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Orders of magnitude of the world's
urban population in history*

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Introduction

1. It is common knowledge that urban populations have never grown so large nor with such speed as in the modern epoch. But little precision can be given to this view unless the new magnitudes can be charted against urban population estimates for historic periods. Aside from their merely historic interest, historic estimates should also make it possible to say both when the new cycle in the transformation of the human habitat seriously gathered speed, and how much more urbanized the world has become as compared with other epochs of civilization. The timing of the onset of the modern urban revolution should also help in pinpointing more exactly the causes which may then have been at work to bring it under way. In the present paper it cannot be claimed that this question is satisfactorily resolved, but the attempt may stimulate efforts by others to bring the matter into sharper focus. It is noteworthy that few such attempts have been made up to the present.

2. One isolated instance has been found in which population estimates concerning human settlements of varied size encompass the space of millennia.^{1/} The source provides no clue as to how these estimates have been made, nor do they seem intended to provide more than a very rough scheme of reference. Taking 5,000 inhabitants as the lower size limit for settlements which can be regarded as "urban",^{2/} we can deduce the following course of events from the figures given (table 1).

^{1/} C.A. Doxiadis and J.G. Papaioannou, Ecumenopolis, the Inevitable City of the Future, Athens, 1974. Reference is made to the table provided on pp.400-401.

^{2/} Why 5,000 inhabitants might be taken as the somewhat arbitrary lower size limit for settlements to qualify as "urban" will be briefly discussed further on.

Table 1. Total population, population in settlements with 5,000 or more inhabitants, and percentage of the latter in total population, years 2500 BC to 1950 AD (population in millions), as estimated by Doxiadis and Papaioannou

<u>Year</u>	<u>Total population</u>	<u>Settlements of 5,000+</u>	<u>Percentage in such settlements</u>
2500 BC	101	3	3.1
2000 BC	110	4	3.8
1500 BC	120	4	3.4
1000 BC	132	3	2.3
500 BC	146	9	6.7
0 BC/AD	165	17	10.3
500 AD	195	13	6.7
1000 AD	245	28	13.5
1500 AD	395	30	8.3
1650 AD	545	30	5.9
1750 AD	728	33	4.8
1800 AD	906	56	6.2
1850 AD	1,160	110	9.5
1900 AD	1,610	290	18.0
1950 AD	2,493	783	31.4

3. If we take these figures literally, then the world's population was already more urbanized at the beginning of our era than by the year 1850, and about the year 1000 AD a level of urbanization was reached not to be surpassed until late in the nineteenth century. While not impossible, this suggested course of developments raises serious doubts.

4. Two studies have been found in which the world's urban population has been estimated back to the year 1800, in terms of settlements with at least 5,000 inhabitants, one by Davis and Hertz,^{3/} the other by Hoyt.^{4/} As will presently be shown, the estimate by Hoyt has probably been well pondered.

^{3/} Kingsley Davis and Hilda Hertz, tables calculated in an unpublished work and reproduced in Urbanization in Asia and the Far East (Philip M. Hauser, editor), UNESCO, Calcutta, 1957, pp.56-58.

^{4/} Homer Hoyt, "The growth of cities from 1800 to 1960 and forecasts to the year 2000", Land Economics, May 1963, vol.39 (Madison, Wisconsin, U.S.A.), p.170.

5. The estimate by Davis and Hertz was probably a result of compilations made for various dates, with evidence more plentiful for recent than for earlier dates, especially as regards the smaller urban settlements. This can be deduced as we compare the particular estimates for 1800, 1850, 1900 and 1950, each of which distinguish urban settlements of three different size categories (table 2).

Table 2. Population in settlements with 5,000 or more inhabitants, and in three size categories of settlements, 1800, 1850, 1900 and 1950 (population in millions), as estimated by Davis and Hertz

Year	All settlements, 5,000+	Settlements within size groups:		
		5,000- -19,999	20,000- -99,999	100,000+
1800	27.2	5.5	6.1	15.6
1850	74.9	24.5	22.9	27.5
1900	218.7	70.8	59.3	88.6
1950	716.7	214.5	188.5	313.7

6. If we accept these figures, the world's population in the year 1800, somewhat in excess of 900 million, would have been urbanized to the extent of 3.0 per cent only, no more than the urbanization level suggested by Doxiades and Papaioannou for as early as the year 2500 BC. But it can be plainly demonstrated that the estimates of Davis and Hertz are deficient for 1800 in respect of settlements smaller than 100,000, though the estimate for the 100,000+ group may be acceptable. When the figures at the end of each 50-year period are divided by those at the beginning of each period, the following ratios are obtained:

Period	<u>5,000-19,999</u>	<u>20,000-99,999</u>	<u>100,000+</u>
1800-1850	4.45	3.75	1.76
1850-1900	2.89	2.59	3.22
1900-1950	3.03	3.18	3.54

The sequence of ratios for the 100,000+ group appears plausible enough when it is considered that the emergence of numerous cities of such size accelerated in the second half of the nineteenth century, as is well

documented in other sources. But since "100,000 and more" is an open-ended group with no upper size limit, it is to be assumed that population in this group at all times grew significantly faster than that of the other two groups which have both an upper and a lower size limit. According to Davis and Hertz, this would indeed have been the case in 1850-1900 and 1900-1950, hence the detailed estimates for 1850, 1900 and 1950 are at least consistent with each other. But it is exceedingly implausible that population in the two lower size groups should have grown so very fast during 1800-1850 when growth in the 100,000+ group apparently was rather moderate. In relation to the several growth rates for 1850-1900 and 1900-1950, and the perhaps entirely acceptable 1800-1850 growth rate for the 100,000+ group, one can assume that the 1800-1850 growth rate in each of the two smaller size groups should have been of the order of 1.40 to 1.60, rather than the rates of 4.45 and 3.75 implied by Davis and Hertz.

7. Assuming the suggested rates of 1.40 to 1.60 for the smaller size groups, and working backward from the estimates for 1850, we now obtain these adjusted estimates for 1800 as compared with 1850 (in millions):

Year	All settlements, 5,000+	Settlements within size groups:		
		5,000- -19,999	20,000- -99,999	100,000+
1800	45.2-49.5	15.3-17.5	14.3-16.4	15.6
1850	74.9	24.5	22.9	27.5

Accordingly, the urban population of the world (settlements of 5,000+) could have totalled between 45 and 50 million in 1800, assuming that it was near 75 million in 1850 and that in other respects the Davis and Hertz estimates were more reliable. The estimate for 1800 might have to be still somewhat larger if it is also assumed that even for 1850 Davis and Hertz somewhat underestimated the population of small towns, which is at least possible.

8. By coincidence, the range of "45 to 50 million" for the world's urban population of 1800 has also been estimated by Hoyt in a later publication. The estimate by Hoyt should perhaps be taken rather

seriously since Hoyt undoubtedly extrapolated from the results of incomplete compilations by means of a mathematical rule. It is to be noted that Hoyt published this estimate in 1963, close on the heels of his 1962 publication in which the rank-size rule was used very extensively.^{5/}

9. United Nations estimates of the world's urban population made so far go back only to 1920.^{6/} For that year a world urban population of 360 million was estimated, and for the year 1930 a world figure of 450 million. By interpolation, the world's urban population may have totalled 400 million in the year 1925, a figure which we shall also use further on. As regards the United Nations estimates -- which are for "urban" population as variously defined in different countries -- note should be taken also of their close coincidence with the Davis and Hertz estimate -- settlements of 5,000 and more inhabitants -- for the year 1950. For that year, Davis and Hertz estimated 716.7 million, while the United Nations estimates, as most recently revised, total 716.8 million.

The lower size limit used to represent urban settlements

10. Currently there is a great diversity, from country to country, in the criteria used for statistical purposes to distinguish "urban" from "rural" localities.^{7/} It is not feasible to discuss here the numerous respects in which the definitions vary, the reasons for their diversity, and the consequences for resulting census totals or other estimates of urban population. At the present time, the very meaning and content of

^{5/} The 1963 publication in which the "45 to 50 million" estimate appears is the one quoted in footnote ^{4/}. The 1962 publication was Homer Hoyt, World Urbanization, Expanding Population in a Shrinking World, Urban Land Institute, Technical Bulletin 43, Washington, 1962.

^{6/} United Nations, Growth of the World's Urban and Rural Population, 1920 to 2000, ST/SOA/Ser.A/44, New York, 1969, p.48.

^{7/} United Nations, "Statistical definitions of urban population and their uses in applied demography", Demographic Yearbook 1972, New York, 1973.

urbanization is undergoing marked changes, new concepts have emerged which displace the earlier ones, and actual developments diverge between the countries of earlier industrialization and the presently less developed countries. In earlier times, urban settlements were on the whole more clearly set apart from the rest of the human habitat, especially in those times when cities had special charters and privileges, and when they were surrounded by walls and moats.

