

A
STUDY OF POPULATION DENSITY
OF ANCIENT, MEDIEVAL AND MODERN
CITIES IN RELATION TO TRANSPORTATION

By

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ABSTRACT

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With the present "explosion of the metropolis", questions are often raised these days about this modern phenomena. What factors are responsible for this spatial dynamic arrangement that cities are now undergoing?

This study will examine the role of transportation on population density of ancient, medieval and modern cities. Transportation technology, used within the city, is classified for the purpose of the study into two periods:- 2000 B.C. to 1886 A.D., 1886 A.D. to 1911 A.D.- the first characterized by movement on foot while the second by the introduction of the electric streetcar in 1886. The data are analyzed in time, geography and civilization, given the two sets of transportation technology.

Population density, examined in time, is vague as to its implication. With geography, the behavior is irrational. However, with civilization, the first promising tie seems apparent. With the findings in time, geography and civilization, an analysis of the role of transportation (First Period) on population density is made. The findings suggest a negative answer. With the electric streetcar, the effect on density is vague.

From all indications, and from insights gained from the study, all things seem to point out civilization as the principal cause of population density and the effect being the transportation.

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INTRODUCTION

Cities have always fascinated all men alike. The fascination may have later turned to a dislike or a liking. But still its attraction and pull towards her fold have always been there. It fell and rose with the times. And in this present era, it has gained far greater momentum and significance than it has ever acquired before. As if like a growing ball, tied to one end of a piece of a rubber band whirled around up in the air, it has enlarged or diminished its compass and sweep as the centrifugal force applied to it has been increased or decreased. With the present "explosion of the metropolis", a timely question is asked: What makes this so? What factors lie in causing the spatial dynamic arrangement that cities have nowadays??" These and many other questions need answering. With a complex entity that a city is, several factors are involved. For my purpose, I have chosen transportation.

An attempt, such as this, to be effective, must start from the time cities evolved to the present. With my present capability, I have divided the study into two stages. The last stage could be the subject of another thesis.

This study will examine the role of transportation on population density of cities from the 4th millennium B.C. through the first decade of the Twentieth Century, A.D. By density, I mean the ratio of urban population to the urban area they covered. Simple as it may appear, the definition is full of complications - especially with respect to making estimates of population and size of city. Most of the data available on these matters are usually based on archeo-

logical findings which are vague enough. The matter is not even clear when the city is walled. Did all the people enumerated in the population figure live within the walls or did some of them retreat there only for protection? And if they lived within the walls, did they also conduct all their business there? Obviously any measure of area will contain a significantly arbitrary element. Estimates of population will encounter the same difficulties - and, the errors are compounded by the possibility of compiling inconsistent estimates of population and area. In modern times, there are other difficulties. The boundaries of a city are legally defined. This definition is clear enough but it can be entirely irrelevant because it may enclose sections of the city that are largely vacant.

For a terminal point of the study, I have chosen the first decade of the Twentieth Century because it represents a time far enough removed from the beginning of a new era in transportation to permit certain conclusions resulting from the technical changes that followed the introduction of the electric street-car in 1886, but does not necessitate taking into account the more far-reaching effects of the automobile. Transportation in this study will be limited to that used within the city. However, the changes in the technology of transportation between cities and from cities to their hinterlands, may also affect urban density through the medium of affecting size. If this was so, then one might expect the larger cities to be more dense. In any event, the effect is a secondary one and the principal emphasis will be laid on transportation within the city.

The effect of a change in technology should be viewed in some context. In an attempt to appreciate the possible variations in context, the cities and their densities will be sorted by time, place and culture.

THE ORIGIN AND GROWTH OF CITIES AND THE EVOLUTION OF TRANSPORTATION

TECHNOLOGY

The first cities evolved about 4000 B.C.². What in the Neolithic Age was a loose aggregation of individuals, had developed into a highly articulated community. Where before people had lived by farming alone, they were now widely diversified in their activities, each individual member fulfilling specialized and interdependent functions; and where there had been only a small conglomerate of households, a well-defined settlement grew up in its place. The evolution was marked by the cultivation of plants, domestication of animals,³ the discovery of the use of metals for tools and weapons, the invention of writing and the intensification and articulation of cultural activities in the crafts and arts.⁴

The beginnings of the earliest recorded civilizations are placed in three apexes of the globe - Chaldea, Asia Minor and Egypt toward the west, India to the south, and China to the east.⁵ The island of Crete may be added as a later fourth apex, where Knossos, as early as 2000 B.C., became the first center of an urban civilization that can be termed European.⁶

Parallel with this urban growth was the development of transportation. Human transport was the first known means of carriage and movement - men carrying bundles as depicted on the "standard" of Ur (2500 B.C.) and a large vessel borne on a pole between two bearers as shown on an alabaster relief from Khafaje in Sumer, dating from about 3000 B.C.⁷ Then followed the use of animals as beasts of burden; their domestication may have been accomplished

as early as 5000 B.C.⁸. It is not clear, however, where their potentiality, as bearer of burdens, was grasped. The first historical evidence for this is found in a relief from Beni-Hasan in Egypt, dating from c. 1900 B.C., depicting the arrival of the Canaanites with their pack asses laden with children and tribute.⁹ In general, by the 2nd millennium B.C., most of the domestic animals used today for carrying or pulling purposes were known in the Mediterranean area and probably in many parts of the world - the ox, the donkey, the horse, the camel, the elephant, and possibly, the mule.¹⁰

At this early period, the location and growth of cities were more or less dictated by the feasibility of the use of existing means of transport. One good example was river transportation. Where crude barges could only go downstream by floating with the current, primarily a one-way system, some cities were purposely located down the river from their sources of food supply, as was the case of Memphis of lower Egypt. The important factor was the movement of people and goods not so much within the city, as without - that is, to the hinterlands and other cities. This was undertaken to a great extent by river and sea transportation. The first cities recorded in history all developed either in the fertile valleys and plains along large tributaries of water - Nineveh, Ur, Uruk, Lagash, Assur and Babylon along the Tigris-Euphrates River, Thebes and Memphis along the Nile River, Mohenjo-daro along the Indus River and Anyang along the Yangtze River; or on a protected deep harbor, as in the case of Knossos on the island of Crete. Land transportation by means of

crude wheeled vehicles was more limited in its use. Its handicaps were many: both wheels attached solidly to the axle with only the latter revolving, not only hard on making corners, but also a serious source of wear to the rim of the wheel;^{11.} an inefficient method of hitching an animal to a vehicle, causing limited pulling power and requiring the use of more animals, than ordinarily needed to pull a load, given a better harness - "as the hearse which carried the remains of Alexander the Great from Babylon to Alexandria by sixty-four miles"^{12.} - no braking mechanism was provided for downhill travels; a most hazardous undertaking especially with a heavy load on a rainy day. Because of these shortcomings, transportation of goods on land was done mostly by pack animals.

Even with the restriction of these primitive types of transport, cities grew up one after another. First they spread around the Mediterranean and the Aegean seas; then to the Western Mediterranean and northward to Gaul.^{13.} Roman civilization followed the Greek in advancing the spread of urbanization. It reached its apex in the city of Rome itself - seat of the greatest empire of the ancient world. But with the decline and fall of Rome, cities, that had been once part of a far-reaching nexus of commercial activities and relations, began to become closed-in and isolated. The encroachments of the Mohammedans on the established trade routes with the East and the advancing onslaught of the barbaric Huns through most part of Europe, partly explains this decline of civilization.

Urban development began again in the late middle ages. "The external stimulus seems to have been bound up with the Crusades and the expanding

influence of Venice."¹⁴. This latter factor, in due time, brought other Italian cities to greatness, rivalling even Venice.

Throughout this period, transportation within the city was still basically by foot, though wheeled vehicles had been greatly improved by the development of the axle,¹⁵ the invention of the horse collar, shoeing and harness, breeching (tenth century),¹⁶ the use of coaches and wagons was still the prerogative of a few.

By the end of the 14th century, all basic transportation inventions had been made¹⁷ - on land, sea and water. With the invention of the tacking sailship, the use of the compass and other navigation instruments, and the development of the science of navigation, an era of exploration, empire building and colonization on a greater scale, began. Empires and colonies were established by the European nations in Africa, the Far East, and in the Western Hemisphere. During the latter part of the 15th Century, Spain initiated the era with the discovery of the New World, thus establishing the ground for a much more spectacular epoch of city building and growth. During this period, too, city development was going on in a relatively large scale in England and in several other European nations.

The next great change in the development of cities came with that complex series of events called Industrial Revolution. It was, not only industrial but also a revolution in agriculture, in transportation and communication, and urbanization. In a period of little over a century, more important

transportation inventions were made than in the whole previous history of the world. With the development of the railroad in the 19th Century, the invention of the electric streetcar in 1886,¹⁸ the beginning of the use of the automobile in the early years of the 20th Century, the first major technical improvement on land transport used within the city in almost four thousand years, was introduced.

This change is generally agreed to have manifested itself first in England. However, the effects of the new transport system on city development had been more pronounced and extensive in the New World because developments were less hampered by hold-overs from a previous system than in the older countries. While in 1800 all that the United States had that could be classified as cities were the port and river-mouth settlements on the Atlantic and Gulf coasts, chief of which were Boston, Philadelphia, New York, Baltimore and New Orleans, the invention of the river steamboat brought further development of cities inland. This period lasted until at least 1870 and saw spectacular growth of such cities as Cincinnati, Chicago, Pittsburgh, Buffalo, St. Louis and Memphis. During this period too, port cities such as San Francisco developed. This spread of urbanization was furthered by the railroad. Inland that could only be serviced by land transportation, gave rise to cities such as Denver, Indianapolis, and Omaha.¹⁹

ANALYSIS OF DATA

One result of the preceding review of the evolution of cities in relation to that of transportation, is to suggest that the latter plays an important role in the location of cities. But whether this factor also affects population density has still to be examined.

Studying the wide range of data collected, three major elements appear basic: time, space, and civilization. Time in that each datum is recorded as having taken place in a particular period; in a specific geographic area; and in a given culture.

In general, with the exception of the first census counts, all data about population and area of cities are derived from sources other than actual statistics. These come from historians, geographers, archaeologists, and demographers. As such the variability, thus the resulting reliability of the figures obtained, is as wide as its range of sources. The only gauge possible for determining the merits of each datum is its comparability with similar estimates and its validity with known historical facts.

In reviewing works on population, one notices a lack of interest in population in the Middle Ages. This carries over to the early Modern period. This lack of interest continued during the eighteenth century when writers such as Montesquieu found little in the subject to cause them to consider it a dynamic force. Even Malthus subordinated the subject because "he believed it to be the result of economic forces."²⁰ The situation was

further aggravated by the lack of data for many periods. Information about the Middle Ages before 1086 is very scarce. Even in the time of the Byzantine Empire, many areas of Europe are singularly lacking in this kind of information. It was only at the very end of the nineteenth century that considerable interest developed in the subject-matter as democracy made human statistics of major significance.^{21.}

Two biases are shown in the study of early population estimates: exaggeration and a tendency to use the number five (man, wife, three children) as the index to the house-hearth or family.^{22.} The idea of a Golden Age in the past, professed by most early historians and writers is the most plausible reason for this. A good case against it is presented in the essay of David Hume, written about 1742.^{23.} Among many other things, he emphasized the tendency of the slave populations to reproduce slowly, cautioned against the acceptance of the often wildly exaggerated figures of ancient writers, and pointed out the comparative smallness of the apparently reliable figures.

With respect to the areas of ancient and medieval cities, the first figures mentioned to which some degree of reliability can be ascribed are in the work of the classical historian, K.J. Beloch.^{24.} Otherwise, most of the recent data have come from archaeological research and from the evidence of contemporary maps when it exists. Information about the sizes of cities derived from the works of ancient writers such as Herodotus and Strabo is not altogether reliable.

Nevertheless, in the present state of our information about population and area of Ancient and Medieval cities, the problem is not so much concern with the reliability of the figures quoted as to the careful and discriminate use of them. Caution too, must be exercised in handling modern census data not because of the exactness of the count, but as to the comparability of the data both as to the scale of the census taken? metropolitan versus central city and as to the legal definition of the city.

Table I shows the variation of population densities as classified according to periods: Ancient, Medieval and Modern. A first glimpse through the table suggests an apparent decline from an average population density of 86 persons per acre for the ancient period to 46 persons per acre for the medieval period. Whereas from the medieval to the modern period, it registers a slight difference of 13 percent.

As a whole, from ancient to modern times, population density seems to have declined approximately twice its original number. Whether the enumerated figures for the different periods represent the true average is another question. This may be answered by taking a closer look at each individual datum for each period. For the ancient times, two ranges with high average figures, and one lone density figure seem to have accounted for the resulting high average for the period. In Iraq's case, out of the seven cities, four cities registered density figures of over a hundred, making the average 128 more or less a true average. As with Italy, of the four cities represented three registered density figures over 100. An average density figure of 98 then would not be too high. Mexico's 120 appears credible too. For the

TABLE I - RANGES OF POPULATION DENSITY ^{1.}
Ancient, Medieval and Modern Times

Country	No. of Ranges in			Period	Ranges in	
	Cities	Pop. Den.	Average		Pop. Den.	Average
Algeria	5	40-67	49	Ancient 4000 B.C.- A.D. 600	31-160	86
Egypt	6	31-95	58	"		
Iraq	7	70-160 ^{1.}	128	"		
Morocco	1	-----	40	"		
Palestine	1	-----	56	"		
Syria	9	30-108 ^{2.}	65	"		
Tunisia	12	35-103	46	"		
Turkey	11	34-71	56	"		
Greece	3	33-77	49	"		
India	1	-----	72	"		
Italy	4	70-150 ^{4.}	98	"		
Mexico	1	-----	120	"		
Spain	7	51-69	60	"		
Morocco	1	-----	48	Medieval 1600-1600 A.D.	12-108	46
Palestine	1	-----	56	"		
Syria	9	40-51	50	"		
Tunisia	1	-----	12	"		
Austria	1	-----	49	"		
Bavaria	1	-----	42	"		
Belgium	7	11-59	28	"		
England	14	11-52	27	"		
France	18	20-277 ^{5.}	65	"		
Germany	33	11-83	45	"		
Italy	20	12-101 ^{6.}	47	"		
Netherland	3	39-46	43	"		
Poland	1	-----	46	"		
Spain	13	42-241 ^{7.}	108	"		
Switzerland	4	41-57	52	"		
Mexico	2	12-30	22	"		
Peru	1	-----	36	"		
Denmark	1	-----	46	Modern 1600-1911 A.D.	14-124	40
England	10	6-99 ^{8.}	32	"		
Germany	4	31-108 ^{9.}	53	"		
Ireland	1	-----	22	"		
Scotland	2	10-20	15	"		
Canada	1	4-23 ^{10.}	14	"		
U.S.A.	27	4-29 ^{11.}	16	"		
Mexico	1	103-143 ^{12.}	124	"		

1. Refer to Table IA for Population Density of Individual Cities in Time

NOTES FOR TABLE I

1. Out of seven cities reported, five register a population density of over one hundred. These figures are not too extravagant for the early cities in civilization and not too small to be taken as an under-estimation.
2. Syria's 108 is for the city of Tyre which in early history was one of the Phoenician's biggest seaports.
3. Thugga of Tunisia, in the northernmost part of Africa, accounts for the sole density figure above one hundred in the group - 103. Thugga was one of the earliest prosperous Roman colonies in Africa.
4. Of the group, two cities register over the one hundred mark: Aosta-150; Pompei - 100. Both had been once prosperous and prominent cities in the Ancient World.
5. Paris accounts for the 277. This is 13th Century Paris. Historical facts seem to support this figure. Paris became the capital of France in the 12th Century. And it was not until then it attained commercial importance (The City, Stuart Alfred Queen and Lewis Francis).
6. The sole figure over hundred - 101 - is Palermo of the 13th Century. Its rise came along way: through the Crusades; by supplying ships to carry men and equipment to the Holy Land and Venice it got its start. In the wake of Venice grandeur, Italian cities followed, Palermo one of them.

