

URBAN SCALES AND FUNCTIONS IN SPANISH AMERICA TOWARD THE YEAR 1600: FIRST CONCLUSIONS

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IN THIS WORK WE PRESENT THE FIRST CONCLUSIONS OF AN ONGOING INVESTIGATION CONCERNING THE PROCESS OF URBANIZATION IN THE SPANISH COLONIES IN AMERICA, AT A PARTICULAR MOMENT IN THEIR HISTORY. WE COVER A PERIOD OF APPROXIMATELY 50 YEARS, BETWEEN THE DECADES OF 1570–80 AND THAT WHICH ENDS IN 1630.

Those years are of great importance in colonial and post-colonial urban history. In the first place, around 1580, the principal cities had been founded, in which the administrative and religious functions and the cultural services of the colonies were concentrated; these cities were also the principal commercial centers and, with the exception of the *reales de minas* (towns near which silver mines were located), were practically the only industrial centers. The early preeminence of some of those cities was decisive in the structuring of later, regional urban systems, and is still clearly visible in many Latin American countries.

In the second place, the relation which the founding process had with Spanish territorial expansion in America takes on particular interest. Toward the end of the sixteenth century Spain had almost reached her maximum expansion in the territories that presently make up the group of Spanish American nations, and the principal land and sea routes had been fixed. During the

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seventeenth and eighteenth centuries, Spain sought the means by which to improve the exploitation of the resources of her colonies and to consolidate their boundaries. Conquest followed discovery, which in turn was followed by colonization.

Moreover, each region had acquired, toward the year 1600, characteristics in its economy which were to remain without major changes until the end of the colonial period: the mining industry in Alto Perú and in the north of New Spain; cattle raising in the Río de la Plata region; agriculture in the fluvial valleys of the Peruvian coast; sugar in the Caribbean area; diversified agriculture and cattle raising in Ecuador and central Mexico, etc. The volume of farm and mine production suffered regional oscillations during the colonial period, but the nature of production did not experience any substantial changes.

Finally, the bases of the administrative and judicial systems had become well established after an experimental period which extended over the greater part of the first half of the sixteenth century.

The crown gradually augmented the number of viceroalties and audiencias, and the church increased the number of archbishoprics and bishoprics but, in essence, colonial institutions were not substantially modified. The urbanization process confirmed a city model that attained its definitive physical characteristics during the decade from 1530 to 1540. All of the subsequent foundings adjusted themselves to the models of Puebla and Lima, founded in 1531 and 1535, respectively, with the exception of the mining centers and the seaports (for reasons of topography and frequent spontaneous development), and other exceptional cases.

All of the information presented in this work has been compiled principally from extant primary sources in the libraries of the city of Buenos Aires. The authors believe that this work could be supplemented with information existing in archives and libraries in other countries in order to obtain a panorama more broad and exact than that which we present.

EXPLANATION OF THE METHODOLOGY.

The methodology employed in the determination of the correlations between the urban scales and functions in Spanish America around the year 1600 has been explained in a recent presentation.¹ The explanation here of that methodology may be defined by its 3 salient aspects.

1. Determination of the scale of the centers.

We tested diverse methods until settling on that which offered us the greatest advantages.

Because of insufficient census data it was possible to obtain, even for a period of half a century, such as we are studying, an exact measure of the

population of the Spanish cities for only a very small sample, one, moreover, which was spread out over the 50 years which we analyzed. We rejected this system, considering it not representative.² Because of deficiencies in urban cartography of the period analyzed, both in number and representation, it would be incorrect to utilize the system of attributing a density to an estimated urban area as if the area were occupied at the moment of laying out the plan.³ The few cases tested provide interesting information, but are little representative of the general reality.

Various authors use the number of dwellings, houses or hearths as a measure of the scale of the centers. Information of this type does not exist for a year or for a brief span of years, nor does it exist for a representative group of cities of a distinct size. Therefore, the application of an index, determinant on the size of the family in relation to the number of dwellings, for the purpose of estimating the total population, would give invalid results.

Other derivatives of the 3 indicated systems were also tried until we decided to adopt the number of *vecinos* (legal residents) as a measure of the scale of some cities with respect to others, and with the exclusive object of comparison, in view of the fact that this term could not be used as a measure of the total population. In spite of this deficiency, working with the number of *vecinos* offered a great advantage: the *vecino* was the measure of scale most used during the colonial period by the greatest number of authors; it thus permits comparative analyses of the relative importance of the Spanish cities and, in a certain way, of the process of urbanization over time. We tried to approximate the total population, taking as a base the number of *vecinos* and using an index which represented the number of family members attached to a *vecino*, obtaining in this manner an estimate of the white population. We think that this could represent, according to the scale of the centers, an approximate percentage of the total population, and, in this manner, an approximation of the total population. However, the fact is that the indices obtained from the comparison of the number of *vecinos* with data on the white population show significantly great differences in several examples: further, percentages worthy of confidence could not be established which were representative of the white population in the total.

One may conclude that because of the frequency and detail with which it was employed in the principal syntheses written during the colonial period, the number of *vecinos* constitutes the best possibility for establishing the importance of some cities with respect to others, and for grouping them by ranks in order to make comparisons concerning the functions they performed.

2. *Determination of the ranks.*

The ranks were established by relating 4 types of functions—admin-

TABLE 1
INDEX FOR THE WEIGHTING OF FUNCTIONS

	Functions	1580	1630
Administrative	Viceroyal Capital	33.66	36.25
	Seat of Audiencia	6.00	5.25
	<i>Gobernación</i>	1.20	1.50
	<i>Alcaldia Mayor</i>	1.00	1.25
Religious-Administrative	Seat of Archbishopric	7.33	10.00
	Seat of Bishopric	2.46	2.00
Religious	Convent	6.66	2.50
	Monastery	1.67	1.00
	Hospital	4.00	2.00
Services	University	33.66	36.25
	Secondary School	6.00	4.12
	Inquisition	33.66	36.25

istrative, administrative-religious, religious, and services—(Table 1) with the number of vecinos considered as an independent variable.

For the purpose of establishing the value of each of the functions a weighting was carried out for each of them. With the value thus established, we calculated the total value of the functions for each city, finding Mexico, with 133.62, the case of maximum concentration of functions. On the other hand, we encountered several cases with a function-value of zero, that is to say, cities which did not have any function which could be classified by this method (Table 2).

The appearance of discontinuities in the weighting value of the functions with respect to the jumps in the number of vecinos permitted us to establish

TABLE 2
RANKS

	1580	1630
Rank I	2,000 vecinos or more	9,500 vecinos or more
Rank II	500 vecinos or more	500 to 4,000 vecinos or more
Rank III	90 vecinos or more	250 to 400 vecinos or more
Rank IV	from 25 to 90 vecinos	from 60 to 250 vecinos
Rank V	from 10 to 25 vecinos	from 10 to 60 vecinos

5 hierarchical ranks. Rank I was established for the cities with the highest weighted index and Rank V for those cities with the lowest weighted index (Table 2). We observed that some centers were not found within the rank established for that number of vecinos, such as, for example, some mining centers and seaports, or cities which, having lost population for identifiable circumstances, maintained functions located within them prior to the causes of the diminution of their population (Table 2).

3. *Determination of the functions.*

Basing ourselves on the information supplied by López de Velazco and Vázquez de Espinosa, and complemented by the contributions of other primary and secondary sources, we established *a priori* a series of functions whose general importance and quantifiable value were easily verifiable for each one of the ranks in which we had grouped the cities. In this manner the following functions resulted:

Administrative. We established 3: capital of viceroyalty, seat of the audiencia and seat of a *corregimiento* (smaller political subdivision), *gobernación* or *alcaldía mayor* (other administrative districts or posts).

López de Velazco and Vázquez de Espinosa mention the administrative functions which each city performed during the time of their work so that it was relatively simple to establish 3 decreasing values for the seats of the viceroyalties, of the audiencias, and of the gobernaciones, corregimientos and alcaldías mayores. The *cabildos* (municipal councils) have not been compared since they existed in all of the centers considered by both authors (López de Velazco and Vázquez de Espinosa). The distinct value which we give to viceroyalties and audiencias warrants a brief clarification in spite of the fact that, theoretically, the audiencias usually exercised a judicial function and the viceroyalties an administrative, political, and legislative function. Given that in practice the audiencias of Lima and Mexico possessed a greater hierarchy than the others, and that at the same time they were both seats of the viceroyalties, it seemed logical to use to establish that hierarchical differentiation.

Administrative-religious. We established 2: archbishopric and bishopric. The kings of Spain counted on the church, and principally on the secular clergy, as efficient instruments for carrying out their colonial policies. The number of archbishoprics and bishoprics grew continually during the sixteenth century and throughout the 50-year span which we studied. The seats of the archbishoprics and bishoprics were determined by a clear hierarchical concept that corresponded to the importance of the political and economic functions of some cities with respect to others.

Religious. We established 2: monasteries and convents. Socially and eco-

nomically the church constituted a force of enormous power. Many of the services such as educational and medical, normally provided in a modern city, were administrated by religious groups. Therefore, the number of members of religious orders who lived in the principal cities should not surprise us, nor should the fact that the monasteries, convents, and churches were the most representative works of urban colonial architecture. Practically every city in Rank IV or larger had a convent and/or monastery; cities in Rank V had several. Because of lack of information, we have not been able to assign distinct values to the convents and monasteries according to some factor such as the number of friars or nuns who lived in each one, and the activities which they performed; thus, we decided only to determine in which cities there were monasteries or convents and in which cities there was none.

Services. We have been able to collect comparative data for only 2 types of services: hospitals and education.

Hospitals. The general policy of the Spanish crown was to establish hospitals in those places where they were most needed. Beginning with the time of Diego Colón, it was common to assign a plot for a hospital in every new Spanish city. In practice, the inclinations of the Spanish crown were not executed, or were executed tardily, and it is evident that the number and quality of hospitals depended on the wealth and scale of the cities, hospitals being essentially an urban service and one maintained primarily by contributions and by the taxes assigned to them. Undoubtedly, it would have been preferable to have counted the number of beds in each hospital or also to have counted the number of professionals who worked in them, but unfortunately we lacked sufficient information to make a comparative analysis.

