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## Expansion and Contraction Patterns of Large Polities: Context for Russia

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Over 5,000 years of history, the effective number of separate political entities has decreased from close to a million to 24, if going by geographical area, and from about a thousand to 15, if going by population. These changes have followed interconnected exponential patterns which extrapolate to a single world polity around year 4000. Within this long-term trend, three sudden increases in polity sizes occur: around 3000 BC, 600 BC, and AD 1600. This study tests the exponential model against area and population data for five millennia. It also gives tables and graphs of area versus time for all major polities since AD 600. The median duration of large polities at more than half the peak size has been 130 years, and it has not changed over 5,000 years. Polities that expand slower tend to last slightly longer. The prospects of the Moscow-centered state are discussed in the light of these findings.

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After the breakup of the Soviet empire the future of this region is one of the most important issues of the decade, overshadowed only by the interrelated complex of population explosion, ozone depletion, and global warming. What was proclaimed a Union was exposed as the Soviet Disunion, as soon as the totalitarian restraints were relaxed and people dared to speak up. What will it lead to? Will the Moscow-centered state break up even further or restabilize within its present borders or recover lost territory?

Light on this issue can be cast at various levels. Detailed knowledge about the incumbent Kremlin powerholders, the dilemmas of Russian economy, and the nature of the various nations within the former empire is useful but does not suffice. History enters, and so do geopolitical factors and general psychological considerations of how masses and decision makers behave in crisis. Finally, the long-term global patterns should be taken into account. What do we know about large polities in general, their expansion, organization, and modes of contraction? What has Eisenstadt's (1963) pioneering study of bureaucratic empires to say about the superbureaucratic Soviet empire and its successors? Or the more recent studies on empires by Doyle (1986) and the group around Duverger (1980)? Or Paul Kennedy's monumental work (1987) on the interaction of Great Powers during the last 500 years?

A most condensed overview of human history has been given by William McNeill, in *The Human Condition* (1980), presenting human masses in a fragile equilibrium

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or even symbiosis with microparasites (diseases) and macroparasites (nonproductive ruling groups). Population size and geographical location appear as major factors for diffusion of disease as well as technological and social inventions, and the latter make it possible to organize ever wider territories. This consolidation can occur voluntarily or be imposed by force, and often there is a mix of economic interest and military coercion. Among those who emphasize commercial and economic aspects of empire formation and preservation, one finds Friedman (1977), Jones (1982), and Chase-Dunn (1985). War and military logistics have been stressed by researchers ranging from Naroll (1967) to Eckhardt (1990). Whatever the mix of causes, it is also important to measure and model the broad patterns of the outcomes, and this is what this study is about.

A model of increasing political concentration of the world will be presented and tested. For testing, previously published data are complemented by new data on areas of large polities, from AD 600 on. After analysis of some broad patterns for the last 5,000 years, implications for contemporary Russia are discussed, keeping in mind the limitations of this approach, like those of various others. After all, no approach clearly predicted the fragmentation of the Soviet Union, much less its date.

To display long-term global trends is not the same as to show all the conditions causing any particular polity to expand or contract. This full range of conditions is not part of the analysis here. The geopolitical literature dealing with logistical overextension and relative resource advantages applies more to the level of particular states and is thus directly relevant to the future prospects of the Russian Federation. The present global level of analysis can cast only indirect light on the future of any particular polity.

### **The Model, Method, and Assumptions**

Over the last 5,000 years the political world has become more concentrated in terms of geographical area. The largest polities of 3000 BC (in Egypt and Mesopotamia) were tiny compared to the present ones. The largest polities of 2,000 years ago (Han, Rome) were already much larger but still smaller than the present largest polities (Russian Federation, Canada, the United States, China). When one considers the relative share of the world population, the picture is less clear, but the trend toward greater concentration still prevails. Technological advances have made it possible to coordinate ever-larger numbers of people over ever-larger distances. Hence the number of separate political entities has tended to decrease, albeit with large fluctuations.

To model this broad trend toward larger and fewer polities, one might well start with an exponential model. This model expresses a constant relative (percent) rate of increase or decrease and hence is the simplest growth model possible.<sup>1</sup> In the absence of theoretical reasons to claim a systematic increase or decrease in the rate at which concentration changes over time, a constant rate is also the only a priori assumption one can make. I'll test the hypothesis that the simple exponential model applies to some measures of change in the concentration of the political world. If the model succeeds in expressing the average trend, then the fluctuations around

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<sup>1</sup> The constant relative rate of change in a quantity  $A$  over time ( $t$ ) is expressed by the differential equation  $dA/dt = kA$ , where  $k$  is the rate constant. Integration leads to the exponential relation between  $A$  and  $t$ :  $A = A_0 e^{k(t-t_0)}$ , where  $e$  is the basis of natural logarithms and  $A_0$  is the value of  $A$  at time  $t_0$  (which can be chosen arbitrarily). The exponential curve becomes a straight line when graphed on semilog paper, and this is a simple way to test whether a data set follows an exponential pattern.

the average may give us insights about the nature of various periods in history. If the model fails, we may obtain clues for how to modify it.

What exactly are we to measure? One must specify what one means by “polity” and which of its characteristics are relevant and measurable. It is hard to find a short substantive definition that would be valid over five millennia of evolution in social relations. One may tentatively characterize polity as an “independent” or “sovereign” entity, usually connected to an area and its population, over which it has exclusive rights of legitimate force, but this definition has many shortcomings.<sup>2</sup> Over 5,000 years, the notions of borders and territorial control, citizens and subjects, and the general nature and scope of political authority have changed almost beyond recognition, so that one might argue that a definition that fits all periods is not possible.

Yet the color patches in historical atlases indicate a widespread belief that some territories can be assigned to some political entities, from 3000 BC on, and this notion has been extended to the populations of these areas in atlases of population history (e.g., McEvedy and Jones, 1978). There is fair agreement among the atlases on the identity and extent of the attributions, reflecting some consensus among the historians more generally. An imperfect but operational definition for the present purposes might be that polities are indicated by the different colored patches in historical atlases. This is less flippant than it may sound. We often have a consensus on recognizing features (e.g., human faces) that we cannot easily define.<sup>3</sup>

Area and population are among the basic determinants of a polity and its power. A large and populous polity may or may not be powerful, but a very small polity with few people rarely is. Apart from area and people, the power of a polity depends on factors such as resources, economic productivity, technological level and innovation, geopolitical location, military strength, seapower, efficiency of organization, and leadership. Which of them can we measure in a way suitable to express concentration?

Measures of concentration imply the existence of a measurable total amount of something in a system, distributed among the system’s components. Area and population are of this nature. Geopolitical location, organizational efficiency, and leadership are not, because their world total seems impossible to define even in principle. Resources, technology, and seapower represent intermediary cases where a total may be definable, although difficult in practice. The world total and distribution of GNP is determinable for the present but becomes quite speculative for the distant past.

The present study tackles only the easiest part, the area and the population. They certainly do not tell the entire story. Neglecting important factors increases the risk

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<sup>2</sup> This definition applies best in the early 1900s, when all dry land territory outside Antarctica was claimed by some recognized member of the international system, and supranational organizations had not begun to blur the notions of independence and sovereignty. In times before the Westphalian Treaty “sovereignty” was not clearly defined. In feudal societies, in particular, no single exclusionary control over a territory existed.