7. Almeria, 196; Badajoz, 105; Cartagena, 107; Granada, 108; Jerez de la Frontera, 101; Malaga, 110; Murcia, 106; Toledo, 107; Zaragoza, 103; Valenica, 241; all cities attained over one hundred density figure during the era of the Moors. Valenica was then the captial.
8. Coventry of 1911 accounts for the lone 6 density figure.
9. 1890, Berlin - 108.
10. Toronto in 1818 - lone 4 figure. This was Toronto in the earliest stage of its development.
11. Kansas City of 1890-6; Los Angeles of 1910-5; Minneapolis of 1890-5; Omaha of 1890-0; St. Paul of 1890-4; Washington of (D.C.) 1910-19.
These low figures may be explained partly by the inclusion of vacant land in the delineation of the city limits. As such, caution must be exercised in the use of such figures.
12. Range stands for Mexico City's density from 1800 to 1910 - 103, 143, & 126 respectively. Considering its background, which is of Spanish culture, the figures are comparable to Spain's high densities - that is if civilization is taken as the basis of comparability.

Table Ia, POPULATION DENSITIES OF INDIVIDUAL CITIES IN TIME

City	Ancient (p/acre)	Medieval (p/acre)	Modern (p/acre)
Antioch	41	51	
Cartagena ^{1.}	50	107	
Jerusalem	56	51	
Malaga ^{2.}	63	110	
Rome ^{3.}	142,77,500	13	
Zaragoza ^{4.}	52	103	
Berlin ^{5.}		28	108
Cologne		31	76
Hamburg		44	31
Leicester		28	13
Leipzig		20	16,32
London		44,49	56
Paris ^{6.}		277	112,118,127
India			

1. Cartagena's 50 - 107: From the Roman Era to Mohammedan Spain.
2. Malaga: 63-110 - comparable to Cartagena.
3. Rome - 142,77,50 and 13 - From Medieval 13th Century. Rome from a million population is said to have declined to 20,000 inhabitants around the 9th Century (The City, Queen and Thomas). Medieval 13th Century might have been a carry-over from the said period, but could not be the result of the Black Plaque since that took place around the 14th Century.
4. Zaragoza, 52-103; Same as Malaga and Cartagena.
5. Berlin's 28 to 108. Medieval 1400 to Modern 1890.

medieval period, Spain's 108 is the only one above the hundred mark, and the rest of the averages of the thirteen cities counted, eleven have density figures above one hundred, making 108 a true average. Except for Canada's U.S.A.'s 4, and England's 6 (refer to II-B for further details) in the ranges for the modern period, the rest of the averages are seemingly in order. However, upon closer examination of the density figures of some individual countries for the different periods, the reverse is true. While there is a downward trend of population as a whole from the ancient to the modern periods, there is a marked increase for individual countries. England and Germany from the Medieval to Modern grew denser by approximately 18% each. Spain, from the ancient to the medieval, gained as much as an 80% increase, nearly twice its original density. Spain though for the first period is only represented by seven cities as compared with the second of 13 cities. When these figures are viewed with known historical facts, the more significant the findings become. Spain of the ancient world, except for the city of Cadiz, which at the time figured prominently in trade and intercourse with the other neighboring nations was a fledgling country. Its extensive city development only began after the invasion by the Moors in the Dark Ages. This historical perspective lends itself too in the case of Italy. With an average density of 98 persons per acre during the ancient period, it declined down to 47 persons per acre for the medieval period: an approximate decline of 51 percent. This may be explained by the history of Rome. With Rome, Italy saw its glory during the late ancient period. But with Rome too, about A.D. 543, it experienced its decline. From a possible one million inhabitants at its zenith, the city of Rome declined to a dismal low of 20,000 inhabitants.²⁵ This effect for the overall period was perhaps alleviated by the emergence of Venice during the Crusades as a

TABLE II - RANGES OF POPULATION DENSITY IN GEOGRAPHY
4000 B.C. to A.D. 1911

<u>Country</u>	<u>Ranges in Population Density</u>	<u>Average p/acre</u>	<u>Continent</u>	<u>Ranges in Pop. Density</u>	<u>Average p/acre</u>
India	-----	72	Asia (4000 B.C. - A.D.1140)	51-128	74
Iraq	70-160	128	"		
Palestine	51-56	53	"		
Syria	30-108	58	"		
Turkey	34-71	58	"		
Algeria	40-67	49	Africa (600 B.C.-Late Middle Ages)	12-103	48
Egypt	31-95	58	"		
Morocco	40-48	44	"		
Tunisia	12-103	43	"		
Austria	-----	49	Europe (2000 B.C. to A.D. 1911)	11-48	48
Bavaria	-----	42	"		
Belgium	11-59	28	"		
England	16-49	33	"		
France	20-130	54	"		
Germany	11-83	45	"		
Greece	33-77	49	"		
Ireland	-----	22	"		
Italy	12-150	59	"		
Netherland	39-46	43	"		
Poland	46	46	"		
Scotland	-----	10	"		
Spain	38-148	81	"		
Switzerland	41-57	50	"		
Canada	4-23	16	North America (A.D.1818-1910)	4-29	16
U.S.A.	4-29	16	"		
Mexico	12-143	89	North America (A.D. 400-1910)	12-143	89
Peru	36		South America (A.D. 1300- Mid. 1600)		

major center, followed by other Italian cities, such as Florence and Milan, even rivalling the former in development and stature.

Summarizing the whole, the following findings were made: First, from the ancient to the medieval, there is a noticeable decline. However, this trend is obscured from the medieval to the modern period; second, with respect to the individual countries, the trend does not seem to follow: Spain's 60 for the ancient period rose to 108 for the medieval period; third, viewing it from the average density figure of each country, as a whole, population density from 4000 B.C. to 1911 has not changed much.

When viewed in geography, Table II reveals a more interesting set of relationships. While continents vary, again individual countries seem to be the same. Spain with its average 81 persons per acre as compared to Mexico's 89, tends to indicate similar geographic conditions, if geography per se is taken as the sole cause of population density. A comparison of the two countries' climate, topography and other elements,²⁶ however, discounts this contention. Spain has considerable lowlands in river valleys, with 38 percent of land arable and a widely seasonal climate (dry summers everywhere); while Mexico, on the other hand, is composed largely of vast, complex central highlands of moderate temperature and tropical low and narrow coastal plains. Of its land though, only 5% is arable. In Spain the different cities, Malaga with 25 feet altitude above sea level, Valencia with 30 and Zaragoza with 30, are in Spain's lowlands. Whereas in Mexico City, the highest numbers in the density count are located high up in the highlands - 7349 feet up. On the other hand, Merida which contributes the low density figures for Mexico, is on lowland of 30 feet

altitude. Though the data for the Spanish cities were of the 8th Century A.D. with only one comparable figure on the part of Mexico (Teotihuacan, 400-700 A.D.),²⁷ the rest dating in more recent times (13th Century, 19th and early 20th Centuries), yet for this span of approximately eight centuries, as far as my information goes, there had been no major climatic or geographic upheavals such as the sinking of land,²⁸ recorded in these two countries. Otherwise the time element, to insure comparability of figures would have been taken into consideration. Following the same line of argument, let's take the case of Spain again, this time in relation to its adjacent neighbor, France. While Spain and Mexico are located in two widely separated continents, France and Spain are not. And with a density figure 54 for France, as compared to Spain's 81, the relationship is the exact opposite of the previous example. Geographic conditions between Spain and Mexico are quite different. In this case, however, there are practically no differences except for slight variations in climatic conditions. Both have their share of mountains, highlands, and lowlands, and each has 38% of its land arable. In spite of this similarity, there is quite a marked difference between the two density figures. Proceeding further, the case of Turkey, with a density of 58 persons per acre and Syria, its immediate neighbor, with 58 also is a good variant of the previous case of France and Spain. Here is another set of adjacent neighbors with apparently the same climatic and topographic conditions but with the same density figures as contrasted from the previous example. To begin with, the comparability of the two averages is quite close. Except for Syria's lone 108 density figure, the rest of the numbers are similar to that of Turkey. Leaving 108 out, Syria's average of 51 would still be comparable. The same is true of the averages of France,

Spain and Mexico. Syria's mountains rise abruptly from its narrow coast separated from the eastern range and the interior uplands by a rift valley. It has a sub-tropical climate with the coastal regions warm and humid. Eighteen percent of its land is arable. Compared to this is Turkey's 19 percent of arable land, characterized by hills and mountains on the southern and southeastern regions, but only mountains on the eastern side, the Anatolian plateau on the central part and a narrow coastal strip along the Black Sea. The climate is temperate as a whole except near the Black Sea, which is semi-tropical. With the exception of Damascus, which is 2250 feet above sea level, most of the cities under consideration are located along the coast, as in the case of Turkey. This interesting case of similar geographic conditions with resulting comparable average density figures is made more complicated and perplexing when considering Algeria and Morocco - another set of neighbors. With both countries having narrow coastal plains and a highly diversified climate, with the sole difference in percentage of Algeria's arable land, 3%, as compared to Morocco's 18%. It is surprising to note that the former's average density figure is near, the same if not higher than the latter's. Qualifications should be made here inasmuch as only two cities constitute the average for Morocco and five for Algeria. The ranges however are quite similar. Delving further into the question of geography's role in population density, it is also interesting to note the fact that in the countries where civilization first started, the percentage of arable land is minimal: 8% for Iraq and 2% for Egypt. This may not have been the case when the ancient empires were founded. Climatic conditions may not have been as harsh as it is today. This theory is made more plausible by the archaeological findings, that down to 2000 B.C. the oxen and the onagers

were the only draught animals that could be directly attested anywhere.²⁹

And that the camel in its domesticated form was not known in these areas before about 100 B.C.³⁰. But the point is if the historical fact that city developments in these areas remained stagnant after its golden past is considered, could there be some explainable tie or connection between the two?

Summarizing, the following points appear significant: First, as far as the investigation undertaken is concerned, there is no clear sign of the relationship between geography and population density: similar geographic conditions produce similar density figures at certain instances and different densities at other; varying climatic and topographic conditions result in comparable densities; harsh natural environments produce higher densities than lesser ones; second, there are certain insights discovered through the course of this study, as in the case of Iraq and Egypt, which promise some tangible explanation as to the specific role of geography, if any, on population density.

With respect to civilization, Table III-C is more explicit than the previous ones. First notice will be made of the comparative density figures for related civilizations: Ancient Oriental's 103, Mohammedan's 108 and Latin America's 124 as one group; Greek, Roman and European with a close range of 40 to 50 persons per acre; and American and Canadian with density figures of 15 and 14 respectively. Examining the figures further, each civilization differ from one another noticeably - 103 for the first group, 40 to 50 for the second, and 15 to 14 for the third group.. This relationship is made more significant considering the fact that each related civilization is set at

TABLE III - RANGES OF POPULATION DENSITY IN CIVILIZATION*
4000 B.C. to A.D. 1911

<u>Epoch in Civilization</u>	<u>Range in Population Density</u>	<u>Average (p/acre)</u>
Ancient Oriental: 4000 B.C.-700 B.C.	16-160	103
Greek: 2000 B.C. - 408 B.C.	31-72	50
Roman: 146-300 B.C. to Imperial Decline, A.D. 543	34-308	68
Mohammedan (Dark Ages): A.D. 632- A.D.950	92-148	108
Near Eastern (The Crusades):A.D.1095 - 1291	40-51	49
European (Middle Ages):A.D. 1291-15th Cent.A.D. 13-277		50
European (Renaissance): 14th Cent. - 16th Century A.D.	11-241	44
Pre-Columbian; A.D. 400 - Mid 1600's	12-120	49
American (Modern): A.D. 1600 - 1910	4-29	15
Canadian (Modern): A.D. 1600-1910	4-23	14
European (Modern): A.D. 1600-1911	6-127	40
Latin American (Modern): A.D.1600-1910	103-126	124

*. Refer to Table III-C for specific cities falling under each epoch in civilization

at different times in history: Ancient Oriental set at 4000 B.C.-700 B.C. nurtured the Mohammedan civilization that reigned over Medieval Spain and from whom modern Latin America (Mexico and the other Spanish-speaking Latin American countries) derived its culture...all these happening in four continents- Asia, Europe, North America (Mexico) and South America. Going further in the analysis, the following points are significant: Spain's Roman density figure of 60 as compared to 108 of Mohammedan's era; Mexico's Spanish density figure of 124 as compared to 22 of the Pre-Columbian era; Middle Ages European's 50, as compared to the Crusades Near Eastern's 49; pre-Crusades' Near Eastern's 65 to the post-Crusades Near Easterns' 49.

Summary: of the three factors considered, civilization seems to have a more noticeable effect on population density than time and geography. It's behavior as seen in the above analysis has been more or less regular and predictable, and its characteristics have seemingly withstood time and geographic changes.

The preceding analyses are premised on a more-or-less static transportation technology. It suggests how population densities have varied widely resulting from changes in time, geography and culture. The question is whether given a fundamental change in technology, will a different effect occur: that is, while population densities fluctuated under a static transportation technology, will a change result either in uniform or lower density figures. Two basic assumptions are made here with respect to the possible effects transportation may have on population density: First, transportation, for purpose of analysis, is viewed as the sole factor affecting population density.

As such, a faster means of transport implies a spread-out spatial arrangement of cities of much lower densities as compared to the concentrated types of developments of much higher densities resulting from slower, inefficient modes of transportation. Second, if movement, within the city from 4000 B.C. to the time of the introduction of the electric streetcar in 1886, was primarily on foot (carriages and coaches being used by only few privileged individuals) it follows from the first assumption that the population densities, regardless of time, geography and civilization, must be relatively high and that its range must be near constant; given a fundamental change, in the form of the electric streetcar, population densities must either decrease or remain stationary but not increase.

With these assumptions, as a gauge, defining the role of transportation, for the period from 4000 B.C. to 1886 A.D. seems not to have any effect on population density.

