COMMUNITY BUILDINGS STANDARDS FOR LATIN AMERICA

by

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Submitted in partial fulfillment of the requirements for the degree of MASTER OF CITY PLANNING at the MASSACHUSETTS INSTITUTE OF TECHNOLOGY. June 1953

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May 25, 1953

Professor Frederick J. Adams, Head
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Dear Professor Adams:

The accompanying thesis, entitled "Community Buildings Standards for Latin America," is herewith submitted in partial fulfillment of the requirements for the degree of Master of City Planning.

Sincerely yours,

Carlos Williams

ABSTRACT OF THESIS

Title: COMMUNITY BUILDINGS STANDARDS FOR LATIN AMERICA.

Author: Carlos Williams, Architect, Escuela Nacional de Ingenieros, Lima, Peru, 1948.

Submitted to the Department of City and Regional Planning on May 25, 1953 in partial fulfillment of the requirements for the degree of Master of City Planning.

Abstract: This paper has been written with the aim of furnishing a preliminary basis for the development of Latin American Planning Standards.

The first part presents the existing Latin American housing situation, underlining the urgent need for planning. A survey of 30 recent Latin American housing projects is also included to illustrate standards in actual use and current planning trends.

The second part is intended to explore theoretically the relationship between size of a given community building - in terms of its capacity to serve people and its optimum size - and the size of the neighborhood population that is likely to use the service in question.

To this end the following community buildings are analyzed: Educational Facilities: Primary school, nursery school, adult education, library; Recreational Facilities: Playgrounds, movie theater; Civic and Community Centers; Church, Civic Center; Shopping Center: Market Place, Stores.

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"COMMUNITY BUILDINGS STANDARDS FOR LATIN AMERICA"

PART I

Chapter 1

The Latin American Housing Problem.

> ...."The slums in Latin America are particularly vicious. They breed disease with a virulence that could occur only in tropical and sub-tropical settings. They are hot-beds of moral disintegration, crime, and civic and political disorder." Edward T. Paxton, Jacob L. Crane. 1/

1. General.

The means of providing a healthful dwelling and sound housing conditions for the entire population of any country, are seemingly far out of reach for any plan or government program. Not solely because of the extent of the housing shortage but also because of the peculiar characteristics of society's mechanism to produce housing 2/ and above all, because of the continuous rise of standards of living that rank dwellings as obsolete before they have had time enough to age. 3/

> "Taking into account the evolution of humanity in the field of science and living conditions, and the fact that the Housing Problem has not been solved with the progress of hundreds of centuries, it would be necessary to admit that the total solution of the problem would only be possible in the case of a complete and radical transformation of the construction methods on one hand and financing on the other." 4/

Despite the fact that such an absolute solution seems impossible, there is no doubt that much can be done to imporve the housing situation in Latin America. Vast fields of research remain still open and the work of programming and carrying out the reconstruction

of almost every Latin American city is yet to be done.

An increasing awareness, however, of the extent and implications of the housing problem, can be easily detected. The current planning literature, the legislation enacted by the various governments and the specific action of the local agencies, furnish an every day example of this trend. In almost every Latin American country some work has been already started, 5/ and it should also be said that government action on housing is increasing at a steady pace.

The present chapter tries to portray the origin and extent of Latin American housing situation. Within the limitations of this work it would be impossible to exhaust the subject. I shall present only whatever information is necessary to show the magnitude of the task ahead and the urgency of its realization.

It is a peculiar characteristic of the housing problem that any delay in action at the present time will result in increasing the burden of the future reconstruction task. Prompt action based on an accurate knowledge of local conditions is desperately needed.

2. Origins of Latin America's Housing Problem.

Basically, the causes that gave birth to the Latin American housing problem and to its consequences are universal in nature. "The housing problem," states A. Lamas,6/ "is as old as man himself." To cope with its complexity we have divided the subject into the three following headings: (1) social; (2) economic and technological;

(3) political causes.

> "Students in the field of town and country planning are well aware of the interdependence of social, economic and technological factors that operate to produce a particular level of welfare at a given time. Given a particular level of housing among a certain group, one may expect to find a corresponding level of health, nutrition, and education. The nature of this inter-relationship is such that is obviously unrealistic to attempt improvements in a single field such as housing without giving some attention to the other closely related ones." LEONARD, Olen E., "Problems of Rural Housing in Eastern Pernambuco (Brazil)."

3. Social Causes.

Deep in the core of Latin America's housing problem lies an assortment of complex social questions that it is necessary to examine carefully so as to obtain a thorough understanding of what is the dimension or extent of the present housing situation. For the sake of a clearer presentation, and quite arbitrarily, we have divided the subject into the following headings: Rurality, Education, Population growth and immigration.

a) Rurality vs. Urbanization.

Even a quite superficial survey of the whole of Latin America would immediately show sharp differences between its various countries, plus a wide range of social conditions inside the countries themselves. The southern part of the continent, for example, including Argentine, Chile and Uruguay, is inhabited almost exclusively by white immigrants with only a small trace of Indian population. The East and West coasts, as well as the Caribbean area, have a high proportion of Negro population and a remarkable degree of intermixture. The Andean Region and inland territories are almost exclusively populated by

the more or less pure descendants of the inhabitants of the old native empires. Variety of race does not imply variety in social status, but it does represent distinct differences in cultural and social behavior. Particularly in the countries with heavy Indian populations, striking differences can be noted between the rural and urban areas. All the ornaments of progress, all the embellishments of civilization, all the lust of life, so to speak, belongs to the latter. Latin cities are thriving beehives with Cadillacs, Neon and Frigidaire splendor. They have sucked, however, all the fertile juice of the adjacent countryside; they have left the farmland void of its natural leaders, empty of spirit, and utterly poor.

In dealing with any specific area in Latin America, and as far as housing is concerned, two things have to be considered: first, the index of rurality of the area; second, the degree of westernization of the local culture. If some special measure or yardstick were to be devised to measure them, it would have to include for the former, sufficient account of the bonds of the individual to the land, the extent of participation in the national economy in terms of goods consumed and goods purchased; and for the latter, it would be necessary to measure the distance of the aspirations of the people concerned from the standard occidental aims. These two indices would probably indicate, if they could be determined, the tremendous gap separating various Latin American societies and would also be a measure of the cultural isolation of some of

these communities.

The close relationship of poor housing conditions to low standard of living has been clearly demonstrated.[9] The two factors mentioned above concur, in one way or another, to bar the peasants from improving their living standards. Rurality, forcing large segments of the population to engage in a bitter fight for a meager livelihood and cultural isolation, maintaining a familiar and closed type of economy, preclude them from taking part in the common enterprise of improving their living standard.

Accepting the most extreme minimum standards that it is possible to set, it would be necessary to rehouse the entire farm population of Latin America. To carry on even a small part of this program, it would be necessary to revise completely the countries' economic set-ups, and to find a way to incorporate in the production and consumption processes all that part of the population now engaged in a closed type of economy.

b) Education.

The relationship of housing to education would in certain cases appear indirect, but what should be stressed is the fact that where there is such a lack of fundamental education as in Latin America, private action on housing cannot be expected, nor is a general individual understanding of housing needs to be seen.

The statistics presented by G. Nannetti [10] (see also chart no. 3), show that in certain countries the percentage of illiteracy is as high as 70% (El Salvador 72.5%). The total number of illiterates

in the whole of Latin America is approximately 70 million.

c) Population Growth.

"....it seems fairly certain that the actual rate of increase is higher in Latin America than in most of the other regions of the world." 11/

The impact on housing of such a high rate of population growth can be readily grasped. Not counting the number of dwellings that have to be rebuilt due to obsolence or unfitness for human habitation, the task of providing shelter for the normal population growth, at first sight, appears unsurmountable.

Again, high birth rates and low standards of living are tied together. To the low Latin American standards of living, specific religious prohibitions in regard to birth control, have to be added.

d) Immigration.

Two factors concur to increase immigration to the cities. One is kin to the excessive population growth taking place in the farm lands. The yield of the land has to be shared by an increasing number of persons. The result is a diminishing of individual earnings and opportunities.

The second could be described in terms of the attraction exerted by the cities upon the underprivileged farmer. The wide range of opportunities in types of employment in urban life, plus movies, streetcars, and even prostitution, as Charles Abrams has pointed out, add to the power of the urban charm. No matter how vicious may be the slum in which they finally lodge, it is considered an

Rate of Population Increase *

Country	Year	Rate of Increase
Argentina	1947	2.15
Bolivia	1950	1.16
Brasil	1950	2.53
Chile	1952	1.53
Colombia	1951	2.03
Ecuador **		
Paraguay **		
Peru	1940	1.31
Uruguay	1908	1.53
Venezuela	1950	2.91
Canada	1951	1.97
Costa Rica	1950	2.32
Cuba	1943	1.62
Dominican Republic	1950	2.39
El Salvador	1950	1.30
Guatemala	1921	1.36
Honduras	1950	2.66
Mexico	1950	2.66
Nicaragua	1950	2.34
Panama	1950	2.86
United States	1950	1.36
Puerto Rico	1950	1.69
Haiti	1950	1.47

* Source: Demographic Year Book, 1952, United Nations

** No data

Table 1

Population Distribution by Age in Millions *

	+ 15	15-59	69+
World total	844	1.330	156
Africa	76	105	10
America	100	185	25
U.S. and Canada	39	101	17
Latin America	61	84	8
Asia	493	685	60
Near East	30	40	4
South-Central Asia	170	239	17
Japan	29	44	6
Remaining Far East	264	362	33
Europe	172	347	60
Northwest Central Europe	50	130	30
Southern Europe	27	52	10
Eastern Europe (1)	95	165	20
Oceania	3	8	1

* Source: World Population trends 1920-1952, United Nation

(1) Including Asiatic part of Russia

Table 2

improvement when compared with the isolation and meagerness of country life.

Steady flow of "campesinos," seeking the advantages of urban life add to the problem of the already overcrowded slums.

Lima doubled its population in the last 20 years; the 1940 census shows that 35% of the total population is formed by "provincianos" (from the provinces). 12/

Venezuela's urban population showed an increase of 118% in 9 years. 13/

São Paulo's boom is shown by the following figures: in 10 years 69.9% of increase (1940-50). 14/

Buenos Aires grew from 1,700,000 in 1914 to 5,000,000 in 1952. 15/

4. Economical.

a) Low per capita income. 16/

There can be no doubt of the close relationship of economics to housing. Development of a sound economic base would be an indirect but fundamental step in improving housing conditions. According to Leo Grebler, ..."it is low productivity (for whatever reasons) that prevent those countries from realizing their potentialities in production and living standards." 17/

Low per capita production of goods results in some countries in a very low per capita income:

Average per capita income in 10 Latin American countries	-	170 U.S. dollars
U.S.A.		1440
Canada		900
United Kingdom		775

El Salvador's housing requirements can best be stated in terms of the number of families which do not have adequate minimum housing and in terms of the financial inability of these families to improve their own housing conditions. 18/

b) Feudalism.