<sup>3</sup> We should continue to look for an analytical definition implicit in such a consensus, but meanwhile, we should not stop measurement just because there is some fuzziness in the meaning of what we measure. Indeed, such imperfect measurements may help to refine a definition. The color patch definition limits my ability to bias the results by adjusting data to suit the model. In the relatively few cases where I depend on written sources, they still have to cross-check with the areas shown in atlases.

What about the many areas in the maps for older periods where no polity is indicated? They may express our ignorance about their political organization, or the existence of many small or diffuse entities, or nonexistence of political structure in those areas. I proceed from the admittedly debatable assumption that humans always were political animals subject to some authority and territorial tendencies. Thus the areas not explicitly attributed to polities on historical maps are treated as belonging to smaller polities, possibly as small as a family unit subject to no outside authority and exploiting a more or less well defined piece of the terrain. The impact of such vagueness on the measurement results must be discussed—see footnote 5.

of ending up with inconclusive results. If, despite omitting all the other factors, the study of area and population produces some expected patterns, then the model must be fairly robust.<sup>4</sup>

Concentration of a system can be expressed in two equivalent formats. One is a concentration index that ranges from near-zero, when the property in question is extremely dispersed, to 1, when all is in the hands of a single owner. A most widespread index is that of Herfindahl-Hirschman (HH):  $HH = \sum A_i^2/A^2$ , where  $A_i$  is the size of the  $i$ -th component and  $A$  is the total size. The other format uses an “effective number of components,” which ranges from one, when one owner owns everything, to very large, when no component is large compared to the total. In the study of party systems the Laakso-Taagepera effective number ( $N$ ) has become the most widely used measure (Lijphart, 1994:70). It is simply the inverse of HH:  $N = A^2/\sum A_i^2$ . Given that  $N$  is easier to visualize than HH, it will be used in this study.

The basic approach in both HH and  $N$  is self-weighting, in the sense that each component size is multiplied by itself. In principle all components must be measured to determine  $N$ , but actually little error is introduced when only the largest components are entered.<sup>5</sup> This is extremely important for the present measurement of areas and populations of polities: small polities (on which information is often lacking) can be ignored. Concentration depends heavily on the size of the largest components.

Bounding the interaction system is a serious problem that I cannot solve satisfactorily within this article. Should we consider the globe or its various separate regions? At the present, the entire globe interacts politically and technologically with a short lag time, but this was not the case even a thousand years ago. To some extent, it is a matter of degree in speed of interaction among the various regions. The invention of light cavalry had a crucial impact on the size of polities in the Middle East around 600 BC; it reached China only 400 years later (when Ch’in used this innovation to conquer its rivals)—but reach it did, eventually. Admittedly, the Americas and Australia seem to have been cut off from interaction for many thousands of years. But excluding them from the main system until recently adds more methodological problems than it solves.

Therefore, this study uses the entire dry land area outside Antarctica as a comparison base throughout the five millennia. If the simplifying decision to treat the entire dry land area as a single system is widely off the mark, it should show up in a reduced fit to the model. To the extent the exponential model works, the assumption of a single system is vindicated.<sup>6</sup>

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<sup>4</sup> One must, of course, be on guard against artefactual patterns. Some robustness can be expected because changes in power, however produced, tend to translate into area changes (and hence population changes). Thus sea power often translates into overseas colonies. Internal disorganization may produce loss of outlying areas. But counter-examples also abound. Thus the weakening Ottoman empire lost rich and populous land in the Balkans, but made up in formal extension by expanding deeper into the Sahara.

<sup>5</sup> Suppose a system consists of four components of sizes 45, 29, 21, and 5, respectively. In this case  $HH = .333$  and  $N = 3.00$ . The former is an abstract number, while the latter says that in some ways the system is equivalent to a system of three equal components. The information content of HH and  $N$  is exactly the same, since  $N = 1/HH$ . Like any single index, both lose information compared to a listing of the constellation itself. Thus  $N = 3.00$  could also originate from 34-33-33 or 53-17-9-9-8-3-1 (Taagepera and Shugart, 1989:259). If in the latter example only 53 and 17 are known (plus the total),  $N$  comes out as 2.82, if the remainder (30) is assumed to be divided 15-15.  $N$  comes out as 3.23, if the remainder is assumed to be divided into infinitesimally small parts. The average of these two extreme estimates is 3.02—rather close to the actual 3.00.

<sup>6</sup> Over millennia even Australia received impulses (witness the existence of human population), and the common ancestral impulse brought state formation (beyond chiefdom) in Peru and Central America only 4,000 years later than in Egypt—a small fraction of the time *Homo sapiens* have existed. On that time scale the entire human population has always formed a single interacting system, albeit with a long lag time. Why exclude Antarctica but not Kalahari or the

I am now in a position to specify the major model to be tested: the worldwide effective number of polities in terms of their land area ( $N_A$ ) is expected to decrease exponentially over time. The same is expected to be the case for the effective number of polities based on population ( $N_P$ ), although the measurement error might be greater. Most important, the two are interconnected in a specific way, to be explained next.

Indeed, the model is more stringent than just two separate exponential curves. If the world should ever be reduced to one single state in terms of area, it would have to be a single state in terms of population as well. Hence both patterns not only must be exponential, but also must extrapolate to  $N = 1$  at the same time. At all other times,  $N_P$  is expected to be lower than  $N_A$ , because large polities tend to include locations with the densest populations.<sup>7</sup> Hence they tend to include a larger share of the world population than of the world dry land area. The expected relationship can be narrowed down even further by the following reasoning.

If large polities tend to form where people are, rather than in empty spaces, then the upper limit on  $N_P$  is  $N_A$ . In other words, population is not more dispersed than area. The lower limit on  $N_P$  is always 1; this would be approached if the world had only one small but fertile valley (a “super-Nile”) which formed a single polity and enclosed most of humankind, while the rest of the world consisted of extremely sparsely inhabited hunting grounds. In sum, we expect  $1 < N_P < N_A$ . In the absence of any further information, one would expect  $N_P$  to be near the mean of the boundary values. When the higher boundary can be larger than the lower one by several orders of magnitude, the geometrical mean is to be used, leading to  $N_P = N_A^{-.5}$ . This relation automatically satisfies the previous requirement: when  $N_A = 1$ , then also  $N_P = 1$ .

In conclusion, the complete theoretical model reads as follows:

$$\begin{aligned} N_A &= N_o^2 e^{2k(t-t_o)}; \\ N_P &= N_o e^{k(t-t_o)}, \end{aligned} \tag{1}$$

where  $N_o$  is the effective number of components in terms of population at the time designated as  $t_o$ . The rate constant for the area equation is predicted to be double the rate constant for the population equation.

### Previous Work

The method of measuring areas on historical maps was pioneered by Hart (1945), who graphed the record sizes reached by landborne empires. Marano (1973) used the area of the largest empire at any given time to estimate the arrival of world government. Taagepera (1978a) dealt with the systematics of geographical size (but not of population) of all major polities and published detailed expansion-contraction curves for the period up to AD 600 (Taagepera, 1978b, 1979). Some results are presented next. In the following, the unit of area used is square megameter ( $Mm^2$ ). Given that  $1 Mm = 1000 km$ , we have  $1 Mm^2 = 10^6 km^2 = 0.39$  million square

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interior of Greenland? It is the only case where an entire continent has remained not only uninhabited but also unvisited until recently, and which even now has not been divided up the usual way among the various polities. In the future one may have to include not only Antarctica but also the Moon.

