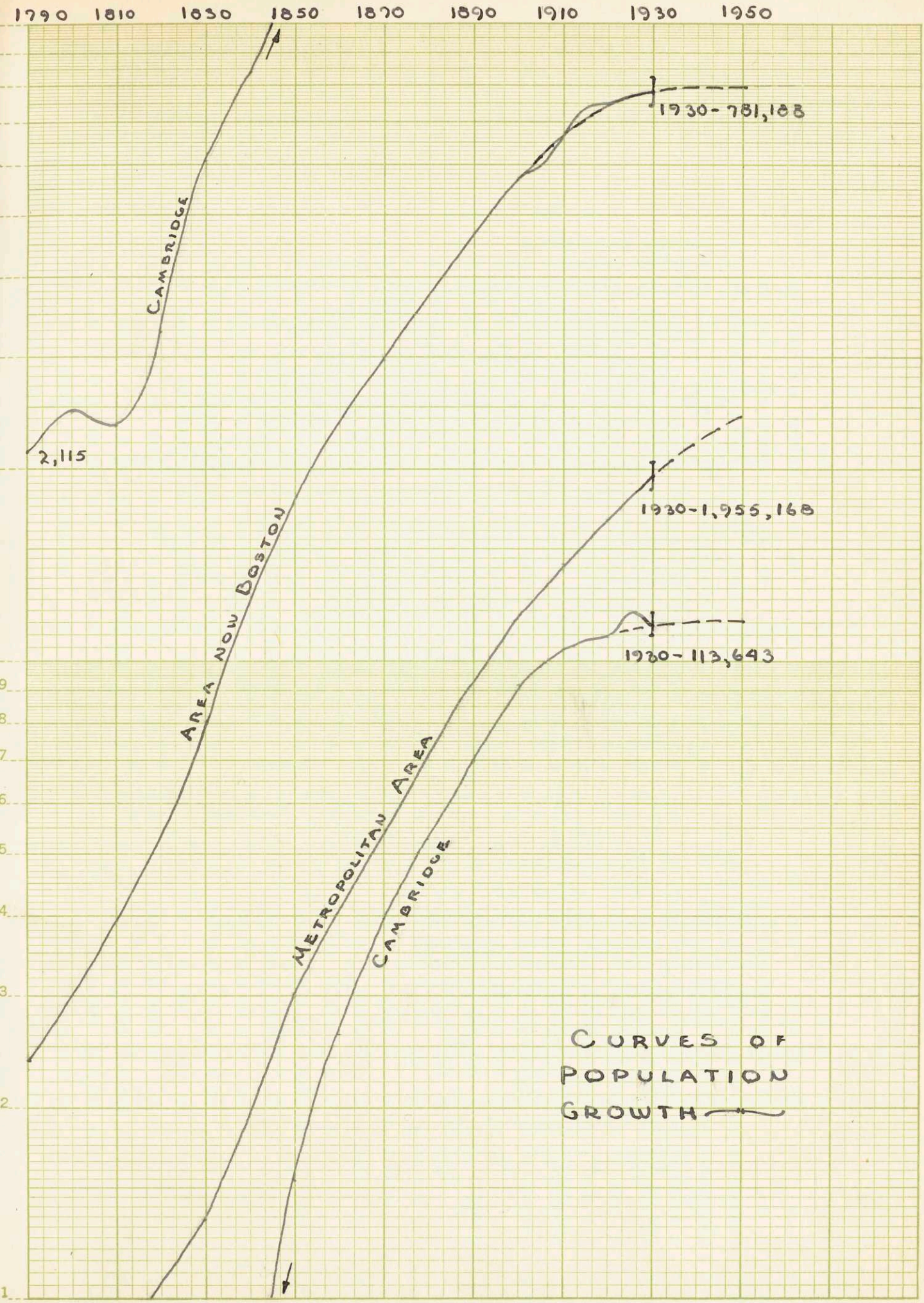
S O C I A L S U R V E Y S

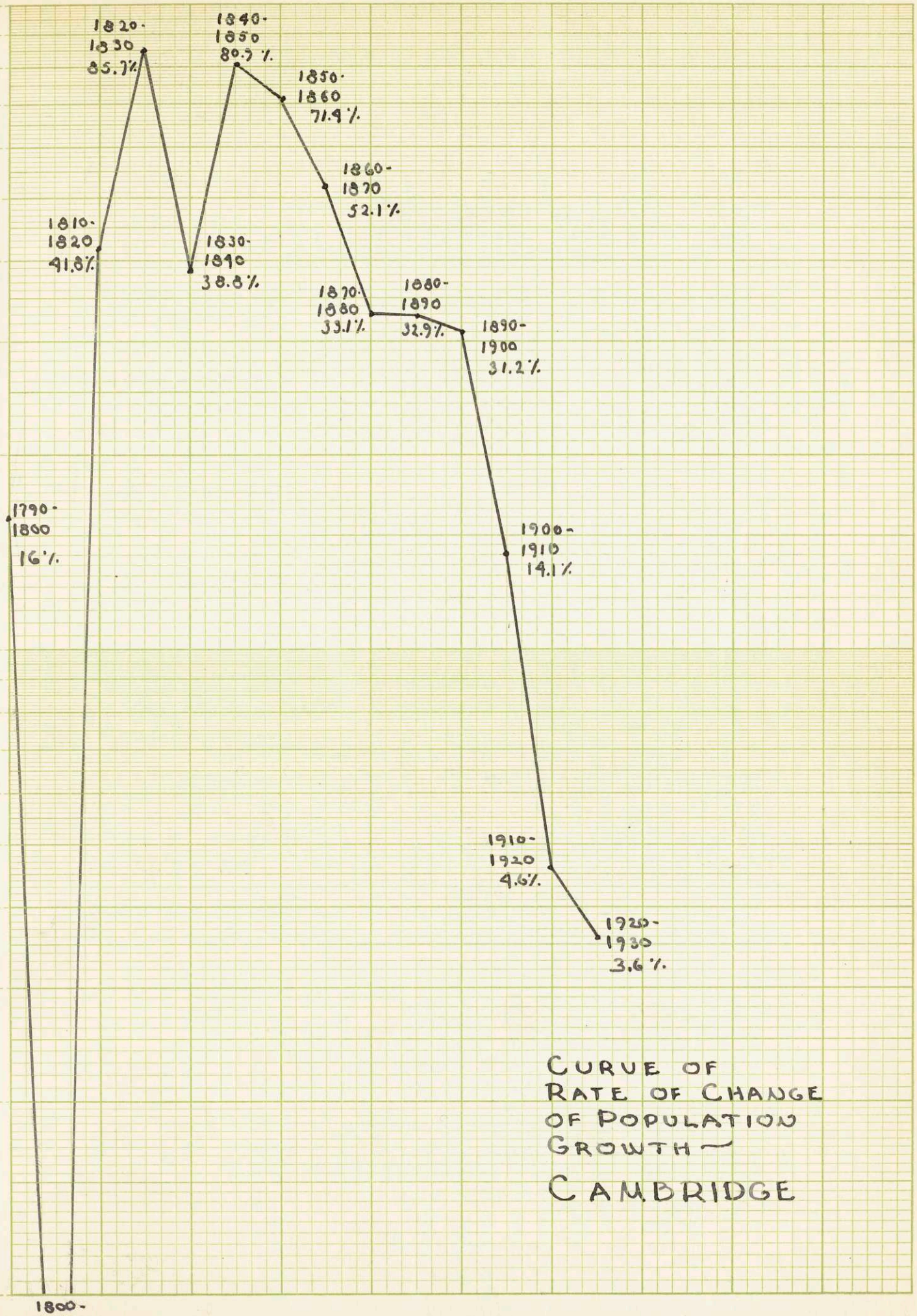
GENERAL SOCIAL SURVEY

Population

Since the early nineteenth century Cambridge has been an integral part of the Boston metropolis. Its evolution cannot be evaluated, nor its future growth predicted, without considering the region as a whole. The first population graph compares the rates of growth of Cambridge, of present Boston, and of the metropolitan region, from the time of the first federal census until today. Since 1850 none of the three has grown quite as fast as it did before; but the curves are substantially parallel, and the rates about equal, up until 1890. After that time both Boston and Cambridge fell off, while the region continued its rapid growth. From the appearance of the curves, it would seem that Boston and Cambridge are rapidly approaching a stable population, at the center of a metropolitan area which will not cease to grow for many decades. This is in accordance with the tendency toward decentralization, and the general slowing up of urban growth.

The second graph shows the changes in the rate of growth of Cambridge. There is a rough curve discernible, which, if produced, predicts successively smaller population increments in the years to come, and bears out the suggestion of the first graph.


1790
1810
1830
1850
1870
1890
1910
1930
1950
CAMBRIDGE
2,115
1930 - 781,188
AREA NOW BOSTON
1930 - 1,955,168
METROPOLITAN AREA
1930 - 113,643
CAMBRIDGE
CURVES OF POPULATION GROWTH