Particularly on the west coast of Latin America and in Central America, the countries are still in a "colonial" type of economy. They show a distribution of wealth which is incompatible with modern ideas of justice or democracy.

"In 1950, 80% of Latin America's population (124,280,000 people) received 50% of the total income." 19/

Speaking about El Salvador, the experts of Public Administration Service wrote in 1949: "The first and most basic remedy (for the housing problem) would be the raising of the general standard of living, and a more equitable distribution of the country's income to a point where all families could afford a decent home as a part of their normal living budget." 20/

c) By-Products.

As a result of the combination of these social and economic factors, additional facts become of importance in considerations of the housing situation.

Lack of long-range investments.

Latin American capital is used to quick return and high porfit. Investments in non-subsidized housing for low-income groups have necessarily to be of long duration, due to the low rent-paying

capacity of the families involved. Despite the fact that substantial capital reserves are available, insufficient public or private funds have been channeled into low and middle class residential construction.

High construction costs.

Underdeveloped building techniques and, paradoxically, too many imported building materials, have resulted in high construction costs. The industrialization and rationalization of local building techniques should have a surprisingly good effect on housing.

Lack of technicians and planning.

Lack of technicians experienced in the field of low-cost housing and planning with respect to design, construction, administration, and management is natural in countries which have not yet had an opportunity to develop a tradition in low-cost housing. However, the lack of specialized technical personnel presents a serious obstacle to housing improvement.

Taxes.

Taxes in Latin America appear to be absurdly low when compared with rates in the U.S. and in Europe. Property tax in Costa Rica is 1/100 of the common U.S. rates. 21/

5. Politics.

The evils of militarism are always linked to colonial economies. The continuous agitation of local demagogues in their strife for power for their faction creates an atmosphere of instability and insecurity in which no continuous action is possible, nor can plans

reach the stage of realization.

"The uneven course of many of the governments has also made difficult the continuance of sustained effort at improving housing. The establishment of housing programs has been a matter of political expedience rather than long range social objectives. Those countries which have enjoyed relatively stable governments are in general the ones which have made the most progress with housing." 22/

6. Extent of the Latin American Housing Problem.

Housing Deficit.

Recent computations made by the Pan American Union (Anatole A. Solow and Luis Vera), 23/ based on the 1950 census, give the figures for the actual deficit as 11,722,168 dwellings.

Out of 17 national censuses of population and of housing, plus estimates for the six other countries, 16,524,020 dwellings were found to be in good, livable condition according to local standards. The total number of families was estimated as 28,246,188 - a rapid computation will show that 41.5% of the population can be considered as "ill housed." It is necessary to mention, however, that the evaluation of liveability has been made according to quite minimum standards and that more precise computation would make the figures substantially higher. The breakdown of this deficit into specific areas will show more clearly the magnitude of the problem.

Mexico City has been the object of a thorough study from the housing point of view. The figures given below can be taken, unfortunately, as typical of all Latin American capitals. 24/

	Area in %	Population in %
Slums	11.00	33.59
Squat huts	9.46	10.65
Obsolete housing	18.90	27.42
Incomplete subdivision	23.48	14.20
New housing	36.00	14.14
Total	100. %	100. %

b) TB Rates.

"The health of the nations is reflected directly in the conditions of housing in which the mass of the people live," Violich has stated 25/ adding "although bad housing conditions may not always be the direct cause of ill health, numerous studies indicate that where tuberculosis, pneumonia and other diseases abound, as they do in many Latin American countries, there are to be found the areas of most substandard housing."

In this connection, it is worth noting the figures in the following table:

TB rates per 100,000 persons	City	Year
195.2	Panama	1942
189.9	Montevideo	1941
171.2	La Paz	1941
160.6	Asunción	1940
151.0	Bogotá	1938
115.0	San José, Costa Rica	1938
74.4	México, D.F.	1941
59.2	Washington, D.C.	1941
49.0	New York	1940

* Source: Banco de Urbanización y Rehabilitación, Panama, Publ. no. 1.

7. Planning for Latin America.

The figures mentioned above will no doubt give a hint on the Latin American housing problem. However, the work of Solow and Vera 26/ proceeds by saying that 50 years of treatment of the housing malady will require the construction of not less than 1,141,466 houses per year. This would represent an increase of 700% in the actual

current pace of construction (166,055 per year).

> In El Salvador, for example: "The magnitude of this problem may be visualized by considering that the splendid effort of Mejoramiento Social (a local housing authority) last year would not even accommodate the new families that are added to the population of the capital in a single year. Even without any rehousing of the families which live at present in slums, the Programa de Mejoramiento Social would have to be increased 8 times to catch up with the yearly demand for urban dwelling units in the low-cost brackets resulting from population growth, and double this amount would be required if sufficient houses were to be built only in rural areas for new families every year." 27/

The proportions of the problem should not be a deterrent to progress but, on the contrary, should be a guide to shaping a realistic housing program. In fact, the governments are in most cases aware of their responsibility and have already taken various different measures to cope with the situation.

The future will undoubtedly show increasing government and private action on housing. Lack of research and systematic study of the planning variables will tend, however, to hamper progress in planning and housing.

The need for precise investigation of these matters cannot be emphasized enough. Planning is no less than the discovery of the best relationship of the individual with his environs, the physical mileu, and with other individuals.

Outside of chauvinistic attitudes or nationalistic pride, the fact of the existence of different human beings with distinct characteristics of their own would require the use of specific planning tools to approach their problems. Planning for Latin America, with

the emphasis on the last two words, should consider first the peculiarities of the people to be dealt with and, secondly, the peculiarities of the problems which they have.

8. Latin American Planning Standards.

It should be clearly pointed out that what we understand for "standard" is not an absolute number nor an inflexible recommendation. Standards should provide a measuring rod, based on number but informed with the habits, needs, and even desires of the people. "Standards are only good if they are not allowed to become stale: they should always tend to become less restrictive and more flexible." 28/

The need for specific Latin American planning and housing standards has been clearly established by a number of authors.

> Violich 29/ in 1949 wrote: "The lack of standards...has greatly hampered the recent work of housing agencies in a number of Latin American countries. A statement of basic principles and minimum healthful standards developed jointly by all the interested nations, would undoubtedly act as a model and inspiration for the housing agencies of the local countries. The statement of principles should be supplemented in each country by model codes and standards defining in greater detail the minimum characteristics of decent housing..."

The Neighborhood Unit concept has been fully accepted in Latin America, not only as a planning principle but also as the sole practical solution to current private and government housing policies, i.e., it is by far more economical to build houses and services on the same plot of land, than to scatter them all around the town.

Although the United States has developed scientific standards for

neighborhood planning (A.P.H.A.), effective application of these standards in Latin America can be questioned. "There seems to exist sufficient ground for extensive research to obtain adequate standards for Latin America." 30/ To quote from Barañano's answer to the United Nations inquiry on Neighborhood Unit attitude in the various countries:

> "Latin America is quite different from its North American counterpart. Elementary schools are important but do not constitute "per se" the heart of any neighborhood unit... Latin America has to find its own standards and its own principles. They ought to be the result, the summary of its own way of thinking rather than the application of Anglo-Saxon concepts of planning and social life."

A comprehensive set of planning standards for any Latin American country should contemplate the following major items:

a) Understanding of local conditions in regard to:

culture
tradition
physical mileu
economic limitations

b) Inclusion of the necessary details to serve as a guide for designers and policy makers, or as a frame of reference for the local authorities in the evaluation of the designs submitted to them.

NOTES

Chapter 1

1. Paxton, Edward T., Crane, Jacob L., "The World-wide Housing Problem," Town Planning Review, April 1951, page 18.

2. The solution of the housing problem requires a permanent accumulation of wealth, consisting either of goods or human effort. The possibility of obtaining this accumulation determines the existence or non-existence of the problem. A. Lamas, "Ahorro y préstamo para la vivienda familiar."

3. For further discussion see A. Lamas, opus cit.

4. Opus cit., page 11 (Lamas).

5. See Violich, Francis, "Low-Cost Housing in Latin America."

6. Lamas, opus cit.

9. One of the basic causes for the present housing situation is undoubtedly the low standard of living, which makes it impossible for the vast majority of the population to afford decent housing. "Housing in El Salvador," Public Administration Service, October 1949.

10. Nannetti, Guillermo, "Unesco and the OAS in Latin America," Pan American Union, 1950.

11. "World Population Trends," UN, December 1949.

12. "El Arquitecto Peruano," August-September 1952, editorial.

13. "La Vivienda Popular en Venezuela," Ministry of Public Works, Caracas, 1952, page 15.

14. In 1950, the population of the state totalled 9.179.050 inhabitants with a percentage increase of 27.8% in 10 years, while the population of the city totalled 2.213.300 with a percentage increase in the same period of 69.9%. Lodi, Carlos, "Sviluppo e Problemi di San Paolo," Urbanistica no. 7, 1951.

15. From PLAN no. 6, Buenos Aires, 1952.

16. Per capita income must be increased to widen the market of consumers who can buy or rent decent housing and contribute toward the necessary community facilities. "Current Information on Urban Land Policies," UN, Social Affairs, April 15, 1951.

17. Grebler, Leo, "Possibilities of International Financing of Housing in Underdeveloped Countries," UN, 1953.

18. "Housing in El Salvador," opus cit., page 1.

19. Solow, Anatole A. and Vera, Luis, "Panorama del Problema de la Vivienda en América Latina," Pan American Union, 1952, page 27.

20. "Housing in El Salvador," opus cit., page 15.

21. Currie, Leonard J. and Espino, Rafaela, "Housing in Costa Rica," 1951.

22. Violich, Francis, "Low-Cost Housing in Latin America," Pan American Union, 1949, page 9.

23. "Panorama," opus cit, page 23.

24. From "Estudios" no. 6, Banco Nacional Hipotecario Urbano y de Obras Públicas, S.A., Mexico.

25. "Low-Cost Housing in Latin America," opus cit., page 2.

26. "Panorama," opus cit.

27. "Housing in El Salvador," opus cit.

28. Discussiones on Urbanism, Columbia Seminar (No. 3).

29. "Low-Cost Housing in Latin America," opus cit, page 20.

30. "Seminarios Regionales de Asuntos Sociales-Vivienda y Urbanismo," page 89.

PART I

Chapter 2

Current Trends in Latin American Housing.

This chapter has been designed with the aim of furnishing a starting point for further research into the design of Latin American Neighborhood Units. We were interested in portraying as accurately as possible actual Latin American trends with the hope of deducing from them the current standards in actual use. This, however, has proved to be a little too early to be dealt with due to the lack of basic data.