11. Despite this variation of modern conditions, as has already been noted the world total of estimates of "urban" population (as variously defined in each country) for the year 1950 coincides very closely with another estimate independently made for the world's population in settlements with 5,000 or more inhabitants. This is to say that there are probably some compensating overlaps. If all countries were to adopt a strictly uniform definition, namely 5,000 inhabitants within localities whose outer contours are defined by the same standards, the resulting "urban" population total will be somewhat larger than actually reported in some countries and at the same time somewhat smaller in other countries. The matter has been studied in further detail by Davis who showed that for the most part urban populations are being distinguished as those of settlements above a lower size limit varying from 2,000 to 10,000 inhabitants.^{8/}

12. In remote history, places deserving the description of "urban" probably evolved from previous villages in which several activities serving a number of functions were locally combined. The population estimates of urban paleontologists may be highly debatable, but on the whole those most ancient cities, already identified as such, are also believed to have had at least 5,000 inhabitants.^{9/}

13. It must be recognized that such a size criterion is strictly physical and geographical, referring as it does to a measurable number of people residing within the contours of a zone inhabited at some

^{8/} Kingsley Davis, World Urbanization 1950-1970, Volume II: Analysis of Trends, Relationships, and Development, Population Monograph Series, No.9, University of California, Berkeley, 1972.

^{9/} Gideon Sjoberg, The Preindustrial City, Glencoe, Illinois, U.S.A., 1960, pp.27-37.

measurable density. Probably more important for the history of culture is the sociological criterion of "urbanism" which manifests itself in multiple and co-ordinated social roles and economic functions and, at the same time, in the evolution of corresponding mental attitudes. The intensity of such features can vary from individual to individual irrespective of the place of residence: physically urban areas may well comprise population segments whose prevailing mentality is still rather rustic, while numerous inhabitants of villages and open countryside may already have absorbed a somewhat "urbane" culture. The sociological content of settlements with 5,000 or more inhabitants, as distinct from other settlements, no doubt varies from place to place and it must also have varied in the course of time.

14. Altogether, in historic times all the regional populations were smaller than they are now. Outside the urban places they also lived at a lower density. Communications over great distances were so rare that most people knew little about the more distant places. In the circumstances, the "urbane" as well as "urban" character of a small nearby city stood out in much sharper relief than does even a very large city in our time. An equal level of physical urbanization, in historic periods, could have represented a markedly greater degree of sociological differentiation. In the absence of measures of degrees of qualitative distinction, the present study can only consider the strictly physical aspect of urbanization.

The historic city population estimates of Chandler and Fox

15. The basic source for the present study are the population estimates for long lists of cities, ordered by size and compiled for various historic dates, recently published by Chandler and Fox.^{10/} These estimates have resulted from many years of systematic research covering all parts of the world, and most of history. Wherever possible, a list of at least 75 cities was brought together which, at the given date, were presumably larger than any other cities wherever they may have been

^{10/} Tertius Chandler and Gerald Fox, 3000 Years of Urban Growth, Academic Press, New York and London, 1974, with particular reference to the tabulations presented in pp.300-340 of that book.

situated. This new source of data, and the use of some suitable mathematical formula, now offers for the first time an opportunity to estimate the combined world's urban population (settlements of at least 5,000 inhabitants) over the course of numerous centuries.

16. The reliability of estimates obtained in this way will depend on two assumptions. First, the city estimates presented by Chandler and Fox themselves would have to be regarded as reliable. Secondly, the formula applied to derive the combined urban population will have to be considered as fully appropriate. Obviously, neither of these two conditions can be taken for granted.

17. The task of identifying, and estimating the sizes of, the 75 largest cities at any time in history, often based only on the scantest evidence, is formidable to say the least. Their chief merit consists in the systematic coverage achieved rather than in the accuracy of each individual estimate. Certainly there will be historic demographers who may take issue with a great many of the figures arrived at by Chandler and Fox. Errors committed in the individual instances will, of course, tend to be compensated to a considerable extent in the aggregate if there persists, throughout the work of Chandler and Fox, an almost equal likelihood of over-estimate and under-estimate. Certainly, these authors have made every effort to eliminate bias, as can be seen from their explanatory text, but it is less certain that they have been entirely successful. For instance, the undoubted rise of urbanization level in China under the Sung Dynasty (eleventh and twelfth centuries) fails to be reflected in the estimates for Chinese cities in that period. While there may be flaws in some of the data the fact remains that no other compilation, comparable to that of Chandler and Fox, is now in existence.

18. The Chandler and Fox series of city population estimates begins with the date of 1360 BC, presumably because for that date the first attainment of 100,000 was estimated for a city, Thebes in Egypt as the case happens to be. For those very early times, however, Chandler and Fox could bring together the estimates for rather few cities only. The first date where the estimates for at least 50 cities are assembled is

430 BC, then 44 cities in 200 BC, and numbers of cities fluctuating from 60 to 70 in 100, 361, 622 and 800 AD. Beginning with 900 AD the estimates are generally for 75 cities. Subsequent dates are the years 1000, 1100, then by half-century intervals up to 1800, and by quarter-century intervals since then. Exceptionally, for the year 1800 the list of cities extends to 536 items, presumably all the cities then in existence which then had at least 20,000 inhabitants; and for the year 1900 an even longer list of cities, namely 650, is provided, the smallest of which had 37,000 inhabitants. Use can be made of these long lists for 1800 and 1900 to check results obtained by a method when only the first 75 cities are included as will be shown further on. This check is significant because for most of history the 75 largest cities only are kept in evidence.

19. For each date the cities are ranked according to their presumable population size but, except for relatively recent dates, the lists also include numerous cities for which no population figure was provided. The resulting gaps can be safely interpolated since the present study is not concerned with each individual city but only with the aggregates of combined city population. It can also be noted that for many cities, in fact for most at some of the earlier dates, the given population figures are considerably rounded. Again, in the aggregate of estimates the rounding errors probably tend to compensate each other. However, in the method of estimation which will be described, some influence may be exerted by the rounding error in the smallest city for which a population figure is shown.

20. It remains to be examined how the Chandler and Fox estimates for the larger and middle-sized cities compare with those of Davis and Hertz.

21. First, with respect to the 100,000+ category, the following can be noted. Davis and Hertz estimated a combined population of 15.6 million in 1800, 27.5 million in 1850, 88.6 million in 1900 and 313.7 million in 1950. For 1800 and 1850, these estimates agree well with Chandler and Fox's, namely 15.2 million and 28.4 million. Chandler and Fox, however, explicitly estimate the populations of agglomerations, as determined by contours of dense settlement regardless of administrative boundaries,

whereas no such specification has been given for the Davis and Hertz estimates. This, no doubt, is the reason why, with the modern growth of suburbs, the Davis and Hertz estimate for 1900 (88.6 million for cities of 100,000+) falls short of the Chandler and Fox estimate (103.9 million for agglomerations of such size). Likewise, and no doubt for the same reason, the Davis and Hertz estimate for 1950 (313.7 million) falls short of the latest United Nations estimate for that date (392.0 million in agglomerations, including suburbs, of 100,000+). The fact to be noted is that for cities of 100,000+ the Davis and Hertz estimates for 1800 and 1850 can be taken quite seriously.

22. As concerns the 20,000-99,999 category, the comparison can be made only for the year 1800. Here, as has been suggested, Davis and Hertz fell far short, with an estimate of only 6.1 million (see the preceding text) which should be brought at least to the level of 14.3 to 16.4 million. The Chandler and Fox series, however, comes to a total of 18.3 million, hence perhaps an even larger adjustment should have been made. One is led to believe that the world's urban population (5,000+) in 1800 could have somewhat exceeded the combined figure of 50 million.

23. Since Davis and Hertz fell so far short, as regards the smaller cities, in 1800, one is led to suspect that they fell at least slightly short also in 1850. In that year, the world's urban population could have easily amounted to 80 million, as compared to the 74.9 million suggested by Davis and Hertz. Based on more recent and plentiful data, the accuracy of the Davis and Hertz estimate for 1900 need not be questioned at this point, in so far as most of the city suburbs -- not included in the Davis and Hertz estimates for the larger cities -- also constituted at least urban localities of 5,000+ inhabitants. Suburban entities smaller than these, yet part of larger agglomerations, may have been omitted, hence in 1900 also Davis and Hertz may still fall slightly short. But the roughness of many of the data which had to be included makes this perhaps too fine a consideration.

24. Tentatively, at this stage, we may put the world's urban population at 50 million in 1800, 80 million in 1850, 225 million in 1900 and 717 million in 1950. The development of other estimates, derived from

the long Chandler and Fox series, depends on the use of a mathematical method which will now be discussed briefly.