CURVE OF
RATE OF CHANGE
OF POPULATION
GROWTH —

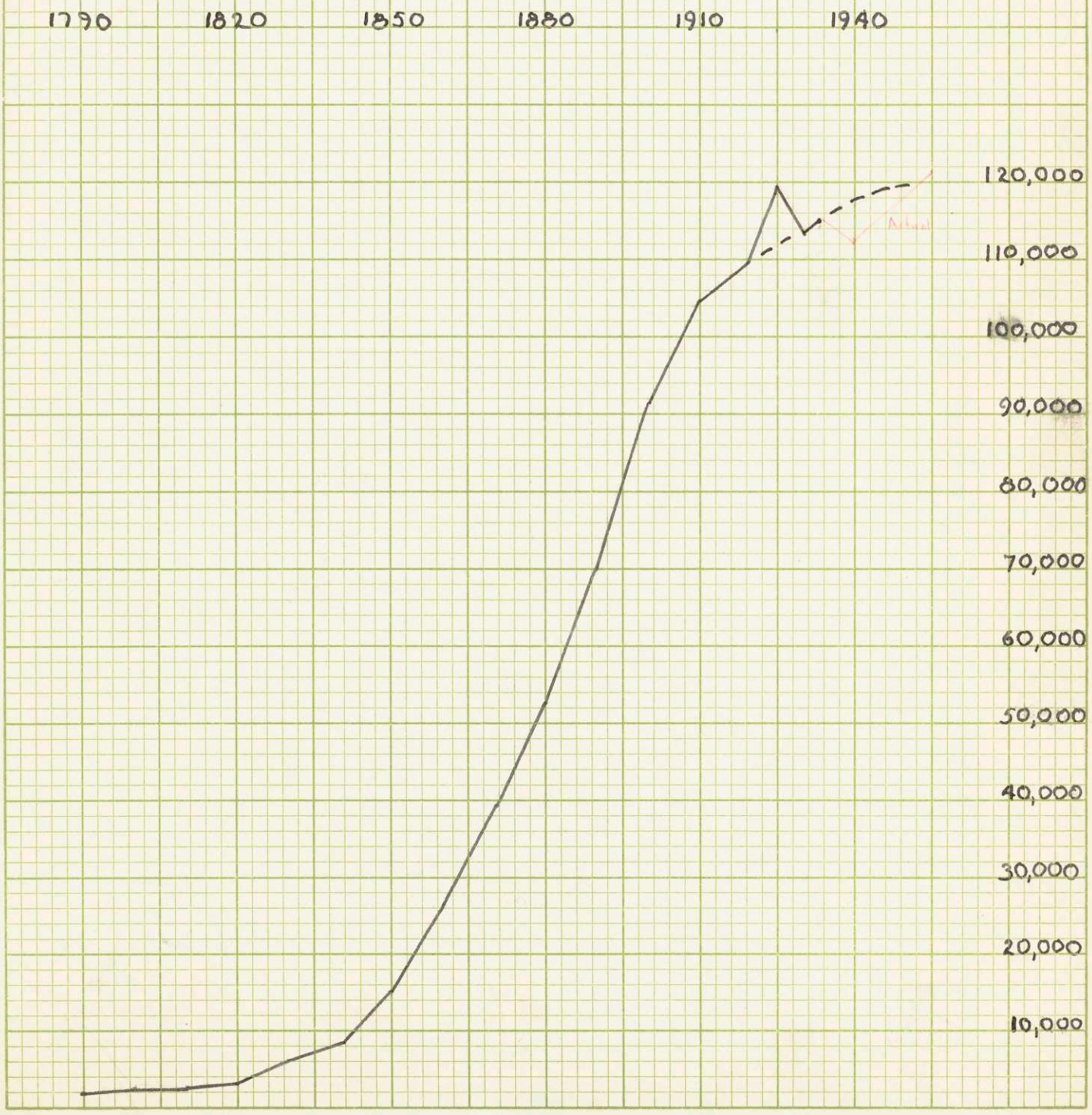
CAMBRIDGE

The third graph shows the actual growth of Cambridge, plotted to an arithmetic scale. The three charts together foreshadow fairly surely a stable population within two or three decades, probably near one hundred and twenty thousand, and surely less than one hundred and thirty thousand. This prediction assumes that no unusual occurrence will push up land values and demand a more intensive use of residential land; but such an occurrence does not seem probable. If Boston itself ceases to grow, not even a subway extension would increase the size of Cambridge much; its use as a dormitory is limited by its attractiveness, and suburbs farther out, more open and less developed, are very little less accessible. If the Boston region is properly planned and guided toward recentralization rather than unwieldy half-measure decentralization, there is no reason why the growth of the region as a whole should necessitate more intense development in Cambridge. Influx of new industries might be reason for immigration of workers; but in spite of large areas zoned for industry, in my opinion they will not come. The industrial future of New England is not bright, either immediately or in the distance; the whole country is probably near the end of the era of rapid industrial expansion. Recently Cambridge, like the rest of New England, has lost several industries; I do not think that future excess of immigrant over emigrant concerns will be enough to jog the growth curve out of line.

POPULATION GROWTH

CAMBRIDGE

1790 - 1933



POPULATION GROWTH
CAMBRIDGE

1790	2,115
1800	2,453
1810	2,323
1820	3,295
1830	6,072
1840	8,409
1850	15,215
1860	26,060
1870	39,634
1880	52,669
1890	70,028
1900	91,886
1905	97,434
1910	104,839
1915	108,822
1920	109,694
1925	119,669
1930	113,643

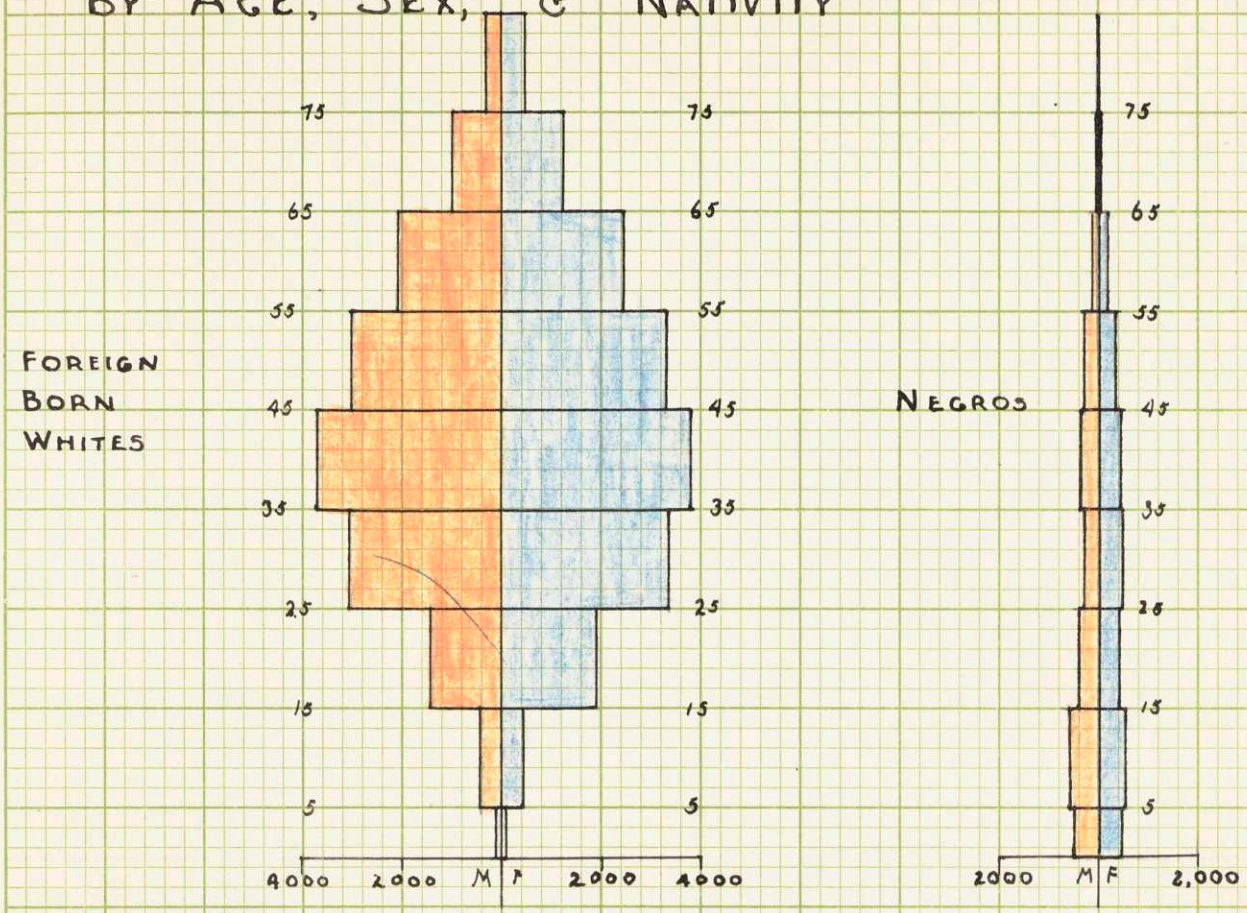
The chart showing population composition by age, sex, and nativity does nothing more than to affirm the normality of Cambridge. The age distribution, the sex distribution, the proportion of negroes and foreign-born whites, all are what one expects to find in an industrial city of New England.

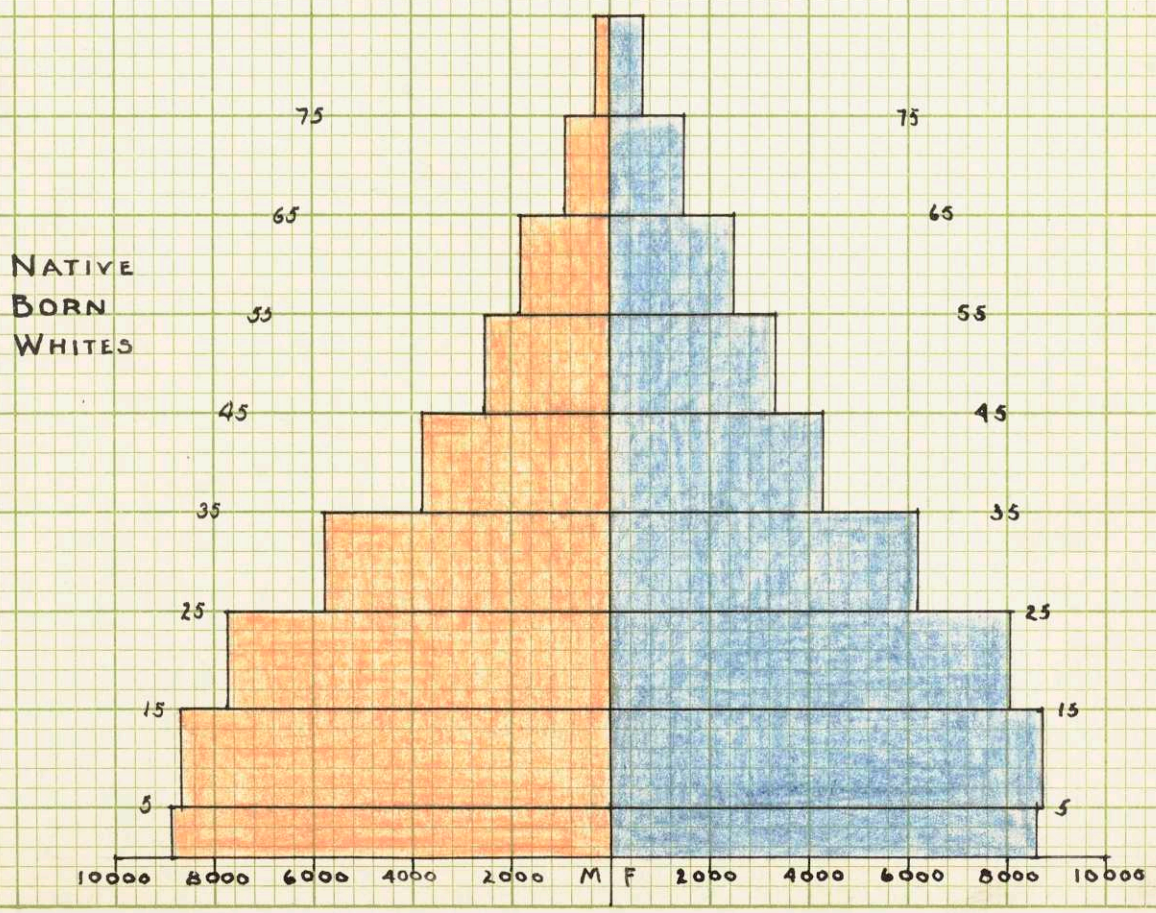
The table of distribution of foreign-born whites and native-born whites of foreign parentage, by country of origin, shows no large group difficult of assimilation. The Irish and the Canadians are the largest groups of foreigners, but they present no social problem. No other national group is large enough to merit separate consideration in the preparation of a housing plan. There is a considerable negro quarter, for which a more complete study might turn up individual needs.