1. Scarcity of the Sources.

Neighborhood planning is certainly a new field in Latin America. (It would be worth noting, however, that public housing has a long history in Latin America. In 1910 Argentina initiated a low-cost housing program for Buenos Aires; in 1906 Chile passed the first housing law). It was only after World War II that comprehensive neighborhood planning began to appear. In 1946 Perú built its first neighborhood unit.

But all projects are still too young to make general evaluations of them, and statistical information is difficult to find. Lack of cooperation, not only among the countries but also among the different local housing agencies accounts for this. This faulty interchange of information is hampering planning progress. Conditions and problems are so similar in certain areas that much can be gained by proper exchange of knowledge of experiences.

2. Research

If planning is to serve people's needs properly, it is imperative to abandon guess work and trial and error techniques. Sound and scientific investigation of reality is necessary. Only through exhaustive research work can accurate knowledge be obtained. In the author's opinion the following items should have immediate consideration:

Extent of the housing problem (deficit)
Amount of housing built (private and public enterprise)
Standards used
Economic base (paying ability)
Family expenditure patterns
Sociology and group structure

3. Analysis of Trends.

The present survey covers 30 projects in 9 countries. The projects were chosen because of their significance from the planning point of view. All the countries in which housing programs of some importance are carried on have been included. The findings are presented in tabulated form below.

4. Description of the Charts.

The information has been arranged into 4 major headings: 1) social; 2) physical; 3) economic; and 4) services, according to the system established by BNHUOPSA, of Mexico. 1/

Social

Occupation of the population
Population in number of
    families
    persons
Densities
    families
    persons

AREA, POPULATION, DENSITIES

	AREAS (in acres)	POPULATION persons	POPULATION families	DENSITIES persons per acre	DENSITIES families per acre
Mexico					
J. BALBUENA	613	50030	10056	81.9	16.2
UNID. MODELO	133	12355	2471	92.2	18.5
CIUDAD INDUSTRIAL.	79.4	7220	1440	91	18.2
CIU.INDUSTRIAL (2)	170.09	1580	316	92	18.5
BARRIENTOS	14.6	1170	234	80.2	16.2
INSURGENTES	44.2	3775	755	82.2	17
SOTELO	204	1690	338	83.6	16.2
MINATITLAN	296.1	10840	2178	36.9	7.3
MERIDA	180.3	5000	1000	27.5	5.7
COL. PARQUE	28.02	4270	854	150.2	27.1
SANTA MARIA	19.8	2400	480	120.3	24.3
NARVARTE	2.67	1030	206	386	77
PRES. ALEMAN	9.9	4000	1080	405	101
Uruguay					
1	24.8	694	193	33.6	8.5
2	18.01	532	125	30.3	7.3
3	17.4	580	125	26.7	6.5
4	125.8	550	152	47.8	12.5
5	6.18	912	192	101	31.2
Venezuela					
POMONA	31.5	1876	300	58.7	9.5
SAN CRISTOBAL	111.2	3840	640	34.4	5.7
CARLOS DELGADO		10334	1650		
PUNTA CRESPO	2.36	600	118	255	50.3
Perú					
ALEXANDER	2.92	560	112	230	41.4
ANGANOS	2.64	363	92	136	32.8
CALLAO	105.1	9600	1240	92.2	11.7
U. VECINAL 3	73.6	5699	1112	78	15.4
Brazil					
PENHA	47	10000	2000	213	60.7
Puerto Rico					
EL MONTE	38.37	1835	367	50	10
Panamá					
VILLA HERMOSA	141	6239	1470	43.5	12.3
Argentina					
BARRIO MUNICIPAL.	14.8	1000		74.3	
AVERAGES	57.87	5333	1078	111.5	23.96

Chart 1

TYPE OF DEVELOPMENT IN %

	TYPE OF DEVELOPMENT				OCCUPANCY
	multi family high	multi family walk-up	row housing	detached	w-workers e-white collar m-mixed
Mexico					
J. BALBUENA	12	21	22	45	m
UNIDAD MODELO	12	21	28	39	e
CIUDAD INDUSTR.		30	14	56	w
CIUDAD INDUS.(2)		38	16	46	w
BARRIENTOS		9	4	87	w
INSURGENTES		13	39	48	w
SOTELO			39	16	e
MINATITLAN		7	56	37	w
MERIDA		10	73	17	e
COL. PARQUE		13	83		e
SANTA MARIA		10	73	17	e
NARVARTE	18	82			e
PRES. ALEMAN	100				e
Uruguay					
1		10		90	m
2				100	m
3				100	m
4			50	50	e
5		100			e
Venezuela					
POMONA	33		67		w
SAN CRISTOBAL					w
CARLOS DELGADO	27		73		e
PUNTA CRESPO	100				e
Perú					
ALEXANDER		100			
ANGAMOS		100			e
CALLAO					w
UNIDAD V. 3		100			e
Brazil					
PENHA	100				
Puerto Rico					
EL MONTE		63		37	m
Panamá					
VILLA HERMOSA				100	m
Argentina					
BARRIO MUNICIPAL				100	e

Chart 2

LAND USES IN % OF TOTAL AREA

	green	built	streets	open
Mexico				
J. BALBUENA	46	28	26	72
U. MODELO	49	29	22	71
C. INDUSTRIAL	49	25	26	75
C. INDUSTRIAL (2)			25.3	
BARRIENTOS	48	29	23	71
INSURGENTES	41	40	19	60
SOTELO	40	42	18	58
MINATITLAN	54	28	18	72
MERIDA	58	26.5	15.5	73.5
COLONIA PARQUE	62	21.5	16.5	78.5
SANTA MARIA	25	40	35	60
NARVARTE	66	34		66
PRES. ALEMAN		20		80
Uruguay				
1	48	11.6	46	88.4
2	49	8	43	92
3	62	9	29	91
4	45	17	38	83
5	25	53	32	47
Venezuela				
POMONA	40	19	14.5	81
SAN CRISTOBAL				
CARLOS DELGADO				
PUNTA CRESPO				
Perú				
ALEXANDER	67	33		67
ANGAMOS	64	36		64
CALLAO	63.5	26	10.5	74
U. VECINAL 3	67.5	12	19	88
Brazil				
PENHA	65.4	13.6	21	86.4
Puerto Rico				
EL MONTE	66.6	20.4	13	79.6
Panamá				
VILLA HERMOSA				
Argentina				
BARRIO MUNICIPAL	12.7	15.6	17.5	66
AVERAGES	50.5	25.5	23.5	71.2

Chart 3

AREA PER PERSON (in sq. ft.)

	total	green	built	streets
Mexico				
J. BALBUENA	536	245	148.5	137.9
U. MODELO	485	267	141	97
C. INDUSTRIAL	464	244	112	125
C. INDUSTRIAL (2)	474			120.5
BARRIENTOS	545	261	157	130.2
INSURGENTES	512	173	96.9	96.9
SOTELO	530	234	208	105.5
MINATITLAN	1180	645	331	213
MERIDA	1560	915	415	249
COL. PARQUE	286	178	61.4	473
NARVARTE	356	144	143	178
PRES. ALEMAN	113	71	36.6	
Uruguay				
1	1300	75.4	150.8	516
2	1500	75.4	129	646
3	1625	32.3	183	473
4	915	118	161.5	345
5	430	107.6	226	91.9
Venezuela				
POMONA	742	291	146.2	107.6
SAN CRISTOBAL				
CARLOS DELGADO				
PUNTA ARENAS				
Perú				
ALEXANDER	226	172.5	53.8	
ANGAMOS	318	204	114	
CALLAO	474	301	111	50.5
U. VECINAL 3	562	379	212	106.3
Brazil				
PENHA	204	129	107.6	43
Puerto Rico				
EL MONTE	914	44	185	118
Panamá a				
VILLA HERMOSA	990			
Argentina				
BARRIO MUNICIPAL	668	80.7	140	116.6
AVERAGES	679	219	151.87	206.08

Chart 4

COMMUNITY SERVICES (area in sq. ft. and number)

	school	playground	market	stores	church	movie th.	administra.	NOTES, brackets indicate number of services
Mexico								
J. BALBUENA	nodata on services							
UNID. MODELO	(4)*	**	**	**	**	**	**	* 2000 pupils per sch. ** Included
CIUDAD INDUSTRIAL	(4)*	(4)17300	10760	(16)23470**	8536	24600	12600	* 2000 pupils per sch. ** 4 groups
CIU.INDUSTRIAL(2)	*	none	18600**		none	none	none	* included 2300 pupils ** market & stores
BARRIENTOS			*					* only stores, no data on area
INSURGENTES	37250*		9000**		none	none	none	* sch. & Playg. ** market & stores
SOTELO	no data on services							
MINATITLAN	nodata on services							
MERIDA	no data on services							
COL. PARQUE	no data on services							
SANTA MARIA	*	*	21300**		*	*	*	* imcluded ** market and stores
NARVARTE	no data on services							
PRES. ALEMAN	(1)**	**	none	36200	none	none	**	* 600 pupils, 2 shifts ** included
Uruguay*								* no data on services
1								
2								
3								
4								
5								
Venezuela								
POMONA	23470*	51200	none	(23)28200	**	**	**	* 600 pupils ** included
SAN CRISTOBAL	(1)*	9600	17200**		***	***	none	* 450 pupils ** 5 groups *** included
CARLOS DELGADO	(1)*	**	**	**	**	**	**	* 1000 pupils ** included
PUNTA CRESPO	*	**	***	none	none	none	none	* kindergarten ** tot-lot only *** included
Perú								
ALEXANDER	none	none	none	(16)7500*	none	none	none	* total area
ANGAMOS	none	*	none	(8)	none	none no	none	* Junior playg.
CALLAO	(2)56500*	10300	10670	(12)20000	8530	10670	**	* 960 pupils ** included
U. VECINAL	(2)*	10300	**	(23)	***	****	**	* 480 pupils each **included *** 300 seats **** 900 seats
Brazil								
PENHA	(1)*	none	none	none	none	**	none	* 1200 pupils ** 1012 seats
Puerto Rico								
EL MONTE	(1)6000	79800	(4)3073	(4)	none	none	none	
Panamá								
VILLA HERMOSA	(2)51300*	21300	61500**		***	23400	10670	* 1200 pupils ** mark. & st. *** included
Argentina								
BARRIO MINICIPAL	(1) 29000	none	2560	(12)1200	4550	none	6300	
AVERAGES								

Physical

Areas: overall
residential
circulation
open
green

Economic

Costs
total
per dwelling

Services

Type
number
area

5. Charts (see attached charts).

6. Evaluation of the Findings.

The scarcity of the data and above all the incompleteness of the information furnished by the local housing agencies, has greatly hampered the development of our original plan of searching for the standards in actual use. The information given by the agencies with regard to communal building and services is very scarce.

From this fact we can deduce the small concern of the Housing Agencies in the matter of community facilities. The policy, as appears to this author, has been only to provide the dwellings with a nearly total disregard of the additional services that would integrate the occupants into a true neighborhood.