The rank-size rule

25. A model often referred to in studies of the population as distributed among localities of diverse size is the so-called "rank-size rule". The same rule is also said to have applications in astronomy, as regards the comparative frequency of stars of given orders of magnitude. It also resembles the principle of the Pareto Curve which finds applications in calculations of the distribution of incomes. According to the simplest form of this rule, when cities and other localities in a large area are listed in the order of their rank in size, the second city tends to be one-half the size of the first, the third city one-third that size, and so forth. In short, the size of each city tends to be in inverse proportion with its rank. This rule is commonly attributed to Zipf,^{11/} but has been widely debated and there is no agreement as to the reasons why so many observations tend to bear it out.^{12/} In particular, it is most commonly found that the size distribution of some of the largest cities can be quite irregular and that the law of inverse proportionality asserts itself increasingly and more clearly among smaller cities, or among localities of comparatively high rank orders.^{13/} The size

^{11/} G.K. Zipf, National Unity and Disunity. The Nation as a Biological Organism, Bloomington, Del., U.S.A., 1941.

^{12/} United Nations, The Determinants and Consequences of Population Trends, Vol.I, ST/SOA/Ser.A/50, New York, 1973, pp.215-217.

^{13/} The simple rank-size rule can be expressed by the formula

$$n_r = \frac{C}{r} ,$$

where n_r is the population of city n , r is its rank, and C is the population of the largest city. In this form, the rule has a number of convenient mathematical properties. Because of a typical deviance of size distribution among the largest cities, some modified formulas have also been suggested, such as

$$n_r = \frac{C (1 + \frac{n-1}{10})}{r}$$

(see J.C. Russell, Late Ancient and Medieval Population, The American Philosophical Society, Philadelphia, June 1958, p.69) This becomes equivalent to the simpler formula $n_r = \frac{C}{r}$ at the limit where n is unity.

However, different effects would result if in the above expression $(n - 1)$ were to be divided by some denominator other than the arbitrary 10.

distribution of the world's cities larger than 100,000 in 1950, 1960 and 1970 has been examined by Davis ^{14/} who found that except in the largest and smallest urban size groups the rule tended to be borne out well enough to justify the derivation of presumable numbers of localities, and the populations contained therein, in several size groups smaller than 100,000, incidentally bearing out that, despite variable national definitions, the world's combined "urban" population probably now differs little from that contained by localities of 5,000+.

26. The population of cities, ranked by size order, can be plotted on double logarithmic graph paper, with a horizontal scale representing the rank of each city, and a vertical scale representing its size. If the rank-size rule, in its simplest form, actually applies the graph of successive cities should follow precisely a diagonal descending at a 45-degree angle. The slope of such a graph can be considered as "unity slope", as it is measured by the tangent of the angle which, in the case of 45 degrees, is unity. A gentler slope, measured by the tangent, would be less than unity and a steeper slope more than unity. Actual observations however often tend to follow a curve with an initially gentle slope that steepens gradually as it proceeds to cities of smaller and smaller size, possibly tending towards "unity slope" at the limit.

27. This reasoning is illustrated in the attached figures 1, 2, 3 and 4, the first two drawn on the basis of the extensive Chandler and Fox data for 1800 and 1900, and the last two according to United Nations estimates for 1950 and 1975. In each figure, a diagonal is also drawn from the position of the largest city downward which represents exact "unity slope". What has just been said is borne out in the figures. Among the largest cities the distribution is somewhat irregular and the prevailing slope is comparatively gentle. Considerable regularity can be seen at least from the fiftieth city downward. The slope steepens progressively until it is almost, but never quite, parallel with the "unity slope" of the diagonal.

28. It needs be pointed out that these observations are for the world as a whole. Observations for individual countries, of course, can often be quite different.

^{14/} See footnote 8/.

Figure 1. Distribution of cities greater than 20,000 inhabitants according to size-rank and population size, using data of Chandler and Fox for 1800

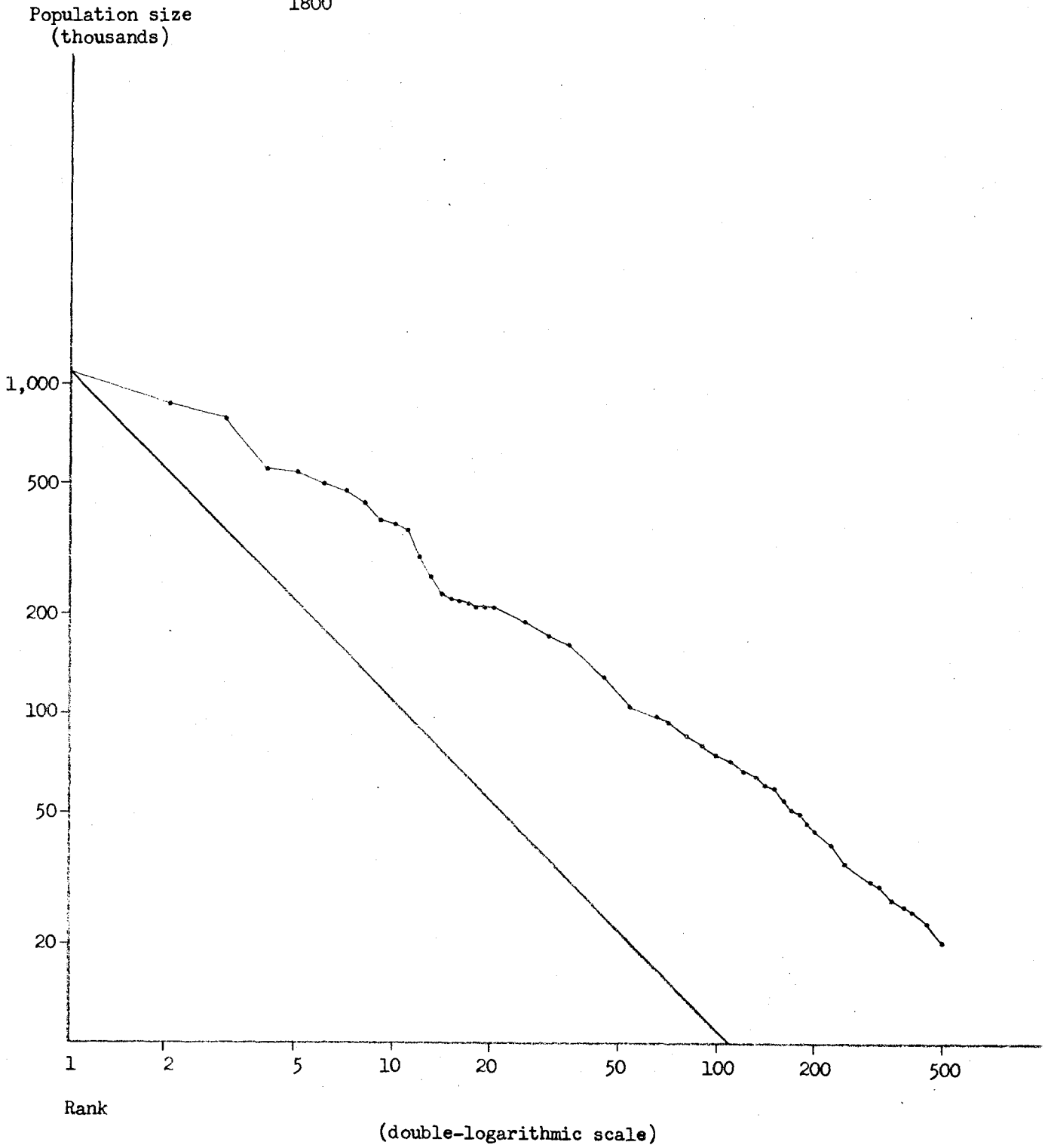


Figure 2. Distribution of cities greater than 37,000 inhabitants according to size-rank and population size, using data of Chandler and Fox for 1900