Working on the second premise, Table IV, shows the ranges of population density of American cities in 1890 and 1910. All cities grew in population density; an average of 15 persons per acre in 1890 and 21 in 1910. Philadelphia rose from a density figure of 13 to 19. Increase in city area was only .6% compared to 4% in population. While Boston increased 53% in population with an equivalent 9% increase in area. The range of change between the two is the same except for the faster rate of growth, both in population and acreage for Boston. The significance of the use of the streetcar with respect to population ^{may be obscured} due to the heavy inflow of immigrants from Europe. Furthermore, the obscurity is intensified by the possibility that the legal definition of the

TABLE IV - POPULATION DENSITIES OF AMERICAN CITIES FROM INTRODUCTION OF ELECTRIC STREETCAR IN 1886 TO 1910

Date	City	Acres Area	Pop.	Den. p/acre	Date	City	Acres Area	Pop.	Den. p/acre
1890	Baltimore	18867	434,000	23	1910	Baltimore	19264	558,485	29
"	Boston	24231	436,200	18	"	Boston	26304	670,585	25
"	Chicago	102765	1,130,400	11	"	Chicago	118464	2,185,283	18
"	Cleveland	15923	261,353	16	"	Cleveland	29184	560,663	19
"	Detroit	13171	205876	16	"	Detroit	26112	465,766	18
"	Milwaukee	10880	204468	19	"	Milwaukee	14592	373,857	26
"	Philadelphia	82807	1076506	13	"	Philadelphia	83328	4,549,008	19
"	Pittsburgh	16106	238617	14	"	Pittsburgh	26496	533,905	20
"	Rochester	9493	133896	13	"	Rochester	12864	218149	17
"	St. Louis	36425	451776	11	"	St. Louis	39296	687,029	17

Population Density Ranges: 11 to 23
Average = 15

Area Ranges: 9493 to 102,765
Average = 33,067

Population Range: 133,896 to 1,130,400
Average 457,309

Population Density Ranges: 17 to 29
Average = 21

Area Ranges: 14,592 to 118,464
Average = 39,590

Population Ranges: 218,149 to 2,185,283
Average = 780,273

city area may include (as has been noted) large vacant sections. In this case, the density of the city can only increase. And therefore, it becomes necessary to take a closer look at the city to determine whether the additional population remained close to the center or settled nearer the periphery. But this question is beyond the scope of this Thesis. A look on the average acreage both for 1890 and 1910 reveals a slight increase of 20% from 33,067 to 39,590. This increase in acreage most likely occurred by the annexation of low density areas. Yet the net density increased. The principal growth therefore must have taken place toward the center of the city, which helps a little explain the problem, but not much. A study only of gross densities will not resolve this question.

SUMMARY AND CONCLUSIONS

Analysis of the data is made in time, geography and civilization with the following resulting points:

1. An apparent decline in population density from the ancient to the medieval periods is shown. This trend however, is obscured from the medieval to the modern. As a whole, the average density figure of each country from 4000 B.C. to 1911 A.D. has not varied much.
2. The behavior of geography on population density is erratic and irrational. No definite trend of inter-action could be derived from the varied cases examined. In general, there is no clear sign of the relationship between geography and population density.
3. Civilization alone, of the three factors, seems to have something to do with population density. It's behavior, regardless of place and time, seems to be always rational. Related civilizations tend to produce similar density figures. And unrelated civilizations appear to differ markedly from one another.

Transportation as from 4000 B.C. to 1886 A.D., when viewed with the preceding findings, appears as a whole to have had no effect on population density, although the average density figure of each country seems to have not varied much in time, and in geography, thus satisfying the assumptions

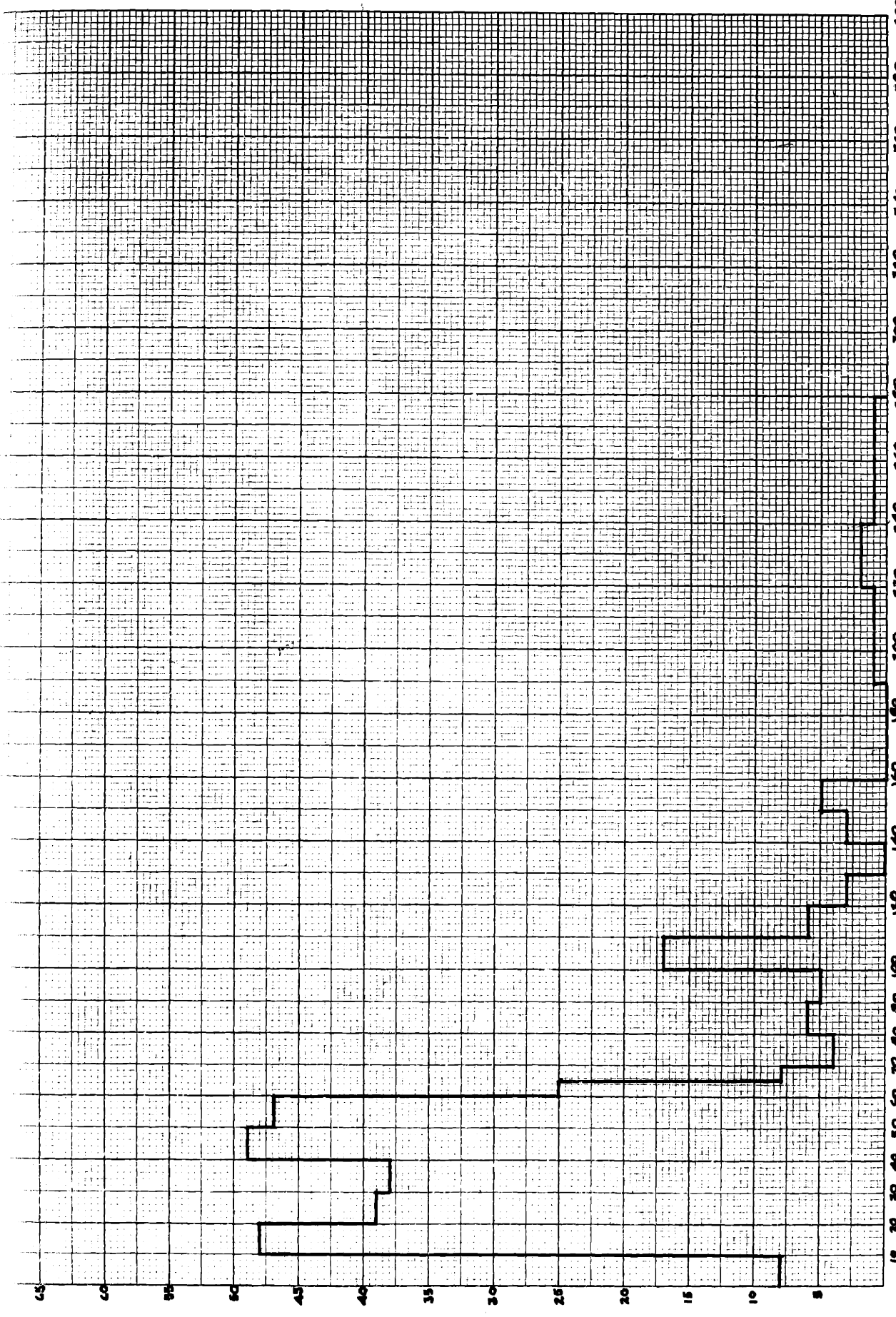


DIAGRAM I - DISTRIBUTION OF URBAN DENSITIES FOR ALL TIMES (4000 B.C. TO A.D. 1911) AND PLACES DATA TAKEN FROM TABLE 1A

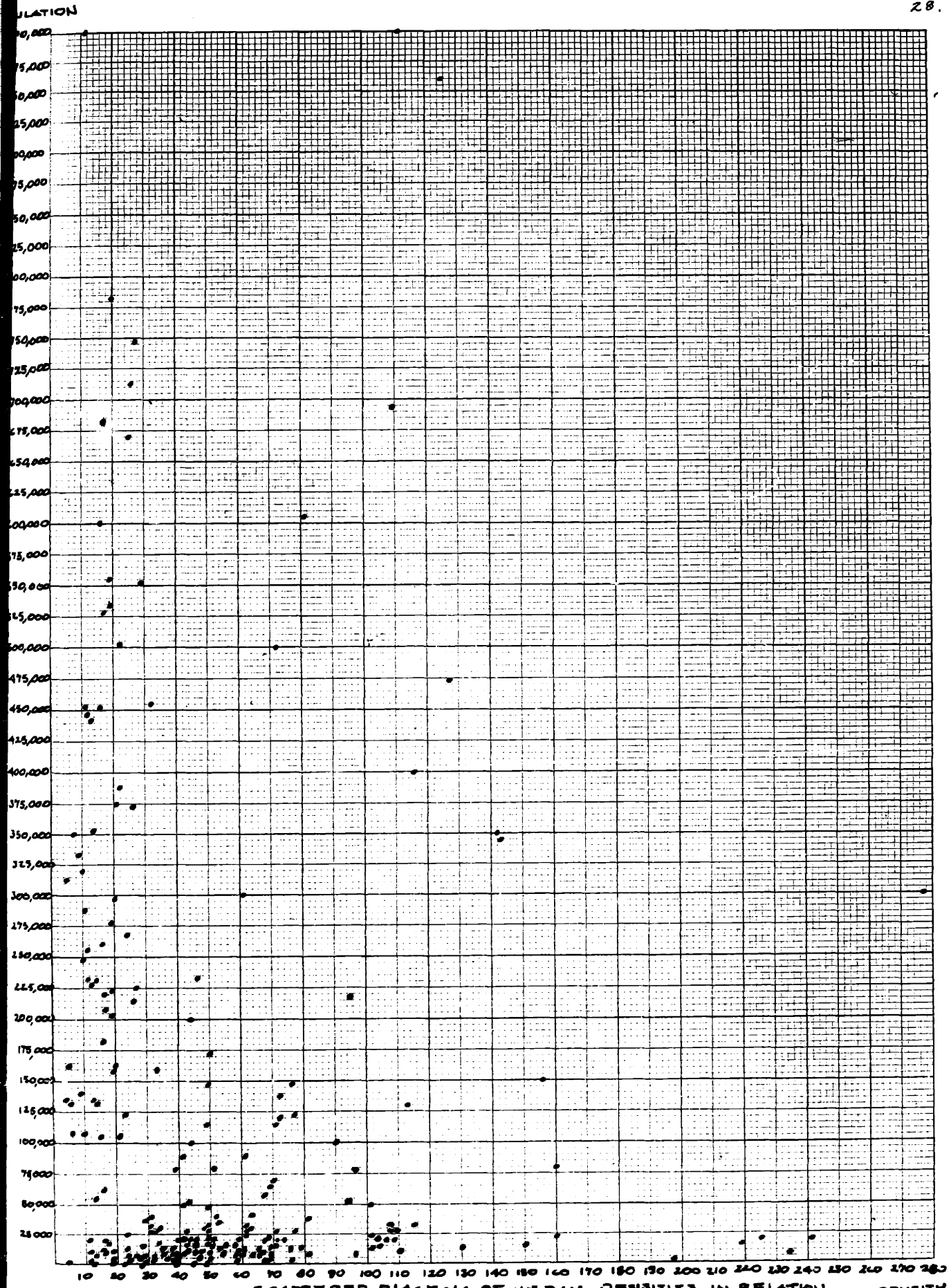


DIAGRAM II - SCATTERED DIAGRAM OF URBAN DENSITIES IN RELATION TO POPULATION - TAKEN FROM TABLE I A

made as to the resulting effect of the former on the latter, marked variations in civilization tend to disprove this. This is made more apparent when density figures of individual cities are considered. With the use of the electric streetcar, the relationship has been obscured by the abnormal high rate of population growth due to the heavy flow of immigrants from Europe, chiefly - 926,291 out of a total of over a million for 1910.³¹ However, judging by the percentage rate of growth in area as compared to population and by deducing from other known facts, the effect of the streetcar at this period on the density seems to have been minimal or negative as compared with the apparent results of other working factors.

Figure I shows the distribution of density with cities of all time (4000 B.C. to A.D. 1911) place and culture. The curve displays two peaks: a principal peak ranging from densities 40 to 60 and a secondary one nearby due largely to the Mohammedan cities in Spain. As a whole the small spread in densities seems remarkable.

Figure II shows the relationship of density and population. One might expect the more populous cities to be also the denser ones. However, as shown by the diagram nothing of this relationship is evident.

From the preceding summaries, the salient points glimpsed in this study are:

1. Individual density figures of cities vary in time and in geography while average density figures of countries vary little in time and place -- that from 4000 B.C. to 1911 A.D. it has been more or less the same; average density figures of continents seem to have declined from ancient to the modern times.

2. Individual density figures of cities, average densities of countries vary little in civilization.
3. Related civilizations seem to produce comparable densities; unrelated civilizations tend to differ markedly in density figures.
4. Population densities of cities from 4000 B.C. to 1886 A.D. appear uninfluenced by transportation technology.
5. From 1886 A.D. to 1911 A.D., the inter-action between population density and transportation appears vague. The period tends to suggest other factors more responsible for population density, than transportation.
6. From all indications and insights derived from the study, civilization seems to be the principal cause of population density. That density is, and appears to have always been, a cultural factor. That transportation is the effect, the means, rather than the cause. To what extent and on what manner, alone or reinforced by other factors, it causes this effect, is beyond my present comprehension.

All these are just beliefs. As such, they must be supported by facts through further study and research.

APPENDICES

APPENDIX A - METHODOLOGY AND EVALUATION OF DATAMethod of Approach

The evolution of transportation technology is classified in three major periods (based on Gilmore's, 1953):

- a. 2nd Millennium B.C. to 14th Century A.D.: All basic transportation inventions used both on land and water during the period were all made by the second millennium B.C. and were not fundamentally changed before about the 14th Century A.D.
- b. 14th Century A.D. to the 18th Century A.D.: Major inventions and improvements were made on existing land, river and sea transportation: horse collar, shoeing, and harness breeching, better coaches and wagons, construction of turnpikes; invention of tacking sailships; use of compass and inventions of cross-staff and astrolabe for ocean navigation.
- c. 18th Century A.D. to the first decade of the 20th Century A.D.: The invention of the steam engine in the 1770's revolutionized the field of transportation, followed by the invention of the railroad in the 19th Century, the electric streetcar in 1886, and the automobile in the early years of the 20th Century.

For purposes of analyzing the data, Period I and Period II are taken as one, where the principal means of movement within the city is by foot. The Third Period is taken as the start of the introduction of the electric streetcar in 1886.

Selection and Grouping of Data

Data are grouped under three major headings: time, geography, and civilization.

In Table I-A, all data about area of cities (in acres), population, and density (p/acre), collected throughout the study are entered, with proper notation of its source. In Tables II-B and III-C, the figures are composed selectively. In this selection process, by methods of comparison and further verification with known historical facts, data are included or discarded accordingly.

Tables I, Ia, II, III, and IV have been formed as such. And as far as can be ascertained, only data about the central city are included for reason of comparability, inasmuch as suburbs as known today, were not in existence in the early times. This is another reason why the terminal point of this study has been arbitrarily fixed at 1911 when the mushrooming of suburbs had not yet begun in a big scale. The difficulty did not end here. In the ancient and medieval world, the town walls were functional. Since the people lived within, the tendency was to live up to the walls rather than spread beyond them; though there were suburbs, not many people lived in them. What people did was to go to these areas to work the entire day and return at night to the safety of the town. This element of the ancient and medieval cities is difficult to reconcile - that is, whether these working areas in the suburb should be considered in the total computation of the area of the city. And if considered, whether there is the means for doing it. The two periods of greatest wall-building tended to make them of considerable importance - from the late third and early fourth centuries and from about

A.D. 1000 to the outbreak of the Black Death in 1348.³².

Method of Analysis

Given a more or less static transportation technology used within the city, population density figures are examined from the viewpoint of time, geography and civilization. If it can be proved that wide fluctuations and differences occur without any change in transportation, it follows that that factor is not the cause. However, this may indicate that the categories used as basis for examination are themselves the causes, it does not follow that they are the sole causes, nor does it show to what extent they are the causes. But a discussion of this is beyond the scope of this investigation.