The table of occupations shows 45% of the population gainfully employed, again a normal figure. 42% of these are industrially employed. This is lower than, for instance, the percentage for industrial Essex County, and the proportion of population engaged in trade, business, and professions is accordingly higher. This is natural in a part of a metropolis, whose chief concern is always business. Many white-collar workers live in Cambridge and work in Boston. However most of those industrially employed who live in Cambridge also

POPULATION COMPOSITION - CAMBRIDGE - 1930

BY AGE, SEX, & NATIVITY





FOREIGN BORN WHITE POPULATION BY COUNTRY OF BIRTH
CAMBRIDGE, 1930

England	1,373	Russia	1,181
Scotland	924	Lithuania	1,160
Wales	55	Latvia	62
Northern Ireland	559	Finland	38
Irish Free State	6,701	Rumania	73
Norway	118	Greece	628
Sweden	797	Italy	3,428
Denmark	67	Portugal	1,811
Netherlands	31	Armenia	350
Belgium	25	Palestine, Syria	56
Switzerland	27	Turkey	145
France	132	Canada - French	1,672
Germany	329	Canada - Other	7,582
Poland	1,181	Newfoundland	1,084
Czechoslovakia	24	Azores	339
Austria	70	All Other Countries	308

Total Foreign Born White -- 32, 330

NATIVE WHITE POPULATION OF FOREIGN OR MIXED PARENTAGE
BY COUNTRY OF BIRTH OF PARENTS
CAMBRIDGE, 1930

England	2,300	Russia	1,297
Scotland	961	Lithuania	1,285
Wales	99	Latvia	65
Northern Ireland	1,201	Finland	46
Irish Free State	13,943	Rumania	86
Norway	125	Greece	653
Sweden	755	Italy	5,167
Denmark	100	Portugal	2,040
Netherlands	42	Armenia	285
Belgium	22	Palestine, Syria	67
Switzerland	38	Turkey	100
France	220	Canada - French	2,594
Germany	867	Canada - Other	6,843
Poland	1,656	Newfoundland	856
Czechoslovakia	29	Azores	414
Austria	139	All Other Countries	321

Total Native White of Foreign Parentage -- 44,616

(Figures from the United States Census, 1930)

PERSONS OVER TEN YEARS OF AGE GAINFULLY OCCUPIED, CAMBRIDGE
STATISTICS FROM THE UNITED STATES CENSUS

Occupation	1910	1920	1930
Manufacturing Industries	20,214	21,262	21,645
Agriculture, Forestry, Fishing	598	254	286
Food and Allied Industries			1,686
Chemicals and Allied Industries			1,421
Printing and Publishing			1,774
Electrical Machinery and Apparatus			427
Rubber Goods			2,630
Iron and Steel Industries			1,982
Clothing Industries			780
Building Industry			3,323
Auto Factories and Repair Shops			930
Shoes and Other Leather Industries			645
Textile Industries			463
Paper and Allied Industries			233
Miscellaneous Metal Industries			311
Industrial Hand Trades			407
Other Manufacturing Industries			3,231
Transportation Industries	4,102	4,453	4,513
Construction and Maint. of Streets			354
Garages, etc.			337
Steam and Street Railroad Lines			1,208
Telephone and Telegraph Companies			908
Other Transportation, Postal Service			1,706
Trade, Business, Professional	15,062	18,377	16,805
Banking, Brokerage			959
Insurance and Real Estate			1,090
Auto Agencies, Filling Stations			362
Wholesale, Retail, and Other Trade			6,549
Other Trade Industries			315
Other Public Service			1,851
Other Professional and Semiprofessional			5,677
Service Industries	7,033	5,633	7,220
Recreation and Amusement			456
Hotels, Restaurants, Board, Houses, etc.			2,101
Laundries, Cleaning and Pressing			553
Other Domestic and Personal Service			4,110
Industries Not Specified			1,081
All Industries	46,845	50,009	51,262

work in Cambridge. This is a conjecture based on the check between the total inhabitants industrially employed (in 1930, 21,645) with the total workers employed by Cambridge concerns (in 1930, 19,364); when the number of building workers (not included in the second figure) is subtracted from the first figure, there is a balance of about 1,000 persons working in Cambridge and living elsewhere.

Economic Conditions and Trends

The table, Manufacturing Industries of Cambridge, shows the major industries, in order of importance according to number of employees. Soap, electric machinery, candy, bread and bake-stuffs, books, rubber goods -- these are the principal products. These industries bid fair to be permanent. All are relatively stable from the point of view of demand; there are no reasons for violent fluctuations of production, no reasons for any of them to fold up or move away, and no reasons for any of them to grow much. The graph and the figures in the table show changes due to the depression, and also a long-time trend. The period of the graph is from one depression in 1923 to another in 1933. The number of establishments, the capital invested, the value of stocks and materials, the value of products, all went up with the boom, and down with the debacle. But it is significant that, throughout the boom, the wages paid and the number

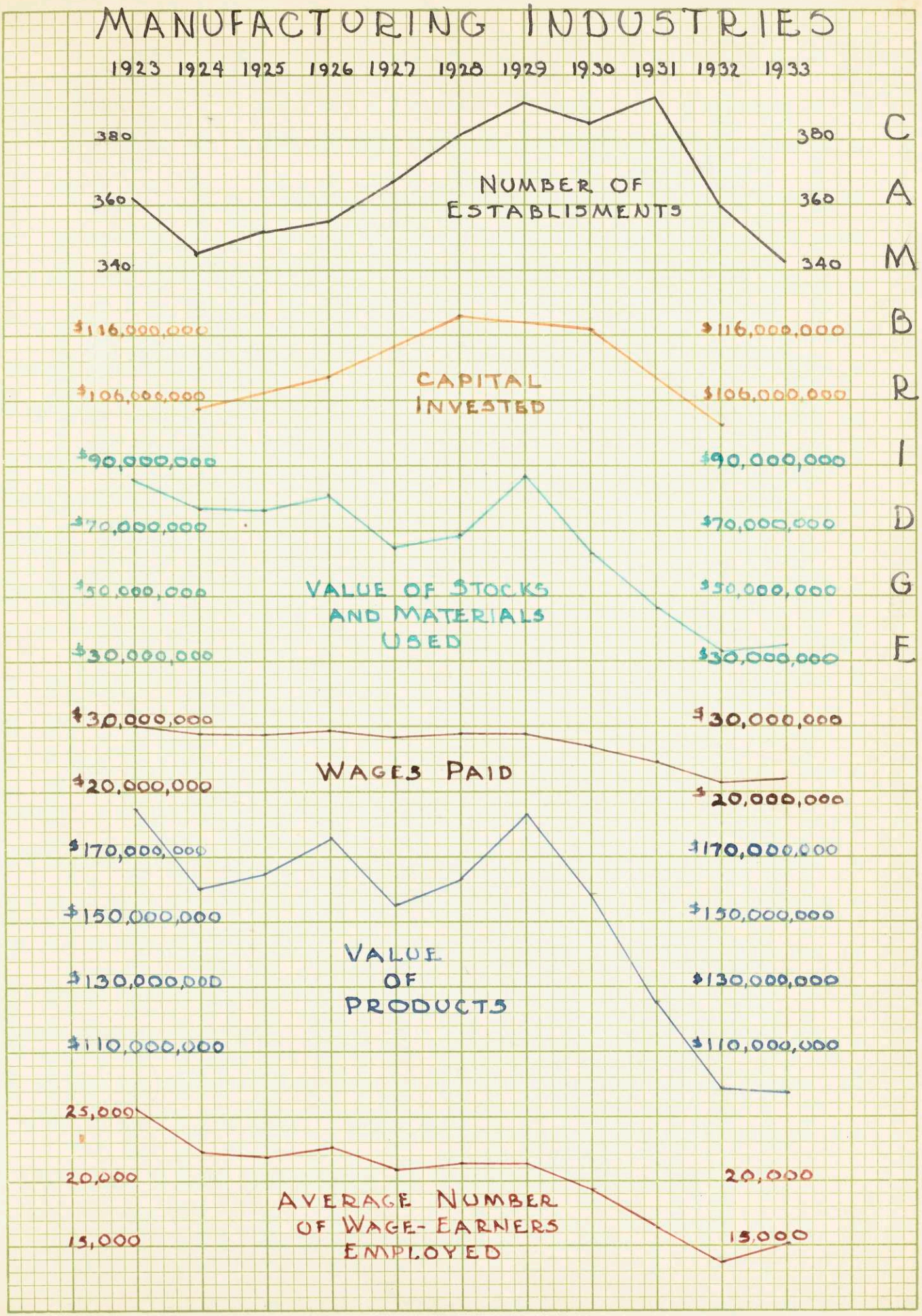
MANUFACTURING IDUSTRIES OF CAMBRIDGE
STATISTICS FROM THE MASSACHUSETTS DEPARTMENT OF LABOR AND INDUSTRIES