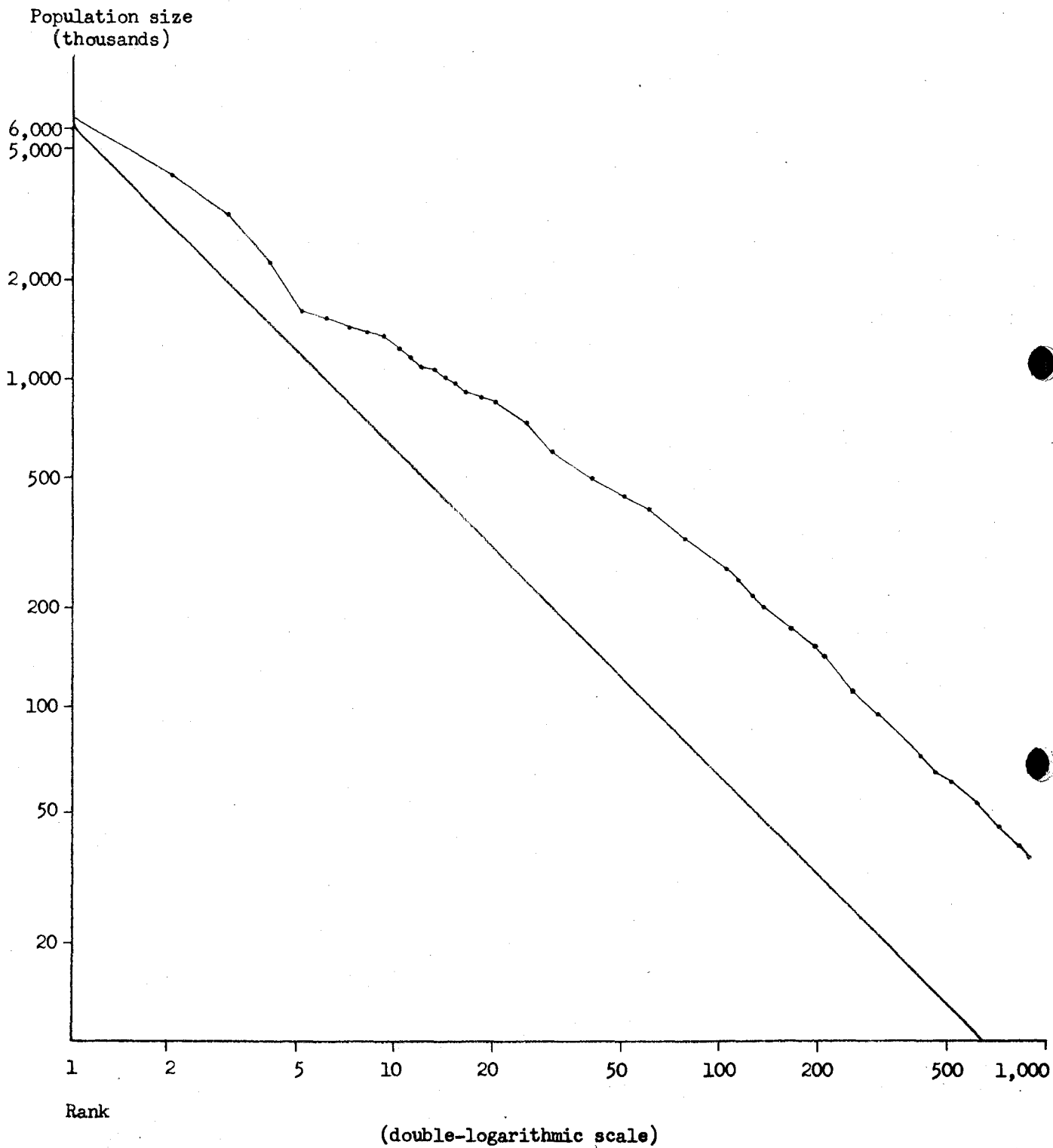


Figure 3. Distribution of cities greater than 100,000 inhabitants according to size-rank and population size, using estimates of the United Nations for 1950

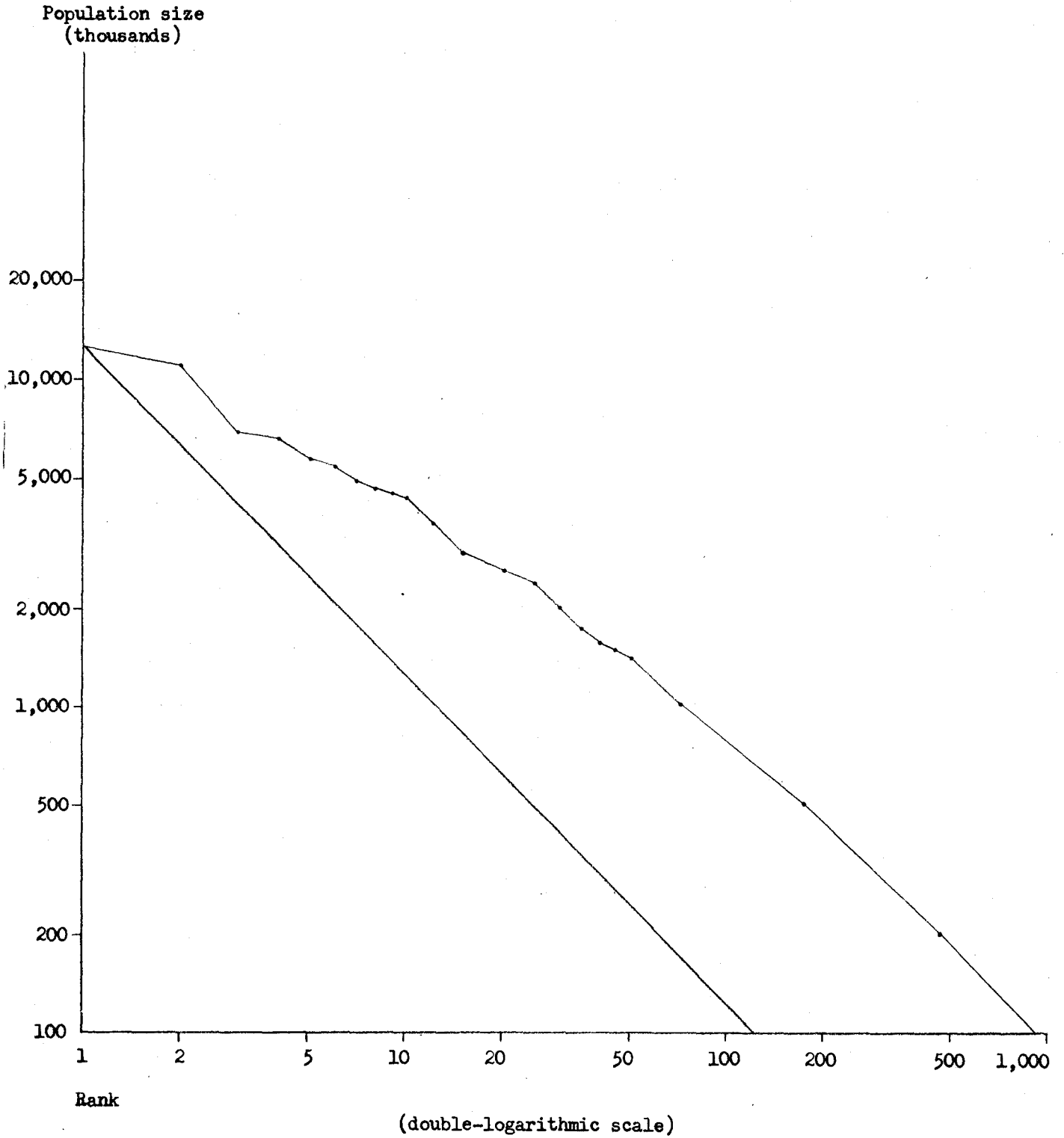
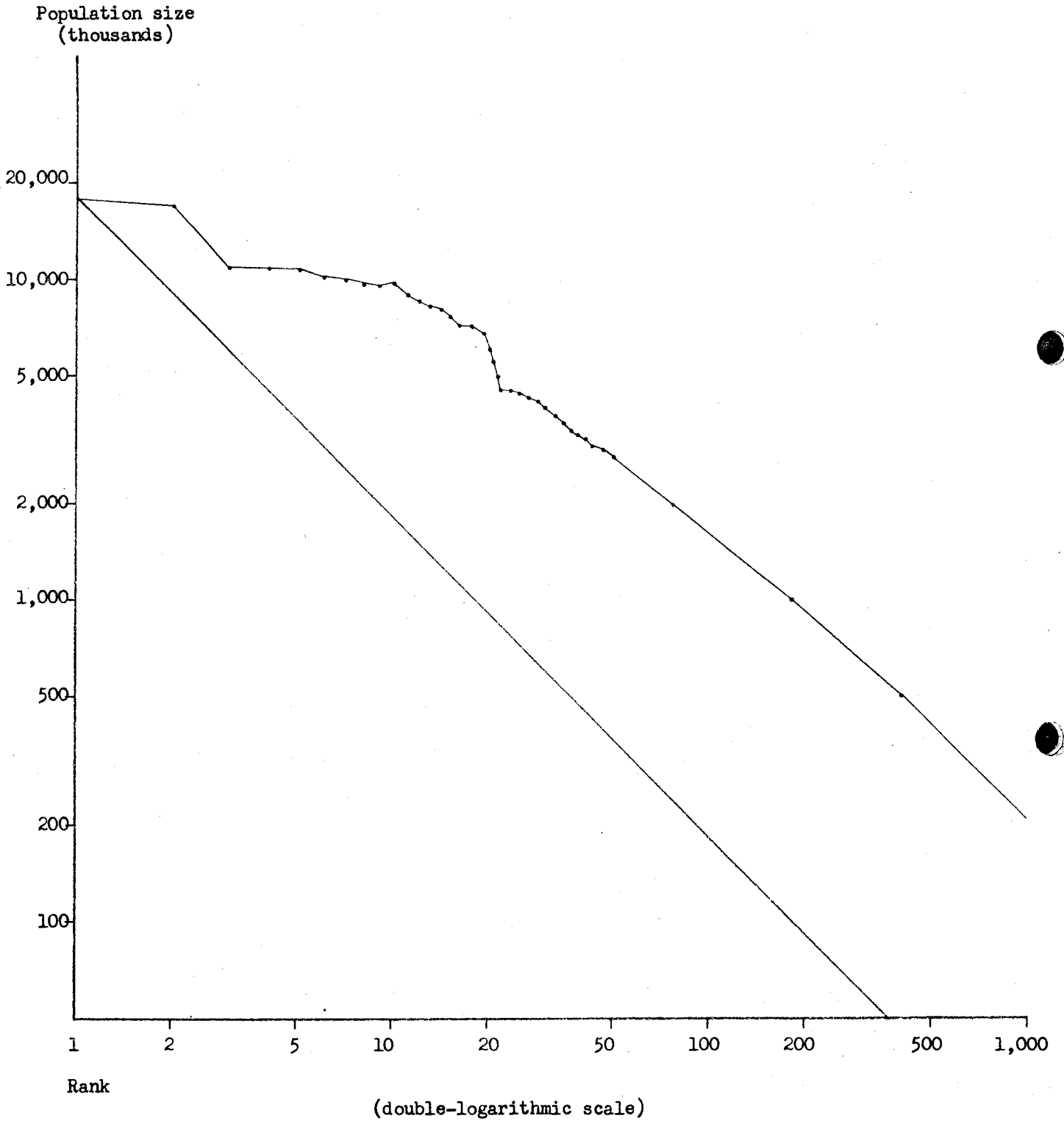