<sup>7</sup> Even if large polities initially form in areas of relatively low population density (Muslim, Mongol) they soon tend to conquer neighboring high-density areas (Fertile Crescent, China). Large purely nomadic polities are rare. The Yuen Yuen (Jou-jan) in 390–552 may come the closest, and even there the sedentary population should not be underestimated.

miles. The total dry land area of the Earth is 133 Mm<sup>2</sup>, excluding Antarctica. I'll use the negative sign for years BC, and the positive sign for AD.

1. Over the last 5,000 years the sizes of the largest polities have tended to increase. This expansion can be fitted with a simple logistic equation, the total dry land area being the ceiling. This ceiling is approached so slowly that one would not expect a stable empire of almost worldwide proportions to materialize within the next 1,000 years.

2. Within this steady increase, one can detect three major spurts. There is no evidence of polities larger than .01 Mm<sup>2</sup> (about 4,000 square miles—the maximum area of a single Egyptian nome) much before –3000 (i.e., 3000 BC). Around –3000 the formation of Lower and Upper Egypt rather suddenly tenfolded this area, and their unification brought the total to .25 Mm<sup>2</sup>. During the subsequent 2,500 years the largest polity most often was centered in Egypt. Throughout this first historical phase, the largest polity occupied 0.3 to 1 percent of the dry land area (except for a breakdown around –2100). Around –600, the size of the largest polity again increased suddenly and from then on never dropped to less than 2 percent of the dry land area. During this second phase (–600 to +1600) the record-breaking sizes gradually increased from 5 to 20 percent of dry land area. The largest polity most often was centered in Iran or China or (since +600) their Mesopotamian and Mongol borderlands. Around +1600, another sharp increase in size occurred (to 15 and even 25 percent of dry land area). At the beginning of this third phase, the centers of large polities shifted to Europe. The question remains whether the largest polities will from now on always stay larger than they used to be prior to 1600.

3. Most large polities are short-lived, and no detectable change in their duration at close to maximum size has taken place over five millennia. Duration time (D) is defined as duration at more than one half of the polity's stable maximum size. By this criterion, only about twenty-five large polities have lasted for more than two centuries, and only two of the present ones belong to this club: China (since its new beginnings under the Manchu dynasty) and Russia (since its beginnings as Muscovy).

4. Polities that expand faster also tend to contract sooner. Rise time (R) is defined as the time it takes for a polity to expand from 20 to 80 percent of its maximum stable size. The D/R ratio varies from 0.5 to 15, with a median of about 3. The longest rise time by this definition is observed in the case of Russia (240 years).

This earlier work (Taagepera, 1978b, 1979) presented detailed graphs for major polities, but only up to the year +600. The present study supplies such graphs for the most recent 1,400 years. The underlying data are tabulated in the Appendix. Regularities in expansion of polity size are revised in the light of more complete data, using some new methodological approaches.<sup>8</sup> In particular, the aforementioned notion of effective number of components is introduced. In addition to geographical size, population is considered, but in a separate section.

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<sup>8</sup> The methods of measurement and the related operational definitions are used as described by Taagepera (1979), unless otherwise noted. Successive polities under different political regimes but with basically the same territory are counted as a single continuum, if the time gap between them is less than 30 percent of the first component's duration. By this count, the Ming empire is distinct from its Mongol-Yuan predecessor, but there is continuity from the Manchu dynasty to the present China and from Muscovy to the present Russian Federation.

### Expansion-Contraction Curves of Large-Polity Areas Since +600

For convenience of graphing, I divide the time span examined into three periods, each starting with the expansion of a record-breaking polity (in terms of geographical size) and ending with appreciably smaller ones. These periods will be designated according to the polities that ushered them in: the Muslim, the Mongol, and the Russo-British eras. In the same sense, one could talk of a previous Egyptian era (from -3000 to -600) and an Irano-Chinese era (from -600 to +600). Only the changes around -600 and +1600 have deeper significance, which will be addressed in the next section. The cutoffs at +600 and +1200 are introduced for convenience of discussion of a long time span.

*The Muslim era (600–1200)*, shown in Figure 1, was ushered in by the Islamic Caliphate, which covered almost twice the area of the previous largest durable polity, Han China: 11 Mm<sup>2</sup> as against 6. (The Hsiung Nu Hunnish empire reached 9 Mm<sup>2</sup> around -180 but stayed at that level only for some twenty years.) The rest of the period is largely the story of challengers and successor states of the Caliphate, in Western Asia and the Mediterranean basin. In Europe north of Byzantium, all empires except Kiev remained relatively small. East Asia evolved separately, with the Tang empire introducing the period, followed by the Sung-Jurchen continuum. During the entire period, the little-known Tibet-centered Tufan remained a major empire in terms of size and duration. Around the year 800, it actually was the world's largest polity, and it also had a large population in the Ganges valley.

All graphs in Figure 1 use the same scale so as to facilitate visual comparison. The grouping into four subgraphs is for graphing convenience only; there is no implication that the four geographical areas shown formed self-contained or tightly interacting regions.

*The Mongol era (1200–1600)*, shown in Figure 2, began with Genghis Khan's Mongol empire which reached more than double the area of the Caliphate: 24 Mm<sup>2</sup> versus 11. The Mongol empire destroyed and incorporated nearly all existing major polities in the world, whereas similar activities by the Caliphate largely bypassed the polities in East Asia. On the other hand, while the political impact of the Caliphate was felt for 600 years (up to 1200 and even further), the political impact of the Mongol empire largely faded within 300 years (although the consequences of its existence remained, such as reorientation of trade routes and speeding up the diffusion of key technologies and of the bubonic plague). The Kazan Tatar continuation of the Golden Horde, the last traceable successor state of the Mongol empire, lasted until 1552. In Central Asia, claims for legitimacy continued in the 1400s to be based on Genghis Khan's lineage—or stewardship for Genghis Khan's descendants, in the case of Timur Khan.<sup>9</sup> Timur's own heirs created the Mogul empire in India which lasted beyond 1700.

By 1500 the new European-centered empires were on the rise, although they remained small until 1600. Overall, a cutoff at 1600 is not unreasonable. The scales for all empires in Figure 2 are the same, but they differ from those in Figure 1. The

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<sup>9</sup> The craving for historical legitimacy is a puzzling phenomenon. The Muslim insistence on Mohamed's blood lineage (e.g., in today's "royaume chérifien" of Morocco) is understandable because of religion. The medieval German insistence on the "Holy Roman empire of the German Nation" could be explained by the long duration of the real Roman empire as the major Christian state. But the legitimizing function of Genghis Khan suggests that more primitive instincts may be at play. This conqueror himself had no legitimacy besides force of arms, had little to do with any religion, and his empire fell apart within one century. Why would later conquerors claim legitimacy based on Genghis Khan's raw military conquest rather than their own? A feature common to the Caliphate, the Mongol empire, and also Rome (from the Eurocentric viewpoint) was their record-breaking size. For those who believe that might is right, a record-breaking size may psychologically be the ultimate legitimacy.