Years	Number of Establishments	Average Number of Wage-earners Employed	Amount of Wages Paid During the Year
1923	362	25,674	$30,998,512
1924	345	22,253	27,896,129
1925	352	21,945	27,409,194
1926	355	22,703	28,769,050
1927	367	20,929	26,334,300
1928	381	21,357	27,012,927
1929	391	21,328	27,438,962
1930	385	19,364	24,519,334
1931	393	16,229	19,060,792
1932	359	13,875	13,662,429
1933	342	15,095	14,102,984

Years	Capital Invested	Value of Stock and Materials Used	Value of Products
1923		$86,562,748	$185,524,463
1924	$104,586,319	77,048,531	160,029,223
1925		76,650,886	165,833,197
1926	109,655,200	81,366,021	176,027,871
1927		64,727,355	155,476,507
1928	119,143,104	69,546,579	163,449,805
1929		86,714,088	183,609,785
1930	116,884,824	63,690,200	158,557,028
1931		46,256,058	125,458,484
1932	100,219,009	33,909,977	98,485,092
1933		34,853,253	97,931,556

Principle Industries Included: 1933

Industry	Average Number of Wage-earners Employed (not published)
Soap	" "
Electrical Machinery and Apparatus	2,281
Confectionery	1,764
Bread and other Bakery Products	1,605
Printing and Publishing	1,496
Rubber Goods	458
Foundry and Machine-shop Products	299
Furniture	281
Bookbinding and Blank-book Making	236
Boxes, Paper	148
Clothing, Men's	136
Plumbers' Supplies	134
Ice Cream	96
Copper, Tin, and Sheet-Iron Work	83
Structural and Ornamental Metal Work	6,078
Other Industries (includes first two)	


MANUFACTORING INDUSTRIES
1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933
380
360
340
NUMBER OF ESTABLISMENTS
$116,000,000
$106,000,000
CAPITAL INVESTED
$90,000,000
$70,000,000
$50,000,000
$30,000,000
VALUE OF STOCKS AND MATERIALS USED
$30,000,000
$20,000,000
WAGES PAID
$170,000,000
$150,000,000
$130,000,000
$110,000,000
VALUE OF PRODUCTS
25,000
20,000
15,000
AVERAGE NUMBER OF WAGE-EARNERS EMPLOYED
CAMBRIDGE

of wage-earners employed decreased steadily. Increased industrial efficiency and mechanization explains this. But if not even 1929 could bring greater volume of employment to Cambridge, it is doubtful if the gloomy future will raise the figure. Even a new industry or two would only serve to take up some of the slack since 1923. Since the population has not dropped since 1930, we may assume that there are still twenty-odd thousand who are available for industrial employment in Cambridge; but this table shows only fifteen thousand employed in 1933. With this much leeway, it seems safe to predict that even substantial industrial recovery will not bring about an appreciable increase in the industrial population of Cambridge.

The table of Wage Data is based on returns from most of the important Cambridge concerns; the figures may be taken as typical of the city. Industrial wages vary from seventeen to twenty-five dollars a week; the average is $20.90, for the winter of 1934-35. This average has fluctuated since 1923 from twenty-five dollars, in 1929, to eighteen dollars, in 1933. This applies to the twenty-thousand wage-earners in industry -- or to that three-quarters that are employed. Wages in trade, and in the service occupations, are about a dollar a week higher.

WAGE DATA FOR CAMBRIDGE
STATISTICS FROM THE MASSACHUSETTS DEPARTMENT OF LABOR AND INDUSTRIES
FROM A CANVASS OF REPRESENTATIVE ESTABLISHMENTS

WINTER, 1934-35

Class of Employment	Number of Establishments	Average Weekly Wage
Manufacturing	95	$20.90
Bread and Other Bakery Products	7	17.88
Chemicals and Allied Products	5	21.07
Confectionery	8	17.10
Electrical Machinery (incl. Radio)	3	22.37
Printing and Publishing	10	25.40
All Other Industries	62	21.83
Trade	109	$22.27
Department and Dry Goods Stores	4	14.27
Groceries, etc. -- Wholesale	30	27.33
All Other Groups	75	21.33
Municipal Employment	1	$30.73
Building Contractors	39	$23.57
All Other Classes	39	$22.10
Laundries	10	16.40
All Others	29	23.93
Totals for Cambridge	283	$22.00

(Note: These statistics, and those entitled "Manufacturing Industries of Cambridge", taken from figures published by the Massachusetts Department of Labor and Industries, refer to wage-earners employed in Cambridge, ragardless of place of residence.)

These general considerations dealing with the growth, composition, occupation, and wages of the population have their bearing on the housing problem. That problem is here limited to the low-income group, for whom mass, government-aided housing seems to be necessary. This low- income group is predominantly industrial workers. The preceding paragraphs strongly suggest that this group in Cambridge is fairly stable in number, that any future growth in population will be among the white-collar classes whose housing, however inadequate, must be left for the present to private enterprise. Accordingly we may deal with the low-cost housing problem as it stands, without fear of aggravation from further congestion. And the population to be rehoused is a part of this great group, supported by twenty-thousand industrial workers and numbering at least sixty thousand, whose average family income is now about twenty dollars a week, and will never, even in boom days, be more than twenty-five.

. . . . . .

HOUSING NEEDS

Population in Unfit Dwellings

The most obvious class that needs rehousing is that of people now living in dwellings unfit for habitation. The Real Property Inventory Survey recorded such dwellings, and an analysis of the data shows 1,200 people living in buildings so listed, in the fall of 1934. That survey, however, conducted by ERA labor largely untrained, could not be expected to be accurate in its diagnosis of structural conditions; a partial supplementary survey, made by a competent engineer, showed that many of the buildings listed as "Needing Structural Repairs" should have been classified as "Unfit for Habitation". Analysis of this partial survey discloses relationships which permit a fairly accurate estimate of 1,800 people more, living in unfit quarters, giving a total of 3,000 who ought to be immediately rehoused.

Overcrowded Population

A study of overcrowded living conditions was made from the data gathered by the Real Property Inventory Survey, to determine how many people need new housing from this point of view. The first thing that appears is that there is no actual housing shortage; vacancies run over nine percent for the city as a whole, and higher in the cheaper parts. If there is overcrowding, it is because people cannot afford to spread out into the empty dwellings.

CALCULATION OF THE OVERCROWDED POPULATION OF CAMBRIDGE
DATA FROM THE REAL PROPERTY INVENTORY SURVEY (1934)

Total Population (in R.P.I. Jurisdiction) -- 100,818

Median Density per Room	Population in Density Districts	Percent of Total Population
1.00 - 2.00	21,449	21.3%
.76 - .99	31,904	31.6%
.51 - .75	43,799	43.5%
0 - .50	3,066	3.6%

Method I

Study of samples of the first three types of districts covering about 20% of the population of each shows:

62.2% of population lives 1 or more per room in 1.0 - 2.0 districts
48.4% " " " " " " " " " .76 - .99 "
22.8% " " " " " " " " " .51 - .75 "

Applying these percentages to the total population in each type of density district,

62.2%	of 21,449	equals	13,400
48.4%	" 31,904	"	15,430
22.8%	" 43,799	"	9,990
(2.2%	" 3,066)	"	80
			38,900

38,900 people in Cambridge live 1 or more per room.

Method II

As a check of the above figure, calculating from the total for the city of dwelling units in the categories of 1 or more persons per room.

Total number of dwelling units -- 30,531
Dwelling units having a density of 1 or more persons per room
25.66% of the total -- 7,842

Density District	Percent of Total Dwellings Crowded	Percent of Total Population Crowded	Ratio
1.0 - 2.0	36.2%	62.2%	1.72
.76 - .99	29.4%	48.4%	1.64
.51 - .75	15.2%	22.8%	1.50

Weighting these ratios of the percent of total population crowded to the percent of total dwelling units crowded according to the percent of the total population in each density district:

Density District	Ratio	Percent of City Total Population	Product
1.0 - 2.0	1.72	21.3%	.366
.76 - .99	1.64	31.6%	.519
.51 - .75	1.50	43.5%	.652
0.0 - .50	(1.20)	3.6%	.043
			1.580

1.58 is the ratio for the city as a whole, of percent of total population crowded to percent of total dwelling units crowded.

1.58 times 25.66% equals 40.5%, percent of the total population of Cambridge that is crowded.

40.5% of 100,818 equals 40,800

40,800 people in Cambridge live 1 or more per room.

Average of Method I and Method II -- 40,000

Due to a fault in the statistical technique of the directors of the R.P.I. project, persons living precisely 1 per room were included in the category 1.01 - 2.00, which I have here relabeled 1.0 - 2.0.

A sample comparison of the number of crowded rooms with the number of crowded people shows that 50% of the population listed as crowded live precisely 1 per room, and that 50% average 1 1/2 persons per room.

50% of 40,000 equals 20,000

The overcrowded population of Cambridge, density averaging 1 1/2 persons per room, numbers

20,000.

A map shows the city divided up according to the Median Density per Room that prevails in each area (the unit of measure was the assessor's block). A comparison of this map with the population spot map shows the close relation that exists between absolute density and density relative to dwelling accommodations.

The accompanying two pages of calculations show how the figure of 20,000 persons was reached, as the number in overcrowded quarters. (This blanket figure includes the doubled-up families shown on the map of Dwelling Occupancy.) However, density taken alone is not a fair criterion of inadequate living conditions; for high-cost apartments are often characterized by high density per room, although they offer -- according to present urban standards -- excellent conditions. Therefore it is only a part of the overcrowded 20,000 with which a low-cost housing project would be concerned.

The rents which people are now paying offers a key, not only to the worst present living conditions, but also to the rents that must prevail in the housing that replaces them. Sample studies show the following current rents in dwellings listed by the Real Property Inventory Survey as overcrowded, in the various density districts (which are distinguished on the map).