7. Size of the Neighborhood.

Population. The average size of the neighborhood in these

examples has been found to be about 4000 persons, subject to a wide range of variation, clearly showing that the only criteria for determining neighborhood size has been the objective of placing the maximum number of houses into the plot.

Areas. 57.87 acres is the average neighborhood area, again ranging widely (from 2 to 200 acres).

Densities. 117.74 persons per acre and 21.78 families per acre are the average densities in persons and families per acre. The densities are quite similar in all the projects showing the trend toward the building of row-houses and garden apartments. This type of density is consistent with local traditions of intensive use of the land. Detached dwellings are the exception in these projects, as they are in Latin American cities where party-wall construction is the general practice.

Services. As shown before, the investigation of this item has been extremely difficult, however, mainly from Mexican and Venezuelan sources the following information was obtained:

Services provided in a neighborhood of 5000 persons: schools, market place, stores: general merchandise, ice cream, cafe, restaurant, shoe repairs, beauty parlor, bookstore, moving picture theatres, communal building, and administrative offices.

Sizes of services. The BNHUOPSA has set the standard for schools as follows: school population - 20% of total population and 86 sq.ft. of area per pupil. This figure includes playground. The same agency establishes 5.3 sq.ft. per person (buildings only) to be allowed for stores. 2/

In Venezuela [3] it has been established that 10 to 12 stores could serve 100 to 1000 families, and 25 to 40 stores, 1000 to 3000 families without specification of character or type of store.

Circulation. Average percentage of street area is 23.5, computed in relation to the total neighborhood area. A further comment on this matter is made below under the heading of site planning.

Housing. It can be clearly seen that there is a definite trend toward the exclusive use of row-housing and multi-dwelling structures with the result of quite dense communities. Almost no attention has been paid to proper standards of occupancy. Households of 6 or 8 persons are fairly common and no attempt is being made to enforce proper separation of sexes or ages.

Site planning. Land use distribution in the projects surveyed resembles, generally speaking, the classical neighborhood layout as far as location of community services, schools, shops, etc., is concerned.

Public or semi-public ownership of the entire project, which is fairly common, facilitates the provision of large green areas (average percentage of green space to total area is 50.5 or 219 sq.ft. per person).

But it is worth noting that maintenance of such areas in many cases is a much too heavy burden on the communities with the result that the neighborhood landscape is impoverished and additional nuisance is furnished.

From this survey, and particularly from the latest projects, it

becomes clear that Latin American planning is following a definite trend aiming to recognize the peculiar characteristics of the Latin American environment and to give those peculiarities its proper design significance, i.e., independence from European or American models. Extensive use of row-housing combined in various types plus the use of proper circulation systems (automobiles are seldom used by the people in such projects) creates a sense of "urbanity," as opposed to the country type of development.

NOTES

Chapter 2

1. See "Estudios" no. 5, Félix Sanchez.
2. Sanchez, Félix, "Estudio comparativo de varias unidades vecinales en construcción," "Estudios" no. 4, Mexico.
3. "La Vivienda Popular en Venezuela," Ministry of Public Works.

PART 2

Quantitative Dimensioning of Community Services.

Chapter 1

Theory.

1. Importance of size.

With the recognition of the various urban area functions, comes an awareness that the size of the divers urban area elements definitely relates to the functions and the social relationships served.

> José L. Sert has stated it in this way: "It is a well established fact that places such as schools, stores, clinics, sport fields, etc., where great numbers of people have to find attendance, must have a certain scale or size related to their functions. The size may vary considerably but it always remains within certain limits. If the structure is too small it will not fulfill the social need of bringing people together and results will be too costly; if it is too large, it becomes uncontrollable and rigid rules must be imposed. Generally these rules tend to make it inhuman. The correct measure or scale is an all important factor in city planning, as it is in any community structure and must be carefully considered when designing a neighborhood unit." 1/

It is assumed in this paper that an optimum size for a given urban service,with specific functional and locational factors, may be attainable even when the quest for a general optimum would appear unrealistic.

With regard to community buildings or services, the idea of size can be better grasped if defined in terms of percentage of total neighborhood population that is likely to use the service building, and in terms of the part of the total

neighborhood area to be served by such building. These two factors are closely related and depend on the specific characteristics of the service. The area of the service building is a function of the number of people that will be using it, or in other words, is a function of its "capacity of attendance."

Determining a proper "capacity of attendance" is of paramount importance for an appropriate rendering of services.

The economics of service building dimensioning entails a two-fold problem. From the public or neighborhood inhabitants viewpoint, the service should have the size that favors best the customer's demand in regard to lower prices, variety of choice and good quality; from the management or store dealers' point of view, it is required that sufficient customers be at hand so as to secure a good stock turnover and reasonable profits.

In short, the design of a proper size of service would result in:

a) maintaining the scale of the project;
b) an efficient functioning of the project; and
c) a sound economic base for the project 2/

2. The theory of service dimensioning.

Method. The procedure used in this paper could be described as the discovery from statistical sources of the trend of usage of a given service plus the finding of the service's "optimum size" through the evaluation of current experience or the utilization of the best current knowledge.

(Where the size of the service investigated could vary broadly without any damage to its functioning, we would say that the service

has no "functional or optimum size." If such is the case the radius of action of the service, representing the maximum distance that people would travel to use it, would take its place).

These two factors: "coefficient of utilization" and "optimum size" are afterwards combined in various ways - that will be discussed below - and the relation of total populations to number of services or establishments plus coefficients of area per person are thus established.

Basic assumption. Within certain limits of time and geographical location, there is a constant relation between size of service and population served. From statistical sources this assumption can be easily demonstrated and proved accurate. The design procedure drawn from it would, however, support a certain limit of variation.

Elements that take part in the computation:

neighborhood population (persons)	P
population using the service building	p
coefficient of utilization (% of total neighborhood pop. using the service)	$w = \frac{p}{P}$
number of service buildings (i.e., number of schools for example)	N
radius of service	R
total neighborhood area	A
neighborhood area served	a
area of the service building per person (constant for any one service)	k
built-up area of service building	$s = pk$
optimum size of service (persons)	e
family size	f
family income	If
gross neighborhood density (persons/acre)	$D = \frac{P}{A}$

3. The problems.

From the theoretical point of view the determination of the size of services can be stated in the form given below. Direct application of this theory is given in the next chapters. 3/ The entire matter of service dimensioning can be reduced to the following questions:

1) How many people are likely to use the service?

2) What is the best size of it? (optimum size)

3) How many service buildings (schools for example) should be provided to serve the neighborhood?

4) What should be the area of the service building in construction, parking and landscaping?

5) What is the best radius of service of the building in question?

The present paper assumes that the first two questions could find an answer in the existing statistical data. These findings would, however, be modified when found necessary to incorporate a clearly shifting trend of use or when they do not reflect a healthy situation or, in other words, when the trend should be brought to a minimum level of desirability. The other three questions could be treated mathematically, provided that we know the answer for the first two, and for their discussion we have developed the following method:

Problem I. To determine the number of establishments fulfilling certain service in a given neighborhood from:

neighborhood population	P
coefficient of utilization	w
optimum size of service	e

Solution. The total number of people using the service will be equal to wP. It is clear that the number of establishments dedicated to this service will be directly proportional to the total number of people using it, and inversely proportional to the optimum or functional size of service, thus:

$$N = \frac{wP}{e} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

If the number of services is equal to one, "e" becomes total population using the service:

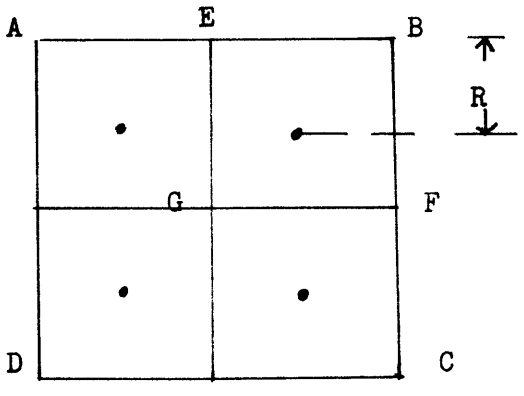
$$P = wP \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

for N = 1

Problem II. To compute the radius of action of a given service from:

neighborhood population	P
density	D
number of establishments	N

Solution. Let us consider the square ABCD as representing total neighborhood area. EBGF will be the area under the service influence.



To simplify the computation, let us also consider R as shown in the figure. Thus

$$R = \frac{1}{2} a \quad \ldots\ldots\ldots\ldots\ldots \text{I}$$

but

$$A = Na \quad \ldots\ldots\ldots\ldots\ldots \text{II}$$

and

$$A = \frac{P}{D} \quad \ldots\ldots\ldots\ldots\ldots \text{III}$$

or

$$R = \frac{1}{2} \frac{P}{ND} \quad \ldots\ldots\ldots\ldots\ldots (4)$$

in this expression for a constant value of D (density), f (P) will increase with the second power of the radius and will plot a straight line in semi-logarithmic paper.

Problem III. Equation IV above could also be used to compute the number of services when there is not recommended a specific optimum size. If such is the case the number of services or establishments depends on the radius of action.

$$N = \frac{P}{Da} \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Considering that $a = 4R^2$ the above formula could also be written

$$N = \frac{P}{D4R^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)\ a$$

to determine the area of the service.

Problem IV. The surface S of the establishment itself is dependent upon the constant K (sq.ft. per person) and it is directly proportional to population served

$$S = Kp$$

if more than one establishment is to be expected, the surface per establishment is given by the formula

$$S = \frac{Kp}{N} \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

NOTES

Chapter 1

1. Sert, José. "The Neighborhood Unit-A Human Measure in City Planning." UN, unpublished, page 13.

2. See: "Small Retail Store Mortality." U.S. Department of Commerce, June, 1940.

3. In the development of this chapter, extensive use has been made of Enrico Tedeschi's article in Metron no. 13: "Il dimenzionamento degli edifici communale."

PART II

Chapter 2

Educational Facilities.

1. General.

Utilizing the theoretical formulae derived above we will enter in this chapter into the specific problem of dimensioning the various community services. These services have been divided into the following categories: educational, recreational, civic and community center, and shopping center.

The subject is approached, generally speaking, in this way: 1) a short description of the service peculiarities in order to distinguish characteristics that could be approached statistically or, in other words, to search for a workable "w" coefficient (relation of total neighborhood population to people using the service); 2) finding of "e" or optimum size; 3) discussion of "K" or square feet of building per person using it; and 4) combination of this factor in a single expression. This general method would, however, be modified when specific characteristics of the problem requiredit.

2. Educational.

Under this heading we are including all the neighborhood educational elements that are susceptible of being measured quantitatively. As this paper is concerned with neighborhood planning only, computation of high school sizes is not included. Items to be dealt with are as follows: primary school, nursery school,

adult education center and library.