Figure 4. Distribution of cities greater than 200,000 inhabitants according to size-rank and population size, using estimates of the United Nations for 1975



29. One observation, important in the present context, can be made when the graphs of the four figures are compared with one another. In figure 1, which is for the year 1800, the slope is still markedly gentler than unity down to the smallest cities shown (altogether the data comprise 536 cities), but in figures 2, 3 and 4, which are for 1900 and more recent dates, the slope among the comparatively smaller cities is noticeably steeper. What emerges from these graphs, and especially figure 1, is that "unity slope" cannot be taken for granted where the size distribution of cities for the whole world is concerned, and though for comparatively small cities the slope probably steepens it can remain markedly less than unity for a large part of its range.

30. In what follows, most estimates of urban population (5,000+) will have to be derived from a list of the 75 presumably largest cities and, more in particular, from the population estimate given for the 75th city. For the first 75 cities, the combined population is obtained directly from the Chandler and Fox estimates (with interpolations where there are gaps). The population of all settlements smaller than the 75th, yet larger than the minimum size of 5,000 inhabitants, can vary in accordance with the slope which will have to be assumed.

31. If "unity slope" can be assumed, the population (in thousands) of all cities smaller than the smallest given yet larger than 5,000 is obtained as

$$nS (\log_e S - \log_e 5),$$

where S is the size of the smallest city shown (in thousands), n is the rank order of that city, usually 75 (though sometimes also a different figure), and 5 stands for the smallest urban settlement, assumed to have the minimum of 5,000 inhabitants.

32. If some other slope has to be assumed, the formula becomes more complicated, namely

$$\frac{nS}{1-r} \left[\left(\frac{S}{5} \right)^r - 1 \right]$$

where, in addition to the above specifications, r represents the slope, to be taken at some value smaller than unity.

33. The attempt has been made to calculate values of r as found among the largest cities (usually 75) for which city population estimates were actually provided, as a possible basis for speculating what the value of r might be among cities of smaller size. But as calculated from these samples of cities the apparent values of r fluctuated so widely as to prohibit any significant inference. This approach towards an estimation of the combined urban population, therefore, had to be abandoned. Judgement as to appropriate values for r , therefore, could be formed only on the basis of observations for 1800 and 1900, two dates for which Chandler and Fox provided much longer lists of cities ranked by population size.

Range of results obtainable by application of the rank-size rule to the city population estimates of Chandler and Fox

34. We are thus left free to assume any reasonable value for r , the slope of the size distribution, for cities smaller than those shown by Chandler and Fox. The cities shown, 75 or fewer at each date, are taken as given, and to the sum of their population will now be added an estimate for the combined population of all other urban settlements, of 5,000 or more inhabitants. Assembled in table 3 below are the population (in millions) of the group of cities shown and the estimates of the entire urban population which result from assuming r equal to 1.0, 0.9, 0.8 or 0.7. It will be seen that large differences can result from variations in the assumption of r , and that the relative range of differences widens as we come to more recent dates.

Table 3. Estimates of world's urban population, 430 BC to 1925 AD derived from varied assumptions of the slope of city size distribution

Year	Population of cities shown (millions)	Population of all settlements of 5,000+ with r variously assumed (millions)			
		r=1.0	r=0.9	r=0.8	r=0.7
430 BC	3.7	7.1	7.9	9.2	11.3
200 BC	4.3	7.3	8.0	9.1	11.0
100 AD	6.2	11.4	12.6	14.7	18.2
361 AD	5.0	10.3	11.7	13.8	17.4
622 AD	5.7	11.7	13.2	15.5	19.6
800	6.5	13.1	14.8	17.7	22.6
900	7.1	13.2	14.7	17.1	21.2
1000	7.0	13.2	14.7	17.1	21.3
1100	6.8	14.3	16.2	19.2	24.5
1150	6.8	15.2	17.4	21.0	27.4
1200	7.0	14.6	16.6	19.2	25.3
1250	7.0	14.3	16.2	19.2	24.4
1300	7.4	14.5	16.3	19.2	24.3
1350	7.4	14.8	16.7	19.7	25.0
1400	8.0	16.6	18.8	22.4	28.9
1450	8.4	17.1	19.4	23.0	29.6
1500	8.7	17.7	20.1	24.0	31.0
1550	9.6	20.1	23.1	27.8	36.4
1600	11.4	23.7	27.1	32.8	43.3
1650	12.7	23.9	27.1	32.1	41.4
1700	13.2	27.0	31.1	37.7	50.1
1750	13.4	28.8	33.4	40.9	55.2
1800 ^{a/}	16.0	35.2	41.2	51.2	70.5
1825	18.7	41.8	49.1	61.7	86.5
1850	25.4	57.8	68.8	88.1	127.3
1875	36.1	90.3	110.5	147.3	225.7
1900 ^{a/}	63.9	176.6	224.0	315.3	526.4
1925	104.0	301.3	392.1	574.8	1,023.3

^{a/} Based on 75 cities, though source also gives a longer list of cities.

Comparison of results obtained from limited and extensive data in 1800 and 1900

35. The foregoing figures for 1800 and 1900 have also been calculated from the data for the 75 largest cities only, the number of cities for which Chandler and Fox have provided data for most other historic dates. The same source, however, also provides a list of the 536 largest cities in 1800, and of the 850 largest in 1900. This makes it possible to compare the results derived from 75 cities with those derived from more extensive lists. In addition, independent estimates of the world's urban population have also been suggested after a critical examination of the estimates of Davis and Hertz, and of Hoyt also, for those two dates. The alternative estimates of the world's urban population (5,000+) are brought together below.

Year	Population of cities shown (millions)	Population of all settlements of 5,000+ with r variously assumed (millions)			
		r=1.0	r=0.9	r=0.8	r=0.7
<u>Derived from 75 largest cities only</u>					
1800	16.0	35.2	41.2	51.2	70.5
1900	63.9	176.6	224.0	315.3	526.4
<u>Derived from extended list of cities</u>					
1800	33.7	48.6	51.2	55.9	62.9
1900	133.3	196.2	211.6	235.4	264.8
<u>Independent estimates</u>					
1800	50.0	...	...	...	...
1900	225.0	...	...	...	...

36. Where the extended list of cities was used, only a smaller residual of urban population had to be estimated, hence the estimates from the extended list vary less than those from 75 cities only. But there is also the additional possibility that beyond the 75th city, the slope among additional cities within the extended list still is less steep than that among the residual cities beyond the extended list. For instance, the same figure of 51.2 million results in 1800 by assuming a constant slope of 0.8 from the 75th city downward, and likewise by

assuming a slope of 0.9 for additional cities beyond the extended list. While this may indeed have been the pattern of distribution in the year 1800 (assuming we can trust the data sufficiently), it does not follow that the same pattern is valid also for other moments of time. For instance, in 1900 even on the assumption of $r=0.9$ throughout the distribution beyond the 75th city, the estimate derived from 75 cities (224 million) exceeds that derived from the extended list (211.6 million).

37. This apparent shift in the pattern of city size distribution, between 1800 and 1900, makes it necessary to refer again to the independent estimates already suggested, namely about 50 million and 225 million. If estimates have to be derived on the basis of 75 cities only then, apparently, it is nearly correct to assume that $r=0.8$ in 1800 but that $r=0.9$ in 1900. This observation makes it uncertain what values of r should be assumed for other dates in history.

38. Reference can also be made to independent estimates of the world's urban population in 1850 (about 80 million) and in 1925 (about 400 million), as previously discussed. On the basis of 75 cities, the urban population in 1850 could have been 68.8 million if $r=0.9$, and 88.1 million if $r=0.8$, hence a correct value of r for the year 1850 could have been approximately 0.833. Noting that with constant r the apparent increase in the world's urban population would have accelerated very greatly between 1800-1825 and 1825-1850, a moderation in this acceleration could be consonant with r remaining near the value of 0.8 also in 1825, then increasing to 0.833 in 1850, perhaps about 0.867 in 1875 (result of interpolation), and about 0.9 in 1900. In 1925, according to the independent estimate, r could have remained at 0.9. The argument is speculative, but it does seem to bring out an important fact. A significant transition probably occurred, roughly between 1825 and 1900, in the pattern of size distribution among the world's urban settlements. If there was such a transition in the particular time period, what implications does this have for the choice of a value of r at historic dates earlier than 1800?