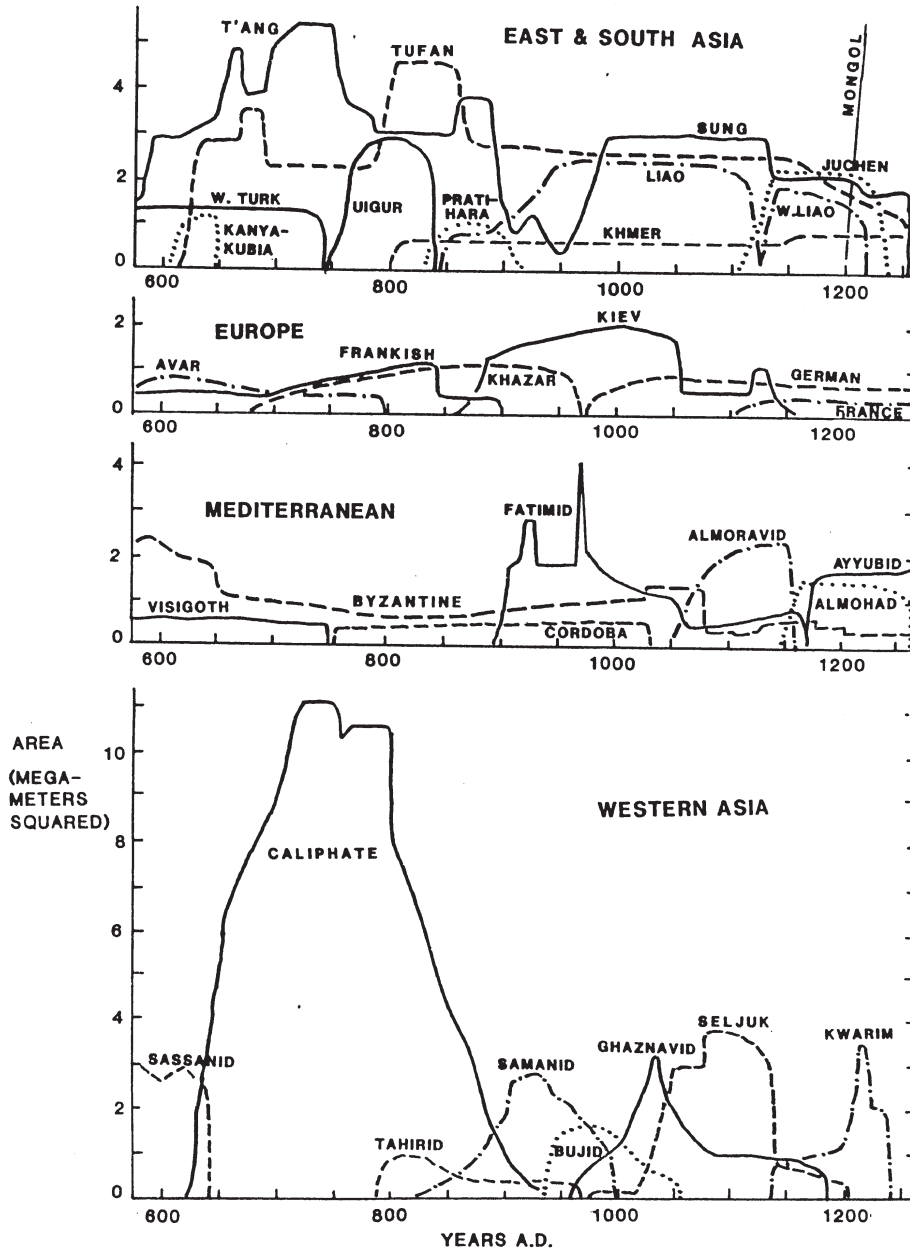


FIG. 1. The Muslim era: expansion-contraction curves of areas of polities, years 600–1200.

four subgroupings (which also are different from those in Figure 1) are for graphing convenience only.

*The Russo-British era (from 1600 on)*, shown in Figure 3, has Russia as the largest polity most of the time. However, Russia never surpassed the Mongol empire in size, while Britain did—and by a considerable margin (35 Mm<sup>2</sup> versus 24). Prior to the one century of British predominance, the Spanish empire was for two centuries almost as large as the Russian. I do not count post-WWII East-Central Europe and Mongolia as parts of the Russian empire, because these states

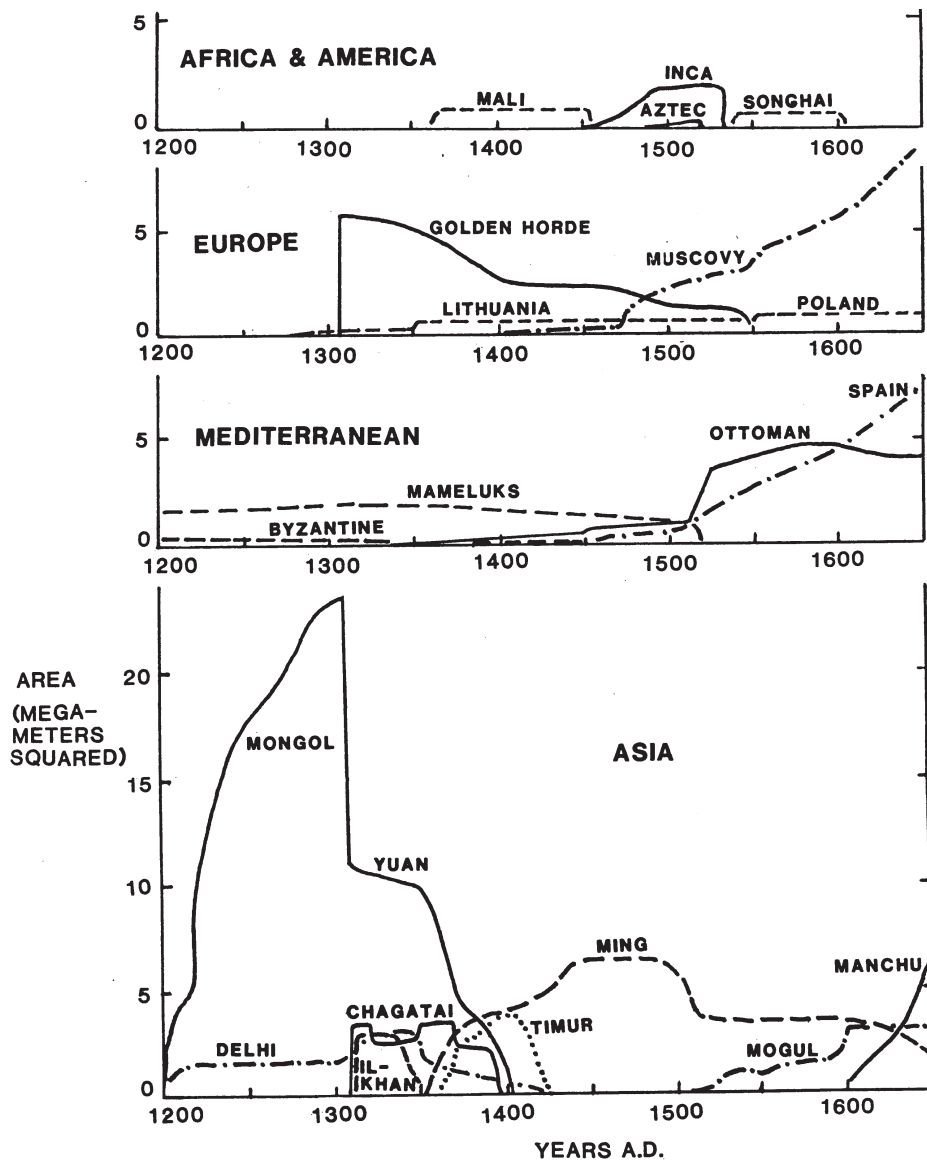


FIG. 2. The Mongol era: expansion-contraction curves of areas of polities, years 1200-1600.

remained formally distinct members of the international community (unlike Khiva and Bukhara in tsarist Russia or the Indian principalities in British India).