3. Primary school.

Primary schools in Latin America are roughly equivalent to elementary schools in the United States, both in age of pupils and in curriculum. Also, these two types of schools are endorsed by the same statutory principle: "Primary school is universal, free and compulsory and it is the duty of the State to provide for the education of the people." 1/

If compulsory education worked effectively, primary school population would be easily computed from the statistical tables giving population distribution by age. In reality, however, primary school trends of attendance will vary broadly with the percentage of literacy of the areas. In some countries primary school attendance is so low (only 21% of the children at primary school age attend school in Honduras), that the direct use of the census percentage is completely unrealistic. The author is well aware that the core of the educational problem rests in the most lamentable lack of proper school facilities. Table 4 shows the magnitude of this shortage 2/ giving the average for the countries, but the breakdown of these figures into rural and urban percentages will prove the former almost nil and the latter of a more reasonable size.

This paper is concerned with the more urbanized areas where new neighborhoods are more likely to be built and by the same token, no matter what the actual trend of primary school

CHILDREN AT PRIMARY SCHOOL AGE (1)
in 19 AMERICAN COUNTRIES

	Children at school age Per person	Age group	% of attendance
Argentine	0.148	6 -13	83.8
Bolivia	0.167	7 -14	26.9
Brasil	0.238	7 -14	31.5
Colombia	0.208	7 -14	33.0
Cuba	0.211	6 -14	48.8
Chile	0.214	7 -15	57.0
Ecuador	0.200 †	6 -14	29.3
El Salvador	0.200 †	7 -14	*
Guatemala	*	6 -14	38.7
Honduras	0.212	7 -15	21.5
Mexico	0.237	6 -14	39.1
Panama	0.214	7 -14	61.7
Paraguay	*	14	*
Peru	0.235	6 -14	46.0
Dominican Rep.	0.218	7 -14	47.3
Uruguay	0.191	5 -14	50.
Venezuela	0.205	6 -14	48.4
U.S.A.	0.120 (2)	6- 13	89.0
Canada	0.135	6 -13	92.0

* - no data

† - estimate

(1)- "Estadísticas de la Educación Primaria," PAU

(2)- "Planning the Neighborhood," page 4

Table 3

CHILDREN WITHOUT SCHOOLS IN THE AMERICAS

As percentage of children at school age *

Argentine	21.20
Bolivia	73.14
Brazil	67.16
Colombia	67.82
Cuba	50.14
Chile	42.51
Ecuador	66.01
Guatemala	76.86
Honduras	77.52
Mexico	52.43
Nicaragua	67.38
Panama	37.10
Peru	53.75
Dominican Rep.	51.50
Uruguay	48.61
Venezuela	59.77

* Source: "UNESCO and the OAS in Latin America," Pan American Union, May 1950

Table 4

attendance is, it is recommended that facilities for at least 75% of the population of primary school age be furnished.

Computing "w" for primary schools.

The coefficient of utilization, "w", is directly given by Table 3 as an average for the country:

$$w = \frac{\text{population at primary school age}}{\text{total population}}$$

Nevertheless, local characteristics should be taken into account. It seems that "w" would vary with the degree of rurality of the area considered and also with the fecundity rate of the zone studied. 3/ These two factors are inter-related and result in different family sizes. The coefficient ϕ, "children at school age per family" could also be used in computing school population. The monograph included in chapter 6 utilizes this coefficient. Diversity of Latin American social conditions is shown by the variation of w:

w =).148 for Argentine and w = 2.35 for Peru.

"e", optimum size.

Current Latin American practices, as portrayed by the latest shcool programs of Venezuela and Mexico, recommend 600 pupils per school as the best size. In the latest Venezuelan program 4/ w e find that out of the 29 planned school buildings, 20 are of 600 pupils.

The average number of pupils per school has been found equal to 586. Assuming 30 pupils per classroom, this school will have 20 classrooms,

which number makes a good size from the administrative and maintenance viewpoint.

"e", optimum size equal 600

Computation of K.

"K" has been computed by analyzing existing school buildings. Here it should be emphasized that our computation is quite close to the recommendation of the A.P.H.A. in "Planning the Neighborhood." 5/

K = 75 sq. ft. per pupil, not considering the inclusing of playground area, but taking into account interior courts, pathways and other tributary areas.

Formulae.

School population would be given by the following formula

$$p = wP$$

in which w is obtained from Table 3 and P is the neighborhood population.

Number of schools.

$$N = \frac{wP}{e}$$

in which e has been determined as equal to 600, thus

$$N = \frac{wP}{600}$$

General Commentary.

The number of grades in elementary school and, therefore, the school population, depends on the school system. The age groups shown in Table 3 are based on the countries' current policies as surveyed by the Division of Education of the Pan American Union. Local

practices would sometimes alter the above given figures. This is not likely to occur in the urban areas, but only in the rural sectors, where for example, a program of "fundamental education" (3 years of elementary schooling) is already under way.

We have given above the figure of 30 pupils per classroom as an ideal recommendation. The generalized lack of proper school facilities and teachers would indicate that a standard of 40 to 45 children per classroom must also be considered acceptable. 6/

4. Nursery School.

Compared with the United States, attendance in nursery schools in Latin America would appear low. Nevertheless, the necessity of furnishing this service as part of the neighborhood facilities has been fully established by many authors. Large families organized in a kind of patriarchal household usually provide for the services of baby-sitting. The elder aunt, grandmother, a grown-up daughter, and not so rarely a kind neighbor, takes care of the children while the mother works.

The percentage of working mothers is also low when compared with analogous percentages in the United States, but as industry develops a rapid shift in this trend is expected. Available statistics show the small proportion of women at work and their underprivileged situation in regard to wages.

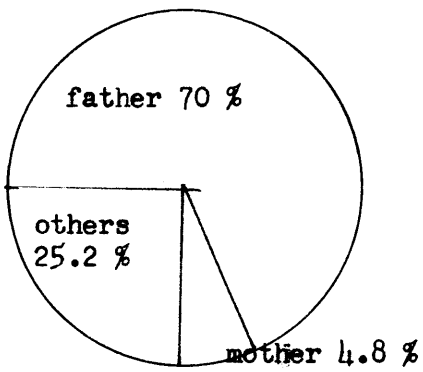
Distribution of industrial workers by sex in Brazil is as follows: 7/

men	-	70.8%
women	-	29.2%

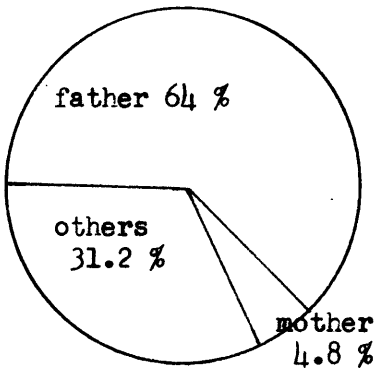
Average monthly salary in cruzeiros:

men	-	897.30
women	-	563.10

A survey made by the Banco Obrero of Venezuela [8] shows the following sources for family income:



Factory Workers



White Collar Workers

It is, nevertheless, the author's own experience that the provision of nursery school facilities is extraordinarily welcome, especially if they are designed to have the possibility of double use, i.e., for children's care during daytime and as neighborhood gathering places in the week-ends and evenings.

Computation of "w".

Population distribution by age in Venezuela - that for the purpose of this paper is considered typical - shows the following percentages of children under school age: [9]

age	percentage
0-3	12.5
4-6	6.5

Due to the usual practice of incoporating kindergartens in the elementary school facilities and letting children of 6 years of age and older attend, a figure of 85 children per 1000 population to be engaged in nursery school (from 2-1/2 to 5 years) should not be considered excessive. Thus,

$$w = \frac{\text{children at nursery school age}}{\text{total population}} = 0.085$$

In "Planning the Neighborhood," page 46, the age group considered as of nursery school age is from 2-1/2 to 4 years ($w = 0.037$), while in "Jardines de Infantes," 10/ José M. Pastor recommends the age group of 2 to 6 years and a radius of 600-900 ft. for such service.

This census computation has to be modified by real trends in attendance. The arguments expressed at the beginning of this section tend to reduce the estimated nursery school attendance. A coefficient $a = 0.5$ of enrollment appears necessary bringing the above value of w to 40 children per thousand population. Thus,

$$w = 0.040$$

"Optimum size: e"

Educational authorities recommend that nursery schools have as a maximum only 15 children per adult supervisor, although groups may include as many as 30 children under one teacher and one assistant. The fact is that class size will vary with the age of the pupils. The National Commission for Young Children 11/ states that the maximum size of groups should be of 20 children

aged about 3, 25 children aged about 4 and 30 for those 5 years old.

Hence, a nursery school with more than 2 teachers is not recommended, that is, more than 60 pupils, which should therefore be the maximum value of e.

$$e = 60$$

K - square feet per children.

The best recommendation available gives the following figures:

$$K = 50 \text{ sq.ft. per pupil}$$

5. Adult Education.

Table 5 gives the percentage of illiteracy of total population 15 years of age and older for 13 American countries. These figures will speak for themselves of the necessity of a subtantial improvement in the current adult education program.

This necessity will become immediately clear if we translate the percentages given in Table 5 into actual numbers: there are in the three Americas 70 million illiterates, with the following distribution: 3 million in North America (Canada and U.S.A.); 21 million in Central America and the Caribbean area; and 46 million in South America.

The breakdown of this number into the figures for rural and urban areas will no doubt show the latter to be in far better educational condition. Even so, they require a substantial improvement.

In this paper it is recommended that adult education facilities be provided for at least 5% of the adult population 15 years of age

PERCENTAGE OF ILLITERACY OF THE TOTAL POPULATION 15 YEARS OF AGE AND OLDER *

El Salvador	72.4
Honduras	65.7
Venezuela	58.5
Perú	57.6
Brazil	56.0
Mexico	53.9
Colombia	44.0
Panama	37.9
Chile	27.0
Cuba	22
Argentine	16.6
U.S.	3
Canada	2.5

* Source: UNESCO and the OAS in Latin America," Pan American Union, 1949

Table 5

and older. That is, if the age group 15-60 years is equal to 60% of total population, [12] 5% of this quantity will give us the value of w

$$w = 0.030$$

The problem of adult education seems to include two different aspects, one related to the provision of "fundamental education: a minimum of equality of opportunities to acquire culture" [13] for the illiterate and others, and the regaining to cultural life of the so-called "illiterate through disuse," people who began to read in primary school but who forgot what they had learned for lack of use of their reading skill. The great majority of adults who have had little education are progressively descending in cultural level with the passage of time. The net result is that "illiteracy is increasing in Latin America." [14]

Programs of fundamental education could be carried on using the facilities of the local school building. The problem of reeducating the "illiterate through disuse" would seem to be more difficult to handle. It would probably require the special facilities of the communal buildings and a well designed program of activities directed to gain their confidence and to make them realize their needs.