39. The era of 1825-1900 was indeed unique in numerous respects. Where the growth of cities, large and small, is concerned, factors of special relevance may have been the increasing organization of world-wide and long-distance trade, and the development of new transport vehicles using heavy power engines (steam) whose efficient operation required expensive installations. The effect may very well have been an alteration in the mutual relationships among cities of varied size, with heightened potentials for growth concentrated particularly in large and very large cities. Such developments, quite conceivably, may explain the apparent shift of r from 0.8 to an eventual 0.9. This line of reasoning suggests that the slope of the distribution at dates earlier than 1800 should have been nearer 0.8 than 0.9, long-distance trade and transport, in earlier times, having used cheaper vehicles which had more limited geographic scope. Smaller towns and cities, then, may have had a degree of relative local and regional importance, not overshadowed to quite such an extent by the influence of larger but more distant cities. Comparative stabilization of r near a value of 0.9 since 1900 is also plausible owing to the more extensive use of additional transport vehicles requiring less heavy equipment (combustion engines, electricity).

40. It should be recognized, nevertheless, that the precise value of r could have fluctuated considerably in the course of the world's history. There were times which saw the emergence of large empires with effective centralized controls that could have raised the prominence of comparatively few rather large cities at the expense of comparative stagnation in smaller regional centres. There were other times when the world's political map was fragmented by numerous smaller kingdoms and republics, and even within these minor provinces could have maintained a degree of autonomy which further disrupted the unity of the economic space. At such times there could have been a relative preponderance of numerous locally significant yet comparatively small cities. When all the historic knowledge is brought together it may become possible to suggest that a larger value of r could have been appropriate in certain epochs, and a smaller value in certain other epochs. Taking the world as a whole, however, it remains possible that

increases in the degrees of urban centralization in some regions were sometimes balanced by more dispersed developments in some other regions, hence for the world as a whole the hypothetical fluctuations in the value of r may not have been so wide.

41. It cannot be pretended that all the relevant historic knowledge, bearing on this particular point, is now available to us. We are therefore reduced to making the rather arbitrary assumption that r at all times equalled 0.8 until 1825, that it then shifted progressively to attain 0.9 in 1900, and that it may have remained at the latter magnitude since 1900. The resulting estimates, however, will have to be assigned varying margins of error, and their relative size will have to be more considerable in earlier epochs, for which the underlying city population estimates are more questionable, than in the more recent centuries. The assumption of error margins, in its turn, is also quite arbitrary.

Suggested estimates of world's urban population, 430 BC to 1925

42. Table 4 which follows shows assumed values of r for each date, the corresponding "medium" estimate of the world's urban population (millions), the assumed percentage margins of error (plus and minus), and the corresponding "low" and "high" estimates of urban population.

Table 4. World's urban population (millions), 430 BC to 1925 AD, estimated with a particular assumption as to the slope of city size distribution, and within assumed margins of error

Year	Assumed r	"medium" estimate	% error (+ or -)	Limiting estimates	
				"low"	"high"
430 BC	0.8	9.2	20	7.4	11.0
200 BC	0.8	9.1	20	7.3	10.9
100 AD	0.8	14.7	15	12.5	16.9
361 AD	0.8	13.8	15	11.7	15.9
622 AD	0.8	15.5	15	13.2	17.8
800	0.8	17.7	15	15.0	20.4
900	0.8	17.1	15	14.5	19.7
1000	0.8	17.1	15	14.5	19.7
1100	0.8	19.2	15	15.4	23.0
1150	0.8	21.0	15	17.8	24.2
1200	0.8	19.2	15	16.3	22.1
1250	0.8	19.2	15	16.3	22.1
1300	0.8	19.2	15	16.3	22.1
1350	0.8	19.7	14	16.9	22.5
1400	0.8	22.4	13	19.5	25.3
1450	0.8	23.0	12	20.2	25.8
1500	0.8	24.0	11	21.4	26.6
1550	0.8	27.8	10	25.0	30.6
1600	0.8	32.8	9	29.8	35.8
1650	0.8	32.1	8	29.5	34.7
1700	0.8	37.7	7	35.1	40.3
1750	0.8	40.9	6	38.4	43.4
1800	0.8	51.2	5	48.6	53.8
1825	0.8	61.7	4.5	58.9	64.5
1850	0.8333	80.3	4	77.1	83.5
1875	0.8667	120.3	3.5	116.1	124.5
1900	0.9	224.0	3	217.3	230.7
1925	0.9	392.1	2.5	382.3	401.9

43. This series of estimates suggests that the world's urban population could have exceeded 10 million near the beginning of the Christian Era, if not even a few centuries before. It could have reached 20 million at any time between the years 800 and 1450, 30 million at some time between 1550 and 1700, 40 million at some time in the course of the eighteenth century, and about 50 million by the year 1800. By 1875, these 50 million could have doubled to more than 100 million, and between 1875 and 1900 the world's urban population could have doubled again. At the beginning of our century it continued to grow with great speed.

Historic estimates of the world's total population

44. A historic series of the world's total population has been put together by Durand making use of two sources: one by Carr-Saunders and another by Clark.^{15/}

45. The most detailed series of historic estimates of total population is that by Clark. Durand however, also publishing in 1967, arrived at the conclusion that at least in a period beginning with the year 1750 there has been a tendency to under-estimate somewhat and that the population estimates for 1750, 1800, 1850 and 1900 should be accordingly increased. In 1974, Durand extended this judgment also to a much longer time series, beginning with the Christian Era, but the actual figures he suggested to replace estimates previously made were confined only to the year 0 AD and the years 1000, 1500, 1750 and 1900. An earlier series of world population estimates beginning with the year 1650 had been made by Carr-Saunders, which can be reconciled with Durand's series (of 1967) when the figures for 1650 are pro-rated upward by the ratio of the two figures for the year 1750. The Durand series beginning with the year 0 AD is expressed by ranges rather than definitive figures, narrower perhaps than ranges of likely errors. Durand describes them as "indifference ranges" so defined that it cannot be determined whether the lower or the upper figure shown is the "most likely". These "indifference ranges" are relatively narrower in recent periods, for which there is more definitive information, than in earlier periods for which there is much uncertainty.

46. A comparison of the Durand series with the Clark series for combined world totals indicates that at those dates which both series have in common, Clark's estimate is always near the lower limit of Durand's

^{15/} John D. Durand, Historical Estimates of World Population: An Evaluation, University of Pennsylvania Population Studies Center, Philadelphia, 1974; John D. Durand, "The modern expansion of world population", Proceedings of the American Philosophical Society, vol. lll, no. 3, June 1967; A.M. Carr-Saunders, World Population: Past Growth and Present Trends, Oxford, 1936; and Colin Clark, Population Growth and Land Use, St. Martin's Press, New York, 1967, especially p. 64.

"indifference range". The implicit conclusion seems to be that Clark, as perhaps also various other historic demographers, could have had some bias towards under-estimation, possibly owing to hesitations not to go too far beyond available evidence. There remains, however, some likelihood that additional population groups could have existed who escaped all records of tax collection, household registration, and so forth, that is groups who lived in such fashion that evidence of their existence has been entirely lost. It would seem fair, therefore, to accept Clark's figures as the "low" estimates, and to add an "indifference range" of a width similar as suggested by Durand to arrive at corresponding "high" estimates. Moreover, because of considerable uncertainty, it is preferable to express corresponding estimates only in rather rounded figures. It is in this way that use has been made of the Clark series up to 1600, of figures by Carr-Saunders for 1650 and 1700 pro-rated to agree with Durand in 1750, and of the Durand series from 1750 to 1950. For 1825 and 1875, estimates have been interpolated, for 1925 there is an estimate of the United Nations, and for 1950 the United Nations estimate is consistent with Durand.

47. In a few instances, the Clark series does not coincide with the exact dates for which estimates of urban population have been deduced from the Chandler and Fox data. In three cases, the years 361, 622 and 1350 used by Chandler and Fox, it will be simply assumed that Clark's world population estimates for 350, 600 and 1340 remain unaffected by the time difference. Clark, however, provided no figure between 0 AD and the year 350, while for present purposes an estimate of world total population for the year 100 AD is also needed. It is known that during the first century of our Era population grew considerably at least within the confines of the Roman Empire; accordingly, it is assumed that the world estimate for 0 AD should be raised by about five per cent.

48. While, in the course of time, population has increased, the accuracy of our knowledge concerning it also improves, hence relative error margins diminish as we proceed to more recent dates. For simplicity, the "indifference range" was maintained in a constant width

of 100 million for all dates from the year 1200 onward, an absolute range which has continued to be appropriate also to the much improved knowledge of current world population. With the increase in both population and the knowledge concerning it the absolute size of the error range may in fact be kept nearly constant.