Density Districts Persons per Room	Population at 1 1/2 per Room	Rent per Rm. per Mo.	Rent per Pers. per Mo.
1.0 - 2.0	8,300	$3.95	$2.60
.76 - .99	8,030	4.70	3.15
.51 - .76	3,900	8.80	5.90

The (.51 - .75) districts coincide with the better parts of Cambridge geographically, and the higher average rent suggests that these people, though crowded, command decent living conditions. If they should be rehoused, at a density of one person per room, they could afford to pay $6.00 per room per month. But the 16,000 people in the other districts could afford only $3.00 per room per month. (Statistics have not been tabulated, but the majority of these lowest rentals do not include heat. If heat were furnished this allowable rental could be raised to $3.75 per room per month, in group dwellings with central heating.) It would obviously be easier to rehouse the less poor; but it is the more poor, living in the crowded and otherwise unsatisfactory areas, that need the housing most, and that will cost the city most if they are left alone. The map showing Average Rentals per Room per Month makes clear the geographical relation of low rents and high density, both absolute and relative.

Here, then, are 16,000 people to be relieved, people whose means are so little that no private enterprise, not even a limited dividend corporation, could give them new housing. Of the 3,000 people who are living in unfit dwellings,

seventy-five percent are overcrowded and fall within this number too. The average rent for the rest is in the same low brackets. The total, then, is about 17,000, whose housing needs must be the concern of governmental agencies. Their average wage is $20 a week or less; it will never be much more. The size of their families varies from 4 to 12, averaging 5.6. If they are to be rehoused at a density of one person per room, they cannot pay more than $3.75 per room per month.

. . . . . .

PHYSICAL SURVEYS

HOUSING CONDITIONS

Population Distribution

The spot map of Population Distribution illustrates clearly the population groupings, according to the data of the Real Property Inventory Survey (which did not include hotels, boarding houses or clubs, nor, of course, the temporary student population). The highest density occurs in East Cambridge, in the industrial vicinity. It is the areas of greatest concentration that will provide not only the people to be rehoused, but also the blighted places that need clearing. However it may prove desirable to rehouse those displaced by clearance elsewhere.

The most crowded blocks house about two hundred and twenty persons per net acre. But any rehousing project in the industrial vicinity would have to duplicate this density in order to bring rents anywhere within reach of the factory workers; and it could be done, without falling short of minimum housing standards. Land crowding alone is not responsible for housing evils in Cambridge.

Real Property Inventory Survey

I have inserted here abstracts of the data gathered by the ERA Real Property Inventory Survey completed in the

DATA FROM THE REAL PROPERTY INVENTORY SURVEY (ERA PROJECT)
CAMBRIDGE, 1934

THE CITY AS A WHOLE

STRUCTURES

Total devoted to Residential Purposes -- 11,585

In need of Structural Repair --	1,496	12.9%
Unfit for Habitation --	216	1.9%

Average Number of Dwelling Units per Building -- 2.7

DWELLING UNITS

Total -- 30,531

Occupied - Owner --	6,059	19.84%
Rental --	21,446	70.24%
Vacant --	3,026	9.92%

Total Number of Persons (in R.P.I. Jurisdiction) -- 100,818
Number of Doubled-up Units -- 586
Average Number of Persons per Family -- 3.63

Monthly Rentals

$5.00 to $9.99 --	221	.9%	$30.00 to $39.99	4,564	18.6%
$10.00 to $14.99 --	1,679	6.8%	$40.00 to $49.99	3,055	12.5%
$15.00 to $19.99 --	3,720	15.2%	$50.00 to $74.99	2,924	11.9%
$20.00 to $24.99 --	3,345	13.8%	$75.00 to $99.99	586	2.4%
$25.00 to $29.99 --	3,445	14.2%	$100.00 and over	331	1.3%
			Not Reported	602	2.4%

Average Rent per Unit $34.80
Median Rent per Unit $29.30

Density -- Persons per Room

.50 and under	5,230	17.13%	1.01 to 2.00 inc.	7,468	24.46%
.51 to .75 inc.	9,132	29.91%	2.01 to 3.00 "	365	1.2 %
.76 to 1.00 "	5,145	16.85	3.01 and over	9	.03%
			Not reported	3,182	10.42%

Median Density .51 to .75 inc.

Number of Rooms

1 Room	347	1.1%	6 Rooms	5,131	16.8%
2 Rooms	1,676	5.5%	7 "	1,899	6.3%
3 "	3,397	11.1%	8 "	1,141	3.8%
4 "	5,865	19.2%	9 " and over	2,147	7.0%
5 "	8,772	28.7%	Not reported	156	.5%

Average Number of Rooms per Unit 5.2
Median Number of Rooms per Unit 5

DATA FROM THE REAL PROPERTY INVENTORY SURVEY (ERA PROJECT)
CAMBRIDGE, 1934

DISTRICT NO. 1

STRUCTURES

Total devoted to Residential Purposes -- 3,924

In need of Structural Repairs	--	729	18.6%
Unfit for Habitation	--	131	3.3%

Average Number of Dwelling Units per Building -- 3.1

DWELLING UNITS

Total -- 11,974

Occupied - Owner		1,671	14.0%
Rental		8,788	73.4%
Vacant	--	1,515	12.6%

Total Number of Persons (in R.P.I. Jurisdiction) -- 39,270
Number of Doubled-up Units -- 223
Average Number of Persons per Family -- 3.7

Monthly Rentals

$5.00 to $9.99	200	1.7%	$30.00 to $39.99	1,151	9.6%
$10.00 to $14.99	1,446	12.1%	$40.00 to $49.99	824	6.9%
$15.00 to $19.99	2,742	22.9%	$50.00 to $74.99	747	6.2%
$20.00 to $24.99	1,897	15.8%	$75.00 to $99.99	31	.3%
$25.00 to $29.99	1,183	9.9%	$100.00 and over	5	
			Not Reported	77	.6%

Average Rent per Unit -- $27.80
Median Rent per Unit -- $22.00

Density -- Persons per Room

.50 and under	1,423	11.9%	1.01 to 2.00 inc.	3,610	30.2%
.51 to .75 inc.	3,081	25.8%	2.01 to 3.00 "	215	1.8%
.76 to 1.00 "	2,097	17.5%	3.01 and over	3	
			Not reported	1,545	12.9%

Median Density -- .76 to 1.00 inc.

Number of Rooms

1 Room	63	.5%	6 Rooms	1,827	15.3%
2 Rooms	538	4.5%	7 "	536	4.5%
3 "	1,466	12.3%	8 "	341	2.9%
4 "	3,104	25.9%	9 " and over	451	3.8%
5 "	3,620	30.3%	Not Reported	28	.2%

Average Number of Rooms per Unit 4.8
Median Number of Rooms per Unit 4

DATA FROM THE REAL PROPERTY INVENTORY SURVEY (ERA PROJECT)
CAMBRIDGE, 1934

DISTRICT NO. 2

STRUCTURES

Total devoted to Residential Purposes -- 2,669

In need of Structural Repair --	269	10.0%
Unfit for Habitation --	18	.7%

Average Number of Dwelling Units per Building -- 2.7

DWELLING UNITS

Total -- 7,022

Occupied --	Owner	1,241	17.7%
	Rental	5,016	71.5%
Vacant --		765	11.8%

Total Number of Persons (in R.P.I. Jurisdiction) -- 23,441
Number of Doubled-up Units -- 101
Average Number of Persons per Family -- 3.7

Monthly Rentals

$5.00 to $9.99 --	14	.2%	$30.00 to $39.99 --	1,269	18.1%
$10.00 to $14.99 --	154	2.2%	$40.00 to $49.99 --	620	8.8%
$15.00 to $19.99 --	690	9.8%	$50.00 to $74.99 --	632	9.0%
$20.00 to $24.99 --	903	12.9%	$75.00 to $99.99 --	79	1.1%
$25.00 to $29.99 --	1,190	17.0%	$100.00 and over --	29	.4%
			Not Reported --	201	2.9%

Average Rent per Unit -- $34.20
Median Rent per Unit -- $29.00

Density -- Persons Per Room

.50 and under	1,123	16.0%	1.01 to 2.00 inc.	1,662	23.6%
.51 to .75. inc.	2,126	30.3%	2.01 to 3.00 inc.	69	1.0%
.76 to 1.00 "	1,253	17.8%	3.01 and over	3	
			Not Reported	786	11.2%

Median Density -- .51 to .75 inc.

Number of Rooms

1 Room	131	1.9%	6 Rooms	1,178	16.8%
2 Rooms	426	6.1%	7 "	528	7.4%
3 "	666	9.5%	8 "	232	3.3%
4 "	1,283	18.3%	9 " and over	487	6.9%
5 "	2,089	29.8%	Not Reported	2	

Average Number of Rooms per Unit -- 5.1
Median Number of Rooms per Unit -- 5

DATA FROM THE REAL PROPERTY INVENTORY SURVEY (ERA PROJECT)
CAMBRIDGE, 1934

DISTRICT NO. 3

STRUCTURES

Total devoted to Residential Purposes -- 2,279

In need of Structural Repair -- 280 12.3%
Unfit for Habitation -- 37 1.6%

Average Number of Dwelling Units per Building -- 2.0

DWELLING UNITS

Total -- 4,653

Occupied -- Owner 1,499 32.2%
Rental 2,896 62.1%
Vacant -- 258 5.7%

Total Number of Persons (in R. P. I. Jurisdiction) -- 16,180
Number of Doubled-up Units -- 84
Average Number of Persons per Family -- 3.6

Monthly Rentals

$5.00 to $9.99 --	2		$30.00 to $39.99 --	934	20.1%
$10.00 to $14.99 -	25	.5%	$40.00 to $49.99 --	511	11.0%
$15.00 to $19.99 -	109	2.3%	$50.00 to $74.99 --	545	11.7%
$20.00 to $24.99 -	154	3.3%	$75.00 to $99.99 --	155	3.3%
$25.00 to $29.99 -	340	7.3%	$100.00 and over --	194	4.2%
			Not Reported --	185	4.0%

Average Rent per Unit -- $45.00
Median Rent per Unit -- $38.00

Density -- Persons per Room

.50 and under	1,154	24.8%	1.01 to 2.00 inc.	866	18.6%
.51 to .75 inc.	1,640	35.3%	2.01 to 3.00 inc.	33	.7%
.76 to 1.00 "	627	13.5%	3.01 and over	1	
			Not Reported	732	15.7%

Median Density -- .51 to .75 inc.