It is certainly impossible to draw definite standards in this field which depends too much upon local variables. But its importance cannot be emphasized enough and should be a priority item in neighborhood design.

6. Library.

A small public library is necessary for complete participation in the neighborhood, either as part of the school facilities or integrated with the community building. In either case, special attention should be given to the provision of adequate space for the fulfillment of the adult education programs, especially with regard to items of "consolidation of culture" mentioned above.

In planning library size the local habits of using facilities should be considered first. The general trend of use is described by the librarians as the relation of readers per year to total population. The index thus derived could only be of any value if computed locally. To show, ho ever, its range of variation, we present the following figures.

Readers per year to total population:

U.S.A.	0.146
Italy	0.350
Latin America	0.095

The American Library Association gives the following recommendation in regard to number of volumes: 15/

Population	
100,000	1.5 books per capita
99,000 to 10,000	2
10,000	3

With regard to reading room capacity in terms of neighborhood population:

Up to 10,000 population $w = 0.005$

7. General remark on educational facilities.

Provision of proper educational facilities could be considered to be within the planner's field of action, but in Latin America this should be especially emphasized. This situation has been explained clearly by Nannetti:

> "While there are 70 million of illiterates, we cannot speak in many parts of America of democracy or industrialization or economic progress or health or cultural aspirations. While there are 19 million children without schools, we cannot call America the continent of the future." 16/

NOTES

PART II

Chapter 2

1. "The Organization of American States." Inter-American Seminar of Rio de Janeiro, Pan American Union, page 16.

2. "The situation of the primary school in Latin America makes the outlook for some of the people of America most somber. 19 million children of school age have no schools." Nannetti, Guillermo, "UNESCO and the OAS in Latin America," Pan American Union, 1950, page 1.

3. This fecundity rate has been measured by means of the "index of fecundity", that is, the relation of children less than 5 years old to women in the age group 15-44 years. It is very interesting to note the figures found for U.S. and Puerto Rico. Numbers represent children per 1000 women.

	Puerto Rico	U.S.A.
urban	441	259
rural	773	348
total	652	331

from: Bartlet, Frederick P., Howel, Branon: "Puerto Rico y su problema de población." Junta de Planificación.

4. Plan Nacional de Edificios Escolares. Ministerio de Educación, Venezuela, 1951, page 43.

5. American Public Health Association, Committee on the Hygiene of Housing, "Planning the Neighborhood," 1948.

6. This lack of teachers would be manifest in the following figures given by Nannetti, opus cit. in terms of children at school age per teacher: Honduras 150; Colombia 140; El Salvador 131.3; Guatemala 122.6; Dominican Republic 121.-; Brazil 118.-; Ecuador 115.5; Nicaragua 105; Bolivia 105; Peru 95.8; Mexico 88.4; Venezuela 77.2; Cuba 67.5; Chile 65.2; Uruguay 63.8; Panama 52.2; U.S.A. 36.8; Argentina 31.-

7. Relatorio- Estudio. 1950, Instituto de Aposentadoria e Pensoẽs dos Industriários, pages 114 and 156.

8. "La Vivienda Popular en Venezuela," opus cit, page 57.

9. ibid.

10. Pastor, José M., "Jardines de Infantes." Nuestra Arquitectura, March 1950.

11. "Planning the Neighborhood." APHA, page 46.

12. See Table 2.

13. Nannetti, opus cit, page 3.

14. ibid.

15. "Small Public Library." American Library Association, 1950.

16. Nannetti, opus cit.

PART II

Chapter 3

Neighborhood Recreational Facilities.

1. General.

Proper planning of this type of facility is of paramount importance to enhance neighborhood integration and to improve both individual and social health. This is especially important in Latin America due to the actual shortage of such facilities and also because of the disregard shown by local authorities of the need for their improvement. "Sportive and recreative areas constitute an important element, until now carelessly considered and banished to the periphery of the cities." 1/

The items to be dealt with in this chapter are playgrounds and movie theatres. Standards for the allowance of space for passive recreation are not discussed.

2. Playgrounds.

Playgrounds will furnish the most important place for active recreation in the neighborhood. In most cases they will be planned as part of the school facilities and will serve mainly the children of school age. A general way to compute attendance at playgrounds as a percentage of total neighborhood population is as follows:

$$w = \frac{\text{population in age group}}{\text{total population}} \times \text{percentage of attendance}$$

Table 6 gives population distribution per age group for Puerto Rico, similar information can be found for the other countries.

Percentage of attendance is more difficult to obtain. The following figures were computed for Italy and it is assumed in this paper that they could be used in Latin America. 2/

Attendance at playgrounds in % per age group. *

Age group	male	female
0 - 13	10	5
14 - 19	70	40
20 - 29	40	25
30 - 39	30	15
40 - 49	20	10
50 +	-	-

* Source: Tedeschi, "Il dimenzionamento degli edifici communale."

Computation of K.

K is dependent upon the different kinds of games included in the neighborhood playground. Current Latin American recreation practices will require the games listed below. Area computations were made by Felix Sanchez. 3/

football	3.2
baseball	2.3
basketball	0.94
volleyball	0.01
tennis	0.07
fronton 4/	0.10
athletics	0.12
Total	6.50 square meters

K = 70 sq. ft. per active user 5/

POPULATION DISTRIBUTION AGE

Puerto Rico (1940) *

1	)
1 - 4	) 15%
5 - 9	13.4
10 - 14	12.1
15 - 19	11
20 - 24	11.1
25 - 29	8.-
30 - 34	5.5
35 - 39	5.4
40 - 44	4.6
45 - 49	3.7
54 - 54	3.0
55 - 59	1.8
60 - 64	1.9
65 - 69	1.4
70 - 74	0.9
75 +	1.2

* Source: "Puerto Rico y su problema de población," Bartlett, Frederick P., Howell Brandon, Junta de Planificación, 1946.

Table 6

"e", optimum size.

The criteria of optimum size is only used in the design of tot-lots in which case it is considered safe to limit the number of children playing together to a maximum of 40.

Radius of action.

This is the factor that will determine the number of playgrounds in the neighborhood. If it is considered that a playground should not be further than 1000 ft. from any house, 6/ then

$$R = 1000 \text{ ft.}$$

3. Movie theatre.

Two methods can be used to compute theatre capacity. The first is based upon the discovery of the local trend of use of theatre facilities in the community, and the second upon the amount of neighborhood income to be spent in recreation. This amount is obtained by itemized expenditure charts. Both methods could be checked against each other to test the accuracy of the results obtained.

By the trend of use.

Movie theatre attendance in Latin America is by now quite large and still rapidly increasing. Percentagewise it is now greater than the U.S.A.'s 1940 peak. Local habits of gregariousness and lack of other kinds of entertainment, plus a different setup for family life, accounts for this. As a starting point in this discussion we will assume that Latin American movie attendance is equal to twice the U.S.A. figure.

From U.S.A. statistics 7/ we find that movie theatre attendance is about 60 millions weekly. Introducing a peak coefficient of 25% and using the figures of the 1950 census, we find that "w" for U.S.A. is 0.07. In other words, there are in existence 70 theatre seats for every 1000 people.

Considering the total number of tickets sold by year in the U.S. 8/ (3 billion) and the U.S. total population, we can state that the average American goes 19.3 times a year to the movies. The same computation was made for Italy by Tedeschi 9/ and found equal to 40. We are assuming in this paper that this figure, also equal to two times the U.S.A. figures, holds for Latin America.

Thus, the total neighborhood theatre capacity and assuming two daily shows, the year availability of places is

$$2 \times 365\ e_t = 730\ e_t \quad \ldots\ldots\ldots\ldots (1)$$

Where P is the neighborhood population and considering, as in Italy, that the average neighborhood inhabitant goes to the movies 40 times a year, the total number of places used for a theatre working full capacity will be:

$$40\ P \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

By equating (1) and (2) we obtain the theatre's capacity in terms of neighborhood population:

$$730\ e_t = 40\ P \quad \ldots\ldots\ldots\ldots\ldots (3)$$

$$e_t = 0.0548\ P \quad \ldots\ldots\ldots\ldots\ldots (4)$$

It seems, however, necessary to provide room for the extra goers attracted by special events, i.e., Sunday and matinée shows. If it is assumed that such events will attract twice as much people as the average show, 10/ then:

$$e = 2\, e_t \qquad (5)$$

$$e = 0.1096\, P \qquad (6)$$

$$w = 0.1096 \qquad (7)$$

In other words, theatre capacity should provide room for about 11% of the total neighborhood population.

Alternative method.

In some areas, fairly detailed itemized charts of expenditure are available 11/ with sufficient breakdown of expenditure items to prove useful in this computation.

If I_r is the amount of family yearly income to be spent in movies and F is the total number of families in the neighborhood, then

$$I_r\, F$$

will be the total neighborhood theatre income. If "T" represents the average ticket value, then

$$\frac{I_r\, F}{T} = N$$

is the number of tickets sold by year in the neighborhood. Assuming two daily shows and a peak coefficient equal to two, the theatre capacity will be given by the expression:

$$e = \frac{2N}{365}, \text{ or}$$

$$e = \frac{I_r\, F}{182T}$$

Computation of K

The figure given below has been obtained by computing the areas dedicated to the divers functions of a theatre of 1000 persons:

K = 9.25 sq.ft. per person

Parking.

Parking space for one car for every 20 persons will be in most cases considered adequate. This figure will, however, vary according to local trends in car ownership. Table 7 gives the average by country in number of vehicles per 1000 persons. But as these figures include farm population in which car ownership is almost nil, the number of cars in urban areas would have to be increased substantially. The average for Caracas in 1948 was 88 per 1000 with a clear trend of augment. For the same city car ownership for 1970 was computed and expected to be 170 cars per 1000 population. 12/

The above recommendation of one car per 20 persons results in an allowance of space for parking of about 1/6 of the theatre's lot to be dedicated to parking.

General.

Movie theatres in Latin America play a somewhat different social role than their American counterparts. They are embedded more deeply in the social texture and deserve a different design approach. They form a distinctive part of the community core and their facilities are broadly used. The evening performances of the movie place with the continuous movement of people who want to have a

MOTOR VEHICLES PER 1000 PERSONS *

Argentina	3.37
Bolivia	2.97
Brazil	7.96
Chile	12.25
Colombia	5.32
Ecuador	3.75
Paraguay	2.26
Peru	5.50
Uruguay	33.23
Venezuela	26.73
Costa Rica	8.66
Cuba	16.84
Dominican Republic	2.66
El Salvador	3.12
Guatemala	2.44
Haiti	1.21
Honduras	2.43
Mexico	12.12
Nicaragua	2.57
Panama	34.81

* Source: Data Book, Latin America, June 1951, Department of State, U.S.A.