World urbanization levels, years 100 AD to 1950

49. In table 5 below, the "indifference ranges" concerning total world population have been combined with the "medium" estimates of the world's urban population to yield percentages of urban in total population. A "high" estimate of total population yields a "low" percentage, and vice versa. For general guidance, a "medium" percentage is also provided.

Table 5. Estimates of world's total and urban population, 100 to 1950 AD, and percentage of urban in total population at each date

Year	Total population (millions)		Urban population (millions)	Percentage of urban in total population		
	"High"	"Low"	"Medium" estimate	"Low"	"High"	"Medium"
100 AD	350	280	14.7	4.2	5.2	4.7
361 AD	315	250	13.8	4.4	5.5	5.0
622 AD	300	235	15.5	5.2	6.6	5.9
1000	350	280	17.1	4.9	6.1	5.5
1200	485	385	19.2	4.0	5.0	4.5
1350	475	375	19.7	4.1	5.3	4.7
1500	525	425	24.0	4.6	5.6	5.1
1600	600	500	32.8	5.5	6.6	6.0
1650	650	550	32.1	4.9	5.8	5.4
1700	750	650	37.7	5.0	5.8	5.4
1750	850	750	40.9	4.8	5.5	5.1
1800	1025	925	51.2	5.0	5.5	5.3
1825	1150	1050	61.7	5.4	5.9	5.6
1850	1300	1200	80.3	6.2	6.7	6.4
1875	1475	1375	110.5	7.5	8.0	7.8
1900	1700	1600	224.0	13.2	14.0	13.6
1925	2025	1925	400.0 a/	19.8	20.8	20.3
1950	2550	2450	715.0 a/	28.0	29.2	28.6

a/ United Nations estimate.

50. If we accept these estimates uncritically, we arrive at the somewhat disturbing view that ever since the beginning of the Christian Era and up to the year 1800 the world's urbanization level could have fluctuated around 5 per cent within a rather narrow range (see the last column in the above table), and that previous urbanization levels were not decisively surpassed until the second quarter of the nineteenth century. From what we know of the historic rises and falls of empires, and of the geographic expansion of city-oriented civilizations, this is somewhat contrary to our intuitive expectations. But there is no proof that this is false. Declines of big cities, in certain epochs, could have been compensated by the growth of more numerous smaller cities. And while urban populations were growing, the rise of urban cultures could also have been paralleled by simultaneous rural developments which favoured a corresponding growth in the rural population. Growing rural populations, in their turn, could have furnished the means of subsistence for growing cities.

51. From the aforesaid it should also be abundantly clear that these estimates have to be viewed with great caution. Perhaps a tendency to under-estimate the total population in earlier epochs still persists among the historians. Perhaps Chandler and Fox have over-estimated some of the earlier population sizes of historic cities. Perhaps, contrary to the reasoning given here concerning the rank-size rule, a steeper slope for the distribution of smaller cities could have been appropriate to estimate the combined urban population (5,000+) for some of the earlier dates. Several components of the summary estimates presented here could have been variously biased.

52. Nevertheless, the present exercise does seem to suggest that throughout eighteen centuries of our Era rather little change occurred in the level of world urbanization. In fact, between the years 1600 and 1750 the level of urbanization could even have decreased. Historians have perhaps given insufficient attention to the possibility that rural settlement, thanks to government and business organization, could have expanded significantly at certain times in concurrence with the growth of cities. Though most of humanity throughout history inhabited rural settlements, the historic facts on record are mostly those pertaining to cities. Knowledge of the history of rural settlement has remained scant.

53. Should it be true, on the whole, that the world's urbanization changed so little over such a long period of time, the upsurge of urbanization levels which began early in the nineteenth century is all the more remarkable.

Asia and Europe, years 1000 to 1975

54. Urbanization probably began more than 4000 years ago in the region of present-day Iraq. From there it spread at first to other ancient centres of river civilization, on the Nile, the Indus and the Yellow River of China. Urban cultures eventually came to encompass the globe, but at all times the bulk of the world's urban population has been shared by Asia and Europe. Table 6 shows the distribution, at any time, of the world's 25 largest cities among five world areas. For historic reasons, Europe is here defined to include present-day Turkey and the Soviet Union.

55. It will be noted that most of the world's comparatively large cities were situated in South Asia until the tenth century AD. Another long period followed, from the year 1000 until about 1825, when comparatively large cities were particularly numerous in East Asia, namely in China, Japan and Korea. From 1850 to 1950 the concentration of the world's largest cities was especially noteworthy in Europe, but eventually very large cities emerged rapidly also in North and South America, rivalling and most recently even overtaking those of Europe. Quite recently also, large-scale urbanization again became prominent in Asia. In historic periods, Northern Africa had a number of comparatively major urban centres. At the present moment urbanization proceeds most rapidly in Africa but not many African cities, so far, have attained a very large size.

Table 6. Distribution of world's 25 largest cities among five areas of the world, 430 BC to 1975 AD

Year	World total	South Asia <u>a/</u>	East Asia <u>b/</u>	Europe <u>c/</u>	Africa	Americas
430 BC	25	11	8	4	2	0
200 BC	25	13	7	2	3	0
100 AD	25	15	4	3	3	0
361 AD	25	13	4	4	3	1
622 AD	25	17	5	1	1	1
800	25	12	9	2	2	0
900	25	12	9	2	2	0
1000	25	7	10	4	4	0
1100	25	8	9	3	5	0
1150	25	8	9	3	5	0
1200	25	7	10	4	4	0
1250	25	5	10	6	4	0
1300	25	6	10	6	3	0
1350	25	10	9	3	3	0
1400	25	7	8	8	2	0
1450	25	7	9	8	1	0
1500	25	8	9	6	2	0
1550	25	8	9	8	0	0
1600	25	5	10	8	2	0
1650	25	10	9	5	1	0
1700	25	5	10	8	2	0
1750	25	5	11	8	1	0
1800	25	4	11	9	1	0
1825	25	4	11	9	1	0
1850	25	4	8	11	0	2
1875	25	4	3	13	1	4
1900	25	2	4	12	0	5
1925	25	2	3	13	0	7
1950 <u>d/</u>	25	2	3	10	1	9
1975 <u>d/</u>	25	7	5	5	1	7

- a/ Asia other than China, Japan, Korea, the Soviet Union and Turkey.
b/ China, Japan and Korea.
c/ Including the Soviet Union and Turkey.
d/ Estimates of the United Nations.

56. Viewed in this perspective, it is clear that the modern upsurge of urbanization, now world-wide, went under way, first of all, in Europe. With interpolations, too tedious to reproduce, it can be calculated that about the year 1890 more than one-half of the world's entire urban population was situated in Europe even without Russia and Turkey. During that period of European ascendancy a world view prevailed which, in particular, differentiated between Europe and Asia, though it must be recognized that Asia is much larger and culturally much more diverse. But Europe's leadership in world urbanization has been a passing phase. Not only has Europe already been overtaken in the sizes and numbers of cities, but various other things have happened as the present century unfolded, so that a world view still favoured at its beginning has already lost most of its previous relevance. Nevertheless the contrasting developments, as between Asia and Europe, remain of historic interest.

57. Chandler and Fox provide separate tables of historic cities for each of the traditional continents,^{16/} and the lists of cities are long enough for Asia and Europe to warrant the use of the rank-size rule in the manner already explained. Again, use was made as far as possible of the data for the 75 largest cities in each of the two continents.^{17/} By coincidence and unexpectedly it was found that the assumption of a slope (r) of 0.9 in the separate instances of Asia and Europe gave results consistent with those already calculated for the world as a whole (where up to 1825 r was assumed as 0.8), always leaving a somewhat plausible residual for the remainder of the world, other than Asia and Europe. This assumption, therefore, was used to calculate the urban and rural populations of Asia and Europe for all dates up to 1900. For 1925, 1950 and 1975 the estimates of urban population are those of the United Nations.

^{16/} Chandler and Fox, *op.cit.*, pp.10-78.

^{17/} Only 60 cities could be used for Europe in the years 1000 and 1200, dates for which the list of Asian cities was too short for the present purpose. For Asia, 56 cities could be used for 1300, and 67 cities for 1400.

58. Estimates of the total populations of Asia and Europe (Europe including Turkey and the Soviet Union) were derived by interpolations utilizing conjointly the estimates of Clark and Durand in the manner already discussed. In table 7 which follows below only the centre of the range between "high" and "low" estimates will be represented. It must be emphasized that most of these historic estimates are very rough indeed, and that they should be interpreted only with exceedingly great caution.