It might be said that these findings are true only with a given static technology. What then if there is a fundamental change? To verify the hypothesis further, the conditions of the problem are reversed. If with a change in transportation technology, there is no corresponding change in the population density, it follows once again that transportation has no appreciable effect on it.

APPENDIX BTable of Measurement

1 Yard = 3 Feet = 0.914399 Meters

1 Mile = 1,760 Yards = 1.6093 Kilometers

1 Kilometer = 1,000 Meters = 914.399 Yards

1 Square Yard = 9 Square Feet = .836126 Square Meters

1 Acre = 4840 Square Yards = 0.40468 Hectares

1 Hectare = 11,955 Square Yards = 2.47 Acres

1 Square Mile = 259.00 Hectares = 640 Acres

TABLE 1A - POPULATION, AREA AND POPULATION DENSITY DATA OF
ANCIENT CITIES

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/Acre</u>
29	4000 B.C.	Ur	-----	30,000	-----
29	3000 B.C.	Uruk	1111.5	100,000	90
23	3000 B.C.	Khafaje	-----	12,000	-----
13	2000 B.C.	"	-----	-----	120-200
18	2000 B.C.	Knosos	2,254	100,000	44
26	2000 B.C.	Mohenjo-Daro	640	-----	-----
12	1500 B.C.	Akhetaten	14,400	40,000	-----
32	1600 B.C.	Thebes	8,320	225,000	27
29-	1700-700 B.C.	Babylon	963.3	150,000	156
30	953 B.C.	Jerusalem	219	-----	-----
28	960-722 B.C.	Jerusalem	178	10,000	56
16	800 B.C.	Babylon	125,440	-----	-----
31	800 B.C.	Nimrud	960	69,574	70
		(Biblical Calah)			
13	850-625 B.C.	Assur	150	24,000	160
13	850-625 B.C.	Ur	150	24,000	160
13	706 B.C.	Khorsabad	640	-----	-----
29	700 B.C.	Nineveh	1654.9	120,000	72
21	700 B.C.	Nineveh	38,400	600,000	16
14	700 B.C.	Nineveh	1400	-----	-----
7	700 B.C.	Nineveh	-----	200,000	-----
28	700 B.C.	Smyrna	1482	90,000	61
7	600 B.C.	Babylon	-----	400,000	-----
29	600 B.C.	Corinth	1,185	50,000	42
28	600 B.C.	Memphis	553	34,000	61
29	600-400 B.C.	Babylon	74,100	350,000	7
12		(Walled-in- Area)	500	80,000	160
36	500 B.C.	Athens	4,480	120,000-180,000	33
7	500 B.C.	Pompeii	160	-----	-----
32	455 B.C.	Thebes	1286	40,000	31
19	450 B.C.	Alexandria	2470	-----	-----
16	420 B.C.	Pompeii	160	-----	-----
28	408 B.C.	Rhodes	126	7500	59
16 & 29	400 B.C.	Syracuse	2422	400,000	116
29	400 B.C.	Agrigent	-----	200,000	-----
29	400-300 B.C.	Pataliputra	6916	500,000	72
7	335 B.C.	Syracuse	-----	200,000	-----
7	335 B.C.	Athens	-----	168,000	-----
7	335 B.C.	Carthage	-----	100,000	-----
7	335 B.C.	Rome	-----	100,000	-----
16	330 B.C.	Gerasa	235	-----	-----

TABLE 1A, ANCIENT CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/Acre</u>
28	330 B.C.	Miletus	289	15,000	52
16	330 B.C.	Prdene	77	4,000	52
16	316 B.C.	Nicaea	132	-----	-----
	316 B.C.	Nicaea	296	18,000	61
25	303 B.C.	Alba Fuciens	82	ca.18,000	219
29	300 B.C.	Antioch	-----	350,000	-----
24	300 B.C.	Athens	-----	100,000	-----
29 & 16	300 B.C.	Carthage	4940	300,000	61
24	300 B.C.	Carthage	-----	500,000	-----
24	300 B.C.	Dura Europos	104	6,000	58
29	300 B.C.	Pergamum	395	24,000	61
29	300 B.C.	Ephesos	-----	200,000	-----
28	300 B.C.	Ephesos	852	51,000	60
24	300 B.C.	Syracuse	-----	100,000	-----
14	300 B.C.	Syracuse	4500	200,000	44
29	300-150 B.C.	Seleukia	-----	600,000	-----
28	283 B.C.	Capua	445	36,000	81
28	283 B.C.	Florence	79	-----	-----
28	283 B.C.	Naples	254	15,000	59
25	273 B.C.	Cosa	32	7,500	234
28	238 B.C.	Aquileia	207	-----	-----
28	238 B.C.	Catania	296	18,000	61
28	238 B.C.	Palermo	494	-----	-----
28	238 B.C.	Padua	358	-----	-----
28	210 B.C.	Cadiz	946	65,000	69
28	201 B.C.	Bologna	123	10,000	81
28	201 B.C.	Milan	279	-----	-----
29	200 B.C.	Caesarea	-----	200,000	-----
29	200 B.C.	Kattak	-----	300,000	-----
28	201-133 B.C.	Merida	249	15,000	60
16 & 29	150 B.C. -				
	350 A.D.	Rome	8384	1,100,000	322
28	146-133 B.C.	Hadrumentum	395	20,000	51
28	146-133 B.C.	Sicca Veneria	321	16,000	50
28	146-133 B.C.	Thugga	121	12,500	103
28	146-133 B.C.	Thysdrus Col.	247	10,000	41
28	133 B.C.	Bulla-Regis	111	5,000	35
28	133 B.C.	Cordoba	346	20,000	58
28	133 B.C.	Garmona	116	8,000	69
28	133 B.C.	Cartagena	200	10,000	50
28	" "	Cartenna	161	6,500	40
28	" "	Hispalis	123	8,000	65
28	" "	Malaga	111	7,000	63
28	" "	Pamplona	198	10,000	51

TABLE 1A, ANCIENT CITIES, Cont'd.

Source Index Number	Date	City	Area (Acres)	Population	Density p/acre
27	133 B.C.	Salamanca	111	6,000	54
28	"	Sitifis	161	6,500	40
28	"	Tarragona	445	27,000	61
28	"	Thapsus	141	5,000	35
28	"	Utica	161	6,500	40
28	"	Zaragosa	116	6,000	52
16	123 B.C.	Carthage	1200	-----	-----
28	107 B.C.	Colonia Utinenses	173	7,000	40
28	107 B.C.	Leptis Magna	173	7,000	40
28	"	Vicus Augusti	173	7,000	40
29	100 B.C.	Alexandria	2212	700,000	308
7	"	Ctesiphon	-----	500,000	-----
7	"	Honan	-----	75,000	-----
7	"	Changan	-----	500,000	-----
16	90 B.C.	Naples	250	-----	-----
5	86 B.C.	Rome	-----	463,000	-----
28	46-44 B.C.	Cirta	519	20,000	395
28	46-44 B.C.	Rusicade	89	20,000	225
19	44 B.C.	Alexandria	1630	-----	-----
28	"	Hipporegis	247	10,000	41
28	"	Lambaesis	175	10,000	60
28	"	Thignica	198	8,000	40
28	"	Tyre	185	20,000	108
28	"	Pomaria	198	8,000	40
28	"	Volubius	198	8,000	40
30	40 B.C.	Republican Rome	968	-----	-----
16	28 B.C.	Turin	127	-----	-----
16	25 B.C.	Aosta	100	15,000	150
16	12 B.C.	Autun	490	-----	-----
28	43 A.D.	London	330	-----	-----
28	74 A.D.	Rome	2470	350,000	142
25	79 A.D.	Pompeii	-----	-----	100
2	"	"	163	10,584	66
29	1st Cent.	Alexandria	2272	216,000	95
18	"	Amiens	20	-----	-----
18	1st Cent.	Apamea	617	37,000	60
18	"	Arles	67	-----	-----
7	"	Autun	494	37,000	60
28	"	Avenches	370	-----	-----
28	"	Avignon	49	-----	-----

TABLE 1A, ANCIENT CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acrea</u>
28	1st Cent.	Beauvais	27	-----	-----
28	"	Cologne	239	-----	-----
28	"	Dijon	27	-----	-----
28	"	Evreux	22	-----	-----
28	"	Fredus	83	-----	-----
28	"	Grenoble	22	-----	-----
28	"	Le Mans	247	-----	-----
28	"	Limoges	28	-----	-----
28	1st Cent.	Lyons	402	-----	-----
28	"	Mainz	202	-----	-----
28	"	Marseilles	79	-----	-----
28	"	Narbonne	593	-----	-----
28	"	Nimes	511	-----	-----
28	"	Orange	494	-----	-----
28	"	Paris	15	-----	-----
28	"	Rennes	247	-----	-----
28	"	Rouen	333	-----	-----
28	"	Strasbourg	49	-----	-----
16	"	Timgad	36	2000	67
16	"	"	123	3-4,000	28
28	"	Toulouse	148	-----	-----
28	First Cent.	Tralles	-----	3700	-----
18	"	Treves	702	-----	-----
24	Early A.D.	Alexandria	-----	500,000	-----
7	100 A.D.	Rome	-----	100,000	-----
7	"	Alexandria	-----	600,000	-----
7	"	Antioch	-----	400,000	-----
7	"	Ctesipon	-----	500,000	-----
7	"	Honan	-----	750,000	-----
7	"	Changan	-----	500,000	-----
28	105 A.D.	Vienne	556	-----	-----
28	106 A.D.	Aradus	82	7,000	96
28	"	Baalbek	225	13,500	60
28	"	Damascus	526	31,000	59
28	"	Sidon	163	12,000	74
28	128 A.D.	Apameia Celenae	178	-----	-----
28	2nd Cent.	Athens	605	28,000	77
28	"	Philadelphia	-----	1,000	-----
24	200 A.D.	Rome	-----	600,000-800,000	-----
28	211 A.D.	Rome	-----	260,000	-77

TABLE 1A, ANCIENT CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	Late 2nd. Cent.	Stratoniceae	----	10,000	-----
28	2nd-3rd Cent.	Aachen	37	-----	-----
28	"	Avenches	22	-----	-----
28	"	Basel	13	-----	-----
28	"	Bonn	62	-----	-----
28	"	Byzantium	1581	80,000-150,000	71
28	"	Cologne	239	-----	-----
28	"	Maastricht	5	-----	-----
28	"	Mainz	296	-----	-----
28	"	Metz	173	-----	-----
28	"	Reims	154	-----	-----
28	"	Soissons	30	-----	-----
28	"	Strasbourg	49	-----	-----
28	"	Tournai	30	-----	-----
28	"	Worms	170	-----	-----
28	Early 3rd. Cent.	Aphrodesia	296	10,000	34
6	"	Rome	-----	241,000	-----
28	3rd Cent.	Carthage	757	38,000-50,000	58
28	"	Palmyra	543	33,000	61
28	"	Rome	3409	-----	-----
16	"	Trier	704	-----	-----
28	366-337	Constantinople	1580	80,000	51
30	350 A.D.	Athens	229	-----	-----
30	"	Imperial Rome	3190	-----	-----
28	3rd-4th Cent.	Arles	40	-----	-----
28	"	Autun	30	-----	-----
28	"	Bordeaux	222	-----	-----
28	"	Cahors	35	-----	-----
28	"	Narbonne	43	-----	-----
28	"	Nimes	511	-----	-----
28	"	Orange	494	-----	-----
28	"	Paris	20	-----	-----
28	"	Poitiers	114	-----	-----
28	"	Toulouse	247	-----	-----
28	"	Vienne	556	-----	-----
28	Late 3rd. Cent.	Arsinoe	598	24,000	40
28	"	Antinoe	370	-----	-----
28	"	Cyzicus	395	24,000	61
28	"	Heracleopolis	-----	-----	-----
28	"	Magna	287	14,000	49
28	"	Mitylene	382	23,000	60
28	"	Cyzicus	395	24,000	61

TABLE 1A, ANCIENT CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	Late 3rd Century	Nicomedia	562	34,000	60
28	3rd-5th Centuries	Thessalonica	578	35,000	61
28	4th Cent.	Alexandria	1580	122,000	77
28	"	Rome	3423	172,600	50
28	410 A.D.	Aldborough	60	-----	-----
28	"	Caerleon	50	-----	-----
28	"	Caerwent	44	-----	-----
28	"	Canterbury	45	-----	-----
28	"	Carlisle	50	-----	-----
28	"	Chester	56	-----	-----
28	"	Chichester	103	-----	-----
28	"	Cirencester	240	-----	-----
28	"	Colchester	108	-----	-----
28	"	Dorchester	86	-----	-----
28	"	Exeter	91	-----	-----
28	"	Glevum	46	-----	-----
28	"	Leicester	106	-----	-----
28	"	Lincoln	41	-----	-----
28	"	North Chester- ton	44	-----	-----
28	"	Silchester	104	-----	-----
28	"	Verulamium	200	-----	-----
28	"	Winchester	138	-----	-----
28	"	Wroxeter	170	-----	-----
28	"	York	50	-----	-----
28	447 A.D.	Constantinople	2964	147,880	50
6	Mid 4th Cen.	Rome	-----	172,600	-----
28	4th-5th cen.	Antioch	2,223	90,000	41
7	"	Constantinople	12,272	80-150,000	49
37	Late 4th- 5th Cent.	Olynthus	-----	15,000	-----
7	5th Cent.	Capua	440	-----	-----
28	"	Dyrrhacium	95	-----	-----
6	"	Naples	250	-----	-----
28	"	Nicopolis	59	-----	-----
28	"	Nicopolis ad Istrum	54	-----	-----
6	"	Rome	-----	36-48,000	-----
28	"	Salona	173	-----	-----
7	"	Surrentum	60	-----	-----

TABLE 1A, ANCIENT CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	5th Cent.	Naples	254	15,000	59
7	Late 5th Century	Aosta	100	-----	-----
7	"	Florence	46	-----	-----
7	"	Lucca	54	-----	-----
7	500 A.D.	Constantinople	-----	500,000	-----
7	"	Alexandria	-----	300,000	-----
7	"	Antioch	-----	250,000	-----
7	"	Ctesiphon	-----	500,000	-----
19	5th-6th Gen.	Alexandria	1,111	-----	-----
7	600 A.D.	Ostia	175	-----	-----
15	400-700 A.D.	Teotihuacan (S.A.)	-----	-----	120
29	350-800 A.D.	Byzanz	-----	700,000	-----
7	750 A.D.	Constantinople	-----	300,000	-----
7	"	Damascus	-----	250,000	-----
7	"	Alexandria	-----	216,000	-----
7	"	Changan	-----	1,250,000	-----
7	"	Honan	-----	500,000	-----
7	"	Nara	-----	200,000	-----

TABLE 1A, MEDIEVAL CITIES

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
30	855 A.D.	Rome	3490	-----	-----
29	900-1100	Angkor	-----	1,500,000	-----
7	1000 A.D.	Constantinople	-----	800,000	-----
7	"	Thessalonica	-----	250,000	-----
7	"	Cordoba	-----	500,000	-----
7	"	Palermo	-----	200,000	-----
7	"	Toledo	-----	200,000	-----
28A	1086	Cambridge	-----	1960	-----
28A	"	Bristol	-----	2310	-----
28A	"	Gloucester	-----	1851	-----

TABLE 1A, MEDIEVAL CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28A	1086	Leicester	106-125	1278	13
28A	"	Norwich	-----	4445	-----
28A	"	Oxford	-----	1431	-----
28A	"	Worcester	-----	945	-----
28A	1086	York	-----	4135	-----
28	11th Cent.	London	410	17,850	44
28	"	Nimes	114	5341	47
28	1140	Aleppo	277	14,000	51
28	1140	Antioch	803	40,600	51
28	"	Damascus	296	15,000	51
28	"	Edessa	474	24,000	51
28	"	Gaza	121	6125	51
28	"	Hansa	143	6750	47
28	"	Hebron	111	5625	51
28	"	Hims	138	7,000	51
28	"	Jerusalem	198	10,000	51
28	"	Tripoli	198	8,000	40
28	1150	Brunswick	284	15-17,000	56
30	1187	Jerusalem	192	-----	-----
28	1180-1223	Bourges	284	32,350	114
28	12th Cent.	Begiers	111	4280	39
28	"	Beziers	111	14476	130
28	"	Leineburg	207	80,000	39
28	ca. 1200	Osnabruck	124	4,800	39
32	12th Cent.	Paris	-----	100,000	-----
28	ca. 1217	Lubeck	264	17,881	68
28	1242	Mantua	370	26,407	72
28	ca. 1250	Hamburg	504	22,000	44
28	"	Parma	496	20,000	40
28	"	Parma	496	11,500	23
7	1250	Palermo	-----	200,000	-----
7	"	Fez	-----	400,000	-----
7	"	Cairo	-----	200,000	-----
28	1277-87	Zittah	100	5,000	50
28	1292	Paris	934	-----	-----
15	ca.1200-1441	Mayaran (S.A.)	-----	-----	-----
28	1297-1326	Bordeaux	679	43,000	63
29	1200-1400	Nepal	-----	200,000	-----
28	1212-1492	Cordoba	-----	90,000	-----
28	"	Seville	556	52,000	94

TABLE 1A, MEDIEVAL CITIES, Cont'd.