Education. Education was an urban activity limited to the upper classes, especially to upper-class males. The great "mass" of the population, including the urban, was illiterate. Colonial education was practically a monopoly of the church at the secondary and university level, and the schools established by the crown were directed by or under the influence of one of the religious orders, especially the Jesuits, Dominicans, and Franciscans.

López de Velazco and Vázquez de Espinosa cite only the universities of Mexico and Lima, yet we know that at the time these authors wrote, 5 universities had been established by 1580, and 10 by 1630.

We do not have a clear idea of what courses were taught, or at what level, with relation to the public schools for children. Undoubtedly, the 2 systems appear to constitute different levels. The number of *colegios* (secondary schools) would vary with the scale of the city, but neither author is precise in this regard, and each limits himself to an indication that secondary schools existed, without specifying how many existed in each city.

At any rate, the presence of universities in some places and of secondary

schools in others is a clear indication of the importance of some cities with respect to others. Higher education was located in the principal cities.

Inquisition. The Inquisition was one of the principal instruments which Philip II and his successors utilized to establish political and religious unity within the Iberian peninsula and the colonies.

The tribunals of the Santo Oficio in America were few and were located in the principal cities, although delegates were found in the least important centers. The location of the Tribunals of the Inquisition gives us a measure of the importance of the cities. Precisely speaking, the 2 capitals of the vice-royalties were the seats of the institution. The concentration of complementary institutions in the religious and political spheres (for whose unity the crown was always preoccupied) and the existence of specialized consultants in those centers plainly justified that localization.

Economics. Studies of the economic structure of the Spanish-American cities are rare and deficient, and we soon arrived at the conclusion that we did not have enough information to make a comparative analysis. We have adequately precise data for only a very limited number of centers.

We may assume by the general information which we have collected that the economy of a city was based in great part on the "basic" activities, including the services, which were those that determined the scale of the commercial and industrial activity, and therefore, to a great degree, the total population of the city; but we do not have quantitative data to measure those activities. It is certain that in every city of a certain range there existed industries whose production was "exported" to the area of their immediate commercial influence, and, in the case of some specialized articles, throughout the audiencia and even to Spain or Asia. Nonetheless, we should not expect that this type of industry had great significance in the urban colonial economy, with the exception of those dedicated to the elaboration of much-sought-after products, located in specific centers and generally not in existence for extensive periods of time. We did not have significant data for determining the employment distribution, or for establishing the area of the "regional" market and the influence which that demand could have had on the scale of the commercial and industrial sector. The number and frequency of the market days could give us an idea of the magnitude of the urban center and of the regional attraction it exercised; but, unfortunately, we encountered dispersed and noncomparable data. The urban industries were almost always of a small scale and were generally structured as family-type shops, with the exception of the extractive industries such as mining, which were concentrated near the raw materials, thus determining the formation of some of the largest cities of the colonies with respect to population.

The only method we encountered for comparing the potential of the

cities was the number of taxpayers. López de Velasco provides data for 47 percent of the cities which he mentions. The correlation between both values (vecinos-taxpayers) confirms that this measure could not be employed as an index of the economic power of one city with respect to others, but merely as one more element of judgment, and not one of the most important.

CONCLUSIONS.

As our work progressed, we continued to notice the possibility of introducing other sources of judgment which, although incomplete, could serve to establish certain forms of life among cities of a distinct range.

Among others, we noted the following economic functions: a) the salaries of civil servants, which are different for the same jobs in cities of different ranks; b) the cost of the products which varied between cities of equal rank for the same product.

Among the functions of service we noted: a) the number of professionals, by number of profession, and their correlation with the scale of the centers; b) the number of printing presses; c) the number of theaters; d) the number of periodical publications.

CHARACTERISTICS OF THE PROCESS OF URBANIZATION BETWEEN 1580 AND 1630. RURAL POPULATION AND URBAN POPULATION.

The Spanish conquest of those territories politically controlled by the Aztec Confederation and the Incan Empire signified the imposition of a new culture with its consequent impact on the indigenous economy, technology, and life-style. The impact was much more direct on the indigenous population living in the cities.

The reaction of the indigenous people to the conquest was active or passive, according to the circumstances. In either case, the wars and the consequent population displacements, the institution of the system of *repartimiento de indios*—their relocation for the purpose of accelerating their “civilization” and facilitating the collection of tribute by the Spanish crown—directly affected the indigenous population and contributed to its decline. There also existed other causes.

During the greater part of the sixteenth century, the crown, some private interests, and particularly the religious orders, dedicated themselves to the construction of churches, convents, monasteries, municipal buildings, and palaces, and to the reconstruction of the indigenous cities which they occupied, or to the planning of new cities. The manpower of the Indians was indispensable in the labors of construction as it was in the exploitation of the mines. Moreover, the introduction of new diseases against which the Indians were

slow to develop immunity, and the institution of tribute in products unknown in America before the conquest, with the consequent ecological disequilibrium and the partial change in diet, contributed to the decline of the population.

Estimates exist with regard to the dramatic decline of the indigenous population in the first century following the conquest. The studies devoted to central Mexico, the area which, along general lines, corresponded to the maximum expansion of the Aztec Confederation, are the most numerous and the best documented. Recent estimates indicate that at the time of the conquest 25,200,000 persons lived in central Mexico, and that an almost immediate decline reduced that population to 2,650,000 persons in 1568; 1,900,000 in 1580; 1,370,000 in 1595; and to 1,075,000 in 1604.⁴ Beginning with the second half of the seventeenth century, a slow recovery began which increased during the eighteenth century; nevertheless, at the end of the colonial period the indigenous population was still far from the figures for the preconquest period.

The population of Inca Peru, excluding that of the province of Quito, was not greater than 3,000,000 inhabitants at the time of the conquest. The rebellion of Manco Inca and the wars between the Spaniards undoubtedly influenced the population decrease directly, while at the same time it provoked the voluntary displacement of indigenous groups from areas controlled by the Spaniards. Around 1561, the indigenous population has been estimated at 1,430,317 persons, that is to say, a decline of approximately 50 percent in thirty years; in 1586, it had descended to 1,230,798 persons, and at the end of the eighteenth century, in 1781 to be exact, the estimated number of Indians was 610,490.⁵

Causes similar to those mentioned above—wars, sickness, the *encomienda* system, and social disorganization—explain the abrupt decline of the Araucanian population, which up until the time of the conquest had densely populated the region bounded by Canal de Chacao and the Bío Bío and Itata rivers.⁶ All of the reports, communiqués, and chronicles of the sixteenth century progressively note the disappearance of the indigenous race; first in the Caribbean islands,⁷ later, in *tierra firme*,⁸ in Ecuador,⁹ and in every other place where contact occurred between the Spanish and indigenous cultures. In no place on the continent did the decline reach the proportions estimated for central Mexico, although in some Caribbean islands the indigenous race practically disappeared.

We are not aware of any estimates of the percentage which the urban population represented within the total population during the pre-Columbian period, nor do we know if the indigenous population decline after the conquest was equally as abrupt in the cities as it was in the rural areas. Our measure of a Spanish city's scale is given by the number of *vecinos*, and we have already

indicated that this system permits only a relative appreciation of the importance of one center with respect to another, and that in no way does it represent the total population. As we will explain below, taking the number of *vecinos* as a measure of scale, one notes an important and general increase in the urban population during the period between 1580 and 1630, in spite of the decline in the rural population. However, by definition, *vecinos* seem to have been those adult males eligible for citizenship in a Spanish city, and that definition did not include the residents of indigenous cities.¹⁰ Consequently, urban growth estimated in this way would only represent that of a very particular group in colonial society, and by the same token, only of a minority of the total urban population.¹¹ Nevertheless, it is possible that the urban population grew constantly, not only because of European immigration which was Spanish almost to the total exclusion of other nationalities, but also as a result of the immigration of rural Indians and the residence of Negro slaves in the cities, where they were utilized as servants and artisans. Kubler compared the indigenous population of 73 Peruvian provinces between the years 1628 and 1754, and concluded that, with the exception of 11, all had lost population.¹² Among the 11 provinces which had gained population were, to be exact, some mining districts and others notably urban, such as Cajamarca, Cuzco, and the district of Cercado, in Lima. Sufficient data exists, moreover, much of which is from censuses, to demonstrate that the population of the principal cities, at least, increased gradually during the colonial period. Such was the case of Lima, Mexico City, Quito, Buenos Aires, Santiago de Chile, and many others. Such was not the case with the mining centers and other specialized centers, because of circumstances totally related to the type of exploitation or economic activity which determined their urbanization at a particular time.

The urban population grew from 29,994 *vecinos* in 1580 to 77,398 in 1630, including all of the territories controlled by Spain in America, with the exception of those presently contained within the boundaries of the United States of North America.¹³ The index of absolute growth was 3.3.¹⁴ However, if we consider that the total number of *vecinos* mentioned by López de Velasco lived in 189 centers, and on the other hand Vázquez de Espinosa supplies data for the population of only 165 centers, the relative growth index for the urban population of the entire area is increased to 3.8.¹⁵ We considered that the growth index of the urban population, measured by the number of *vecinos*, should have been higher, since Vázquez de Espinosa gives the names of 331 centers, for which he provides population data for only 165; while on the other hand, López de Velasco indicates, for a period some 50 years earlier, the number of *vecinos* of 189 centers out of a registered total of 225. We do not believe that the preceding figures constitute the totality of the inhabited cities at the time when López de Velasco and Vázquez de Espinosa wrote their

URBAN SCALES AND FUNCTIONS IN SPANISH AMERICA

 TABLE 3
 GROWTH INDICES

V. O F N E W S P A I N — V. O F P E R U	AUDIENCE	1580			1630			Abs. Indx.	Rel. Indx.
		No. of Number of vecinos w/data	No. of cities inhabtd.	No. of cities w/data	No. of cities inhabtd.	No. of cities w/data	No. of cities inhabtd.		
	Sto. Domingo	1,711	29	37	5,030	22	49	2.9	2.4
	Mexico	6,229	34	38	25,500	24	58	4.0	5.8
	Guatemala	2,294	17	21	2,940	15	22	1.2	1.5
	Guadalajara	1,099	14	21	2,700	9	32	2.4	3.8
	Panama	577	5	8	1,070	7	22	1.8	1.2
	Bogotá	2,196	37	41	6,844	26	56	3.1	4.1
	Quito	874	15	16	5,288	11	24	6.0	8.2
	Lima	5,018	19	20	16,966	24	29	3.3	2.7
	Charcas	1,445	8	12	10,000	20	40	6.9	2.8
	Chile	1,551	11	11	960	7	10	0.6	0.9
	Viceroyalty of New Spain	11,333	94	117	36,170	70	161	3.1	4.3
	Viceroyalty of Peru	11,661	95	108	41,228	95	170	3.5	3.4
	TOTALS	22,994	189	225	77,398	165	331	3.3	3.8

works, nor do we believe that they constitute a faithful representation of the number of vecinos who were living in the viceroalties of New Spain and Peru.