Table 7

place to stride along, requires special treatment of the theatre's environs, and the planning significance of this should be taken into account.

NOTES

Chapter 3

1. Pastor, José M. "Anatomía de la unidad vecinal." Nuestra Arquitectura, August 1946, page 286.

2. The % of attendance for women over 30 years old should, however, be considered high.

3. Sanchez, Félix. "Factores de densidad." Espacios 5-6, Mexico, 1950.

4. Mexican game equivalent to the Basque "jalalai."

5. In "Planning the Neighborhood" playgrounds, 100 sq.ft. per child.

6. See Gutkind, A. "L'Urbanistica," in Urbanistica no. 4, Torino, 1950.

7. Standard's and Poor's Industry Surveys. "Motion Pictures," page M8-7, February 14, 1952.

8. The World Almanac, 1952.

9. Tedeschi, opus cit.

10. This is explained by the fact that Latin Americans use movie going practices, not only for private entertainments, but also for social intercourse in the theatre surroundings, public square or promenade, before and after the show.

11. Extremely accurate charts are drawn to compute cost of living indexes for almost every city of 40,000 population or more. See "Enquires into household standards of living in less developed areas." United Nations, Social Affairs, 1951.

12. "Estudio de transporte y tráfico para la ciudad de Caracas." Technical Services Corporation, IBEC, Venezuela, 1948, page 57.

PART II

Chapter 4

Civic and Community Centers.

1. General.

Experience indicates the convenience of organizing neighborhoods in "civic associations," of men and women with the aim of extending to everyone opportunities to participate in communal life and to find the proper environment to develop his or her own personality. This civic association will also contribute in adding to "adult education" the democratic orientation necessary to bestow the people with the sense of responsibility and understanding of their own position inside the community. These civic associations will require a place to carry on their activities. Quantitative dimensioning of them cannot be generalized due to excessive local variation in regard to the services required.

2. Church.

For the purpose of this paper it is assumed that church will be attended (Sunday service) as an average by one member out of every family in the neighborhood. It is also assumed that more than one service is given and finally that one of the services is preferred by the parishioners at the ratio of 1 to 1.5. Under these assumptions, "w" will be as follows:

$$w = \frac{1}{\text{family size}} \times \frac{1}{\text{number of services}} \times \text{peak coefficient}$$

$$w = \frac{1.5}{Nf}$$

Computation of K

It has been recommended to allow 10 sq. ft. per person.

Parking.

Parking space will be allowed at the same ratio as the movie theatre: one car for every 20 persons.

3. Civic Center.

Under this heading we include the following neighborhood elements: post office, fire station, police, private offices, bank agency, health center. Most of these facilities do not bear a straight-line relationship to population in the scale of the neighborhood. In most cases only minimum figures concerning size of the service could be given.

$$K = 4 \text{ sq. ft. per person}$$

PART II

Chapter 5

Neighborhood Shopping Center

1. General.

Proper design of neighborhood shopping centers is of paramount importance for the neighborhood success. In many cases the neighborhood's overall size has been deduced from the number of people that will sustain a shopping center with adequate store variety. In this paper the shopping center problem has been divided into two different aspects that will be treated separately: one is the market place, and the other the various stores to be operated individually.

2. Market place.

The market place in Latin America is a sui-generis type of structure. Sometimes it bears some resemblance to the French "marché," and to its oriental counterpart. It is an almost entirely open place, - sometimes a pitched roof on stilts is provided -operated by a number of independent dealers, each of them having a separate booth or counter. They buy the right to sell in the market place under certain specific conditions established by the local municipality.

In these places quite an heterogeneous variety of products is offered, but as a minimum the following lines are covered: vegetables and fruits, meat, delicatessen goods, pastry and bakery goods, flowers, rice, beans, etc.

FAMILY SIZE IN 17 LATIN AMERICAN COUNTRIES AND U.S.

Argentina	4.3
Bolivia	5.5 *
Brazil	5.16
Colombia	5.5 *
Cuba	5.5 *
Chile	5.2 *
Ecuador	5.5 *
El Salvador	6.0 *
Guatemala	5.0
Honduras	5 *
Mexico	4.8
Panama	4.25
Paraguay	-
Peru	4 8/6
Dominican Republic	5.5 *
Uruguay	5 *
Venezuela	6.0
U.S.A.	3.5

* PAU estimates

Table 8

Lack of proper storage facilities, and above all lack of refrigeration in the homes, result in the daily travel to the market of at least one member of the family to acquire the necessary foodstuffs.

This fact will be used here as a basic assumption of computation of market size, that is to say, that if "f" is the average family size, the number of people attending daily to the market will be:

$$p = \frac{P}{f}$$

Assuming that the market place will remain open for "k" hours, and assuming also that the average buyer will spend there "t" hours shopping, the total number of people simultaneously using the market facilities will be:

$$n = \frac{Pt}{fk} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

It seems, however, necessary to introduce the coefficient $q = 1.5$, to express the greater attendance at the peak hours, thus:

$$n = \frac{1.5\ Pt}{fk} \quad \ldots\ldots\ldots\ldots\ldots (2)$$

$$w = \frac{1.5\ t}{fk} \quad \ldots\ldots\ldots\ldots\ldots (3)$$

The total area of the market place is

$$S = nK \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

the value of "K" being equal to 2 to 4 square meters or 20 to 40 square feet. The total area required by the service, considering parking as $0.5S$ and landscaping equal to S:

$$S_t = 2.5S \quad - - - - - - - - - - - - - (5)$$

3. Stores.

As noted above, the market place specializes in the sale of perishable foods plus small amounts of dry goods, cereals and eatables. The stores usually provide a wider variety of foodstuffs plus all the other products necessary to house maintenance and husbandry.

A tentative list of these facilities is given here as computed for 1400 families in Panama:[1/]

ice cream shop
drugstore
restaurant
bookshop
barber shop
beauty parlor
clothing
dime-store
shoe repair
laundry
gas station

Proper design of these facilities, as far as number and size of them is concerned, constitutes a basic problem in neighborhood design. Two are the principal conditions which it is necessary to meet: first, to give the consumers sufficient variety of choice, and second, to furnish the store dealer with a proper economic base.

The basic approach to the problem has been set by Villanueva and Lilibridge in more or less a parallel way:

> "The only valid means of estimating the need for retail facilities and the area they should occupy is analysis of annual income and expenditures into units of purchasing power for the population being considered."

PER CAPITA INCOME IN 19 LATIN AMERICAN COUNTRIES

PUERTO RICO AND U.S.A.*

				1949 U.S.A. dollars **
Argentina	638	pesos	1945	346
Bolivia	2450	bolivianos	1940	55
Brazil				112
Colombia	960	pesos	1940	132
Chile	5000	pesos	1943	188
Cuba				296
Ecuador	1010	sucres	1949	40
Mexico				121
Nicaragua				89
Panama	1600	dollars	1940	183
Perú	780	soles	1947	100
Paraguay	323	guaranies	1946	84
El Salvador				92
Uruguay	250	pesos	1943	331
Venezuela	305	bolivares	1936	322
Costa Rica				125
Guatemala				77
Dominican Republic				75
Haiti				40
Puerto Rico	300	dollars	1950	295
U.S.A.				1453

* Source: National income statistics, UN, 1950.

** National and per capita incomes seventy countries, 1949, UN, New York, Oct. 1950

Table 9

Data on family income and on expenditure patterns is available for Latin American urban places. Accurate charts have been prepared for the preparation of "cost of living index numbers." 2/ From them it is possible to follow a procedure similar to the one devised by Lilibridge. 3/ The present paper, however, tries to devise a different method which, if not as accurate, is certainly easier.

Method.

If "I_f represents yearly family income and "n" the number of families in the neighborhood, the total neighborhood purchasing power will be

$$L = I_f n \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Table no. 10 gives for Puerto Rico the quantity of this neighborhood income that will be spent in the neighborhood. This figure is quite in agreement with the findings for Venezuela, 5/ for Peru, 6/ and for Brazil. 7/

We will assume as a minimum that 60% of the family income will be spent in the neighborhood stores and market place

$$L_n = 0.6\, I_f n \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

If the market place absorbs 1/3 of this income, total store gross receipt will be $\frac{2}{3}$ of Ln

$$R_s = \frac{2L_n}{3} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$R_s = 0.4\, I_f n \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

EXPENDITURES IN % OF TOTAL INCOME

Puerto Rico *

Item	%	% to be spent in the neighborhood shopping center	
a) food and tobacco	51.50	100%	51.50
b) clothing	11.40	50%	5.70
c) personal care	1.40	100%	1.40
d) housing	6.90	-	
e) household operation	10.50	50%	5.25
f) medical care	2.50	-	
g) personal business	1.75	-	
h) transportation	7.50	-	
i) recreation	2.15	50%	2.07
j) private education	0.28	-	
k) religious and other	1.60	-	
l) foreign travel	1.82		
	100%		£%("

* Obtained from: National Income Statistics, 1939-48, United Nations

Table 10

It is widely known that the small retail stores profit by a rapid movement of capital. Here we assume a "turnover" of 2 and we find the total capital investment

$$C = \frac{Rs}{2} = 0.2\, I_f n \quad \ldots\ldots\ldots\ldots \quad (5)$$

The store dealer profits by the difference between wholesale and retail prices. This difference is about 20 to 30% and it is usually considered that expenses will take from 8 to 18% of such difference. The dealer's income results then is about 12% of the capital. 8/

Total rent = $0.12 \times 0.2\, I_f n$

$$R_t = 0.024\, I_f n \quad \ldots\ldots\ldots\ldots \quad (6)$$

In order to find the number of store dealers that will share such rent, we make the following assumption: to make sure the store dealer has a permanent interest in the neighborhood and the service will not suffer discontinuance, it is necessary to secure for the store owner a higher income than the average neighborhood family has. We have chosen $1.5\, I_f$ as the proper income relation, that is, he will belong to the immediately higher income bracket (from 2000 to 3000 a year, for example).

The number of stores in the neighborhood will be given by the relation:

$$N = \frac{\text{total stores' income}}{\text{per store income}}$$

$$N = \frac{0.24\, I_f n}{1.5\, I_f}$$

$$N = 0.018n \quad \ldots\ldots\ldots\ldots \quad (7)$$

that is, 18 stores per 1000 families.

To this respect it is worth-while to quote J.L. Sert in "Unidad Vecinal Pomona": "10 to 12 stores may serve from 500 to 1000 families and a group of 1000 to 3000 families justify a shopping center of 25 to 40 stores." 9/

Existing cities have an excessive number of stores. In a survey made for Panama in 1940 10/ a ratio of 160 stores per 1000 families was found "new business start in a ratio of about 1 to 5 concerns in existence," 11/ withdrawals are in the same proportion. Relatively few operators have attempted specifically to analyze their opportunities for successfully operating the establishment.

Areas.