The multicentrism of this period differs from the single preeminence of the Caliphate and the Mongol empire during their entire existence. The Russo-British era might as well be called more broadly the European era. The breakup of Eurocentric empires has produced many successor states outside Europe, some of which are among the largest polities that ever existed: Canada, USA, Brazil, Australia, each close to 10 Mm<sup>2</sup> or about 7 percent of the world dry land area,

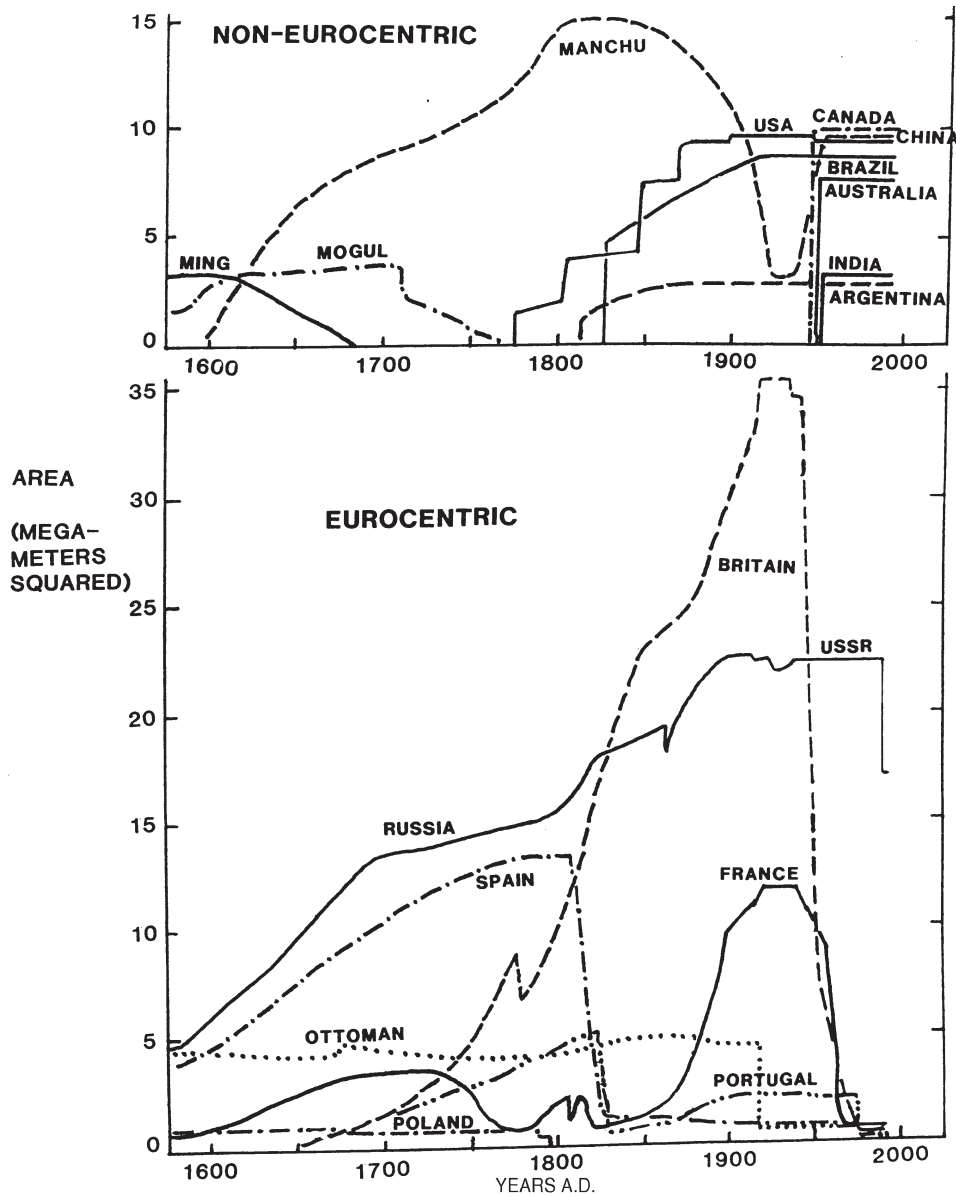


FIG. 3. The Russo-British era: expansion-contraction curves of areas of polities, years 1600-1995.

though of varying population and power. In contrast, the largest polities that followed the breakup of the Caliphate and the Mongol empire did not surpass 6 Mm<sup>2</sup>, the record established by the prior Han empire. Several of the present largest successor states are Anglophone, and in this sense the Russo-British era still continues.

This completes the data compilation. It is now time for analysis of long-term historical trends.

**Area-Based Effective Number of Polities**

Political power in the world was 5,000 years ago dispersed among very numerous separate entities. By now, the number of such entities has been reduced to about 200. Many of these are of negligible size, compared to the largest, and hence an “effective” number ( $N_A$ ) is used here, as explained earlier. It undercounts the smallest components. The constant  $A$  in  $N_A = A^2/\sum A_i^2$  is the total dry land area of the Earth (133 Mm<sup>2</sup>, excluding Antarctica). As of 1995,  $N_A$  was 24. This figure does not mean that the twenty-four largest polities matter to an equal degree while others do not matter at all; it is a more abstract indicator of fragmentation.

Figure 4 shows the pattern of change in  $N_A$ . The effective number of polities is graphed on logarithmic scale. The overall trend and the three distinct phases observed in previous work are well in evidence.

*Phase 1.* In Egypt and Mesopotamia supra-village aggregation into multicommunity chiefdoms may have begun by -5000 (Carneiro, 1978), leading in Egypt to some forty-two “nomes.” City cultures led to the first state formations beyond chiefdoms probably no earlier than -3500 and no later than -3200 (cf. Service, 1975:207ff, 227ff). Prior to this development, the effective number of separate political entities in the world may have been as high as 1 million.<sup>10</sup> At the latest by

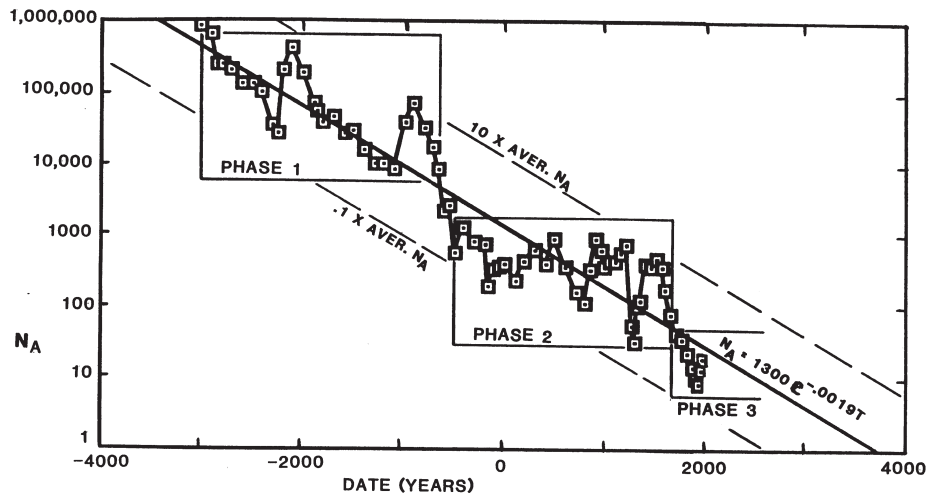


FIG. 4. Effective number of polities, based on area.