Source Index Number	Date	City	Area (Acres)	Population	Density p/acre
28	1212-1492	Almeria	291	31,000	107
28	"	Cartagena	272	29,000	107
28	"	Toledo	256	28,000	109
28	"	Jerez de la Fron- tera	237	24,000	101
28	"	Mallorca-Palma	222	23,000	104
28	"	Badajoz	200	21,000	105
28	"	Granada	186	20,000	108
28	"	Murcia	161	17,000	106
28	"	Zaragoza	116	12,000	103
28	"	Valencia	109	11,000	101
28	"	Malaga	91	10,000	110
28	13th Cent.	Bologna	1036	32,000	31
28	"	Cologne	1001	31,000	31
28	"	Die	57	1723	30
28	"	Florence	259	20,000	73
28	"	Heidelberg	89	5200	58
28	"	Laon	99	6720	68
28	"	Leipzig	104	2076	20
28	"	"	104	2936	28
30	"	London	307	-----	-----
28	"	Lucca	185	14,300	78
28	"	Mainz	296	5767	20
28	"	Magdeburg	272	16,000	59
28	"	Norwich	210	15,928	28
28	"	Nurberg	247	15,000	59
29	"	Paris	1084	300,000	277
28	"	Pisa	282	15,000	53
28	"	Palermo	494	16,168	33
28	"	Palermo	494	50,000	101
28	"	Rome	3409	55,035	13
28	"	Rostock	168	14,000	83
28	"	Strasbourg	477	30,000	63
28	"	Trier	356	8-9000	24
28	1305	Northeim	60	2916	49
28	1323	Wittenberg	57	2146	38
15	1325	Tenochtitlan	----	-----	30
28	1330	Breslau	301	14-15,000	50

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TABLE 1A, MEDIEVAL CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
8	1338	Florence	----	90,000	-----
28	1350	Roden	52	3864	74
28	1351	Avignon	378	15,340	41
22	1352	Lucerne	----	3,000	-----
22	1357	Zurich	----	7,200	-----
28	1358	Reims	196	-----	-----
28	1359	Carcassone	99	8143	82
28	"	"	99	4957	50
28	ca. 1363-68	Venice	----	65,000	-----
28	1364	Geneva	74	4204	57
28	1368	Embrun	20	1935	197
28	1374	Palermo	----	500,000	-----
28	1374	Sicily	----	500,000	-----
28	1377	Bristol	----	9517	-----
28	"	Cambridge	----	3153	-----
28	"	Coventry	----	7,226	-----
28A	"	Gloucester	----	3358	-----
28A	"	Hull	----	2336	-----
28A	"	Leicester	100-125	3121	27
28A	"	London	330	35,000	106
8	"	"	----	30,000	-----
28A	"	Norwich	----	4445	-----
28A	"	Oxford	----	2160	-----
28A	"	Winchester	138	2160	-----
28A	"	Worcester	----	2376	-----
28A	"	York	----	7248	-----
28	1380	Florence	----	4082h	-----
28	1390	Arezzo	----	5000	-----
28	1393	Rome	----	1776h	-----
28	1395	Parma	----	30,000	-----
28	Late 1300	York	207	10,872	52
28	1300-1400	Pisa	282	13,000	46
28	"	Pisa	282	9,940	35
28	1390-1400	Prato	----	54,747	-----
28	"	Toulouse	524	25,964	50
28	"	"	524	22,136	42
15	1300-mid 1600	Chan-Chan	----	-----	36
28	1400	Augsburg	440	18,300	42
28	"	Basel	247	10,000	41
28	"	Berlin	215	6,000	28
28A	"	Biergeven	----	1386	-----
28	"	Bologna	1036	32,000	31
28	"	Bristol	----	2310	-----

TABLE 1A, MEDIEVAL CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	1400	Canterbury	99	3861	39
28A	14th Cent.	Cardiff	-----	1480	-----
28A	"	Carmarten	-----	984	-----
28A	"	Florence	1265	54,747	43
28	"	"	1265	37,224	29
28	"	Grenoble	49	1862	38
28	"	"	49	2170	45
28	"	Hague	237	5392	23
28	"	Hull	82	2336	29
28	"	Lincoln	165	5354	32
28	"	Lodeve	136	4028	30
28	"	London	711	34,971	49
28	"	Mecklenberg	170	1100	65
28	"	New Castle- On Tyne	222	13,970	18
28	"	Nurnberg	341	16,568	48
28	"	"	341	22,800	67
28	"	Padua	865	41,000	47
19	"	"	247	-----	-----
28	"	Pistoria	356	6,000	17
28	"	Siena	249	16,700	67
28	"	Stadthagen	52	2040	39
28A	"	Tinby	-----	934	-----
28	"	Tunis	240	2800	12
28	"	Valencia	351	13,500	38
28	"	Venice	800	77,700	96
28	Early 14th Century	Danzig	258	11,775	46
28	1404	Parma	-----	20,000	-----
28	1408	Maritima	-----	1600	-----
28	1421	Parma	-----	11,500	-----
8	1422	Venice	-----	190,000	-----
28	1423	Arezzo	-----	1166h	-----
28	1424	Florence	-----	37,225	-----
28	1436	Arezzo	-----	1255h	-----
8	1440	Frankfort	-----	8719	-----
28	1441	Strasbourg	477	20722	43
28	1443	Arezzo	-----	1087h	-----
22	1448	Berne	-----	5000	-----
28	mid 14th	Brussels	889	29,656	33
28	1448	Naples, K.	-----	230,000	-----
28	1450	Arezzo	-----	1128h	-----

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TABLE 1A, MEDIEVAL CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	1458	Florence	----	38,865	-----
28	1463	Mantua	----	26,407	-----
28	1463	Mantua Con	----	105,000	-----
28	1463	Milan	----	40,000	-----
28	1465	Naples, K.	----	230,000	-----
28	1467	Arezzo	-----	1217h	-----
28	1470	Florence	----	40,323	-----
28	1479	Palermo	----	5109h	-----
28	1480	Arezzo	----	1274h	-----
28	1480	Florence	----	39,090	-----
28	1481-88	Amsterdam	1193	7476	39
28	1485	Naples, K.	----	215,107	-----
28	1490	Arezzo	----	973h	-----
28	1493	Medola	-----	1800-	-----
28	Late 14th	Ghent	1591	50-60,000	59
28	15th Cent.	Augsburg	----	18,000	-----
28	"	Brussels	1109	19,058	17
22	"	Frankfurt am Main	--	9,000	-----
22	"	Nuremberg	----	20,000	-----
22	"	Strasbourg	----	20,000	-----
22	"	Ulm	----	20,000	-----
28	1501	Catania	----	2798h	-----
28	1501	Messina	----	31,385	-----
28	"	Naples, K.	----	254,380	-----
28	"	Palermo	----	8000h	-----
28	1502	Parma	----	15,760	-----
28	1509	Parma	----	19,034	-----
28	1509	Venice	----	110,000	-----
28	1510	Naples, K.	----	264,916	-----
31	1520	Coventry	----	6601	-----
16	1521	Mexico City	494	-----	-----
28	1540	Venice	----	131,000	-----
28	1542	Milan	----	68490	-----
28A	1545	Bristol	----	10,536	-----
28A	"	Cambridge	----	4189	-----
28A	"	Gloucester	----	4738	-----
28A	"	Hull	----	2336	-----
31	1545	London	----	67,744	-----
28	"	Naples	----	422,030	-----
28A	"	Norwich	----	9320	-----

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TABLE 1A, MEDIEVAL CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28A	1545	Oxford	----	4,000	-----
28A	"	Winchester	----	2160	-----
28A	"	Worcester	----	6660	-----
28A	"	York	----	8000	-----
28	1548	Catania	----	4907	-----
28	"	Naples	----	18,000h	-----
28	"	Messina	----	15,000h	-----
28	"	Sicily	----	850,000	-----
6	1550	Paris	----	260,000	-----
6	"	Naples	----	220,000	-----
6	"	Constantinople	----	800,000	-----
6	"	Cairo	----	430,000	-----
6	"	Aleppo	----	250,000	-----
6	"	Kyoto	----	500,000	-----
28	1551	Arezzo	----	1550h	-----
28	"	Prato	----	6845	-----
31	1553	London	----	86,000	-----
28	1559	Mantua	----	36,196	-----
28	1562	Mantua Con	----	125,000	-----
28	"	Medola	----	1800	-----
31	1563	London	----	93,276	-----
28	1568	Maritima	----	1115	-----
28	1573	Parma	----	20,000	-----
31	1582	London	----	120,000	-----
31 & 32	1593	London	1920	138,000	72
30	1644	Rome	1644	-----	-----
29	1550-1650	Istanbul	----	500,000	-----
28	Late Middle Ages	Aix	104	6,000	58
28	"	Albi	247	9341	38
28	"	Albi	247	5712	23
28	"	Altenburg	59	2,800	47
28	"	Antwerp	869	13,760	16
28	"	Antwerp	869	27,344	32
28	"	Arnstadt	94	3,600	38
28	"	Barcelona	642	27,056	42
28	"	"	642	30,604	48
28	"	Beaume	91	3072	34
28	"	Bergamo	499	20,843	42
28	"	Bern	89	5,000	56
28	"	Bruges	1062	25,000	23
28	"	Chemnitz	47	2,330	49
28	"	Dijon	257	8235	32
28	"	"	"	10,088	39

TABLE 1A, MEDIEVAL CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	Late Middle Ages	Dresden	138	3745	27
28	"	Fez	790	37,700	48
28	"	Frankfurt-am-Main	316	9,844	32
28	"	Freiburg	----	5,000	-----
28	"	Freiburg-in-Lichtland	242	5,800	24
28	"	Forlitz	178	7,800	43
28	"	Haarlem	198	9,094	24
28	"	Leicester	111	3,152	28
28	"	Liege	198	8,000	41
28	"	Louvain	1,013	10,828	11
28	"	Meissen	54	2,100	39
28	"	Milan	776	52,000	67
28	"	Modena	178	8,000	45
28	"	Muhlhausen	148	7-9,000	54
28	"	Naples	501	22-27,000	49
28	"	Perigeux	99	-----	-----
28	"	Perugia	198	13,000	66
28	"	Placenza	852	25,000	29
28	"	Reggio Emilia	247	9201	37
28	"	Salzburg	143	7,000	49
28	"	Stettin	156	9-9,500	59
28	"	Toulon	44	1512	34
28	"	"	"	2800	12
28	"	Ulm	183	20,000	11
28	"	Valencia	116	28,000	241
28	"	Vienne	89	3836	43
28	"	Winchester	136	2160	16
28	"	Wismar	143	8-9,000	59
28	"	Wurzburg	119	2,800	24
28	"	Ypres	277	12,220	44
28	"	Zurich	173	7399-8576	52
28	Early 16th Century	Genoa	724	37,788	52
8	16th Cent.	Antwerp	----	200,000	-----

TABLE 1A, MODERN CITIES (up to 1910)