Number of Rooms

1 Room	57	1.2%	6 Rooms	1,077	23.1%
2 Rooms	180	3.9%	7 "	388	8.3%
3 "	312	6.7%	8 "	248	5.3%
4 "	513	11.0%	9 " and over	574	12.1%
5 "	1,212	26.0%	Not Reported	92	2.0%

Average Number of Rooms per Unit -- 5.9
Median Number of Rooms per Unit -- 6

DATA FROM THE REAL PROPERTY INVENTORY SURVEY (ERA PROJECT)
CAMBRIDGE, 1934

DISTRICT NO. 4

STRUCTURES

Total devoted to Residential Purposes	--	2,713	
In need of Structural Repair	--	218	8.0%
Unfit for Habitation	--	30	1.1%

Average Number of Dwelling Units per Building -- 2.6

DWELLING UNITS

Total -- 6,882	Occupied --	Owner	1,648	24.0%
		Rental	4,746	68.9%
	Vacant --		488	7.1%

Total Number of Persons (in R.P.I. Jurisdiction) -- 21,927
Number of Doubled-up Units -- 178
Average Number of Persons per Family -- 3.3

Monthly Rentals

$5.00 to $9.99 --	5		$30.00 to $39.99 --	1,210	17.6%
$10.00 to $14.99 --	54	.8%	$40.00 to $49.99 --	1,100	16.0%
$15.00 to $19.99 --	179	2.6%	$50.00 to $74.99 --	1,000	14.5%
$20.00 to $24.99 --	391	5.7%	$75.00 to $99.99 --	321	4.7%
$25.00 to $29.99 --	732	10.6%	$100.00 and over --	103	1.5%
			Not Reported --	139	2.0%

Average Rent per Unit -- $43.50
Median Rent per Unit -- $40.00

Density -- Persons Per Room

.50 and under	1,530	22.2%	1.01 to 2.00 inc.	1,330	19.3%
.51 to .75 inc.	2,285	33.2%	2.01 to 3.00 "	48	.7%
.76 to 1.00 "	1,168	17.0%	3.01 and over	2	
			Not Reported	519	7.5%

Median Density -- .51 to .75 inc.

Number of Rooms

1 Room	96	1.4%	6 Rooms	1,049	15.2%
2 Rooms	532	7.7%	7 "	447	6.5%
3 "	953	13.9%	8 "	320	4.7%
4 "	965	14.0%	9 " and over	635	9.2%
5 "	1,851	26.9%	Not Reported	34	.5%

Average Number of Rooms per Unit -- 5.25
Median Number of Rooms per Unit -- 5

fall of 1934. The city was divided into four districts for the purposes of the survey; and although the districts are not homogeneous, each has certain distinguishing characteristics. District No. 1 includes the areas most blighted, the factories and the homes of most of the factory workers. District No. 2 covers some of the same sort of territory, and also a medium-class residential area. District No. 3 includes the highest-cost residential parts of the city. District No. 4 is medium residence, largely for white-collar workers. The map entitled Political Subdivisions shows these four districts, as well as the division into assessor's blocks, which were the units for all the spot maps, and into wards, the units for the mortality and morbidity maps.

Vacancies and Dwelling Condition

The map entitled Dwelling Occupancy shows the distribution of the three thousand vacant dwelling units, as well as single-family units doubled up to hold two families. These vacancies constitute almost ten percent of the total thirty and a half thousand dwelling units. Their part in the rehousing of the underhoused 17,000 must be considered.

In the first place five hundred of these vacancies occur in buildings unfit for habitation; this leaves 2,500 livable vacant dwelling units.

The following table shows the results of an analysis of rents and number of rooms in vacant dwellings, based on the same density districts that were used in the study of overcrowding.

Density District	Dwelling Units	Habitable Vacancies	Number of Rooms	Average Rents per Rm. per Mo.
1.0 - 2.0	7,000	12.7% - 890	x 4.5 - 4,000	$3.60
.76 - .99	9,500	9.3% - 880	x 4.3 - 3,800	5.10
.51 - .75	13,000	5.5% - 720	x 5.4 - 3,900	6.70
0.0 - .50	1,000	(2%) - 20	x (5) - 100	
Total	30,500	2,510	11,800	

At these rates, none of the 17,000 underhoused could afford even the cheapest vacancies, unless they continued to be overcrowded. Yet these vacancy rents are more often than not lower than the rents now prevailing in occupied dwellings in the same blocks. This is especially true of the high-density, low-rent districts, where the percentage of vacancies is also high. This is hard to understand, unless the vacant dwellings are for some reason less desirable than the others; a review of the raw data, comparing the percentage of vacant dwellings needing structural repairs, or without sanitary fixtures, with a similar percentage for occupied dwellings, would probably prove this to be the fact.

In 1925 the population was over five thousand more than it now is, and that drop has taken place partly, I assume, in the class of industrial workers; this would help to explain the high percentage of vacancies in the workers' districts.

Wages relatively even lower than the low rents explain continued overcrowding in the face of room for expansion. This is one of the most important features of the Cambridge problem: namely, that there is not an absolute shortage of housing, but only a shortage of cheap housing within reach of industrial wage-earners. This means that rents are all-important in any new housing -- in fact, that no government-aided housing is warranted unless the rents are really low enough to reach the needy class.

Data for successive spot maps showing population movement are not available, but the map of vacancies throws some light. It is obvious that the blocks where vacancies are high are being to some extent abandoned, in spite of low rents, especially in the industrial districts. Yet industry is not expanding to take over these areas, and it is doubtful if it will do so. They are being left because of their physical condition: the map entitled Residence Delapidation shows that the number of buildings unfit for habitation and in need of structural repair is greatest in these same areas of high vacancies. The districts picked out on these two maps are clearly blighted districts, and "something should be done."

Health Conditions

Health conditions are a fair index of the cost to the city of certain areas, not only in direct nursing and hospitalization expenses, but in expenses resulting from the breeding of disease in other areas and the indirect, intangible costs of an unhealthy stock.

The spot map entitled Health Statistics showing pulmonary tuberculosis incidence and death, and infant mortality, over a five year period from 1930 to 1934 inclusive, is taken as an index of the health conditions in general which relate most closely to housing conditions. (The map shows only residents of Cambridge who died in the city, not residents who died elsewhere nor strangers who died here.) Here certain areas stand out as having a high rate, and these areas in some places overlap the areas emphasized by the Vacancies and Delapidation maps. The general Mortality and Morbidity Rates for 1933 confirm the conclusions, though being divided by wards they are not accurate enough to denote specific areas.

A proper health survey would be more detailed, taking into account the actual health costs as they appear in the city budget, and allocating them more or less accurately according to obtainable data.

. . . . . .

TABLE OF MORBIDITY AND MORTALITY RATES
CAMBRIDGE, 1933

Ward	Population	Area in Acres	Density per Acre	Morbidity Rate per Thousand	Mortality Rate per Thousand
1	17,266	421	41	3.1	6.9
2	12,864	406	31	3.0	10.9
3	9,080	122	73	3.3	11.2
4	8,905	158	56	3.1	8.2
5	9,636	320	30	4.8	10.0
6	9,364	205	45	3.6	10.0
7	8,517	301	28	2.7	9.4
8	6,946	268	25	2.1	9.6
9	11,383	905	12	2.3	8.3
10	10,184	554	18	2.8	8.7
11	10,746	520	21	2.1	11.9
Total	114,891	4,181	27	3.0	9.4

Note: Density is expressed in persons per gross acre; large vacant areas in certain wards are not compensated for.

GENERAL CONDITIONS AFFECTING HOUSING

Zoning

The map entitled Present Use Zoning shows little more than the lack of organic planning in the drafting of the zoning ordinance. With the map of Transportation Facilities to explain it, it is no more than a crystallization of the conditions existing when the law was passed, modified at will by spot zoning as shown, and by five-hundred-odd nonconforming uses which have been passed by the Board of Appeals (not indicated on the map). The unrestricted areas, intended for industry, in the eastern part of Cambridge follow the railroad and the old canals, and are reasonably well occupied by factories and warehouses; they are invaded very slightly by residential use, but the one outstanding spearhead of invasion (not strictly invasion, since the residential use preceded the zoning), between Main, Washington, and Moore Streets, is the sore spot of the whole city, from the point of view of density, dwelling condition, vacancies, tax delinquencies, and health. In the west end of Cambridge a large tract adjoining the Fitchburg Railroad has been zoned unrestricted, with the result that it and neighboring areas are already blighted before they have been developed, although the industries, but for six small factories, have not materialized. The ribbon commercial zoning along the main streets indicates and unfortunate existing condition, but it affects

present and future housing of the class under discussion less than the industrial zoning, and the residential zones have least effect.

Transportation Routes

The map of Transportation Routes shows the three approaches to Boston, along which the army of commuters must pass in trolleys, buses, subways, or private cars, cutting across the area where the factories are and where our 17,000 industrial workers in need of housing must live. The river boulevards help considerably, but the arteries remain; they still provide the shortest route to Boston for commuters without cars, so that these white collar workers try to live as close to them and to Boston as possible, crowding the industrial workers and keeping them in the blighted factory fringe. Here is a problem for comprehensive city planning. It would be desirable to take the factories and their workers out altogether, putting them in the other unrestricted district, or better still in a new satellite town on raw land, leaving Cambridge as a dormitory for Boston and the colleges. But this is impossible at the present, and improbable for a long time to come. Immediate housing schemes must submit to existing conditions. Sites for industrial housing must be accessible to industry; but they should not compete more than necessary with sites for commuters' housing. The administrative

difficulties of preserving industrial housing for the class for which it was built will be great enough as it is.

Location of Industries

The zoning map showed the general outline of the industrial area. The map entitled Industrial Employment shows more precisely the location of the factories where the class to be rehoused is employed. An area has been delimited on the map roughly half a mile from the centers of employment; industrial housing should come within this area. Sites as far away as the second, one-mile line would come within Bauer's "thirty minutes to work" requirement, but under any circumstances they would be inferior to closer sites, and the competition of white-collar housing in this case rules them out entirely. The problem is to place housing projects within the half-mile area, as close to the factories as possible without running the risk of interfering with unlikely industrial expansion, and at the same time as far as possible out of the line of travel to Boston.