<sup>10</sup>This is an extremely rough estimate of fragmentation. The world population around -3200 may have been around 14 million. This is the upper limit on  $N_A$ . One may envisage individual hunters, families, tribes and villages exerting some control over areas averaging some 100 km<sup>2</sup>, that is, an area 10 times 10 kilometers that may be traversed in 2 hours walking. The world dry land would fit 1.3 million such average units, with an average of ten persons each. The effective number tends to be lower than the actual number. I estimate the possible lower limit as being about 10 times lower, around  $N_A = 100,000$ . This would imply coordinated hunting and gathering groups of about 100 members, loosely controlling 1,000 km<sup>2</sup> each, which seems excessive.

Carneiro (1978) estimates that the number of political units was under 200,000 around -9000 and then increased (along with the world population) up to a peak of 600,000 around -1000; the corresponding effective number would be somewhat lower. Getting ahead of my argument, note that a lower estimate for  $N_A$  before known state formation would improve the agreement with the model: it would decrease the slope of the  $N_A$  line in Figure 5 and hence bring the crossing point of the two lines closer to the predicted 1. Thus a high  $N_A$  prior to urbanization and state formation and also a late date for the latter (as shown in Figures 4 and 5) test the model the most severely.

–3000 occupational differentiation that went with city formation made larger territorial units possible and started Phase 1.

The first known supra-chieftdom states were Upper and Lower Egypt, with a combined population of about 1 million and controlling initially about 0.1 percent of the world dry land area. The Egyptian state formation reduced the effective number of separate political units.<sup>11</sup> During the following 2,400 years, this number slowly came down to 10,000 at times of empire-building in the Near East, India, and China. Periods of empire breakdown increased the effective number again, at times beyond 100,000. Qualitatively, the picture agrees with that given by the earlier graphing of the area of the largest empire (Taagepera, 1978a). Phase 1 corresponds to the era of Egyptian domination.

*Phase 2.* A sudden and permanent increase in concentration of territory occurred between –650 and –500. Prior to that time, the effective number of components never fell below 8,000, even during imperial peak periods; in contrast, it later never rose above 1,300, even during periods of major breakdown of empires. Correspondingly, the maximum size of the single largest polity prior to –650 never surpassed 1.1 Mm<sup>2</sup>, while it later never fell below 2.3 Mm<sup>2</sup>.

The transition reflected a breakthrough in the art of bureaucratic “government at a distance” (McNeill, 1980:25): delegating appreciable power to provincial governors while still preventing them from becoming independent princes. Achaemenid Persia achieved it partly by speeding up communications through use of relay stations. A few centuries later, China assigned provincial authority to three specialized functionaries who served as watchdogs on each other. Frequent rotation was another technique.

The skills needed to build bureaucratic command structures spread and were refined. During the next 2,000 years (–500 to +1600) the largest polities continued to become larger during their peak periods, from Achaemenid Persia (5.5 Mm<sup>2</sup>) to Genghis Khan (24 Mm<sup>2</sup>). Accordingly, the effective number of polities was reduced from around 600 to 30. However, during periods of breakdown, the effective number of polities kept jumping back to close to 1,000. In the late 1100s, the world’s largest empire, Jurchen, reached merely 2.3 Mm<sup>2</sup>—one-half of the area of the Achaemenid empire seventeen centuries earlier. It was followed by Genghis Khan’s huge empire, but the latter’s technology and political organization skills do not seem to differ qualitatively from those of the Achaemenids. Phase 2 includes the eras of Irano-Chinese, Muslim, and Mongol predominance.

*Phase 3.* A third phase in expansion of empire sizes probably started somewhere between 1600 and 1800, propelled by modern technologies, especially the uses of electromagnetism. The magnetic compass needle expanded the maritime horizons, and the telegraph ushered in the age of near-instant communications that could hold together huge empires. Since 1800, the effective number of polities has constantly remained below 30, a value first reached during the short-lived Mongol empire. At the peak size of the British empire (35 Mm<sup>2</sup>, in 1925),  $N_A$  reached an all-time low of 9.

By 1990, the effective number had moved up again, to 19, and the Soviet breakup lifted it to 24. The latter increase does not mean adding five specific successor states

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<sup>11</sup> At this stage, it is hard to visualize the meaning of an effective number, given a mix of very numerous tiny components (of 100 km<sup>2</sup> or less) and two comparatively huge ones (almost 100,000 km<sup>2</sup>) which are still small on the world scale. In such cases, consider  $N$  just a measure of dispersion or fragmentation, the inverse of concentration. For properties of the effective number of components, see Taagepera and Shugart (1989:77–91).

to a list. Rather, the reduced area of the Moscow-centered state increases the relative salience of various other polities throughout the world.

Phase 3 corresponds basically to the era of Russo-British predominance. The existence of such a third distinct phase in polity sizes is not yet quite certain. From the Mongol empire in 1300 to the British empire in 1925, the relative decrease in  $N_A$  is no more marked than it was from the Caliphate to the Mongol empire. In other words, there is no clear separation between the second and third phases, unlike the visible shift between the first and second, in terms of record-breaking polity sizes. However, a difference between the second and third phases appears in the limited extent of increases in  $N_A$  during periods of empire breakdown. Major decolonization since the 1940s has put only a small upward kink in the curve in Figure 4.

Potential for further fragmentation also looks limited. If the Russian Federation lost all its non-Russian republics, if Quebec left Canada, if Tibet re-achieved independence, and Kashmir and the Sikh region left India,  $N_A$  would still remain below 30. For the world to become again as fragmented as it was in 1500, the United States, Australia, Brazil, Anglophone Canada, Russophone parts of Russia, and the ethnically Han parts of China would all have to break up into several pieces. Given that these areas are geographically compact and linguistically fairly homogenous, such a simultaneous breakup seems unlikely. Breakup of smaller polities would have little impact on worldwide concentration. Meanwhile, new peaceful consolidation forces are visible, as in Western Europe. Thus several of the largest polities of the next century are likely to remain larger than any pre-1600 empire was, apart from the Mongol realm and the Caliphate.

In sum, what distinguishes Phase 3 from Phase 2 is not the size of an occasional record-breaking empire but the large array of fairly large and fairly stable states. Among the fifteen largest polities that ever existed, six exist now: Russia, Canada, China, USA, Brazil, and Australia.

*The Continuum Approach.* Observation of distinct phases in worldwide concentration should not detract attention from the remarkable continuity of the overall process, which is expressed by the best-fit exponential equation

$$N_A = 1300 e^{-.0019t}, [r^2 = .90] \quad (2)$$

where  $e$  is the basis of natural logarithms and  $t$  is time in years AD. The line corresponding to this equation is shown in Figure 4. The dashed parallel lines indicate that all actual values are within a factor of 10 of equation (2). This part of the exponential model is confirmed to a fair degree.