INDICES OF GROWTH BY VICEROALTIES.

The viceroyalty of New Spain included the audiencias of Santo Domingo, Mexico, Guatemala, and Guadalajara. The urban population grew from 11,333 vecinos in 1580 to 36,170 in 1630. The absolute growth index is 3.1. However, since López de Velazco provides data for 94 cities out of a total of 117 within the viceroyalty, and Vázquez de Espinosa provides data for 70 out of a total of 161, the relative growth index rises to 4.3.

The viceroyalty of Peru included the audiencias of Panama, Bogotá, Quito,

Lima, Charcas, and Chile. The urban population grew from 11,661 vecinos in 1580 to 41,228 in 1630. The absolute growth index is 3.3. However, considering that López de Velazco provides data for 95 cities from a total of 108, and Vázquez de Espinosa provides data for 95 out of a total of 170, the relative growth index is 3.4.

Vázquez de Espinosa confirms the incomplete nature of his list of cities. He says, referring to the bishopric of Guadiana, or Durango, in Nueva Vizcaya, "There are many other settlements and silver mining centers to which it is impossible to refer";¹⁶ and later he generalizes: "... those which are annotated with an 'M' are mining centers (*reales de minas*), omitting many others which are not included because they are Indian cities, which, in the archbishopric of Mexico, are the cities of Tescuco (Taxcoco), Suchimilco (Xachimilco), Tacuba, Chalco and others; and in the district of the bishopric of Los Angeles, the cities: Tlaxcala, Tepezca, that called Sagura, Quejotingo (Huejotzingo), Cholula, and others."¹⁷

INDICES OF GROWTH BY AUDIENCIA.

Of the 4 audiencias into which the viceroyalty of New Spain was divided, the one which had the highest absolute growth index was Mexico, with an index of 4.0, and the lowest was that of Guatemala, being 1.2. The audiencias of Santo Domingo with 2.9 and Guadalajara with 2.4, represent intermediate indices, which are, however, less than the total absolute growth index (3.3), and less than that of the viceroyalty of New Spain (3.1). If we consider the relative growth index, the audiencia of Mexico, with 5.8, represents the highest index; and the lowest corresponds to Guatemala, with an index of 1.5. The audiencia of Santo Domingo, with 2.4, represents an index which is much smaller than the total growth index (3.0) or than that of the viceroyalty of New Spain (4.3). Conversely, the index of the audiencia of Guadalajara is similar to the total and is somewhat less than that of the viceroyalty.

In the viceroyalty of Peru the differences between the 6 audiencias are much more accentuated. The extremes, with reference to the index of absolute growth, are represented by the audiencias of Charcas with 6.9, and Chile with 0.6, the lowest of all America. The index of the audiencia of Quito is also high, at 6.0; and that of the audiencia of Panama is low at 1.8. The remaining audiencias, Lima, with 3.3, and Bogotá, with 3.1, have absolute growth indices which are very similar to the total (3.3) and to that of the viceroyalty of Peru (3.5).

The analysis of the relative growth indices offers important changes with respect to the absolute indices. Quito is the audiencia with the highest index

(8.2), and that of Chile continues to be the lowest, at 0.9. However, because of the important percentage of (urban) centers with *vecinos* mentioned, the relative index of the *audiencia* of Charcas descends to 2.8, the *audiencia* of Lima to 2.7, and that of Panama to 1.2, all substantially lower than the total relative index (3.8) and than that corresponding to the viceroyalty of Peru (4.3). On the other hand, the index of the *audiencia* of Bogotá goes up to 4.1.

It is interesting to observe that only 3 *audiencias*, those of Charcas, Quito, and Mexico, have an absolute growth index which is higher than that estimated for the total, the index of the *audiencia* of Lima also being similar. And only the *audiencias* of Quito, Mexico, and Bogotá show relative growth indices which are higher than the total, with that of the *audiencia* of Guadalajara being similar.

When analyzed for each *audiencia*, the indices of relative and absolute growth have, along general lines, their explanation.

AUDIENCIAS OF THE VICEROYALTY OF NEW SPAIN.

Audiencia of Guatemala.

This is the *audiencia* with the lowest absolute and relative growth in the viceroyalty, much lower than the total indices. The number of *vecinos* in the *audiencia* goes from 2,294 in 17 centers in 1580, to 2,940 in 15 centers in 1630. The total number of populated centers was 21 and 22, respectively, but data are not given for 4 and 5 of them. The seat of the *audiencia* was the city of Santiago de Guatemala, which had 500 *vecinos* in 1580 and 100 in 1630, descending from 6th to 11th place in order of importance in Spanish America. Nonetheless, its growth index of 2.0 is considerably higher than that of the *audiencia* in general, although it is inferior to that of the viceroyalty. In 1580, 21.8 percent of the population was concentrated there, and in 1630, 34 percent. The highest growth index is that of the town (*villa*) and seaport of Realejo (3.33), through which the products of the zone left and those from Peru entered; the town changed from 30 *vecinos* in 1580 to 100 in 1630. Several cities in the *audiencia* decreased in population.

The reason for the slow population growth is, without doubt, related to the scarcity of labor which could be dedicated to the characteristic crops of the zone, such as cacao, one of the principal export products. The mineral resources were not exploited. Vázquez de Espinosa adds himself to a long list of authors and administrators who believed that the situation could change only if the importation of Negroes for planting and harvesting were permitted.

Audiencia of Guadalajara.

The absolute growth index is 2.4, and the number of *vecinos* in 14 centers grew from 1,099 in 1580 to 2,700 *vecinos* divided among 9 centers in 1630.

The total number of populated centers was 21 and 32, respectively, but population data are not given for 7 and 23 of them. The seat of the *audiencia* was the city of Guadalajara, which had 150 *vecinos* in 1580, and 600 in 1630 (growth index: 4), advancing from 36th place to 17th in order of importance in Spanish America. Its growth index is much higher than that of the *audiencia* in general and is somewhat higher than that of the viceroyalty. In 1580, 13.7 percent of the *vecinos* registered in the *audiencia* were concentrated there, and in 1630, 22.2 percent. The highest growth index in this *audiencia* is shown by the seat of the bishopric of Guadiana in Nueva Vizcaya, the city of Durango, which grew from 30 *vecinos* in 1580 to 400 *vecinos* in 1630 (13.3). This index is one of the highest in the entire Spanish-American area, and is owed to the intensive mineral exploitation in its area of influence, which was accelerating very rapidly in the period under analysis. It is also explained by the great number of new Spanish foundations of cities and towns. Vázquez de Espinosa speaks of, although he does not name or give other data for, "more than 150 places populated by Spaniards, of which most are silver mining towns and camps ("reales y sientos de minas de plata").¹⁸ The relative growth index of the *audiencia* is 3.8, equal to that of all America, and somewhat less than that of the viceroyalty.

Audiencia of Santo Domingo.

The absolute growth index is 2.9. The number of *vecinos* rises from 1,711 in 29 centers in 1570, to 5,030 in 22 centers in 1630. The total number of populated centers was 37 and 49, respectively, omitting the data for 8 and 27 of them.

The seat of the *audiencia* was the city of Santo Domingo, which in 1580 had 500 *vecinos*, and 600 in 1630, registering the lowest growth index of all of the seats of *audiencias* (1.2), being less than that of both the *audiencia* in general and the viceroyalty. It descended from 6th to 17th place in order of importance in all America. In 1580, 29.2 percent of the total population of the *audiencia* was concentrated there, and in 1630, 11.9 percent. Paradoxically, the highest index of urban growth in all America was registered in the *audiencia* by the city of Havana, which grew from 60 *vecinos* in 1580 to 1,200 in 1630 (23.8 percent of the total population of the *audiencia*).

The low growth index for this *audiencia* is explained by the virtual disappearance of indigenous labor in the islands of Santo Domingo, Puerto Rico, and Cuba, necessitating the importation of slave labor.

Audiencia of Mexico.

This *audiencia* registered the highest growth index of the entire viceroyalty of New Spain (4.0). Both the index of absolute growth and that of relative growth are much higher than those estimated for the viceroyalty in particular, and for all Spanish America in general. The number of *vecinos* grows from

6,229 in 34 centers in 1580, to 25,500 in 24 centers in 1630. The total number of populated centers in 1580 was 38, and 58 in 1630, and data are not recorded for 4 and 34 of them.

The seat of the audiencia was Mexico City, which had 3,000 vecinos in 1580 and 15,000 in 1630 (growth index 5), greater than that of the audiencia and than that of the viceroyalty of New Spain. Mexico maintained first place in order of importance in all of Spanish America, and offers at both dates, 1580 and 1630, the highest index of the concentration of functions. In 1580, 48.1 percent of the population registered in the audiencia was concentrated there, and in 1630, 58 percent.

The high growth which is recorded in this audiencia is due principally to the increased quantity of indigenous labor, to the establishment of the export-import nuclei in its principal urban centers, to the intensive exploitation of the mineral wealth, and to the existence of an extensive zone of agricultural production, constituted principally by the Bishoprics of Tlaxala, Oaxaca, and Yucatán.

AUDIENCIAS OF THE VICEROYALTY OF PERU.

Audiencia of Chile.

This is the only audiencia of all those in Spanish America which recorded a high index of decrease (0.6). The number of vecinos changed from 1,551 in 11 centers in 1580, to 960 in 7 centers in 1630. The total number of populated centers in 1580 was 11, and 10 in 1630; data are not recorded for 3 centers in 1630. Four of the cities included in the population data for 1580 were depopulated in 1630.