Table 7. Estimated total population, urban population, and percentage of urban in total population, in Asia and Europe, years 1000 to 1975 (population in millions)

Year	Total population		Urban population		Percentage urban	
	Asia	Europe <u>a/</u>	Asia	Europe <u>a/</u>	Asia	Europe <u>a/</u>
1000	...	50	...	3.5	...	7.0
1200	...	70	...	4.3	...	6.2
1300	200	90	11.0	5.7	5.5	6.5
1400	225	70	13.2	5.5	5.9	7.8
1500	250	80	15.0	6.7	6.0	8.4
1600	325	100	18.1	9.3	5.6	9.3
1700	425	150	20.3	11.1	4.8	7.4
1750	490	175	24.5	12.2	5.0	7.0
1800	620	220	28.4	16.7	4.6	7.6
1850	790	295	32.4	34.0	4.1	11.5
1900	910	440	61.6	124.9	6.8	28.4
1925 <u>b/</u>	1030	520	102.5	192.5	10.0	37.0
1950 <u>b/</u>	1347	593	215.0	292.2	16.0	49.3
1975 <u>b/</u>	2216	768	572.2	491.0	25.8	63.9

a/ Defined to include the Soviet Union and Turkey.

b/ United Nations estimates.

59. The figures in this table show that in historic time Asia had always at least twice the total population of Europe, and by 1975 almost three times (Europe here being calculated with inclusion of the Soviet Union and Turkey). Asia's urban population also was about twice that of Europe at any time between 1300 and 1750. Thereafter, Europe's urban population grew more rapidly, overtook that of Asia by about 1850, and grew so fast that, despite rapid growth also in Asia, by 1900 Europe's urban population was twice that of Asia. In the present century, the comparative trends were reversed, and recently Asia's urban population has come to outnumber again that of Europe, including here also the Soviet Union and Turkey.

60. It appears, on the other hand, that the level of urbanization was somewhat higher in Europe than in Asia already in the year 1300 if not even before. But, with the error margins of such estimates, it is uncertain whether the difference is fully significant. The apparent decline in the urbanization level of Europe between 1600 and 1700 may perhaps have to be associated with the consequences of the Thirty Years' War. In Asia, if the estimates are not severely misleading, there appears to have been an almost continuous decline in urbanization level from 1500 to 1850, despite steady increases in the size of the urban population. Asia's rural population, it would seem, then grew faster than the urban, but with the scant historic knowledge now available the possible reasons for such a course of development will be difficult to find. After 1850, most likely, urbanization levels in Asia began to rise significantly, but by that time Europe was already considerably ahead of Asia. By 1900 Asia was about as urbanized as Europe had been already in 1750, and as of 1975 the urbanization level in Asia can be compared with that of Europe shortly before 1900.

Presently more developed and less developed regions: working figures for 1800-2000

61. While much doubt must be expressed concerning estimates of urban population and urbanization level in periods prior to the nineteenth century, we are on decidedly safer ground for dates from 1800 onward. In addition, the Population Division has carried out

projections of urban and rural population up to the year 2000.^{18/} Since divergent developments have differentiated certain regions of the world in the past two centuries, and large differences in living conditions are certain to persist for some time to come, it is of particular interest to distinguish the presently more developed regions from the presently less developed regions. Among the more developed regions are counted Europe (Turkey not included), the Soviet Union, Japan, the United States, Canada, Argentina, Chile, Uruguay, Australia and New Zealand. The remainder of the world is considered to constitute the less developed regions.

62. An effort has been made to utilize Durand's estimates of total population, estimates of urban population by Hoyt, Davis and Hertz, and for more recent dates by the United Nations, and separate estimates of urban population in the more developed and less developed regions derived from the city data of Chandler and Fox. The tentative estimates for Asia and Europe, discussed in the above, have also been taken into consideration. No precise rule has been followed. Several further methods of applying the rank-size rule were tried, such as on the basis of cities in the 100,000-199,999 group, and on the basis of cities shown, from the smallest given by Chandler and Fox up to cities twice that size. In each instance, somewhat different results were obtained. These were then tested for consistency and adjusted in such ways to rounded figures that a combined picture for the world and its two sets of regions could be obtained which is plausible at least in so far as consistency with all the available data is concerned, as well as consistency among the resulting figures themselves. From all that has been said before, apparent consistency should not mislead the user of these figures into thinking that they can be very accurate. They are perhaps as accurate as presently available knowledge permits us to make them.

^{18/} The latest published were "Trends and prospects in urban and rural population, 1950-2000, as assessed in 1973-1974" (ESA/P/WP.54), 25 April 1975.

63. The results of these estimating procedures are shown in the following three tables. Table 8 shows, by 25-year intervals, the world's total urban and rural population from 1800 to 2000 (as projected), percentage urbanization levels, average annual growth rates, and the world-wide "force of urbanization", defined as the absolute difference between the rate of urban population growth and the rate of rural population growth.^{19/} Table 9 breaks down the same data according to the presently more developed and presently less developed regions. The last table shows how the share of the more developed regions in total, urban and rural populations of the world has changed since 1800, and how it may continue to change up to the year 2000. Finally, the rises in percentage level of urbanization are illustrated also in figure 5. Some of the inferences which can be made from comparisons of these figures are so striking that they are amply justified despite imperfections in the particular estimates and projections.

^{19/} The "force of urbanization", so defined, is a basic parameter used in the method of projection used by the United Nations with respect to each individual country. See footnote ^{18/}.

Table 8. World's total, urban and rural population and percentage urban, 1800-2000, and average annual percentage growth rates in total, urban and rural population in 25-year periods (working figures)

Year	Population(millions)			Percentage urban	Annual growth rates(per cent)			Force of urbanization <u>a/</u>
	Total	Urban	Rural		Total	Urban	Rural	
1800	978	50	928	5.1	...	...	...	...
1825	1,110	60	1,050	5.4	0.5	0.7	0.5	0.2
1850	1,262	80	1,182	6.3	0.5	1.2	0.5	0.7
1875	1,420	125	1,295	8.8	0.5	1.8	0.4	1.4
1900	1,650	220	1,430	13.3	0.6	2.3	0.4	1.9
1925	1,950	400	1,550	20.5	0.7	2.4	0.3	2.1
1950	2,501	717	1,784	28.7	1.0	2.3	0.6	1.7
1975	3,968	1,556	2,412	39.2	1.8	3.1	1.2	1.9
2000	6,254	2,997	3,257	47.9	1.8	2.6	1.2	1.4

a/ Urban growth rate minus rural growth rate.

Table 9. World's presently more developed and presently less developed regions: total, urban and rural population and percentage urban, 1800-2000, and average annual percentage growth rate (working figures)

Year	Population(millions)			Percentage urban	Annual growth rates(per cent)			Force of urbanization ^{a/}
	Total	Urban	Rural		Total	Urban	Rural	
<u>Presently more developed regions:</u>								
1800	273	20	253	7.3	...	...	...	...
1825	305	25	280	8.2	0.4	0.9	0.4	0.5
1850	352	40	312	11.4	0.6	1.9	0.4	1.5
1875	435	75	360	17.2	0.8	2.5	0.6	1.9
1900	575	150	425	26.1	1.1	2.8	0.6	2.2
1925	715	285	430	39.9	0.9	2.6	0.0	2.6
1950	857	459	398	53.6	0.7	1.9	-0.3	2.2
1975	1,132	784	348	69.3	1.1	2.1	-0.5	2.6
2000	1,360	1,090	270	80.1	0.7	1.3	-1.0	2.3
<u>Presently less developed regions:</u>								
1800	705	30	675	4.3	...	...	...	...
1825	805	35	770	4.3	0.5	0.6	0.5	0.1
1850	910	40	870	4.4	0.5	0.5	0.5	0.0
1875	985	50	935	5.0	0.3	0.9	0.3	0.6
1900	1,075	70	1,005	6.5	0.3	1.3	0.3	1.0
1925	1,235	115	1,120	9.3	0.6	1.7	0.4	1.3
1950	1,644	258	1,386	15.7	1.1	3.2	0.8	2.4
1975	2,836	772	2,064	27.2	2.2	4.4	1.6	2.8
2000	4,984	1,906	3,078	39.0	2.2	3.6	1.6	2.0

^{a/} Urban growth rate minus rural growth rate.

Table 10. Percentage of world's total, urban and rural population in presently more developed and presently less developed regions, 1800-2000 (working figures)

Year	Percentage share of world population (total, urban, rural) in presently:					
	More developed regions			Less developed regions		
	Total	Urban	Rural	Total	Urban	Rural
1800	27.9	40.0	27.3	72.1	60.0	72.7
1825	27.5	41.7	26.7	72.5	58.3	73.3
1850	27.9	50.0	26.4	72.1	50.0	73.6
1875	30.6	60.0	27.8	69.4	40.0	72.2
1900	34.8	68.9	29.5	65.2	31.1	70.5
1925	36.7	71.2	27.7	63.3	28.8	72.3
1950	34.3	64.1	22.3	65.7	35.9	77.7
1975	28.5	50.4	14.4	71.5	49.6	85.6
2000	21.7	36.4	8.3	78.3	63.6	91.7

Figure 5. Percentage levels of urbanization of the world and of presently more developed and less developed regions, 1800 to 2000.