Extrapolation based on this equation suggests that the effective number of polities would be reduced to 1 around the year 3800; there would be a 50 percent probability of the world being one single polity at that time. The lower envelope line reaches 1 around +2600, suggesting that it is highly unlikely that a world state would materialize even briefly within the next six centuries. A completely bipolar world (with two equal-sized polities) could briefly occur by +2200 but has a 50 percent chance only by +3400.

This extrapolation is in fair agreement with Marano (1973), who assumed exponential increase in the area of the largest empire and projected it to fill the dry land area by +3500. Both projections put a world government off into a much more remote future than envisaged by Naroll (1967), who saw a 50 percent probability by +2200, or by Carneiro (1978), who projected the number of political units to decrease to 1 around +2300.

One of Naroll's (1967) starting assumptions was: "Henceforth, there will always be at least one state on Earth as large as the Soviet Union is today. For the foreseeable

future, there seems no reason to expect the Soviet Union itself to shrink in size, or break up into fragments.” The same might have been said about the British empire seventy years earlier. Despite his penetrating study of all historical empires, Naroll overestimated the cohesion of the largest empire of his own time. We should be careful not to assume that what is, is bound to remain.<sup>12</sup>

Needless to say, extrapolation is not prediction. All extrapolations are highly speculative as long as they are not supported by a rational model. We should go beyond qualitative reasoning such as McNeill’s (1980) and express quantitatively the mechanisms that produce the observed exponential trend; this remains to be done. Meanwhile, no better approach than the present one seems available. When guessing at when “history will end,” the best we can do is look at all the history we’ve got and extrapolate, very skeptically.

### Population-Based Effective Number of Polities

The previous procedure can be repeated with populations of polities instead of areas, subject to the quality of historical population data. Considerable data have been made available by McEvedy and Jones (1978), and I very much depend on their work. In conjunction with knowledge about the territories controlled, the populations of polities can be estimated, but this being a second-order estimate, the possible error range widens.

For calculation of the population-based effective number ( $N_P$ ) one replaces areas by populations and keeps in mind that in this case the world total also keeps changing over time. The long-term pattern is shown in Figure 5, together with the area-based one. Because of uncertainties in estimating the population of the world and of each polity at all times, the population-based curve is less detailed than the area-based.

In conformity with the model, we always have  $N_P < N_A$ , meaning that population is less fragmented than area. The average pattern for  $N_P$  can be fitted with an exponential equation:

$$N_P = 31 e^{-.0008t}. [r^2 = .68] \quad (3)$$

The fluctuations are larger than in the case of geographical area, but the exponential model still can be considered confirmed. Also in line with the model,  $N_P$  is close to the square root of  $N_A$ , which is  $36 e^{.00095t}$  on the basis of equation (2). The best-fit lines for  $N_A$  and  $N_P$  cross around  $N = 2$  rather than the required  $N = 1$ . This is quite close, given that we extrapolate from values of  $N_A$  and  $N_P$  that start from around one million and one thousand, respectively. Lines close to the best-fit lines in Figure 5 are obtained with  $N_A = 1300 e^{-.0018t}$  and  $N_P = 36 e^{-.0009t}$ , which satisfy  $N_P = N_A^{.5}$  exactly and extrapolate to  $N_P = N_A = 1$  at  $t = 3982$ . With this,

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<sup>12</sup> In a direction opposite to Naroll (1967) and Carneiro (1978), good reasons can be offered to doubt that the size of polities could continue to increase at all in the future. In the past, big jumps in the areas of the largest polities often occurred when they acquired nominal control over sparsely populated areas, starting with Sargon’s over the desert between Mesopotamia and Syria. Much of the Mongol expansion involved steppe. The British empire was unprecedentedly large because of its control over areas like Australian desert and Canadian tundra. Australia and Canada remain among the largest polities for the same reason, without corresponding geopolitical power. The same applies to Brazil (although its potential power may be underestimated). Russia’s large area is due to essentially uninhabitable polar regions that add little to its power. Given that all such marginal areas have been divided up (short of Antarctica and the Moon), no future earthbound polity can achieve a new record size by the time-honored device of absorbing wastelands. Any further record expansion will have to come from someone else’s hide, either by conquest or by voluntary fusion—or semivoluntary, subject to economic imperatives. I am not at all convinced that history has come to an end, so that the present level of concentration will continue. How states produce and maintain geopolitical limits upon each other is an important topic I will not discuss here.

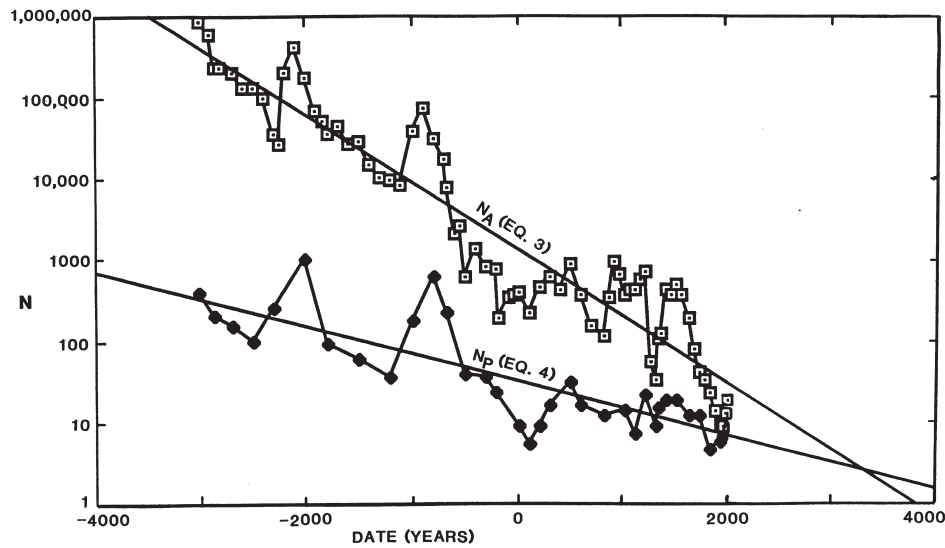


FIG. 5. Effective number of polities, based on area and on population.

the predictions of the combined model can be considered confirmed to a satisfactory degree.

It remains to consider some details of the population graph. Extrapolation from equation (3) yields a 50–50 probability for a single-empire world around the year 4300—a date comparable to that obtained with  $N_A$  (3800). The sudden change around  $-600$ , observed for  $N_A$ , is visible in the  $N_P$  curve as well, but the sudden change in  $N_A$  around  $+1600$  is not in evidence for  $N_P$ . The effective number of polities in terms of population decreased up to year  $+100$ , but since then it has been essentially stationary. The lowest values of  $N_P$  (about 5) were reached already around year  $+100$ , and again after 1800. Since 1900,  $N_P$  has gradually increased to 15 in 1995. For the first time in world history we have approached a situation where area concentration catches up with population concentration. What is behind this stability of  $N_P$ ?