The seat of the audiencia was the city of Concepción, from 1565 until 1572. In 1609, the audiencia seat was moved to the city of Santiago. We will consider the indices of growth for the city of Santiago. The city grew from 375 vecinos in 1580, to 500 vecinos in 1630. Its index of growth, 1.3, is much higher than that of the audiencia in particular, and clearly less than that of the viceroyalty, in general. In 1580, 22.5 percent of the vecinos were concentrated there, and in 1630, 52 percent. As a result of the installation of the audiencia, a high index of concentration of functions is recorded: from 2.46 in 1580, it changes to 16.87 in 1630. On the other hand, one notes a decrease in the order of importance which it occupied among the urban centers of all Spanish America, moving from 16th place to 21st place. The 4 cities which disappeared were of Rank III: Valdivia, La Imperial, Los Confines, and Villa Rica.

This notable decrease was caused by the war with the Araucanians, which made the exploitation of mineral wealth impossible, and also prevented the cities from developing economic activities for simple subsistence.

Audiencia of Panama.

After Chile and Guatemala, this is the audiencia that records the lowest growth index (1.8), being much less than either that of the viceroyalty or that of all Spanish America.

The number of vecinos changes from 577 in 5 centers, in 1580, to 1,070 in 7 centers, in 1630. The total number of populated centers was 8 and 11, respectively, and data are not recorded for 3 and 4 of them. The seat of the audiencia was the city of Panama, which had 400 vecinos in 1580 and 500 vecinos in 1630 (growth index 1.25), clearly less than that of the audiencia, and than that of the viceroyalty. Panama descends in order of importance from 9th place to 21st place among all the centers of Spanish America. In 1580, 69.3 percent of the vecinos in the entire audiencia were concentrated there (Panama City), and in 1630, 46.7 percent.

The cause of the low growth index for this audiencia is the lack of indigenous labor which, aside from being scarce, was, for the most part, withdrawn and at war with the Spaniards. Speaking of the province nad gobernación of Veragua, which forms a part of this audiencia, Vásquez de Espinosa says, ". . . The encomiendas are poor and tenuous because of the scarcity of indigenous people, because the majority are withdrawn in their heathendom. . . . Every province and gobernación is poor in indigenous folk and very rich in gold-bearing minerals . . . but since there are not people to wash it and extract it, one enjoys little of this wealth."¹⁹

Audiencia of Santa Fe de Bogotá.

This audiencia records a growth index (3.1) similar to that of the viceroyalty, and to that of all Spanish America.

The number of vecinos changes from 2,196 in 37 centers in 1580, to 6,844 in 26 cities in 1630. The total number of centers is 41 and 56, respectively, and data are not recorded for 4 and 30 of them. The seat of the audiencia was the city of Santa Fe de Bogotá, which had 600 vecinos in 1580, and 2,000 in 1630 (growth index 3.3), similar to that of the audiencia and to that of the viceroyalty. The city descends, in order of importance, from 4th to 7th place among all of the centers of Spanish America; however, it maintained its position of Rank II in the 5-rank scale which we have established. In 1580, 28.2 percent of the total number of vecinos registered in the audiencias were concentrated there, and in 1630, 29.2 percent.

The growth of this audiencia, and the new foundings (of cities and towns) are directly linked to the exploitation of the mineral wealth of the area.

Audiencia of Lima.

Its growth index (3.3) is similar to that of the viceroyalty or equal to that of Spanish America. The number of vecinos changes from 5,018 in 19

centers, in 1580, to 16,966 in 24 centers, in 1630. The total number of populated centers was 20 and 29, respectively, and population data are not recorded for 1 and 5 of them. The seat of the audiencia was at the same time that of the viceroyalty of Peru, and had 2,000 vecinos in 1580 and 9,500 vecinos in 1630. Its growth index (4.7) is much higher than either that of the audiencia or that of the viceroyalty. It maintained second place in order of importance among all of the centers considered, and recorded, after Mexico, the highest index of the concentration of functions. These are the only 2 cities of Rank I on the scale of 5 ranks which we established. In 1580, 39.8 percent of the total number of registered vecinos in the audiencia was concentrated there, and in 1630, 55.8 percent.

The growth of this audiencia is explained by the intensive exploitation of the coastal valleys, by the concentration of the import-export nuclei from all over the viceroyalty in its capital, by the exploitation of the mining centers, such as Huancavelica, and by the exploitation of coca, as in the area of Cuzco.

Audiencia of Quito.

This audiencia recorded one of the highest growth indices of all Spanish America (6.0), and almost doubled the growth indices of the viceroyalty.

The number of vecinos changes from 674 in 15 centers in 1580, to 5,288 in 11 centers in 1630. The total number of centers is 16 and 24, respectively, and data are not recorded for 1 and 13 of them. The seat of the audiencia was the city of San Francisco de Quito, which had 400 vecinos in 1580 and 3,000 in 1630. Its growth index of 7.5 is higher than that of the audiencia and is clearly higher than that of the viceroyalty. It advanced from 9th to 6th place in order of importance among all of the centers considered. In 1580, 45.7 percent of all the vecinos in the audiencia were concentrated there, and in 1630, 56.7 percent.

One of the principal causes of the high growth index in this audiencia was the availability of indigenous labor, and of the consequent possibility of subjecting the area to efficient exploitation. Vázquez de Espinosa says regarding this, "All of these provinces have continued in expansion since their discovery and conquest, the opposite of all the other provinces of the Indies."²⁰

Audiencia of Charcas.

This audiencia had the highest growth index (6.9), a much higher index than that of the viceroyalty or of all America.

The number of vecinos changes from 1,445 in 8 centers in 1580, to 10,100 in 20 centers in 1630. The total number of cities is 12 and 40, respectively, and data are not recorded for 4 and 20 of them.

The seat of the audiencia was the city of La Plata, which had 100 vecinos in 1580, and 1,100 in 1630. Its growth index (11.0) is much higher than either that of the audiencia or that of the viceroyalty. It increased in order from

45th place to 10th place with respect to the other cities considered. In 1580, 6.9 percent of the total number of vecinos in the audiencia was concentrated there, and in 1630, 10.8 percent.

The high growth index in this audiencia may be explained by the existence within it of the silver-rich hill in Potosí, where 39.6 percent of the total population of the audiencia was concentrated, and by the effective incorporation of those territories which are situated in what today is the Republic of Argentina.

CASES OF THE GREATEST URBAN GROWTH BETWEEN 1580 AND 1630.

The 5 cases of the greatest growth are: La Habana, which grew from 60 to 1,200 vecinos, with an index of 28.0, and which jumped from 70th place to the 9th; Santiago de los Valles, which grew from 18 to 200 vecinos, with an index of 18.8, and which moved from 180th place to 64th; Durango, which grew from 30 to 400 vecinos, with an index of 13.33, and which jumped from 103rd place to 32nd place; La Plata, which grew from 100 to 1,100 vecinos, with an index of 11.00, and jumped from 45th place to 10th place; and San Juan de Pastos, which grew from 29 to 300 vecinos with an index of 10.71, and jumped from 133rd place to 44th place.

Another 5 cases present a growth index of 10.0, and they are: Potosí, which grew from 400 to 4,000 vecinos, and changed from 9th place to 3rd place; Popayán, which grew from 30 to 300 vecinos and changed from 103rd to 44th place; Tlaxcala, which grew from 50 to 500 vecinos and changed from 103rd to 44th place; and Mérida, in Yucatán, which grew from 30 to 300 vecinos and changed from 103rd to 44th place.

Some of these cases of growth may be explained. During the period analyzed, La Habana became one of the most-frequented ports in Spanish America, because it was an obligatory stop for the fleet that linked the colonies with Spain. The cases of Cochabamba, Potosí, and La Plata are evidently based on the boom in the mines of Potosí. In all of the mining area to the north and south of Durango, especially in the district of Parral, the exploitation began in the first part of the seventeenth century, and Durango became an important point on the road which one was obliged to take from the north to Mexico City; moreover, beginning with 1594, the municipality became the general headquarters of the Jesuits of New Spain, Cuba, Florida, and other territories. The other cases are more difficult to explain.

It is interesting to observe that among the 10 cases analyzed, there is not a single city which, in 1580, qualified for Rank I or II, the 2 highest ranks, while on the other hand, we note the case of Santiago de los Valles, which was in Rank V, the lowest. Of the remaining 9 examples, only 2, Potosí and

La Plata, were in Rank III; with the remaining ones belonging to Rank IV, in 1580. Moreover, only 35 of the 94 cities mentioned by Vázquez de Espinosa and which López de Velasco also records, have the same index as the total average for both viceroyalties (3.3), or a higher index.

Three of the cases of highest growth are in the audiencia of Mexico, another 3 are in the audiencia of Charcas, and there is 1 in each of the audiencias of Santo Domingo, Bogotá, Guadalajara, and Quito.

Vázquez de Espinosa supplies the number of vecinos of 69 cities, for which López de Velasco gives no information. Among them appear cities which were founded between the appearance of the 2 books, such as Córdoba (500 vecinos in 1630), and La Rioja (250); or they were founded in 1565, a few years before López de Velasco had written his book, as in the case of Tucumán and Estuco, both with 250 vecinos in 1630. Such were also the cases of an agricultural center such as Atlisco near Puebla, tied to the consumption of Mexico City; or a mining center in the audiencia of Charcas, like the city of Oruro, which with 1,000 vecinos occupied the 11th place among all the cities according to its population; or a seaport like Callao, with 700 vecinos, whose development was related to the boom of Lima and of mining in the viceroyalty of Peru, by being the obligatory port for the embarkation of the shipments of metals which were headed to Spain, and for the entrance of the imports from Europe and other parts of America.

THE CASES OF GREATEST URBAN DECREASE BETWEEN 1580 AND 1630.

Of the 94 cities for which both authors give population data, 8 of them did not experience increases in population. All of them are in Rank III, IV, or V; however, 8 other centers lost population.

The extreme case of decrease is Guánuco, in the audiencia of Lima, which changed from 300 to 100 vecinos (index 0.3), descended from 17th place to 90th place, and from being a center of Rank III to Rank IV. Another 2 cases of marked decrease are Castro de Nueva Galicia, which changed from 87 to 40 vecinos (index 0.45), descended from 60th to 140th place, and from being a center of Rank IV to Rank V; and Agreda, a small center of 24 vecinos which descended to 10 (index 0.41).

Three cities which appear among the 15 most important of Spanish America in 1580, ceased to be so in 1630: Guanajuato, which lost half of the 600 vecinos which it had in 1580 (index 0.5), and descended from 4th place to 44th; Sensonato, which also lost half of 400 vecinos (index 0.5) and descended from 9th place to 64th; and Arequipa, which lost 100 of its 400 vecinos (index 0.7), and descended from 9th to 44th place. The other 2 cities which lost population were León de Nicaragua (0.53), and San Miguel (0.76).