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
28	1300-1850	Peking	----	2,550,000	-----
28	1650	London	----		
		(incl. suburbs)	----	10,000,000	-----
4	"	New York	----		
		(New Amsterdam)	----	1,000	-----
4	1650	Boston	----	2,000	-----
4	1660	New York	----	2,400	-----
4	"	Boston	----	3,000	-----
4	1680	New York	----	3,200	-----
4	"	Boston	----	4,500	-----
4	"	Newport	----	2,500	-----
4	1685	Philadelphia	----	2,500	-----
4	1690	New York	----	3,900	-----
4	"	Boston	----	7,000	-----
4	"	Newport	----	2,600	-----
4	"	Philadelphia	----	4,000	-----
4	"	Charlestown	----	1,100	-----
4	1700	London	6400	696,000	109
4	"	New York	----	5,000	-----
4	"	Boston	----	6,700	-----
4	"	Newport	----	2,600	-----
4	"	Philadelphia	----	5,000	-----
4	"	Charlestown	----	2,000	-----
4	1742	New York	----	11,000	-----
4	"	Boston	----	16,258	-----
4	"	Newport	----	6,200	-----
4	"	Philadelphia	----	13,000	-----
4	"	Charlestown	----	6,800	-----
36	1800	New York	----	79,216	-----
36	"	Philadelphia	----	41,000	-----
36	"	Detroit	----	1,000	-----
36	"	Baltimore	----	27,000	-----
36	"	Los Angeles	----	1,000	-----
36	"	Boston	----	25,000	-----
36	"	Pittsburgh	----	2,000	-----
36	"	Washington, D.C.	----	3,000	-----
17 & 36	"	Mexico	1252	130,000	103
36	"	Rio de Janeiro	----	43,000	-----
36	"	Santiago	----	45,000	-----
36	"	Montevideo	----	6,000	-----
36	"	Buenos Aires	----	40,000	-----
32 & 36	"	London (ex-			
		cluding suburbs)	7680	959,000	125
7	"	"	----	900,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1800	Birmingham	----	71,000	----
36	"	Glasgow	----	77,000	----
36	"	Liverpool	----	82,000	----
36	"	Manchester	----	77,000	----
36	"	Sheffield	----	46,000	----
36	"	Berlin	----	172,000	----
36	"	Hamburg	----	130,000	----
36	"	Cologne	----	50,000	----
36	"	Munich	----	30,000	----
36	"	Leipzig	----	40,000	----
36	"	Essen	----	4,000	----
36	"	Dresden	----	60,000	----
36	"	Breslau	----	60,000	----
36	"	Frankfurt	----	48,000	----
36	"	Paris	----	547,000	----
7	"	Paris	----	540,000	----
36	"	Marseilles	----	111,000	----
36	"	Lyons	----	110,000	----
36	"	Rome	----	153,000	----
36	"	Milan	----	170,000	----
36	"	Naples	----	350,000	----
7	"	"	----	400,000	----
36	"	Turin	----	78,000	----
36	"	Genoa	----	100,000	----
36	"	Amsterdam	----	201,000	----
36	"	Rotterdam	----	53,000	----
36	"	Stöckholm	----	76,000	----
36	"	Copenhagen	----	101,000	----
36	"	Barcelona	----	115,000	----
36	"	Madrid	----	160,000	----
36	"	Lisbon	----	180,000	----
36	"	Warsaw	----	100,000	----
36	"	Vienna	----	247,000	----
36	"	Prague	----	75,000	----
36	"	Budapest	----	54,000	----
36	"	Istanbul	----	600,000	----
36	"	Moscow	----	250,000	----
36	"	Leningrad	----	220,000	----
36	"	Odessa	----	6,000	----
36	"	Shanghai	----	300,000	----
36	"	Peiping	----	700,000	----
36	"	Tientsin	----	600,000	----
36	"	Canton	----	600,000	----
7	"	"	----	1,200,000	----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1800	Nanking	----	250,000	-----
7	"	Peking	----	1,500,000	-----
36	"	Hankow	----	550,000	-----
36	"	Chungking	----	200,000	-----
36	"	Hangchow	----	400,000	-----
7	"	Tokyo	-----	520,000	-----
36	"	"	----	800,000	-----
36	"	Osaka	----	350,000	-----
36	"	Kyoto	----	250,000	-----
36	"	"	----	400,000	-----
36	"	Calcutta	----	600,000	-----
36	"	Bombay	----	200,000	-----
36	"	Madras	----	300,000	-----
36	"	Cairo	----	300,000	-----
7	"	Constantinople	----	600,000	-----
36	"	Alexandria	----	20,000	-----
32	1818	Toronto	320	1200	4
20	1827	Havana	----	94,000	-----
12	1839	Tyre	----	3,000	-----
32	1842	Toronto	1280	20,000	16
36	1850	New York	----	696,000	-----
36	"	Chicago	----	30,000	-----
36	"	Philadelphia	----	121,000	-----
36	"	Detroit	----	21,000	-----
36	"	Los Angeles	----	2000	-----
36	"	St. Louis	----	78,000	-----
36	"	Cleveland	----	17,000	-----
36	"	Baltimore	----	169,000	-----
36	"	Boston	----	137,000	-----
36	"	Pittsburgh	----	68,000	-----
36	"	Washington, D.C.	----	40,000	-----
36	"	San Francisco	----	35,000	-----
36	"	Milwaukee	----	20,000	-----
36	"	Buffalo	----	42,000	-----
17	"	Mexico	1368	-----	-----
36	"	Rio de Janeiro	----	266,000	-----
36	"	Montevideo	----	34,000	-----
36	"	Buenos Aires	----	76,000	-----
36	"	London (exclud. suburbs)	----	2,363,000	-----
36	"	Birmingham	----	242,000	-----
36	"	Glasgow	----	329,000	-----

TABLE 1A, MODERN CITIES, CONT'D.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1850	Liverpool	----	397,000	-----
36	"	Manchester	----	336,000	-----
36	"	Sheffield	----	135,000	-----
36	"	Berlin	----	419,000	-----
36	"	Hamburg	----	132,000	-----
36	"	Cologne	----	97,000	-----
36	"	Munich	----	110,000	-----
36	"	Leipzig	4051	63,000	16
36	"	Essen	----	9,000	-----
36	"	Dresden	----	97,000	-----
36	"	Breslau	----	114,000	-----
36	"	Frankfurt	----	65,000	-----
19 & 36	"	Paris	8492	1,053,000	112
36	"	Marseilles	----	195,000	-----
36	"	Lyons	----	177,000	-----
36	"	Rome	----	175,000	-----
36	"	Milan	----	242,000	-----
36	"	Naples	----	449,000	-----
36	"	Turin	----	135,000	-----
36	"	Genoa	----	120,000	-----
36	"	Brussels	----	251,000	-----
36	"	Amsterdam	----	224,000	-----
36	"	Rotterdam	----	90,000	-----
36	"	Stockholm	----	93,000	-----
36	"	Copenhagen	----	129,000	-----
36	"	Barcelona	----	175,000	-----
36	"	Madrid	----	281,000	-----
36	"	Lisbon	----	240,000	-----
36	"	Warsaw	----	160,000	-----
36	"	Vienna	----	444,000	-----
36	"	Prague	----	118,000	-----
36	"	Budapest	----	178,000	-----
36	"	Bucharest	----	120,000	-----
36	"	Moscow	----	365,000	-----
36	"	Leningrad	----	485,000	-----
36	"	Kharkov	----	45,000	-----
36	"	Kiev	----	61,000	-----
36	"	Odessa	----	90,000	-----
36	"	Havana	----	200,000	-----
7	1851	London	----	2,300,000	-----
7	"	Paris	----	1,500,000	-----
7	"	New York	----	700,000	-----
7	"	Constantinople	----	700,000	-----
7	"	Peking	----	1,500,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
7	1851	Canton	----	1,300,000	-----
2	1861	Montreal	----	107,225	-----
2	"	Toronto	----	44,821	-----
2	1871	Montreal	----	107,225	-----
2	"	Toronto	----	56,992	-----
36	1880	New York	----	1,912,000	-----
19 & 36	"	Chicago	22,822	503,000	22
36	"	Philadelphia	----	847,000	-----
36	"	Detroit	----	116,000	-----
36	"	Los Angeles	----	11,000	-----
36	"	St. Louis	----	351,000	-----
36	"	Cleveland	----	160,000	-----
36	"	Baltimore	----	332,000	-----
36	"	Boston	----	363,000	-----
36	"	Pittsburgh	----	235,000	-----
36	"	Washington, D.C.	----	178,000	-----
36	"	San Francisco	----	234,000	-----
36	"	Milwaukee	----	116,000	-----
36	"	Buffalo	----	155,000	-----
36	"	Montreal	----	155,000	-----
36	"	Toronto	----	96,000	-----
36	"	Rio de Janeiro	----	275,000	-----
36	"	Sao Paulo	----	31,000	-----
36	"	Santiago	----	130,000	-----
36	"	Buenos Aires	----	236,000	-----
36	"	London (exclud. suburbs)	----	3,830,000	-----
36	"	Birmingham	----	437,000	-----
36	"	Glasgow	----	511,000	-----
36	"	Liverpool	----	624,000	-----
36	"	Manchester	----	462,000	-----
36	"	Sheffield	----	285,000	-----
36	"	Berlin	----	1,122,000	-----
36	"	Hamburg	----	290,000	-----
19 & 36	"	Cologne	1902	145,000	76
36	"	Munich	----	230,000	-----
36	"	Leipzig	----	145,000	-----
36	"	Essen	----	57,000	-----
36	"	Dresden	----	221,000	-----
36	"	Breslau	----	278,000	-----
36	"	Frankfurt	----	137,000	-----
36	"	Dortmund	----	67,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1880	Paris	19,271	2,269,000	118
36	"	Marseilles	-----	360,000	-----
36	"	Lyons	-----	377,000	-----
36	"	Rome	-----	300,000	-----
36	"	Milan	-----	322,000	-----
36	"	Naples	-----	494,000	-----
"	"	Turin	-----	254,000	-----
"	"	Genoa	-----	180,000	-----
"	"	Brussels	-----	421,000	-----
"	"	Amsterdam	-----	317,000	-----
"	"	Rotterdam	-----	148,000	-----
"	"	Stockholm	-----	169,000	-----
"	"	Copenhagen	-----	235,000	-----
"	"	Barcelona	-----	346,000	-----
"	"	Madrid	-----	398,000	-----
"	"	Lisbon	-----	187,000	-----
"	"	Warsaw	-----	252,000	-----
"	"	Lodz	-----	34,000	-----
"	"	Vienna	-----	726,000	-----
"	"	Prague	-----	162,000	-----
"	"	Budapest	-----	371,000	-----
"	"	Moscow	-----	612,000	-----
"	"	Leningrad	-----	877,000	-----
"	"	Odessa	-----	194,000	-----
"	"	Tashkent	-----	82,000	-----
"	"	Tyre	-----	5,000	-----
"	"	Calcutta	-----	612,000	-----
"	"	Bombay	-----	773,000	-----
"	"	Madras	-----	406,000	-----
"	"	Singapore	-----	139,000	-----
"	"	Cairo	-----	375,000	-----
"	"	Alexandria	-----	231,000	-----
"	"	Sydney	-----	225,000	-----
"	"	Melbourne	-----	283,000	-----
2	1881	Montreal	-----	140,747	-----
2	"	Toronto	-----	86,415	-----
32	1885	Toronto	5120-	120,000	23
2	"	Antwerp	-----	198,174	-----
"	"	Gand(Ghent)	-----	143,242	-----
"	"	Liege	-----	135,371	-----
"	"	Bruges	-----	46,274	-----
"	1886	Copenhagen	5120	234,850	46

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Index Number</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
2	1886	Athens	----	84,903	-----
"	"	Pireus	----	21,055	-----
"	"	Stockholm	8320	214,688	26
"	"	Constantinople	----	873,565	-----
"	"	Smyrna	----	150,000	-----
34	1890	London	74692	-----	56
"	"	Paris	19295	-----	127
"	"	Berlin	14661	-----	108
"	"	Liverpool	5210	-----	99
"	"	Manchester	12788	-----	39
"	"	Hamburg	18544	-----	31
"	"	Birmingham	8400	-----	51
"	"	New York	230,000	-----	13
"	"	Chicago	102,765	-----	11
"	"	Philadelphia	82,807	-----	13
"	"	Boston	24231	-----	18
"	"	Baltimore	18,867	-----	23
10	"	Allegheny	5096	105,287	21
"	"	Buffalo	24011	255,664	11
"	"	Chicago	102,765	1,099,850	11
"	"	Cincinnati	14,192	296,908	20
"	"	Cleveland	15,923	261,353	16
"	"	Denver	10,576	106,713	10
"	"	Detroit	13,173	205,876	16
"	"	Indianapolis	6965	105,436	15
"	"	Jersey City	8320	163,003	20
"	"	Kansas City	20,774	132,716	6
"	"	Louisville	7913	161,129	20
"	"	Milwaukee	10,880	204,468	19
"	"	Minneapolis	31,255	164,733	5
"	"	Newark	11,375	181,830	16
"	"	New Orleans	23,739	242,039	10
"	"	Omaha	15,680	140,452	9
"	"	Pittsburg	16,106	238,617	14
"	"	Providence	9277	132,146	14
"	"	Rochester	9493	133,896	13
"	"	St. Louis	36425	451,776	11
"	"	St. Paul	32,390	133,156	4
36	1900	New York	-----	3,437,000	-----
"	"	Chicago	111,712	1,699,000	15
"	"	Philadelphia	-----	1,294,000	-----
"	"	Detroit	-----	286,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Number Index</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1900	Los Angeles	-----	102,000	-----
"	"	St. Louis	-----	575,000	-----
"	"	Cleveland	-----	382,000	-----
"	"	Baltimore	-----	509,000	-----
"	"	Boston	-----	561,000	-----
"	"	Pittsburgh	-----	452,000	-----
"	"	Washington, D.C.	-----	279,000	-----
"	"	San Francisco	-----	343,000	-----
"	"	Milwaukee	-----	285,000	-----
"	"	Buffalo	-----	352,000	-----
"	"	Montreal	-----	268,000	-----
"	"	Toronto	-----	208,000	-----
" & 17	"	Mexico	244	345,000	143
"	"	Havana	-----	236,000	-----
"	"	Rio de Janeiro	-----	811,000	-----
"	"	Sao Paulo	-----	240,000	-----
"	"	Santiago	-----	292,000	-----
"	"	Montevideo	-----	303,000	-----
"	"	Buenos Aires	-----	821,000	-----
"	"	Rosario	-----	120,000	-----
"	"	London (exclud. suburbs)	-----	4,537,000	-----
"	"	Birmingham	-----	522,000	-----
"	"	Glasgow	-----	762,000	-----
"	"	Liverpool	-----	685,000	-----
"	"	Manchester	-----	544,000	-----
"	"	Sheffield	-----	381,000	-----
"	"	Berlin	-----	1,889,000	-----
"	"	Hamburg	-----	706,000	-----
"	"	Cologne	-----	373,000	-----
"	"	Munich	-----	500,000	-----
"	"	Leipzig	14,252	456,000	32
"	"	Essen	-----	119,000	-----
"	"	Dresden	-----	396,000	-----
"	"	Breslau	-----	423,000	-----
"	"	Frankfurt	-----	289,000	-----
"	"	Dortmund	-----	143,000	-----
"	"	Paris	-----	2,714,000	-----
"	"	Marseilles	-----	491,000	-----
"	"	Lyons	-----	459,000	-----
"	"	Rome	-----	423,000	-----
"	"	Milan	-----	539,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Number Index</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1900	Naples	-----	621,000	-----
"	"	Turin	-----	330,000	-----
"	"	Genoa	-----	378,000	-----
"	"	Brussels	-----	599,000	-----
"	"	Amsterdam	-----	511,000	-----
"	"	Rotterdam	-----	319,000	-----
"	"	Stockholm	-----	301,000	-----
"	"	Copenhagen	-----	401,000	-----
"	"	Barcelona	-----	533,000	-----
"	"	Madrid	-----	540,000	-----
"	"	Lisbon	-----	356,000	-----
"	"	Warsaw	-----	638,000	-----
"	"	Lodz	-----	315,000	-----
"	"	Vienna	-----	1,675,000	-----
"	"	Prague	-----	202,000	-----
"	"	Budapest	-----	732,000	-----
"	"	Bucharest	-----	276,000	-----
"	"	Istanbul	-----	1,106,000	-----
"	"	Moscow	-----	989,000	-----
"	"	Leningrad	-----	1,133,000	-----
"	"	Kharkov	-----	175,000	-----
"	"	Kiev	-----	247,000	-----
"	"	Odessa	-----	405,000	-----
"	"	Baku	-----	112,000	-----
"	"	Tashkent	-----	156,000	-----
"	"	Shanghai	-----	870,000	-----
"	"	Peiping	-----	1,000,000	-----
"	"	Tientsin	-----	750,000	-----
"	"	Canton	-----	900,000	-----
"	"	Nanking	-----	270,000	-----
"	"	Hankow	-----	870,000	-----
"	"	Chungking	-----	620,000	-----
"	"	Hangchow	-----	350,000	-----
"	"	Tokyo	-----	1,819,000	-----
"	"	Osaka	-----	996,000	-----
"	"	Nagoya	-----	285,000	-----
"	"	Kyoto	-----	381,000	-----
"	"	Kobe	-----	285,000	-----
"	"	Yokohama	-----	326,000	-----
"	"	Calcutta	-----	848,000	-----
"	"	Bombay	-----	776,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Number Index</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1900	Madras	-----	509,000	-----
"	"	Bangkok	-----	600,000	-----
"	"	Singapore	-----	228,000	-----
"	"	Cairo	-----	570,000	-----
"	"	Alexandria	-----	320,000	-----
"	"	Sydney	-----	482,000	-----
"	"	Melbourne	-----	496,000	-----
33	1910	New York	-----	4,769,000	-----
"	"	Chicago	118,464	2,185,283	18
"	"	Philadelphia	83,328	1,549,008	19
"	"	Detroit	26,112	465,766	18
"	"	Los Angeles	63,488	319,198	5
"	"	St. Louis	39,296	687,029	17
"	"	Cleveland	29,184	560,663	19
"	"	Baltimore	19,264	558,485	29
"	"	Boston	26,304	670,585	25
"	"	Pittsburgh	26,496	533,905	20
"	"	Washington, D.C.	38,400	331,069	9
"	"	San Francisco	-----	417,000	-----
"	"	Milwaukee	14,592	373,857	26
"	"	Buffalo	-----	424,000	-----
"	"	Providence	11,328	224,326	20
"	"	Rochester	12,864	218,149	17
"	"	Montreal	-----	491,000	-----
"	"	Toronto	-----	382,000	-----
" & 17	"	Mexico	3749	471,000	126
"	"	Havana	-----	297,000	-----
"	"	Rio de Janeiro	-----	858,000	-----
"	"	Sao Paulo	-----	400,000	-----
"	"	Santiago	-----	333,000	-----
"	"	Montevideo	-----	328,000	-----
"	"	Buenos Aires	-----	1,320,000	-----
"	"	Rosario	-----	176,000	-----
"	"	London (exclud. suburbs)	-----	4,522,000	-----
"	"	Birmingham	-----	842,000	-----
"	"	Glasgow	-----	1,029,000	-----
"	"	Liverpool	-----	756,000	-----
"	"	Manchester	-----	719,000	-----
"	"	Sheffield	-----	479,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Number Index</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1910	Berlin	----	3,730,000	-----
"	"	Hamburg	----	931,000	-----
"	"	Cologne	----	517,000	-----
"	"	Munich	----	596,000	-----
"	"	Leipzig	----	590,000	-----
"	"	Essen	----	295,000	-----
"	"	Dresden	----	548,000	-----
"	"	Breslau	----	512,000	-----
"	"	Frankfurt	----	415,000	-----
"	"	Dortmund	----	214,000	-----
"	"	Paris	----	2,936,000	-----
"	"	Marseilles	----	551,000	-----
"	"	Lyons	----	524,000	-----
"	"	Rome	----	520,000	-----
"	"	Milan	----	702,000	-----
"	"	Naples	----	751,000	-----
"	"	Turin	----	416,000	-----
"	"	Genoa	----	465,000	-----
"	"	Brussels	----	720,000	-----
"	"	Amsterdam	-----	566,000	-----
"	"	Rotterdam	----	418,000	-----
"	"	Stockholm	----	342,000	-----
"	"	Copenhagen	----	462,000	-----
"	"	Barcelona	----	560,000	-----
"	"	Madrid	----	572,000	-----
"	"	Lisbon	----	436,000	-----
"	"	Warsaw	----	864,000	-----
"	"	Lodz	----	404,000	-----
"	"	Vienna	----	2,301,000	-----
"	"	Prague	----	224,000	-----
"	"	Budapest	----	881,000	-----
"	"	Bucharest	----	338,000	-----
"	"	Istanbul	----	1,200,000	-----
"	"	Moscow	----	1,506,000	-----
"	"	Leningrad	----	1,911,000	-----
"	"	Kharkov	----	224,000	-----
"	"	Kiev	----	446,000	-----
"	"	Gorki	----	106,000	-----
"	"	Odessa	----	498,000	-----
"	"	Baku	----	218,000	-----
"	"	Tashkent	----	165,000	-----
"	"	Shanghai	-----	651,000	-----
"	"	Peiping	-----	693,000	-----