Recreation Space and Schools

The map entitled Public Property shows the half-mile area mentioned above fringed with schools; no point within the area is more than half a mile from a school. Parks and playgrounds, however, are inadequate. The schools fill their lots practically to the sidewalk. Dirty streets, and

occasional trash-filled vacant lots, provide the play-space for the children of this region, especially the smaller ones, for whom proper places are essential. Clearly any housing project here should provide play spaces for its children as a part of the design. If it is toward the center of the area it should have its own school, replacing one of the existing schools.

Tax Delinquency - Cost and Income

Tax delinquency may be taken as one index of the ability of a district to pay for its support. The map of Tax Delinquencies shows properties delinquent since 1933, put up for sale by the city in 1935. It presents a picture of fairly equally distributed cases of non-payment, except for one accented area -- the sore spot discussed under Zoning.

This study is entirely inadequate as an analysis of cost and income to the city of various districts. A spotting of poverty cases, according to relief rolls, charity cases, or some such base, would be significant, but I have been unable to obtain necessary data. It would be essential, for the final selection of any site for slum clearance, to make a complete cost and income survey, similar to those recently done in Boston and now under weigh in Cambridge for representative districts. But in order to complete this thesis I must proceed without this indispensible step.

Land Values

Insofar as the rents of any proposed housing project are of primary consideration, land values are of importance. I was unable to obtain complete information, however. The map entitled Land Values shows square foot values as assessed, for land and buildings, estimated by the unit of the assessor's block, for certain areas which other surveys indicated as possible sites for housing. But land values cannot be an overruling factor in the selection of sites; for they are notoriously fictitious and independent of best land use, and appropriateness for housing depends on a well-considered decision as to land use.

Three possible sites are shown on this map, and figures concerning them are listed in the table below. One, on unbuilt land, is by far the cheapest. But even so it is not really cheap; and it may be worth while for the city to make up the difference in economic rent between the new land and the blighted built land, in order to reclaim a slum area. The important thing is to pay true prices for land taken, to avoid "bailing out" speculative land owners or landlords who have for years exploited slum dwellers for excessive profits, at the expense of the other tax-payers of the city.

DATA CONCERNING THREE POSSIBLE HOUSING SITES

Site No.	I	II	III
Gross Acreage	36	38	39
Net Assessed Acreage	28	28	34
Housing Acreage with Group Project	26	28	28
Total Assessed Value, Land and Buildings	$1,867,800	$1,380,700	$909,500
Per Net Acre	$66,600	$49,300	$26,700
Per Net Sq. Ft.	$1.53	$1.12	$0.62
Assessed Value, Land Alone	$640,000	$464,100	$909,500
Per Net Acre	$22,900	$16,600	$26,700
Per Net Sq. Ft.	$0.53	$0.38	$0.62
Estimated Condemnation Price	$1,300,000	$1,000,000	$900,000
Present Population	3,000	2,300	0
Present Density per Gross Acre	84	61	0

The relation of assessed value to estimated condemnation price for the three areas was worked out from a study of significant and representative individual lot and building assessments. For instance in Site No. I the value of buildings unfit for habitation is almost three hundred thousand dollars; damages should be awarded for the land alone in these cases. Buildings needing structural repair, and otherwise in bad condition, constitute a large proportion of the other dwellings; these too warrant a reduction. Taking this into consideration, a thirty percent deflation seemed to be justified. The value of Site No. II was reduced by a smaller percentage, but a reasonable one; there is a considerable number of unfit and deteriorated buildings, and further, there is a school, fairly new, included in the total assessment, which of course would not be condemned. Site No. III, unbuilt, and belonging to a single corporation (Massachusetts Institute of Technology), could not be condemned for less than the land value, if indeed it could be acquired at all.

. . . . . .

CHOICE OF SITES

Three sites have been indicated as potential locations for housing projects. Two of them have been chosen because of their present conditions, in regard to structure, health, fire hazard, and general blight; one of these is much worse than the other. The third has been chosen because of its low land value. All three fulfill the requirement of location for industrial housing. In selecting them thirty-five acres has been taken as a minimum gross area, for a smaller size would not change its environment enough to bring to its inhabitants the benefits of good housing. Thirty-five acres should provide housing for five or six thousand people, or even a few hundred more; a school and shops; and adequate play and open spaces.

Site No. I is as near to being a slum as any district in Cambridge. The worst section of it, fronting on Main Street, is made up of brick tenements five and six stories high, covering as much as ninety percent of the lot and in very bad repair. The rest of the area consists of old, shabby frame houses, one, two, and three stories high, frequently converted into flats, with many back-yard houses; there is little open ground around any house, no grass, and few trees. Streets are poorly paved, and serve as the neighborhood playground. There

are three or four small and old work-shops and factories, of one-story brick construction. Adjacent on the north-east is the Lever Brothers soap factory, whose evil odors are by no means confined to this part of the city. A few straggling shops along Main Street serve the people (a minority) who do not go to Central Square for their marketing. There are no through traffic streets, and Main Street is the only bounding street with much activity.

Site No. II is west of the Central Square shopping district, in about the same relation to it as Site No. I. The houses are two and three story frame dwellings built or converted for from one to four families. They crowd the land, leaving very small yards, if any; there is no grass, but a few trees and shrubs and an occasional melancholy garden. There are two or three stores on Western Avenue, and a single laundry in the north-east corner; otherwise the area is entirely residential. There are two schools, one in the center of the district, wooden and shabby and outworn, and the other two blocks away, of solid brick with a recently added wing, but very little play space. A block across Western Avenue is a large play-field, but most of the children under ten play in the streets. Sidewalks and pavement are rare within the area. The population is much of it colored. This site

is definitely blighted, but it cannot be called a slum.

Site No. III adjoins Memorial Drive and the railroad tracks. It is now entirely vacant, reserved by M.I.T. for expansion. The site is too good for cheap housing, if there were other vacant land available; but it is convenient to places of industrial employment, which cluster just across the tracks.

These three sites command differing degrees of attention. No. I must be used; No. II ought to be used; No. III might be used.

There are likewise alternatives as to how they might be used. The blighted areas might be cleared and rebuilt as housing, or only partially cleared and renovated, using the existing structures. Parts might be cleared and retained as public open space, or turned over to industrial use. These alternatives will be discussed as they would affect housing needs and housing conditions, and definite proposals offered, in the second part of this report.

. . . . .
. . . . .

PART TWO

THE HOUSING PLAN

GENERAL PROPOSALS

SPECIFIC PROPOSAL

THE HOUSING PLAN

GENERAL PROPOSALS

Extent of Immediate Activity

It has been submitted that there are at least 17,000 people in Cambridge who badly need decent housing, which only governmental action can give them. The questions arise, whether all of these are to be considered in an immediate housing program; whether they should be housed in new housing on new land, in new housing on old land, or in remodeled housing on old land; and whether these 17,000 are the only ones to be considered in the program.

The field of mass housing is, in this country, totally untried by governmental agencies. Its benefits to the city that provides it, and even to those housed, are still unknown quantities. Methods of financing, of land taking, of design, are all controversial questions to which no answers can be given without actual experiment. Therefore it is my opinion that we should proceed slowly, trying and testing one scheme at a time. Immediate activity in Cambridge should be limited to a single housing project.

The set-up of that project will be a stab in the dark, no matter how many preliminary schemes are drawn up and compared; but it will serve as a guide to future

developments. Careful and complete cost and income analyses should be made of the area chosen, before building and for successive years thereafter; this will enable the city to judge, after ten years or so, just how much of a subsidy to new housing is warranted, to replace existing subsidies in the form of deficits between cost and income. The comparison will be more significant and useful if the area chosen is now blighted -- this does not mean that low-cost housing and slum clearance need in the future be combined, but in this experimental instance the information obtained would justify spending more on the housing itself than otherwise. For it is the population, not the housing, that is being subsidized in any case; therefore an area already housing members of the 17,000 house-needing, who would be rehoused on the same spot, would permit a really significant comparison between the old and the suggested forms of subsidy.

The fact that the industry of Cambridge, even if it remains in the Boston region, should and ultimately will migrate with its workers to new satellite production towns, also militates against permanent industrial housing in Cambridge on a large scale. We should do only what needs to be done immediately, to avoid anchoring a

large industrial population to an area that will in fifty or seventy-five years be abandoned by industry.

But there are 17,000 whose housing needs are immediate. A single project can shelter only a third of these; what of the rest? Will their situation be improved? I believe it will. The most crowded of the alternative areas, Site No. I, now holds 3,000 people. With group housing and proper planning, 6,200 can be housed, within the minimum standards. So that in addition to the present population, 3,200 other, inadequately housed, people can move out of their present quarters, into the new housing. Of the original 3,000 60% are now overcrowded; so that in all, 5,000 of the 17,000 will have been rehoused in new dwellings. 2,200 rooms outside of Site No. I will have been abandoned, among them -- under proper administration -- all of the buildings throughout the city now declared unfit for habitation (which total about 1,000 rooms). Probably some of the landlords of the unfit buildings, if forced to tear them down, would rebuild, though not for the same price class; anyway there would result a net addition of at least 1,500 rooms to the present 11,500 vacant rooms (I have subtracted the number now in Site No.I). This must result in lower rents, in a redistribution of population, however slight, which would relieve to some

extent the remaining 12,000 inadequately housed. These figures are of course quantitatively tentative, but qualitatively they express a feasibility.

However more important than this shake-up in population pattern resulting in better housing for several thousand would be the example set to those who remain in bad or border-line housing. Almost the most important obstacle to housing achievement in America now is the lack of an effective demand for housing among those who need it. They do not know what they lack, or what it would be possible, with modern methods and materials, for them to have. A single experimental project would not only provide a background of fact and experience for future activity, but also furnish the incentive, the demand, that must be behind an effective housing movement.

In line with this discussion, I conclude that a housing program for Cambridge should start with a single mass low-cost housing project, to be built in a blighted area, large enough to be a significant housing unit to itself and to the city, and designed for the lowest rents now being paid by the inadequately housed. Government activity in the field of direct housing should not now go further. This is as much as can be done for the 17,000 under-housed, and for the rest of the city, by

direct provision of housing, without interfering unwarrantably with private enterprise and the legitimate field of private initiative.

But the program does not stop here; other activites, less dramatic, less expensive, but no less important, must keep pace. The following paragraphs take up different phases of a full housing program, and the legislation necessary to make them effective.

Clearing

Site No. I is to be cleared, to make room for a housing project. This site is chosen as the best suited to experiment, since it is in the worst condition; it is also best located in respect to the factories.