Guanajuato was a mining center. The activities of Guánuco and Arequipa were also tied to mining in their areas of influence. León de Nicaragua was one of the first cities founded in Central America; its decrease in population is related to the general depopulation of the area which dates from 1606, as a consequence of the inhabitants' fear of the continuous nearby volcanic eruptions. The city was relocated 6 leagues from its previous site.

Of the 8 cases which lost population, 3 were in the audiencia of Guatemala, 2 in the audiencia of Lima, and 1 each in the audiencias of Chile, Mexico, and Bogotá.

Vázquez de Espinosa reports as "depopulated" 6 cities which were populated in 1580; among them, 4 were of Rank III in 1580, and they are Valdivia, La Imperial, Los Confines, and Villa Rica. Of the other 2, one was of Rank IV, La Victoria, and the remaining one, Ceravalisco, was in Rank V. Of the 6 depopulated cities, 4 belonged to the Kingdom of Chile, 1 was in the audiencia of Bogotá, and the other was in Venezuela, in the audiencia of Santo Domingo.

THE VICEREGAL CAPITALS AND THE SEATS OF THE AUDIENCIAS

The 2 viceregal capitals which were at the same time seats of audiencias grew at a greater rate of speed between 1580 and 1630 than did the total urban population of Spanish America, and faster than the urban population of their respective viceroyalties.

Mexico and Lima are the only 2 cities in Rank I. Their rate of growth is almost identical, with Mexico maintaining the initial advantage, and Lima being in both years the second city in Spanish America according to its number of vecinos. Mexico grew from 3,000 to 15,000 vecinos, and its growth index is 5.0, 35 percent greater than that of the viceroyalty of New Spain, which was 3.1. Lima grew from 2,000 to 9,500 vecinos, and its growth index is 4.7, 25 percent greater than that of the viceroyalty of Peru, which was 3.5.

In 1580, 26.4 percent of the number of vecinos of New Spain concentrated themselves in Mexico, and in 1630, 41.4 percent. In Lima, those percentages are 17.1 percent and 23.4 percent, respectively.

With the exception of Quito and La Plata, none of the other 6 seats of audiencias shows a growth rate like that of Mexico or Lima. La Plata was, as has been mentioned, the fourth example of increased importance; its index, 11.3, is the highest of all of the seats of audiencias; Quito follows it, growing from 400 to 3,000 vecinos (index 7.5); and after it, Mexico and Lima. The growth of Guadalajara changes from 150 to 600 vecinos (index 4.0), which is also greater than the total for the urban population of Spanish America, and greater than that of the viceroyalty of Mexico, where it was located. The growth

of Bogotá, which changed from 600 to 2,000 vecinos (index 3.33), is quite parallel to the total and to that of the viceroyalty of Peru.

In the other 4 seats of audiencias, the situation is very different: in all cases their growth is considerably less than the total, and less than that of their respective viceroyalties. Santo Domingo is the case with the least growth (index 1.20); Panama follows it (index 1.25), then Santiago de Chile (index 1.3), and Guatemala (index 2.0).

The increase or decrease of size of the seats of the audiencias reflects the existing situation in their respective territories: depopulation of the Caribbean islands in general, and of Santo Domingo and Central America, the wars in Chile, and the artificiality of the Panamanian economy, totally dependent on the commerce which passed through the isthmus. Around 1610, the decadence of Panama was evident; among the causes were: (1) the fleets were smaller and less frequent; (2) the city had burned in 1596, and the fleet in that year shared the same ill fate, producing tremendous losses among the vecinos; (3) the regional economies were becoming organized and began to be self-sufficient; and (4) the decadence of the mines of Veragua and of the pearl-fishing industry.

CENTRALIZATION AND DECENTRALIZATION.

For the purpose of estimating whether or not urban centralization was occurring and to what degree, we performed a series of estimates which are synthesized in Table 4. These estimates were performed, basing ourselves on the 5 ranks of cities adopted before, according to their scale determined by the number of vecinos (a term whose definition we previously presented). We should, however, make the qualification that Vázquez de Espinosa did not

TABLE 4
THE NUMBER OF VECINOS BY RANKS FOR 1580 AND 1630.

	1580			1630		
	No. Vecinos	%	No. Cities	No. Vecinos	%	No. Cities
Rank I	5,000	22	2	24,500	37	2
Rank II	3,500	15	6	32,500	42	29
Rank III	9,730	42	50	10,200	13	31
Rank IV	4,030	10	85	8,556	12	79
Rank V	756	3	46	692	1	24
	23,016	100%	189	77,398	100%	165

bother to record the small cities, and consequently, their lesser weights fall into the general percentages.

The first conclusion is that at that time, between 1580 and 1630, an acute concentration of the urban population occurred in the cities of Ranks I and II. In 1580, 5,000 vecinos, that is, 22 percent of the total urban population, lived in the only 2 cities of Rank I, Mexico and Lima; in 1630, 24,500 vecinos, that is, 32 percent of the total, lived in those same 2 cities. In 1580, there were only 6 cities of Rank II which had a total of 3,500 vecinos who represented 15 percent of the total; in 1630, there were 29 cities in Rank II, in which 22,500 vecinos lived, constituting 40 percent of the total. On the other hand, although in 1580, almost half of the urban population (42 percent) was concentrated in the 50 cities of Rank III, with a total of 9,330 vecinos, in 1630, there were only 31 cities in Rank III, in which 10,200 vecinos lived, representing 13 percent of the total. The importance of the centers of Ranks IV and V also declined, and although 21 percent of the population lived in them in 1580, in 1630, it was only 13 percent.

A second conclusion is that the size of the centers seems to have increased in importance. We ought to reiterate that Vázquez de Espinosa gives very little information about the smaller cities; consequently, any comparison of the scale of the cities favors the estimates made for 1630. Nevertheless, it appears significant that the average population of the 189 centers mentioned by López de Velazco was 121.7 vecinos in 1580; on the other hand, it increases to an average of 469 vecinos for the 165 centers for which Vázquez de Espinosa gives population data in 1630. The average by rank and for the 2 dates would be: Rank I, 25,000 and 12,250 vecinos; Rank II, 583.3 and 1,120.6 vecinos; Rank III, 194.6 and 329 vecinos; Rank IV, 47.4 and 123.8 vecinos. We do not believe that it would be opportune to estimate the average growth for the cities in Rank V, for reasons which we have explained.

INTERESTING CASES.

We have mentioned the cases of greatest urban growth, and among them appear cities which principally performed specialized functions, such as the ports and the mining centers. These specialized centers were, in general, those which experienced the greatest population growth between 1580 and 1630, although their development throughout the colonial era was rarely sustained as was that of the cities which had a more diversified economic base, such as the principal viceregal capitals and seats of audiencias.

The ports that show the greatest growth are those that maintained direct commerce with Spain, and within this group, those which exploited the products

of expanding regional economies. The 2 cases which best illustrate this are: (1) La Habana, whose growth index was the highest of all (20.0), and (2) Cartagena, with an index of 6.0. Their growth is directly related to the definitive organization of the fleet system; and their importance is reflected in the interest which the crown had in fortifying them, and to which they assigned their principal engineer, Bautista Antonelli. Another interesting case is that of Callao. Beginning in 1551, lots were distributed to those who had taken up residence there, and beginning in 1556, the *cabildo* (municipal council) of Lima named an *alcalde* (mayor) for Callao. Another port which had a greater-than-average growth rate was Guayaquil (index 4.0), which was, during the colonial period, like La Habana, one of the principal centers of ship-building. Realejo, a port on the Pacific Ocean in the *audiencia* of Guatemala, grew at an index rate of 3.3.

The other key ports in the commerce with Spain (besides La Habana, Cartagena, and Callao) were Panama, Nombre de Dios, and, later, Portobelo, true ports-of-call, and Veracruz.

In 1596, Nombre de Dios burned and was replaced by Portobelo, founded March 20, 1597; however, one description of 1610 indicates the poverty of that incipient and strategic fleet port, which, after being burned in February 1601, had hardly 50 houses in 1610. Portobelo became livelier once a year at the arrival of the fleet, when a fair was organized which attracted businessmen from other regions.

The situation of Panama has been explained already by analyzing it as the seat of an *audiencia*. The slow growth of Veracruz (index 2.0) has no explanation other than having reached a population sufficient to manage the activities located there. On the other hand, the slow growth of Santo Domingo (1.2) and San Juan, Puerto Rico (index 1.5) is explained by the difficult economic situation which the first territories conquered by the Spaniards in America suffered, because of their lack of mineral resources and the gradual disappearance of the indigenous people. Santa Marta (index 2.5) was replaced by Cartagena, and Santiago de Cuba (index 2.66) was replaced by La Habana.

A clear relationship exists between the growth or decline of the ports and that of the *audiencias* where they were located. For example, in the *audiencia* of Chile (index 0.6), the port of Valdivia was depopulated. In the *audiencia* of Panama (index 1.8), the port of Panama (1.25) declined. In the *audiencia* of Santo Domingo (2.9), the ports of Santo Domingo (1.2), San Juan de Puerto Rico (1.50), and Santiago de Cuba (2.66) also declined; La Habana is an exceptional case. In the *audiencia* of Quito, on the other hand (index 6.0), the port of Guayaquil grew, with an index of 4.0.

CORRELATIONS BETWEEN URBAN SCALES AND FUNCTIONS.

We have already explained the methodology followed in order to determine the scales of the cities, their ranks, and the functions which were performed within them, basing ourselves primarily on the information supplied by López de Velasco and Vázquez de Espinosa, which, in spite of errors of information and of interpretation, we have accepted as valid because their data permitted us, for 1580 and 1630, respectively, to establish fundamental correlations of explaining the process of urbanization during a particular epoch in the colonial period. The information collected from the works of the authors was first dumped into an original draft and was later systematized. We utilized, following the same systematization procedures, other primary sources²¹ and contemporary studies,²² for the purpose of completing and verifying the information. Nevertheless, our interest for the moment has not been to work with detailed statistics, the search for which would have been very difficult, and which undoubtedly would have given us an incomplete panorama. Rather, we sought to elaborate general information which, in spite of its deficiencies, would allow us to obtain interesting indications concerning the process of colonial urbanization and some of its characteristics.