TABLE 1A, MODERN CITIES, Cont'd.

<u>Source Number Index</u>	<u>Date</u>	<u>City</u>	<u>Area (Acres)</u>	<u>Population</u>	<u>Density p/acre</u>
36	1910	Tientsin	-----	800,000	-----
"	"	Canton	-----	900,000	-----
"	"	Nanking	-----	267,000	-----
"	"	Hankow	-----	826,000	-----
"	"	Chungking	-----	598,000	-----
"	"	Wenchow	-----	100,000	-----
"	"	Hangchow	-----	350,000	-----
"	"	Tokyo	-----	2,186,000	-----
"	"	Osaka	-----	1,227,000	-----
"	"	Nagoya	-----	378,000	-----
"	"	Kyoto	-----	442,000	-----
"	"	Kobe	-----	378,000	-----
"	"	Yokohama	-----	394,000	-----
"	"	Calcutta	-----	896,000	-----
"	"	Bombay	-----	979,000	-----
"	"	Madras	-----	519,000	-----
"	"	Mukden	-----	158,000	-----
"	"	Bangkok	-----	629,000	-----
"	"	Singapore	-----	303,000	-----
"	"	Cairo	-----	654,000	-----
"	"	Alexandria	-----	332,000	-----
"	"	Sydney	-----	636,000	-----
"	"	Australia	-----	589,000	-----
1	1911	Birmingham	45,136	526,000	17
"	"	Liverpool	27,328	746,000	27
"	"	Manchester	27,264	714,000	26
"	"	Sheffield	39,616	455,000	11
"	"	Leeds	38,272	446,000	12
"	"	Bristol	26,368	357,000	14
"	"	Nottingham	16,192	260,000	16
"	"	Kingston	14,336	278,000	19
"	"	Bradford	25,536	288,000	11
"	"	Newcastle	11,072	267,000	24
"	"	Leicester	16,960	227,000	13
"	"	Stoke-on-Trent	21,184	235,000	11
"	"	Coventry	19,136	106,000	6
"	"	Glasgow	39,232	784,000	20
"	"	Edinburgh	31,140	320,000	10
"	"	Belfast	15,296	387,000	22

TABLE II-B, POPULATION DENSITY IN GEOGRAPHY
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Ancient	400-300 B.C.	Patauputra	India	Asia	72
"	800-625 "	Assur	Iraq	"	160
"	1700-700 "	Babylon	"	"	156
"	600-400 "	"	"	"	160
"	2000 B.C.	Khafaje	"	"	120-200
"	800 "	Nimrud	"	"	70
"	700 B.C.	Nineveh	"	"	72
"	4000 B.C.	Uruk	"	"	90
"	850-625 B.C.	Ur	"	"	160
"	960-722 B.C.	Jerusalem	Palestine	"	56
Medieval	1140	"	"	"	51
Medieval	1140	Aleppo	Syria	"	51
Ancient	4th-5th Cent.	Antioch	"	"	41
Medieval	1140	"	"	"	51
Ancient	106 A.D.	Aradus	"	"	96
"	"	Baalbek	"	"	60
"	"	Bostra	"	"	30
"	"	Damascus	"	"	59
"	300 B.C.	Dura-Europos	"	"	58
Medieval	1140	Edessa	"	"	51
"	"	Gaza	"	"	51
"	"	Hansa	"	"	47
"	"	Hebron	"	"	51
"	"	Hims	"	"	51
Ancient	3rd Cent.A.D.	Palmyra	"	"	61
"	106 A.D.	Sidon	"	"	74
Medieval	1140 A.D.	Tripoli	"	"	40
Ancient	44 B.C.	Tyre	"	"	108
"	Early 3rd Cent. A.D.	Aphrodisias	Turkey	"	34
"	2nd-3rd Cent. A.D.	Byzantium	"	"	71
"	306-377 A.D.	Constantinople	"	"	51
"	447 A.D.	"	"	"	50
"	4th-5th Cen.A.D.	"	"	"	49
"	Late 3rd A.D.	Cyzicus	"	"	61
"	300 B.C.	Ephesos	"	"	60
"	Late 3rd Cen. A.D.	Mitylene	"	"	60
"	"	Nicomedia	"	"	60
"	"	Pergamum	"	"	61
"	40 B.C.	Rhodes	"	"	59

TABLE II-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Ancient	700 B.C.	Smyrna	Turkey	Asia	61
"	3rd-5th Cent. A.D.	Thessalonica	"	"	61
Ancient	133 B.C.	Cartenna	Algeria	Africa	40
"	44 B.C.	Lambaesis	"	"	60
"	133 B.C.	Sitifis	"	"	40
"	44 B.C.	Thignica	"	"	40
"	1st Cen.A.D.	Timgad	"	"	67
"	"	Alexandria	Egypt	"	95
"	4th Cen. A.D.	"	"	"	77
"	Late 3rd Cen. A.D.	Antinoe	"	"	54
"	"	Arsinoe	"	"	40
"	"	Heracropolis- Magna	"	"	49
"	600 B.C.	Memphis	"	"	61
"	455 B.C.	Thebes	"	"	31
Medieval:	Late Middle Ages	Fez	Morocco (Fr.)	"	48
Ancient	44 B.C.	Volubius	"	"	40
"	133 B.C.	Bulla-Regis	Tunisia	"	35
"	3rd Cen. A.D.	Carthage	"	"	58
"	107 B.C.	Colonia Utinenses	"	"	40
"	44 B.C.	Hippo Regis	"	"	41
"	107 B.C.	Leptis Magna	"	"	40
"	44 B.C.	Pomaria	"	"	40
"	46-44 B.C.	Rusicade	"	"	39
"	133 B.C.	Thapsus	"	"	35
"	146-133 B.C.	Thugga	"	"	103
"	"	Thysdrus Col.	"	"	41
Medieval	14th Cen.A.D.	Tunis	"	"	12
Ancient	133 B.C.	Utica	"	"	40
"	107 B.C.	Vicus Augusti	"	"	40
Medieval	Late Middle Ages	Salzburg	Austria	Europe	49
"	1400	Augsburg	Bavaria	"	42
"	Late Middle Ages	Antwerp	Belgium	"	16
"	"	"	"	"	32
"	"	Bruges	"	"	23
"	15th Cent.	Brussels	"	"	17
"	Late 14th Cen.	Ghent	"	"	59
"	14th Cent.	Hague	"	"	23
"	Late Middle Ages	Liege	"	"	41

TABLE III-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Medieval	Late Middle Ages	Louvain	Belgium	Europe	11
Modern	1886	Copenhagen	Denmark	"	46
"	1890	Birmingham	England	"	51
"	1911	"	"	"	17
"	"	Bradford	"	"	11
"	"	Bristol	"	"	14
Medieval	1400	Canterbury	"	"	39
Modern	1911	Coventry	"	"	6
Medieval	14th Cent.	Hull	"	"	23
"	"	Kingston	"	"	19
"	14th Cent.	Leeds	"	"	12
"	Late Middle Ages	Leicester	"	"	28
Modern	1911	"	"	"	13
Medieval	14th Cent.	Lincoln	"	"	32
Modern	1890	Liverpool	"	"	99
"	1911	"	"	"	27
Medieval	11th Cent.	London	"	"	44
"	14th Cent.	"	"	"	49
Modern	1890	"	"	"	56
"	1890	Manchester	"	"	39
"	1911	"	"	"	26
"	"	Newcastle	"	"	24
Medieval	14th Cent.	New-Castle-on- Tyne	"	"	18
"	"	Nottingham	"	"	16
"	13th Cent.	Norwich	"	"	28
"	"	Sheffield	"	"	11
"	"	Stoke-on-Trent	"	"	11
Medieval	Late Middle Ages	Winchester	"	"	16
"	Late 1300's	York	"	"	52
"	Late Middle Ages	Aix	France	"	58
"	"	Albi	"	"	38
Ancient	1st Cent.A.D.	Autun	"	"	60
Medieval	1351	Avignon	"	"	41
"	Late Middle Ages	Beaune	"	"	34
"	12th Cent.	Begiers	"	"	39
"	"	Beziers	"	"	130

TABLE III-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Medieval	1297-1326	Bordeaux	France	Europe	63
"	1180-1223	Bourges	"	"	114
"	1359	Carcassone	"	"	82
"	13th Cent.	Die	"	"	30
"	Late Middle Ages	Dijon	"	"	32
"	1368	Embrun	"	"	20
"	14th Cent.	Grenoble	"	"	38
"	13th Cent.	Laon	"	"	68
"	14th Cent.	Lodeve	"	"	30
"	11th Cent.	Nimes	"	"	47
"	13th Cent.	Paris	"	"	277
Modern	1850	"	"	"	112
"	1880	"	"	Europe	118
"	1890	"	"	"	127
Medieval	1350	Rodez	"	"	74
"	1390-1400	Toulouse	"	"	50
"	1390-1400	Toulouse	"	"	42
"	Late Mid. Ages	Altenburg	Germany	"	47
"	"	Arnstadt	"	"	38
"	1400	Berlin	"	"	28
Modern	1890	"	"	"	108
"	"	"	"	"	"
Medieval	1330	Breslau	"	"	50
"	1150	Brunswick	"	"	56
"	Late Mid. Ages	Chemnitz	"	"	49
"	13th Cent.	Cologne	"	"	31
Modern	1880	"	"	"	76
Medieval	Late Mid. Ages	Dresden	"	"	27
"	"	Frankfurt-am- Main	"	"	32
"	"	Freiburg-in- Lichtland	"	"	24
"	"	Gorlitz	"	"	43
"	ca. 1250	Hamburg	"	"	44
Modern	1890	"	"	"	31
Medieval	13th Cent.	Heidelberg	"	"	58
"	12th Cent.	Leineburg	"	"	39
"	13th Cent.	Lepzig	"	"	20
Modern	1850	"	"	"	16
"	1900	"	"	"	32
Medieval	ca. 1217	Lubeck	"	"	68
"	13th Cent.	Mainz	"	"	20
"	"	Magdeburg	"	"	59
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TABLE III-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Medieval	14th Cent.	Mecklenberg	Germany	Europe	65
"	Late Mid. Ages	Meissen	"	"	39
"	"	Muhlhausen	"	"	54
"	1305	Northeim	"	"	49
"	13th Cent.	Nurnberg	"	"	59
"	14th Cent.	"	"	"	48
"	"	"	"	"	67
"	ca. 1200	Osnabruck	"	"	39
"	13th Cent.	Rostock	"	"	83
"	14th Cent.	Stadthagen	"	"	39
"	13th Cent.	Strasbourg	"	"	63
"	Late Mid. Ages	Stettin	"	"	59
"	18th Cent.	Trier	"	"	24
"	Late Mid. Ages	Ulm	"	"	11
"	"	Wismar	"	"	59
"	"	Wittenberg	"	"	38
"	"	Wurzburg	"	"	24
"	1277-1287	Zittau	"	"	50
Ancient	500 B.C.	Athens	Greece	"	33
"	2nd Cent.	"	"	"	77
"	600 B.C.	Corinth	"	"	42
"	2000 B.C.	Knosos	"	"	44
Modern	1911	Belfast	Ireland	"	22
Ancient	400-300 B.C.	Agrigent	Italy (Sicily)	"	72
"	25 B.C.	Aosta	Italy	"	150
Medieval	Late Mid. Ages	Bergamo	"	"	42
"	13th Cent.	Bologna	"	"	31
"	1400	"	"	"	31
"	13th Cent.	Florence	"	"	73
"	14th Cent.	"	"	"	43
"	"	"	"	"	29
"	13th Cent.	Lucca	"	"	78
"	1242	Mantua	"	"	72
"	Late Mid. Ages	Milan	"	"	67
"	"	Modena	"	"	45
"	"	Naples	"	"	49
"	14th Cent.	Padua	"	"	47
"	13th Cent.	Palermo	"	"	33
"	13th Cent.	"	"	"	101
"	ca. 1250	Parma	"	"	40
"	"	"	"	"	23
"	Late Mid. Ages	Perugia	"	"	66
"	"	Piacenza	"	"	29