In "Factores de Densidad," Espacio 5-6, Félix Sanchez recommends 5 sq.ft. per person to be allowed for stores.

NOTES

Chapter 5

1. See Solow, A. and Bermudez Ricardo, "Informe preliminar para el proyecto Villa Hermosa." Banco de Urbanización y Rehabilitación, Panama, 1940.

2. See "National Practices in the Field of Retail Prices and Retail Prices Index Numbers." UN Statistical Commission, January 1953.

3. Lillibridge, Robert M. "Shopping Centers in Urban Redevelopment." Land Economics, May 1948, page 137.

5. See "La Vivienda Popular en Venezuela," opus cit.

6. "The percentage of family income spent for food in Lima is equal to 50.7." El Seminario de Ciencias Económicas de la Universidad de San Marcos, 1940.

7. Food 52.83, Una pesquisa de Padrão de Araujo, São Paulo.

8. Same results are obtained by computing the net annual rent as 6% of the total annual store's gross receipt. The following % are given by Lillibridge: super-market 2%, grocery 4-6, bakery 3-5, drugstore 6-7, restaurant 6-7, tavern 6-8.

9. "La Vivienda Popular en Venezuela," opus cit, page 36.

10. Banco de Urbanización y Rehabilitación. Publicación no. 1, Panama, 1945, chart 14.

11. Villanueva, Marcel. "Planning the Neighborhood Shopping Centers." National Committee on Housing, Inc., New York, 1946, page 11.

PART II

Chapter 6

Summary and Conclusion

1. General.

This chapter tries to summarize what has been studied in the preceding pages, to evaluate the approach followed and to comment on the subject of design as a modifier and regulator of the results obtained.

2. Evaluation of the Method.

There is no doubt that planning is a new discipline. Planners have only scant information on which to base their decisions or to develop programs. But, being all the time forced to act quickly on all the issues they are confronted with, they must, by ingenuity or otherwise, make the best use of the available sources, however meager they may be. If this situation holds for the planner's profession as a whole, it is specially so with regard to Latin American planning. Few would, for example, question the need for information on family size, income levels, education and similar facts as a basis for planning, but an answer even to these simple questions has been for this author quite difficult to obtain. It is worth noting that this paper represents, as far as this author knows, the first attempt to gather and compile such information on a Latin American basis. This paper was written to try to alleviate the scarcity of data and the lack of Latin American planning in the past. It was

hoped to obtain, broadly speaking, two main goals: first, to emphasize the importance of initiating investigation and research toward answering basic planning questions; second, to excite the planner's imagination toward the better use of existing information.

The accuracy of the results obtained through the use of this method cannot be greater than the accuracy of the statistical data on which they are based, not to mention the possibility of errors in the assumptions chosen.

The most important advantage of the formulae approach lies in its flexibility. Due to the fact that it isolates the variables it becomes possible to obtain a clear understanding of their interdependence. It shows the manner in which they influence the standards sought for, and makes it possible to manipulate the key factors so as to procure a more precise answer to a given problem.

The generality of the formulae methods becomes especially important when dealing with areas like Latin America where extremely different conditions are the prevailing rule.

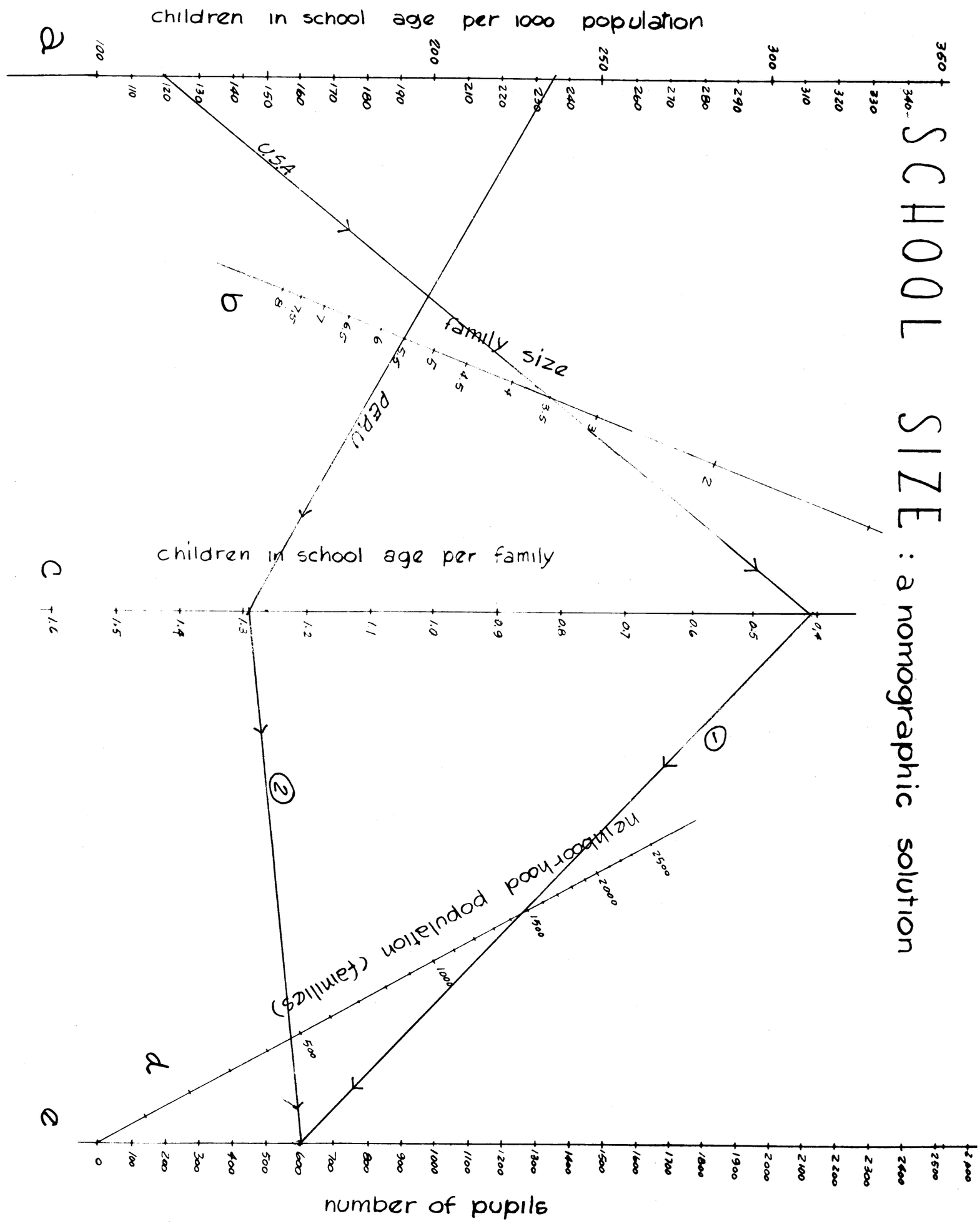
As an example of the possibilities of this kind of approach we present the attached monograph. Strictly speaking it should be named a multiplication chart. It was designed to represent the inter-connections among demographic variables influencing school size.

From the two lines drawn (line 1 and line 2), it would appear clear how utilization of American standards in Perú leads to absurd conclusions. Accepting a 600 pupil optimum size school for both countries we come to a neighborhood size of 500 families for Perú and to 1500 families for U.S.A. It is evident that the former is a much too small number of families to support a minimum shopping center. The whole theory of the neighborhood unit as a comprehensive entity based upon a single school building becomes inapplicable. It appears that a minimum of two schools should be provided in Perú to give support to a minimum shopping center. For an optimum shopping center size, the population supporting 3 schools would be required to grant enough economic base.

Since the group of 500 families is just large enough so as to be a primary group with face to face knowledge among its members, it is possible to revise the neighborhood unit theory for Perú so as to form a community of 3 integrated primary groups, each one centered around its respective school building, served by a common shopping and community center.

The above statement does not intend to be definitive nor should it be considered final: it was only made to give an example of the possible results of our approach which if complemented with research and ingenuity could lead to more adequate planning, with real regional significance.

SCHOOL SIZE: a nomographic solution



3. Design.

In developing this work it was necessary to study and analyze separately the different problems of community buildings. In the neighborhood site they tend to form groups, they merge with each other, and they constitute integrated unities. Fundamental to good planning is the arrangement of all neighborhood elements into a coherent scheme. The composition thus obtained is of higher rank than the compositional value of the parts assembled. Design is a limitless tool. Based on a profound knowledge of reality, it has, at the same time, the power of modigying it, the capacity to rearrange its features, the ability to produce a higher order of reality with all elements entering the problem. The findings of this paper have been thought of only as parts of a puzzle that have to be put together by the creative mind, or rather they should be considered as a means to incite the planner's imagination in the search of better planning techniques.

4. Chart.

The attached table shows in condensed form the principal findings of this work. The first column states the way in which "w" was obtained for the various services. The second established its value in terms of persons using the service per 1000 neighborhood population. Other items of this chart are self-explanatory.

	Compute of "w"	"w" in per. per 1000	sq.ft. P. user: K	optimum size, "e"	radius of action, R	net servic area, S	tributary area	total area	N O T E S
EDUCATIONAL									
Primary School	population at school age / total population	143 to 235	1/ 75	600	1500	75p		2/ 3/ 75p	1) See Table 3 for values of "w" 2) Triburary area included in 75p 3) Does not include playgrounds
Nursery School	populat. nurs.sch.age / total population x % of attendance	40	1/ 50	2/ 60	600 to 900	50p		3/ 50p	1) Children 2 to 6 years old 2) One teacher every 30 children 3) included in 50p
Adult Education 1/		30	2/						1) combined with primary school 2) 5% pop. 15 uears and older
Library		5	1/ 20	none	3000	20p	0.5 S	30p	1) Reading Room capacity
RECREATIONAL									
Playgrounds	population in ag. group / total population x % of attend.		1/ 70	2/ none	1000	70p	none	70p	1 1) See page 41 2) Only for Tot-lots, "e" equals 40
Movie Theaters		109.6	1/ 9.25	1000		9.25p	9.25p/6 2/	11p	1) See page 42 2) One car every 20 persons
CIVIC AND COMMUNITY CENTER									
Church	1/fam. size x 1/No. of serv. x pk.coeff.	75	1/ 10	none	3000	10p	10p/6	12p	1) Computed for a peak coeff. of 1.5, fam.size of 5 and 4 No. of services.
NEIGHBORHOOD SHOPPING CENTER									
Market Place	(see page 49)	19	1/ 20	none	1500	20p	1.5 S 2/	50p	1) for t = half hour, k = 8 hours, fam.s = 5 2) includes landscaping and parking
Stores	(see page 51)		1/ 2/	none	1500	3/ 5P	0.5 S	1.5 S	1) 18 stores per 1000 families 2) sq.ft. per total neigh. pop. 3) P equals total neigh. pop.

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