ADMINISTRATIVE FUNCTIONS.

The 2 viceregal capitals were also the 2 most important cities in Spanish America around the year 1600. During the period analyzed, new viceroalties were not established. However, while the first viceroy of New Spain, from the moment he took charge in 1535, had as his capital a city which was already over 100 years old, with several tens of thousands of inhabitants, the first viceroy of Peru, on the other hand, established, in 1542, his seat in a city which had been founded for only 7 years, and which had grown little because of civil warfare among the Spanish residents of Peru.²³ Mexico and Lima are the only 2 cities of Rank I from 1580 to 1630. New audiencias existed around 1580, 2 of them coinciding with the capitals of the 2 viceroalties, and thus were in cities of Rank I. Of the remaining 7, 3 were in cities of Rank II, being Santa Fe de Bogotá, Santiago de Guatemala, and Santo Domingo; 4 were cities of Rank III, being Panama, San Francisco de Quito, Guadalajara, and La Plata. In 1574, the audiencia of Concepción del Nuevo Extremo was abolished. In 1630, there was 1 more audiencia, that of Santiago de Chile (1609), which replaced that of Concepción. As a result of the population growth of the cities which were seats of audiencias, the distribution then becomes 2 cities in Rank I and 8 in Rank II. In general, the seats of the audiencias coincided, within a fundamental regionalization for the better administration of justice, with the regional centers of the highest rank.

López de Velazco indicates the existence of 15 gobernaciones (administrative divisions within an audiencia) in 1580, of which 7 were located in cities of Rank III, and 8 in cities of Rank IV. In 1630, the number of gobernaciones had increased to 27, of which 6 were in cities of Rank II, 10 in cities of Rank III, 10 in cities of Rank IV, and 1 in a city of Rank V. In 1580, the existence of 12 alcaldías mayores (smaller administrative districts) was indicated, of which 1 was in a city of Rank II, 4 in cities of Rank III, 5 in cities of Rank IV, and 2 in cities of Rank V. Almost all of the alcaldías mayores were in ports or in mining centers. In 1630, the number of alcaldías mayores had grown to 21, of which 5 were in cities of Rank II, 6 were in cities of Rank III, 9 in cities of Rank IV, and 1 was in a city of Rank V.

Clearly, the declining importance of their administrative functions is reflected in the declining scale of the cities.

SERVICES.

We have worked with only 3 services because of lack of information for establishing correlations with other variables.

Hospitals.

López de Velazco records a total of 22 hospitals distributed among 13 cities. Seven percent of the Spanish cities had hospitals in 1580. The hospitals appeared in cities with 30 or more vecinos, although really this function acquires relevance only beginning with those cities having 500 vecinos. The 2 cities in Rank I (Mexico and Lima) had hospitals, and in both cases, more than one. Of the 6 cities in Rank II, it appears that Bogotá and Guanajuato did not have hospitals in 1580; conversely, the other 4 had more than 1 hospital each.

For 1630, a total of 94 hospitals was recorded, which were divided among 65 cities. Thirty-nine percent of the Spanish cities had hospitals in 1630. The number of hospitals in cities of Rank I had doubled. Twenty-three of the 29 cities in Rank II had hospitals, that is to say, 83 percent. Of those which had no hospital, some cases may be explained: Callao because of its proximity to Lima, and Cholula and Tlaxcala, because of their proximity to Puebla. Seventy-one percent of the cities in Rank III had a hospital. The number of cities with a hospital declined perceptibly when the municipality had less than 150 vecinos. There were no hospitals in cities with less than 80 vecinos. The coefficient of correlation in 1580 is 0.805, which indicates a very strong tendency toward a linear function, to such a degree that the number of hospitals is clearly a function of the number of vecinos. Moreover, the slope of the angle of minimum quadratic regression indicates to us that the growth of the number of hospitals is not as rapid as that of the number of the vecinos. The value of the coefficient

of correlation for 1630 indicates to us that the tendency toward a linear function exists slightly, and that the hospitals depend on the number of vecinos can be accepted only with limitations.

The criteria adopted is that of accepting any hospital as such, independent of its size. In this manner, the hospital in Tunja has the same value as the hospital "Santa Ana" in Lima, where 300–400 Indians were treated continually. Because of a lack of data, we could not establish correlations between the scale of the city and the number of beds, the number of doctors, or the amount of accumulated income among all of the hospitals of a particular city, which would permit us to establish more realistic relationships.

UNIVERSITIES.

Both López de Velasco and Vázquez de Espinosa cite only 2 universities, those of Mexico and Lima, which were chartered in 1551 in the viceregal capitals, and which were the only 2 cities of Rank I in our study. We do not know the reasons that both authors could have had for neglecting to mention the existence of other universities which were already founded when they wrote their respective works. A recent book mentions the existence of 5 universities around 1580, and 10 around 1630.²⁴ For 1580, they are the following: (1) The University of Santo Tomás de Aquino in Santo Domingo, authorized in 1538 by Pope Paul III, and directed by the Dominican friars; (2) the present autonomous University of Mexico, authorized in 1551, which began to function in 1553; (3) the present University of San Marcos in Lima, authorized in 1551, although only in 1571 did it receive the necessary funds to begin its activities; (4) in 1558 the Jesuits established their first university in America, the University of Santo Domingo de La Paz in Santo Domingo; and (5), in 1563, a university was founded in Bogotá.

Thus it is that around 1580, the 2 cities in Rank I each had a university, even as did 2 of the 6 cities in Rank II. Santo Domingo, the 6th city by population at that time, was the only one with 2 universities. In 1586, the creation of the University of San Fulgencio in Quito was authorized, and it began to function in 1603. Another 4 universities, all directed by Jesuits, were founded in the first 3 decades of the seventeenth century; that of Córdoba, in 1613; the Javeriana in Bogotá, in 1622; San Gregorio Magno in Quito, also in 1622; and San Francisco Javier in Chuquisaca, in 1624. Thus it is that around 1630, 10 universities had already been founded, although we are not sure if all of them were functioning, nor if they really had a university level. However, the 10 institutions were located in the 2 cities which were in Rank I around 1630, and in 5 of the 29 cities of Rank II. Three cities of Rank II, Quito, Bogotá, and Santo Domingo, had had 2 universities each.

According to the number of vecinos, the universities were located in cities numbered: 1, 2, 5, 7, 10, 17, and 21, respectively.

Generally speaking, the location of the universities does not have a close correlation with the importance of the city according to the number of its vecinos. Cities like Potosí, Puebla, and Cartagena (numbers 3, 5, and 8 in 1630), did not have universities during the colonial period. Cuzco (number 4) finally got one in 1692; Santiago de Guatemala (no. 11) in 1676; La Habana (no. 9), in 1721. Zacatecas (no. 11) and Atlisco (no. 11) did not have a university. On the other hand, the University of San Cristóbal was founded in 1677 in Huamanga (32nd place), which was a center of Rank II.

It is evident that the location of the universities followed criteria of regionalization similar to that of the audiencias. With the exception of Córdoba, the other 6 cities in which the other 9 universities were located were the seats of the audiencias, and 5 were also the seats of archbishoprics. Quito was the seat of a bishopric. On the other hand, exceptions omitted, the universities were not established in ports or mining centers during the colonial period, regardless of their population; the exceptions were La Habana and Guanajuato, centers in which 1 university each was established in 1721 and 1723, respectively. Yet Potosí was located only 18 leagues (1 Spanish league = 3.26 miles) from Chuquisaca, Puebla was only 24 leagues from Mexico (city), and Atlisco was only 29 leagues from Mexico.

The only explanation for the location of more than 1 university in some scantily populated cities might be the pressures exercised by the different religious orders, since when more than 1 university existed in a city, they were invariably under the direction of different orders.

COLEGIOS (SECONDARY SCHOOLS).

In 1580, only 6 cities had colegios: Mexico, Santo Domingo, Puebla, Quito, Guadalajara, and Chuquisaca. These comprise 1 city in Rank I, 2 of the 6 cities in Rank II, and 3 of the 50 cities in Rank III. None of the cities of Ranks IV or V had a colegio, according to the works of López de Velasco. Neither López de Velasco nor Vázquez de Espinosa define what they understood to be a colegio. Obviously, education began at the primary school level, while the colegios signified a more advanced level, equivalent to the present high-school degree (bachillerato), with the university capping the system.

Evidence exists that the founding of the universities obliged the colegios to raise their level of education. Inevitably their number increased and they became located in a growing number of cities. Nevertheless, it is surprising that, according to the testimony of López de Velasco, colegios did not exist in Lima or Bogotá, where universities were already functioning; nor did they exist in

Cuzco, Santiago de Guatemala, or other centers of regional importance. The information of López de Velazco is incomplete, since he mentions the existence of only 1 colegio for girls in Puebla, while in the decade of 1570, at least 1 colegio which was directed by the Franciscans, and the colegio of San Luis, Rey de Francia, directed by Dominicans, were operated in the city. Only Mexico City would have had 2 colegios. Three of the cities with colegios, Mexico, Santo Domingo, and Quito, also had universities.²⁵

Around 1630, 16 cities, which were representative of the 2 cities in Rank I, of 13 of the 29 cities in Rank II, and of 1 of the smallest cities in Rank III, had colegios. In 7 of the 16 cities, there was more than one colegio. The 7 cities with a university had colegios, and in 3 of them, Mexico, Lima, and Córdoba, 2 or more were operative. As had occurred with the universities, the ports and mining centers did not have colegios either, in the epoch which we studied, in spite of their importance as cities according to their number of vecinos. Without colegios were: Potosí (3rd place), Cartagena (8th place), La Habana (9th place), Zacatecas (11th place), and an agricultural center like Atlisco (11th place). Nevertheless, Atlisco was located only 5 leagues from Puebla, in which several colegios functioned. The only city which, having had a colegio in 1580, ceased to have one in 1630, was Guadalajara. If the information provided by both authors is correct, there is no valid explanation for this loss, since the growth of the number of vecinos during this period was normal, and the city substantially improved its relative importance (36th place in 1580 and 17th place in 1630). The ports with less population than those mentioned, such as Callao (15th place in 1630), Panama (21st), Veracruz (32nd), Guayaquil (32nd), and San Juan de Puerto Rico (44th), did not have colegios either.