TABLE III-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Medieval	13th Cent.	Pisa	Italy	Europe	53
"	1300-1400	"	"	"	46
"	"	"	"	"	35
"	14th Cent.	Pistoria	"	"	17
Ancient	79 A.D.	Pompeii	"	"	100
Medieval	Late Mid. Ages	Reggio Emilia	"	"	37
Ancient	74 A.D.	Rome	"	"	142
"	211 A.D.	"	"	"	77
"	4th Cent.	"	"	"	50
Medieval	13th Cent.	"	"	"	13
"	14th Cent.	Siena	"	"	67
"	Late Mid. Ages	Toulon	"	"	34
"	"	"	"	"	12
"	14th Cent.	Venice	"	"	96
"	1481-1488	Amsterdam	Netherlands	"	39
"	Late Mid. Ages	Haarlem	"	"	46
"	"	Ypres	"	"	44
"	14th Cent.	Danzig	Poland	"	46
Modern	1911	Edinburgh	Scotland	"	10
"	"	Glasgow	"	"	20
Medieval	632-950	Almeria	Spain	"	106
"	"	Badajoz	"	"	105
"	Late Mid. Ages	Barcelona	"	"	42
"	"	"	"	"	48
Ancient	133 B.C.	Carmona	"	"	69
"	"	Cartagena	"	"	50
Medieval	632-950	"	"	"	107
Ancient	133 B.C.	Cordoba	"	"	59
Medieval	632-950	Granada	"	"	108
Ancient	133 B.C.	Hispalis	"	"	65
Medieval	632-950	Jerez de la Frontera	"	"	101
Ancient	133 B.C.	Malaga	"	"	63
Medieval	632-950	"	"	"	110
"	"	Mallorca-Palma	"	"	148
"	"	Murcia	"	"	106
Ancient	133 B.C.	Pamplona	"	"	51
"	"	Salamanca	"	"	54
Medieval	632-950	Seville	"	"	92
Ancient	133 B.C.	Tarragona	"	"	61

TABLE III-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Medieval	632-950	Toledo	Spain	Europe	107
"	14th Cent.	Valencia	"	"	101
"	Late Mid. Ages	"	"	"	241
Ancient	133 B.C.	Zana Gosa	"	"	52
Medieval	632-950	"	"	"	103
Modern	1886	Stockholm	Sweden	"	26
Medieval	1400	Basel	Switzerland	"	41
"	Late Mid. Ages	Bern	"	"	56
"	1364	Geneva	"	"	57
"	Late Mid. Ages	Zurich	"	"	46
Modern	1818	Toronto	Canada	North Ame- rica	4
"	1842	"	"	"	16
"	1885	"	"	"	23
"	1890	Allegheny	U.S.A.	"	21
"	"	Baltimore	"	"	23
"	1910	"	"	"	29
"	1890	Boston	"	"	18
"	1910	"	"	"	25
"	1890	Buffalo	"	"	11
"	1880	Chicago	"	"	22
"	1890	"	"	"	11
"	1900	"	"	"	15
"	1910	"	"	"	18
"	1890	Cincinnati	"	"	20
"	"	Cleveland	"	"	16
"	1910	"	"	"	19
"	1890	Denver	"	"	10
"	"	Detroit	"	"	16
"	1910	"	"	"	18
"	1890	Indianapolis	"	"	15
"	"	Kansas City	"	"	6
"	1910	Los Angeles	"	"	5
"	1890	Louisville	"	"	20
"	"	Milwaukee	"	"	19
"	1910	"	"	"	26
"	1890	Minneapolis	"	"	5
"	"	Newark	"	"	16
"	"	New Orleans	"	"	10
"	1890	New York	"	"	13
"	1890	Omaha	"	"	9
"	"	Philadelphia	"	"	13
"	1910	"	"	"	19

TABLE III-B, POPULATION DENSITY IN GEOGRAPHY, Cont'd.
4000 B.C. to A.D. 1911

<u>Era</u>	<u>Date</u>	<u>City</u>	<u>Country</u>	<u>Continent</u>	<u>Density p/acre</u>
Modern	1890	Pittsburgh	U.S.A.	North Ame-	14
"	1910	"	"	rica	20
"	1890	Providence	"	"	14
"	1890	Rochester	"	"	13
"	1910	"	"	"	17
"	1890	St. Louis	"	"	11
"	1910	"	"	"	17
"	1890	St. Paul	"	"	4
"	1910	Washington, D.C.	"	"	9
Medieval	ca.1200-1441	Mayaran	Mexico	North Ame-	12
				rica	
Modern	1800	Mexico City	"	"	103
"	1900	"	"	"	143
"	1910	"	"	"	126
Medieval	1325	Tenochtitlan	"	"	30
Ancient	400-700 A.D.	Teotihuacan	"	"	120
Medieval	1300-mid 1600	Chan-Chan	Peru	South Ame-	36
				rica	

TABLE III-C, POPULATION DENSITY IN CIVILIZATION
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
4000 B.C.	Uruk	Ancient Oriental	90
2000 B.C.	Khafaje	"	120-200
1700-700 B.C.	Babylon	"	156
600-400 B.C.	Babylon	"	160
960-722 B.C.	Jerusalem	"	56
800 B.C.	Nimrud (Biblical Calah)	"	70
850-625 B.C.	Assur	"	160
"	Ur	"	160
700 B.C.	Niniveh	"	72
700 B.C.	"	"	16
406-300 B.C.	Pataliputra	"	72
2000 B.C.	Knosos	Greek	44
700 B.C.	Smyrna	"	61
600 B.C.	Corinth	"	42
"	Memphis	"	61
500 B.C.	Athens	"	33
455 B.C.	Thebes	"	31
408 B.C.	Rhodes	"	59
300 B.C.	Dura Europos	Roman	58
"	Ephesos	"	60
146-133 B.C.	Thugga	"	103
"	Thysdrus Col.	"	41
133 B.C.	Bulla-Regis	"	35
"	Cordoba	"	59
"	Carmona	"	69
"	Cartagenna	"	50
"	Cartenna	"	40
"	Hispalis	"	65
"	Malaga	"	63
"	Pamplona	"	51
"	Sitifis	"	40
"	Salamanca	"	54
"	Tarragona	"	61
"	Thapsus	"	35
"	Utica	"	40
"	Zaragosa	"	52
123 B.C.	Carthage	"	---
107 B.C.	Colonia Utinenses	"	40
"	Leptis Magna	"	40
"	Vicus Augusti	"	40
100 B.C.	Alexandria	"	308
46-44 B.C.	Cirta	"	225
"	Rusicade	"	39

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, Cont'd.
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
44 B.C.	Hippo Regis	Roman	41
"	Lambaesis	"	60
"	Thignica	"	40
"	Tyre	"	108
"	Pomaria	"	40
"	Volubilis	"	40
25 B.C.	Aosta	"	150
74 A.D.	Rome	"	142
79 A.D.	Pompeii	"	100
1st Century	Alexandria	"	95
"	Autun	"	60
"	Timgad	"	67
106 A.D.	Aradus	"	96
"	Baalbek	"	60
"	Bostra	"	30
"	Damascus	"	59
"	Sidon	"	74
2nd Century	Athens	"	77
211 A.D.	Rome	"	77
2nd-3rd Century	Byzantium	"	71
Early 3rd Century	Aphrodisias	"	34
3rd Century	Carthage	"	58
"	Palmyra	"	61
306-337 A.D.	Constantinople	"	51
Late 3rd Century	Arsinoe	"	40
"	Antinoe	"	54
"	Cyzicus	"	61
"	Heraclropolis Magna	"	49
"	Mitylene	"	60
"	Nicomedia	"	60
"	Pergamum	"	61
3rd - 5th Cent.	Thessalonica	"	61
4th Century	Alexandria	"	77
"	Rome	"	50
447 A.D.	Constantinople	"	50
4th-5th Cen.	Antioch	"	41
"	Constantinople	"	49
		Dark Ages	
632-950 A.D.	Almeria	Mohammedan	106
"	Badajoz	"	105

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, Cont'd.
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
632-950 A.D.	Cartagena	Dark Ages	107
"	Granada	Mohammedan	108
"	Jerez de la Fron- tera	"	101
"	Malaga	"	110
"	Mallorca-Palma	"	148
"	Murcia	"	106
"	Seville	"	92
"	Toledo	"	107
"	Valencia	"	101
"	Zaragossa	"	103
1140	Aleppo	The Crusades- Near Eastern	51
"	Antioch	"	51
"	Damascus	"	"
"	Edessa	"	"
"	Gaza	"	"
"	Hansa	"	47
"	Hebron	"	51
"	Hims	"	"
"	Jerusalem	"	"
"	Tripoli	"	40
11th Century	London	Middle Ages European	44
"	Nimes	"	47
1150	Brunswick	"	56
1180-1223	Bourges	"	114
12th Century	Begiers	"	39
"	Beziers	"	130
"	Leineburg	"	39
ca. 1200	Osnabruck	"	"
ca. 1217	Lubeck	"	68
1242	Mantua	"	72
ca. 1250	Hamburg	"	44
"	Parma	"	40
1277-1287	Zittau	"	50
1297-1326	Bordeaux	"	63
13th Century	Bologna	"	31
"	Cologne	"	"
"	Die	"	30
"	Florence	"	73

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, Cont'd.
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
13th Century	Heidelberg	Middle Ages European	58
"	Laon	"	68
"	Leipzig	"	20
"	Lucca	"	78
"	Maing	"	20
"	Magdeburg	"	59
"	Norwich	"	28
"	Nurnberg	"	59
"	Palermo	"	33
"	Paris	"	101
"	Pisa	"	277
"	Rome	"	53
"	Rostock	"	13
"	Strasbourg	"	83
"	Trier	"	63
"	Trier	"	24
1305	Northeim	"	49
1323	Wittenberg	"	38
1330	Breslau	"	50
1350	Rodez	"	74
1351	Avignon	"	41
1359	Carcassone	"	82
"	"	"	50
1364	Geneva	"	57
1368	Embrun	"	20
Late 1300's	York	"	52
1300-1400	Pisa	"	46
"	"	"	35
1390-1400	Toulouse	"	50
"	"	"	42
1400	Augsburg	"	42
"	Basel	"	41
"	Berlin	"	28
"	Bologna	"	31
"	Canterbury	"	39
14th Century	Florence	"	43
"	Grenoble	"	38
"	Hague	"	23
"	Hull	"	29
"	Lincoln	"	32
"	Lodeve	"	30
"	London	"	49

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, Cont'd.
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
		Middle Ages	
14th Century	Mechlenberg	European	65
"	New Castel-on-Tyne	"	18
"	Nurnberg	"	48
"	"	"	67
"	Padua	"	47
"	Pistoria	"	17
"	Siena	"	67
"	Stadthagen	"	39
"	Tunis	"	12
"	Valencia	"	38
"	Venice	"	96
Early 14th Cent.	Danzig	"	46
1441	Strasbourg	"	43
1481-1488	Amsterdam	"	39
Late 14th Cent.	Ghent	"	59
15th Cent.	Brussels	"	17
Mid-15th Cent.	Brussels	"	33
		Renaissance	
Late Middle Ages	Aix	European	58
"	Albi	"	38
"	Altenburg	"	47
"	Antwerp	"	16
"	"	"	32
"	Arnstadt	"	38
"	Barcelona	"	42
"	"	"	48
"	Beaune	"	34
"	Bergamo	"	42
"	Bern	"	56
"	Bruges	"	23
"	Chemnitz	"	49
"	Dijon	"	32
"	"	"	39
"	Dresden	"	27
"	Fez	"	48
"	Frankfurt-am-Main	"	32
"	Freiburg-in-Litchland	"	24
"	Gorlitz	"	43
"	"	"	60
"	Haarlem	"	46
"	Leicester	"	28
"	Liege	"	41
"	Louvain	"	11
"	Meissen	"	39
"	Milan	"	67
"	Modena	"	45

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, Cont'd.
4000 B.C. to A.D., 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
		Renaissance	
Late Middle Ages	Muhlhausen	European	54
"	Naples	"	49
"	Perugia	"	66
"	Piacenza	"	29
"	Reggioemilia	"	37
"	Salzburg	"	49
"	Stettin	"	59
"	Toulon	"	34
"	"	"	12
"	Ulm	"	11
"	Valencia	"	241
"	Winchester	"	16
"	Wismar	"	59
"	Wurzburg	"	24
"	Ypres	"	44
"	Zurich	"	46
400-700 A.D.	Teotihuacan	Pre-Columbian	120
ca. 1200-1441	Mayaran	"	12
1325	Tenochtitlan	"	30
1300-Mid.1600's	Chan-Chan	"	36
		Modern	
1880	Chicago	American	22
1890	Allegheny	"	21
"	Baltimore	"	23
"	Boston	"	18
"	Buffalo	"	11
"	Chicago	"	11
"	Cincinnati	"	20
"	Cleveland	"	16
"	Denver	"	10
"	Detroit	"	16
"	Indianapolis	"	15
"	Jersey City	"	20
"	Kansas City	"	6
"	Louisville	"	20
"	Milwaukee	"	19
"	Minneapolis	"	5
"	Newark	"	16
"	New York	"	13
"	New Orleans	"	10
"	Omaha	"	5

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, CONT'D.
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
1890	Philadelphia	Modern American	13
"	Pittsburgh	"	14
"	Providence	"	14
"	Rochester	"	13
"	St. Louis	"	11
"	St. Paul	"	4
1900	Chicago	"	15
1910	Baltimore	"	29
"	Boston	"	25
"	Chicago	"	18
"	Cleveland	"	19
"	Detroit	"	18
"	Los Angeles	"	5
"	Milwaukee	"	26
"	Philadelphia	"	19
"	Pittsburgh	"	20
"	Providence	"	20
"	Rochester	"	17
"	St. Louis	"	17
"	Washington, D.C.	"	9
1818	Toronto	Modern Canadian	4
1842	"	"	16
1885	"	"	23
1800	Leipzig	Modern European	125
1850	"	"	16
"	Paris	"	112
1880	Cologne	"	76
"	Paris	"	118
1886	Copenhagen	"	46
"	Stockholm	"	26
1890	Birmingham	"	51
"	London	"	56
"	Liverpool	"	99
"	Manchester	"	39
"	Berlin	"	101
"	Hamburg	"	31
"	Paris	"	127
1900	Leipzig	"	32
1911	Belfast	"	22
"	Birmingham	"	17
"	Bradford	"	11
"	Bristol	"	14

TABLE III-C, POPULATION DENSITY IN CIVILIZATION, Cont'd.
4000 B.C. to A.D. 1911

<u>Date</u>	<u>City</u>	<u>Epoch</u>	<u>Density p/acre</u>
1911	Coventry	Modern European	6
"	Edinburgh	"	10
"	Glasgow	"	20
"	Kingston	"	19
"	Leeds	"	12
"	Leicester	"	13
"	Liverpool	"	27
"	London	"	56
"	Manchester	"	26
"	Newcastle	"	24
"	Nottingham	"	16
"	Sheffield	"	11
"	Stoke-on-Trent	"	11
1800	Mexico	Modern Latin American	103
1900	"	"	143
1910	"	"	126

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INDEX

- (B) - Books
- (P) - Periodicals
- (A) - Articles and Essays in Collections
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FOOTNOTES

1. For more detailed explanation of methodology, see Appendix A.
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