The block adjoining Site No. I to the east, between Main, Portland, Washington, and Burleigh Streets, shall be cleared, and not returned to residential use. It might be retained as a public park, or turned over for industrial or commercial development with strict height and coverage regulations.

All dwellings all over the city, judged unfit for habitation, shall be razed, or put into livable condition, at the expense of the owner, either by the owner or by the city.

In order to accomplish these clearings, a legislative act is nesessary conferring such powers of condemnation and execution on a municipal housing authority, which would act on the recommendation of the Board of Health. Within areas chosen for municipal housing, such as Site No. I, unfit buildings shall be razed at the owner's expense and taken for the value of the land alone. Similar sites may be taken for parks or playgrounds in like manner. The processes of condemnation and damage assessment must be simplified and speeded up.

Remodeling Old Housing

The remodeling of dwelling structures, whether it is compulsory under the unfit law or voluntary, shall conform to certain strict regulations of height, coverage, light and air, conveniences, etc. These regulations shall apply to dwellings wherever existing, not only in areas zoned for residence, but especially in the less restricted zones. This requires considerable modifications of the zoning ordinance.

Groups of dwellings in poor condition may be taken over by the housing authority, remodeled, and operated as a municipal project, if study shows this to be the most efficient way of dealing with certain specific problems.

New Housing on Old Land

The municipal housing authority shall erect and operate on Site No. I a housing project, more fully discussed below under Specific Proposals. If and when a second slum clearance project is decided on, Site No. II and other parts of the city shall be restudied and a choice of site and design made in the light on then existing conditions.

New Housing on New Land

If study more complete than this thesis could be, should prove that slum clearance should follow new housing on new land rather than preceding it, Site No. III could be leased from Massachusetts Institute of Technology for thirty years or so (it probably could not, and should not, be obtained under any other arrangement). The housing authority could build and operate dwellings of cheap construction, short-lived, to provide adequate housing for five thousand of those now inadequately housed until such time as slum clearance or recentralization of industry becomes possible. The land would again be free by the time M. I. T. wanted to expand. This would undoubtedly be the cheapest type of housing project, and would permit low rents with the least subsidy; but it would also do least to solve the city's housing problem, and it would meet strong opposition from that powerful class, the land-holders, whose tenants would be withdrawn without compensation.

Zoning Changes

The zoning ordinance shall be changed, to incorporate such restrictions as were discussed under Remodeling Old Housing, to apply to all new dwellings, wherever built. The advisability of prohibiting entirely residence use within the heavy industrial areas should be considered seriously. The existing provisions of the ordinance, and the machinery for enforcing it, should be studied and revised in accordance with a comprehensive city plan.

General Planning

Activity in fields related to housing, but not directly concerned with it, may do more than anything else to improve housing generally.

There shall be prepared a comprehensive city plan for Cambridge. It shall take into special account the possibility of creating within the city "neighborhood units", residential integers capable of providing lasting economic and social values. Parks and recreation space shall be planned to serve the population adequately. Especially playgrounds for little children, which are now lacking, should be provided in congested districts where private yards are insufficient, so arranged that crossing of traffic streets is avoided. A plan shall be made for the school system, to replace old buildings

when they become obsolete with schools in new locations properly placed with relation to residence, open space, and traffic. Some attempt shall be made to organize the straggling commercial developments into units, convenient to residence, but grouped for efficiency and appearance and arranged not to interfere with through traffic. Traffic and transportation shall be studied to facilitate movement, and to restrict through traffic from residential units of however low an economic class.

This plan will be of an advisory rather than a statutory nature, prepared under the City Planning Board in coöperation with all the city departments, and binding on them only by the force of its logic and public acceptance. Such a plan, carried into effect, will create residential values and improve housing conditions tremendously, even without any direct housing activity.

. . . . . .

SPECIFIC PROPOSAL

In the course of this report I have gone through the steps -- many of them incomplete -- of justifying a low-cost housing project for Site No. I. I here present a tentative design for such a project, and a general description of its requirements.

Elements of the Program

The project provides housing for 6,200 people. According to American standards of density 6,200 rooms are required. The families to be housed vary from 4 persons to 12, averaging 5.6. Apartments range from 4 to 10 rooms, averaging 5.5. These families are larger than the average, with many children; therefore small apartments are not planned for. The average gross room area is taken at 185 square feet; this figure, lower than usual, is justified by the fact that the number of rooms per apartment is higher than usual, the child population is larger than usual.

The apartments are arranged in four-story walk-up groups of the linear type of design, two apartments per stair-well per floor. This design is accepted as the most economical of construction, and the most readily oriented for sunlight and air.

A school building is provided, capable of taking care of all the children in the project of elementary school age, which would be between 1,000 and 1,200. This would be a part of the city school system, replacing existing schools whose attendance would be depleted by the change in population pattern. There is a fairly new school immediately adjoining the property on the north, which might continue to draw some of the children from this area.

Markets and stores are required, to serve the neighborhood needs of the inhabitants. The proximity of central square permits a proportion of frontage to population lower than normal for residential districts.

Playgrounds for the school children under ten are provided, meeting the area requirements of the child population (one hundred square feet per child). The older school-children would use the central school field. Proper yards for the pre-school children are essential.

Small park areas should be provided for adult outdoor recreation.

No central heating plant is planned for. Individual heaters in each apartment, with fuel purchased wholesale by the authority and sold as needed, allows better control of individual heating expenditures.

General Arrangement

As far as possible existing streets were preserved in the lay-out of the street pattern, for the sake of economy in utilities. Only one entirely new street is necessary. Most of the existing criss-cross of streets has been eliminated, and the area thrown into public walks and playgrounds.

The dwelling blocks have been oriented for sun and air, as far as the outline of the site and the streets preserved have permitted. Two orientations were used: one, north and south, permitting sunlight in all rooms every day; the other, west-north-west by east-south-east, taking full advantage of all-day sun on one face and sacrificing sunlight on the other. Both of these systems have advantages and disadvantages, and it did not seem inconsistent to use both here. Typical apartment layouts would vary between the two.

The school is centrally located, toward the eastern end of the site, as far from the existing Roberts School as possible. The school and school grounds are safely accessible from all parts of the site, for none of the streets would carry through traffic.

The local shopping units have been grouped at two strategic boundary points. These buildings would be designed as markets or arcades, which offer a much more efficient way of merchandising than the street-store. Service space is provided behind, in a walled-in court.

There are playgrounds in three corners of the site, and small parks in three other spots. The school field would provide space for both adult and child recreation. In addition the spaces between the apartment buildings would be laid out for the littlest children, with largely a gravel surface, and a few hardy shrubs. In the landscaping of the building plots no grass could be used, but perhaps small protected areas for ground-cover, or places for individual flower-gardens, could be worked into a design intended primarily for hard use. Grass and trees would be possible in the little parks, and along the public walks.

No garages have been provided. This housing is designed for the lowest economic groups, and it is necessary to use every available subsidy to bring the rents within their reach. Families well enough off to afford the luxury of an automobile could not be admitted to such charity housing.

Financial Set-up

A very tentative financial set-up is offered on the next page. All of my assumptions are disputable. But I suggest one way in which the rent could be brought down to a reasonable figure. There may be better schemes, but the rent must be kept low. I stress again my contention that the whole project is unjustifiable, unless it can be rented to the groups now inadequately housed.

TENTATIVE SET-UP FOR A HOUSING PROJECT ON SITE NO. I

AREAS

	Proposed	Present
Housing	23 acres	28 acres
Markets	3 "	
School and Field	3 "	
Playgrounds	2 "	
Public Walks, Parks	1 "	
Streets	4 "	8 "
	36 "	36 "

COSTS

Land for Housing and Markets		$1,200,000
Total Condemnation Price, $1,300,000		
Land for School and Field 100,000		
Construction		
Apartments		$3,450,000
6,200 rooms x 185 sq. ft. x 10 ft.		
11,500,000 cu. ft. x $0.30		
Stores, Markets		750,000
100,000 sq. ft. x 25 ft.		
250,000 cu. ft. a $0.30		
Total Cost to the Housing Authority		$5,400,000

Interest	4.00 %	
Amortization	1.00 %	
Taxes	3.37 %	-- Reduced from 3.82% since land tax is paid on present land value, and land cost includes present buildings.
Maintenance	2.40 %	-- Heat not included
Vacancies	.33 %	
Economic Rent	11.1 %	or $600,000 per year

INCOME

Apartment Rents	$255,000 per year
$3.40 per Room per Month	
Store and Market Rents	
$1.50 per Sq. Ft. per Year	150,000 " "
30% Government Grant on Construction	
30% of $4,200,000 at 5% per year	63,000 " "
Tax Exemption on Buildings	
3.82% of $4,200,000 per year	132,000 " "
Income plus Federal Subsidy plus	
Municipal Subsidy equals Economic Rent	$600,000 per year

. . .

Construction has been assumed as very cheap. All the benefits of mass production and efficient operation would be necessary to bring even the most minimal dwelling down to thirty cents a cubic foot. But since this sort of housing, in a capitalistic democracy, must be regarded as a sort of charity, it is justifiable to strip the accommodations down to the bare essentials for decent, healthy living. Construction would have to be fireproof, to warrant the forty-five year amortization that I have assumed.

Maintenance charges have been assumed very low. I cite a set-up for a similar project, by Clarence Stein, as justification. Vacancies, in a development offering so much for so little rent, may reasonably be estimated as low.

I have applied the federal 30% grant on labor and materials which is now available, as one form of subsidy. The other necessary subsidy is a municipal tax exemption on the buildings. This is flexible; if the people were able to pay higher rents, the exemption might be partially removed; if rents were still too high, exemption might be extended to cover land as well as buildings.

All capital is assumed to be borrowed from the federal government, at 4% interest.

. . . . .

CONCLUSION

To my mind, this thesis has not proved anything, except the extent of the investigation that should precede housing action. I have probed a little, certain phases, and touched too lightly on others. My conclusions are frankly tentative, based on assumptions.

But I have indicated a method of procedure which might serve in the preparation of an adequate housing program for any town or city. Here lies the value of such a study as this. I submit this thesis in full recognition of its shortcomings, but in hope that it has some worth.

. . . . . .

. . . . .

F I N I S

. . .

.