Thus, it may be concluded that colegios did not function in any of the 7 principal ports, according to their number of vecinos. Something similar occurred in the mining centers. Without colegios were: Oruro (11th in 1630), San Luis de Potosí (21st), Cuenca (21st), and Guanajuata (44th); that is to say, colegios did not operate in the 6 principal mining centers either, according to their number of vecinos. On the other hand, in Saltillo, a city of Rank III, and one in which none of the other functions analyzed in this paper existed, there appeared a colegio in which art and theology were taught. The existence of a colegio in Saltillo is surprising, not only because of its relative unimportance, but also because of the geographic location of the city, in the Sierra Madre Oriental, to the east and more than 400 kilometers "as the crow flies" from Durango and from the important mining district of Parral, completely isolated from the "Camino Real de la Tierra Adentro" over which traveled the traffic along the central axis of the viceroyalty.

INQUISITION.

Around 1580, 2 tribunals of the Santo Oficio were functioning in the

Spanish-American colonies, 1 in the city of Mexico, the other in Lima. Both were established in 1570. The one in Lima had jurisdiction over all of the territories dominated by Spain in South America, and the one in Mexico had jurisdiction over the Antilles, Mexico, and Central America. The locations of both tribunals lent themselves to the principal objectives for which they had been created, the suppression of heresy. This activity had a very broad scope and, in practice, the Inquisition became an instrument of the policy followed by Spain toward her colonies. It was obvious, then, that the location of both tribunals should coincide with the seats of the 2 viceroyalties, of the 2 principal archbishoprics, and of the 2 most influential universities, having at the same time a clear regional influence because of their location. Later, the Inquisition established representatives in smaller cities, following a criterion of regionalization; in this manner, representatives existed in Santiago de Chile, Buenos Aires, Quito, and other cities.

In 1630, a third tribunal, the one in Cartagena, was operating, having been established in 1610, with jurisdiction over Colombia, Venezuela, and the islands of the Caribbean. The placement of the tribunals in ports was undoubtedly a function of the area over which they had jurisdiction, made up in part of numerous islands. Moreover, Cartagena was, according to the organization of the fleet system, the first port-of-call on the route from Spain and was, therefore, the best place for control of passengers and literature.

RELIGIOUS-ADMINISTRATIVE FUNCTIONS.

In 1580, 4 archbishoprics existed, 2 of them with seats in the 2 cities of Rank I, and the other 2 in cities of Rank II. In 1630, another archbishopric existed with its seat in another city of Rank II. According to population, the archbishoprics were located in cities 1, 2, 4, and 7, in 1580, and numbers 1, 2, 7, 10, and 17, in 1630, while maintaining a clearly regionalistic sense in their location.

In 1580, 22 bishoprics existed, 3 of which had their seats in cities of Rank II. Of the other 3 cities in Rank II, Santo Domingo and Bogotá were the seats of archbishoprics, while Guanajuato, a mining center, was not a seat of religious-administrative functions. Fourteen cities of Rank III were seats of bishoprics, that is, 28 percent. The 5 remaining seats of bishoprics were in cities of Rank IV, that is, in 6 percent of them.

In 1630, there were 29 bishoprics, 12 of which had their seats in cities of Rank II, that is, in 41 percent of them. Another 12 seats of bishoprics were in cities of Rank III, being 39 percent of them. The 5 remaining seats of bishoprics were in cities of Rank IV, that is, in 6.2 percent of them.

Between 1580 and 1630, the number of archbishoprics grew considerably, responding to the administrative necessities of the consolidated territories which were continually more extensive.

RELIGIOUS FUNCTIONS: MONASTERIES.

López de Velazco records a total of 119 monasteries distributed among 61 cities. Thirty-two per cent of the Spanish cities had a monastery in 1580. The monasteries appeared in cities with 17 vecinos or more.

The 2 cities in Rank I, Mexico and Lima, had 4 and 5 monasteries respectively. Of the 6 cities in Rank II, Guanajuato is the exception: the 5 remaining cities had monasteries, and in every case, more than one.

Vázquez de Espinosa records a total of 334 monasteries among 122 cities. Seventy-four per cent of the 165 centers considered had monasteries in 1630. The function appeared in cities with 30 or more vecinos. The number of monasteries in a city of Rank I was quite high; there were 20 in Mexico and 12 in Lima. All of the cities in Rank II had a monastery, and 14 of them had 5 or more, as was the case of Puebla, with eight. Except for 3 cities of the 31 in Rank III, all had a monastery, that is to say, 90.3 percent of them. In Rank IV, the percentage is 71 percent. And for Rank V, only 7 of the 24 cities had a monastery, representing 29 percent of those centers.

The coefficient of correlation in 1580 is 0.66, which indicates to us that a tendency existed which was not very accentuated toward a linear function between the variable, "monasteries," and the number of vecinos. In 1630, the index of correlation increases slightly (0.73), and the indicated variable may be considered, with some approximation, as a function of the number of vecinos. Moreover, the slope of minimum quadratic regression indicates to us that the growth of the number of monasteries is not as rapid as is that of the number of vecinos. This may be explained by the fact that the catechization agreed to by the orders required the presence of a monastery even in the smallest centers. We believe that the correlation would be much closer if we could count the number of friars who lived in each monastery. For us, a convent in the city of Lima where 200 monks lived has the same value as does that in the little city of Jaén, with 25 vecinos, and a monastery with 1 monk.

RELIGIOUS FUNCTIONS: CONVENTS.

López de Velazco recorded a total of 11 convents distributed among 7 cities. Only 4 percent of the cities considered had a convent in 1580. The appearance of convents is recorded in cities of 170 vecinos or more. The 2 cities in Rank I, Mexico and Lima, had 3 and 2 convents, respectively. In the 6 cities of Rank II, convents appear in 3 of them: Cuzco, Santo Domingo, and Puebla. The 2 other cities where this function appeared were in Rank III: Guamango and Osorno.

Vázquez de Espinosa records a total of 74 convents distributed among 29 Spanish cities. Seventeen percent of the centers considered had a convent in

1630. This function appeared in centers of 300 vecinos or more. Mexico and Lima, in Rank I, had 16 and 8 convents, respectively. Of the cities in Rank II, 18 had convents, that is, 62 percent of them, and the majority of those which did not have them were mining centers like Potosí, Zacatecas, and Oruro, or were ports, like La Habana. The 9 remaining cities with a convent are all in Rank III, which represents 29 percent of the 31 centers in that Rank.

The coefficient of correlation in 1580 is 0.79, and in 1630, is 0.77, which indicates to us that a strong tendency exists toward a linear function between the variable, "number of convents," and the number of vecinos. The slope of the minimum quadratic regression records a very low value in both cases, which indicates that the number of convents grew much more rapidly than the number of vecinos. For lack of information, we have had to assign the same value to all of the convents, regardless of the number of nuns living within them. The existence of a greater proportion of convents in the cities of higher ranks may be explained by the greater quantity of available resources in those centers for their maintenance, and is also related to the existence of a proportionally greater number of women in the cities with a greater number of vecinos.

ECONOMICS FUNCTIONS.

Neither of the 2 authors who serves us as the basis for this work provided information which permitted us, even with some approximation, to determine the economic base of the cities analyzed. Neither did we have at our disposal—and we believe that they are uncommon—contemporary studies of the economic structure of the Spanish-American cities during the period analyzed. Fragmentary information of some value appears from diverse authors, Salinas, for example, for Lima, in 1630, or in various memoranda and descriptions; however, the number of *tributarios* (indigenous taxpayers) can give an idea of the productive force within the area of influence of a city; likewise, the number of *encomenderos* (Spaniards to whom Indian tribute payers were granted) can give an idea of the existence of a group which, without doubt, would be, in the majority of cases, among those with the highest income in a city.

For the purpose of showing whether the 2 hypotheses are correct, we performed correlations whose conclusions are as follows. With respect to tributarios, this variable may be analyzed only for the year 1580, since the data offered for 1630 by Vázquez de Espinosa are fragmentary, and prove to be useless for establishing even an approximate comparison.

López de Velazco records a total of 89 centers which possessed "indios tributaries," that is to say, for 47 percent of the total of 189 centers, for which he gives population data.

The index of correlation, 0.69, indicates to us that the number of tributarios tends to be a function of the number of vecinos. If we eliminate the 6 cases of greatest deviation, the index of correlation increases to 0.78, and a greater dependability is obtained. The cases which are eliminated are: the ports of Cartagena and Trujillo (Honduras), the mines of Tenozcolpedec (Mexico), La Serena (Chile), San Juan de Pasto, and Asunción.

The angle of minimum quadratic regression indicates to us that the number of tributarios increases much more rapidly than the number of vecinos.

The 2 cities in Rank I, Mexico and Lima, have, respectively, 33,000 and 23,000 tributarios. Four of the 6 cities in Rank II had more than 20,000 tributarios, and 19 of the 50 cities in Rank III had more than 10,000 tributarios.

As to encomenderos, this variable has also been analyzed for 1580, since for 1630, Vázquez de Espinosa gives us the number of encomenderos for only 7 cities, while López de Velasco records a total of 89 centers with encomenderos, that is, 47 percent of the centers for which he gives population data.

The coefficient of correlation is 0.38, a very low value, and one which indicates to us that a tendency toward a linear function does not exist between the variable "number of encomenderos" and number of vecinos. From the analysis of the data, it is possible to estimate that:

- 1) The existence of encomenderos in the city is related to the existence of indigenous laborers in their zone of influence; as they disappear, through wars or sickness, the number of encomenderos diminishes. For example, Santiago de Chile changed from 60 to 30 encomenderos.
- 2) In those cities where central administrative functions existed (seat of viceroyalty, audiencia, or gobernación) or in those centers which were dedicated to economic activities which were not related to agricultural activities (e.g., mining centers, ports), the proportion of encomenderos is very small with respect to the total number of vecinos; for example, Lima with 2,000 vecinos and 30 encomenderos.
- 3) The centers which have the same number of vecinos as encomenderos are cities of more recent founding, and the closest correlation between both variables is provided by cities with 35 vecinos or less. This close relation between the number of vecinos and encomenderos is given by the greater weight, in those centers, of the agricultural activities.

NOTES

1. Jorge E. Hardoy and Carmen Aranovich, "Escalas y funciones urbanas en América hacia el año 1600: un ensayo metodológico"; a work presented to the Jornadas de la Asociación Argentina de Historia Social y Económica, Buenos Aires, Aug. 24–26, 1966.
2. Among other censuses used are: the *Censos de Lima*, 1599 and 1614; of *Panamá*, 1610; of *Santiago de Chile*, 1613; of the *Villar de Don Pardo o Riobamba*, 1605; of *Zacatecas*, 1608; of *Buenos Aires*, 1622; and of *México*, 1599.

3. We refer specifically to the modern cartographic collections of: Manuel Carrera Stampa, "*Planos de la ciudad de México*," 1949; Germán Latorre, "*La cartografía colonial americana*," Sevilla, 1916; F. Chueca Goiria and L. Torres Albas, "*Planos de ciudades iberoamericanas y filipinas*," Madrid, 1951; Félix F. Ovter, "*Cartas y planos inéditos de los siglos XVII y XVIII y primer decenio del XIX*," Buenos Aires, 1930; Pedro Torres Lanza, "*Relación descriptiva de los mapas, planos, etc. del Virreinato de Buenos Aires existentes en el Archivo General de Indias*," Buenos Aires, 1921; A. Teullard, "*Los planos más antiguos de Buenos Aires (1580–1880)*," Buenos Aires, 1940; Diego Angulo Iníiguez, "*Planos de monumentos arquitectónicos de América y Filipinas*," Sevilla, 1933–1939; Manuel Toussaint, F. Gómez de Orozco, and J. Fernández, "*Planos de la ciudad de México; siglos XVI y XVII*"; (México, 1938), Municipalidad de Buenos Aires, "*Documentos y planos relativos al período edilicio colonial de la ciudad de Buenos Aires*," Buenos Aires, 1910; and others.
4. Woodrow Borah and Sherburne F. Cook, "The Aboriginal Population of Central Mexico on the Eve of the Spanish Conquest," *Ibero-Americana*, No. 45, 4 (Berkeley, 1963).
5. George Kubler, "The Quechua in the Colonial World," *Handbook of South American Indians*, II, 331–410 (Washington, D.C., 1946).
6. John W. Cooper, "The Araucanians," in *Handbook of South American Indians*, II, 687–760 (Washington, D.C., 1946).
7. By 1518, the accountant for the king, Gil González Dávila, noted in a report the situation which had been created in the island of Santo Domingo by the general depopulation. The replies to a questionnaire given to a number of people in 1520 are also illustrative of the causes of the depopulation of the island. Both reports are in Vol. I of the "*Colección de documentos inéditos*." See Vol. V of the same collection for information on the depopulation of the island of Cuba, in a fragment of a letter from the then bishop of Cuba, dated April 20, 1556.
8. See Vol. V, 522–529 of the "*Colección de documentos inéditos*" for a letter from the bishop of León, province of Nicaragua.
9. Cieza de León, who toured Peru around 1547, refers to this situation; see, for example, Ch. XXXIV of "La crónica del Perú," *Colección Austral*, No. 507, Espasa-Calpe (Buenos Aires, 1945).
10. Woodrow Borah, "New Spain's Century of Depression," in *Ibero-Americana*, No. 35, 6 (Berkeley, 1951).
11. We have estimated the Spanish population in some examples. It was 37.8 percent of the population of Lima in 1614; 21.2 percent of Panama's in 1610; 16.2 percent of Santiago de Chile's in 1613; and 33 percent of Zacatecas' in 1608.
12. Kubler, "The Quechua in the Colonial World," 338, Table 2.
13. In order to establish the growth index of the urban population, we have considered only the number of vecinos mentioned by López de Velazco and Vázquez de Espinosa in their works. For the purpose of facilitating the comparison, all of López de Velazco's information is analyzed as if it corresponded to the year 1580, and that of Vázquez de Espinosa as if it corresponded to the year 1630. We have utilized the following editions: Juan López de Velazco, "*Geografía y descripción universal de las Indias*," collected from the year 1571 to 1574, and published for the first time in the *Boletín de la Sociedad Geográfica de Madrid*, Madrid, 1894; and Vázquez de Espinosa, *Compendio y descripción de las Indias Occidentales*, transcribed from the original manuscript by Charles Upson Clark, published by the

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Smithsonian Institution, Smithsonian Miscellaneous Collections, Vol. 108 (Washington, D. C., 1948).

14. We understand the absolute index to be the relation which exists between the number of vecinos in 1630 and the number of vecinos in 1580. This index permits us to measure growth independently from the number of cities which existed in each viceroyalty or audiencia in 1580 and 1630.
15. We understand the relative index to be that which is obtained by establishing the number of vecinos per city with population data for 1630 and 1580. Carrying out the quotient of the two values obtained for both dates gives us the relative growth which occurred in each viceroyalty or audiencia.
16. Vázquez de Espinosa, *Compendio y descripción*, 260.
17. Vázquez de Espinosa, *Compendio y descripción*, 261.
18. Vázquez de Espinosa, *Compendio y descripción*, 172.
19. Vázquez de Espinosa, *Compendio y descripción*, 208.
20. Vázquez de Espinosa, *Compendio y descripción*, 342.
21. Among the primary sources of regional interest which were consulted, including the modern collections, are: Bernardo Aldrete, *Del origen y principio de la lengua castellana* (Madrid, 1674), written around 1600; Joaquín García Iczabalceta, *Relación de los obispos de Tlaxcala, Michoacán, Oaxaca y otros lugares en el Siglo XVI* (México, 1904); Antonio de Herrera, *Historia de las Indias* (Buenos Aires, 1945–47); Fray Buenaventura de Salinas, *Memorial de las historias del Nuevo Mundo-Perú*, Universidad Nacional Mayor de San Marcos (Lima, 1957); Francisco del Paso y Troncoso, *Papeles de Nueva España, I–VII* (Madrid, 1905–06); José de Acosta, *Historia natural y moral de las Indias* (Madrid, 1792), edited for the first time in 1608; Alonso de la Mota y Escobar, *Descripción geográfica de los reinos de Nueva Galicia, Nueva Vizcaya y Nueva León* (Madrid, 1940); Bernardo de Vargas Machuca, *Milicia y descripción de las Indias* (Madrid, 1892), edited for the first time in 1599; Juan Matienzo, *Gobierno del Perú* (Buenos Aires, 1910), written before 1573; Author unknown, *Descripción del Virreinato del Perú a comienzos del siglo XVII* (Rosario, 1958); Diego de Encinas, *Cedulario indiano* (Madrid 1954–46), reproduction of the edition of 1593; Colección de documentos inéditos relativos al descubrimiento de América y Oceanía, 42 vols. (Madrid, 1864–1884); Marcos Jiménez de la Espada, *Relaciones cartográficas de Indias* (1881–1897); Francisco Cervantes de Salazar, *Crónica de la Nueva España* (Madrid, 1914); Germán Latorre, *Relaciones geográficas de Indias* (Sevilla, 1919); Juan de Cárdenas, *Problemas y secretos maravillosos de las Indias*, edition in facsimile (Madrid, 1945), original published in 1591; Instituto Histórico de Marina, *Colección de diarios y relaciones para la historia de los viajes y descubrimientos*, 4 vols. (Madrid, 1943); Fray Reginaldo de Lizarraga, *Descripción breve de toda la tierra del Perú, Tucumán, Río de la Plata y Chile*, Nueva Biblioteca de Autores Españoles, XV (Madrid, 1909), 485–660; P. Rubén Vargas Ugarte, *Relaciones de Viajes* (XVI, XVII, and XVIIIth centuries) (Lima, 1947); Fernández Piedrahita, *Historia de la conquista del Nuevo Reino de Granada*, Biblioteca Popular de Colombia, vols. 12–15 (Bogotá, 1942). Among sources for localities are: Juan B. Antonelli, "A Relation of Ports," in R. Haklyut, ed., *Principal Navigations*, X, 135–56 (Glasgow, 1901); Luis Capoche, *Relación del asiento y villa imperial de Potosí* (Madrid, 1959), written around 1585; J. and F. de Moga-buru, *Diario de Lima (1629–1634)* (Lima, 1935); Padre Bernabé Cobo, *Historia de la*

fundación de Lima (Madrid, 1956), finished in 1639; Muñoz Camargo, *Historia de Tlaxcala* (México, 1892).

22. Among other contemporary works consulted which were of particular use are: Woodrow Borah, *Silk Raising in Colonial Mexico* (Berkeley, 1943) and, "Early Colonial Trade and Navigation between Mexico and Peru," *Ibero-Americana*, No. 38 (Berkeley, 1954); Enrico Marco Dorta, *Cartagena de Indias* (Cartagena, 1960); Vicente Riva Palacio, *México a través de los siglos* (México, 1887–89); Benjamín Vicuña Mackenna, *Historia de Valparaíso* (Valparaíso, 1869–72), and *Historia de Santiago* (Santiago de Chile, 1924); I. A. Wright, *The Early History of Cuba, 1492–1586* (New York, 1916); Nicolás Bensio Moreno, *Buenos Aires, estudio crítico de su población* (Buenos Aires, 1939); José Barba Gelata and Juan Bromley, *Evolución urbana de la ciudad de Lima* (Lima, 1940); M. Toussaint, F. Gómez de Oroasco, and J. Fernández, *Planos de la ciudad de México; siglos XVI y XVII* (México, 1938); Lewis Hanke, *The Imperial City of Potosí* (The Hague, 1956); C. H. Haring, *El comercio y la navegación entre España y las Indias en época de los Hapsburgos* (Paris, 1939); Ricardo Machain Lafuente, *Buenos Aires en el siglo XVII* (Buenos Aires, 1944), and *La Asunción de antaño* (Buenos Aires, 1942); George Kubler, *Mexican Architecture of the Sixteenth Century* (New Haven, 1948); François Chevalier, "Significations sociales de la fondation de Puebla de los Angeles," in *Revista de Historia de América*, No. 23, 105–130; Gonzalo Menéndez Pidal, *Imagen del mundo hacia 1570* (Madrid, 1944); Sherburne F. Cook and Lesley B. Simpson, *The Population of Central Mexico in the Sixteenth Century* (Berkeley, 1948).
23. Barnabé Cobo, *Historia*.
24. Harold Benjamin, *Higher Education in the Americas* (New York, 1965).
25. López de Velasco, "Geografía y descripción," 186.