If the second-largest component is clearly smaller than the first, then the value of  $N$  is largely determined by the largest component. This has often been the case for record-breaking polities. Prior to  $-2000$ , the valleys in the  $N$  curves reflect mainly the consolidation of Egypt. From  $-500$  on, China has been by far the most populous component, whenever its core lands did form a single polity. This was so even when China was not the world's largest polity in area. The mistaken impression seems to be widespread that contemporary China represents an expanding population which “already” forms nearly one quarter of the world population (21 percent, in 1995). Actually, China's present share is the lowest in at least 1,300 years. Most of the time since  $-400$ , the territory of the present PRC has contained more than a quarter of humankind. At times it has represented more than a third: 35 percent in  $+200$  and as much as 37 percent in 1800 (based on estimates in McEvedy and Jones, 1978:197).<sup>13</sup>

<sup>13</sup> If historical demographical data were more precise one could plot population graphs analogous to the area graphs in Figures 1 to 3. In this format the predominance of the Muslim and European empires would fade compared to the steady population concentration in China. For example, in 800 the T'ang empire had about 50 million people (out of a world total of 220 million) while the much larger Islamic Caliphate had only about 34 million.



Since the 1800s, the population of the rest of the world has increased faster than China's, increasing the worldwide fragmentation. More generally, the river valleys where early polities formed are by now choked with people, and growth is fastest in previously less populated locations, which keeps  $N_P$  relatively high. At the same time, the extremely sparsely populated areas such as northern Siberia, which previously remained outside the organized polities, are now formally incorporated, and this reduces  $N_V$ . Thus the gap between  $N_V$  and  $N_P$  is narrowed down.<sup>14</sup>

### Duration of Polities

Before proceeding to evaluate the outlook for Russia, the possible systematics of duration should be briefly considered, although it is not connected to the exponential model. This section is purely empirical. It is evident from Figures 1 to 3 that polities can last a few years or many centuries. Rise and duration times were determined for all polities in Figures 1 to 3 for which the data were adequate, following the procedure outlined in the section on previous work and fully described in Taagepera (1979). Results reported for earlier times (Taagepera, 1978b, 1979) were added. Recall that duration time ( $D$ ) is defined as duration at more than 50 percent of the polity's stable maximum size, and rise time ( $R$ ) is defined as the time it takes for a polity to expand from 20 to 80 percent of its maximum stable size.<sup>15</sup>

The median duration for seventy-eight major polities that have run their full course is 130 years, and there is no trend toward increase or decrease. Only sixteen polities have lasted 300 years or more. Apart from the poorly documented Elam (east of the mouth of Euphrates), which possibly lasted 1,100 years (starting in -1600), the most durable have been the Parthian-Sassanid continuum in Iran (700 years, starting in -60), Tufan in Tibet (580 years, starting in +660), and the Old and New Empires of Egypt (both about 500 years). In modern times, the most durable is the Ottoman empire (390 years, starting in 1525). Russia has already lasted for 330 years at half its maximum size (starting in 1665). Durability does not seem to be tied to size.

It has been long suspected that rapid expansion is destabilizing in many a field (Olson, 1963). In Figure 6, duration times of polities are graphed against the rise times, whenever the rise time could be measured.<sup>16</sup> Figure 6 confirms that polities that expand slower tend to last longer. However, the correlation is weak, and the average trend is closer to  $D = 25R$ <sup>5</sup> than to the previously surmised  $D = 3R$  (Taagepera, 1979). The longest expansions (from 20 percent to 80 percent of eventual maximum) are featured by Russia (235 years, after 1555) and Han (160 years, after -60), followed by Maghada-Maurya, Rome, Lithuania-Poland, Spain, and the Manchu empire (all at 140 years).

<sup>14</sup> The concentrations in terms of areas and populations differ, and neither reflects fully the power relations. Neither the present second-largest country (Canada) nor the second most populous one (India) rank second in terms of GNP or military strength. For modern countries, one can also calculate the concentration in terms of their GNPs. Thus, in 1975 we had  $N_{GNP} = 10$ , which was lower than either  $N_A$  (21) or  $N_P$  (14). Wealth was more concentrated than either area or population. For past polities GNP estimates become highly speculative.

<sup>15</sup> Why not consider the "total" time of expansion? In the case of a pattern close to simple logistic, the total expansion time (from zero to maximum) cannot be defined. To have measurable and comparable  $R$ , one must specify starting and ending levels between zero and maximum. In engineering, 10 and 90 percent are often chosen, but large random fluctuations in the early and late parts of polity expansion forced me to go to 20 and 80 percent. Similarly, duration at "top level" can be defined only as duration above a certain percentage of maximum. Duration at more than 50 percent of maximum has been called "half-width" in engineering.

<sup>16</sup> For countries like Canada, which gradually emerged from existing polities, the rise time cannot be defined. For some others, like the polities of ancient Egypt, data are not sufficiently precise. Long rise times for the Frankish kingdom and France are artefacts of very irregular growth patterns. At the other end of the scale, most rise times of twenty years and less are questionable in two respects: the rise time may have been underestimated in some cases, and several other cases are close to being continuations or spin-offs of earlier polities under a new management.

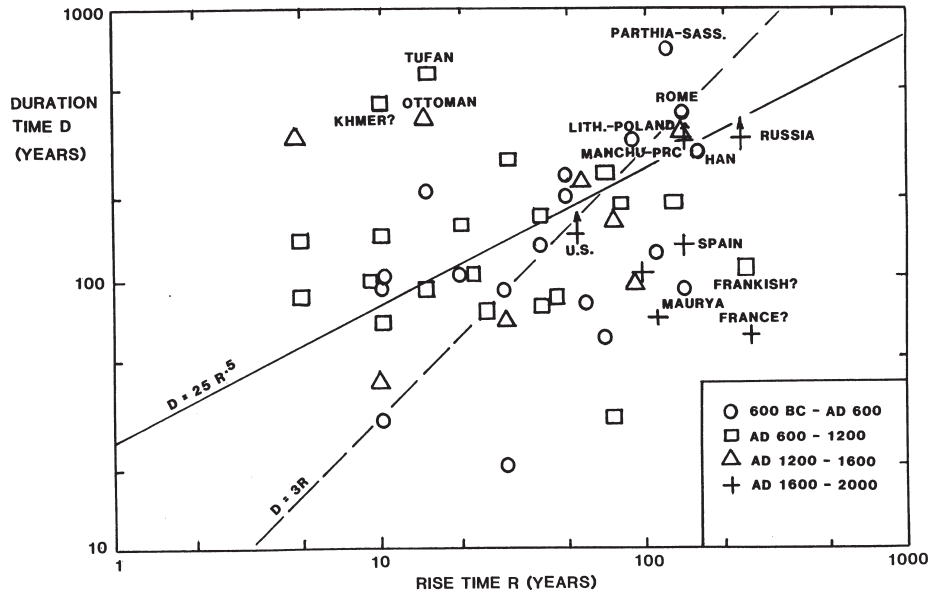


FIG. 6. Relationship between rise and duration times of polities.

### Implications for Russia

A look at the figures presented may help us visualize where we come from, in terms of geographical extent of political organization, where we stand now, and maybe even where we are heading. The future of the Moscow-centered state is the most topical issue in this respect. It should be stressed that this study is not about political regimes but about polities within the same borders, regardless of who rules them—Darius or Alexander, Nikolai II or Lenin. The Soviet regime has collapsed, but three quarters of the area it ruled (with one half of the population) has remained in one piece. To what extent will the pieces fly even further asunder or rejoin, under a different label and leadership? At the one extreme, the CIS label may enable Russia to recover most of the former Soviet territory. At the other, even the predominantly Russian Siberia may feel the pull of Pacific prosperity and detach itself from Muscovy.

Given that the Russian Federation is presently the largest polity in the world (but not the most populous), its area changes are most directly interconnected with the general trends in Figure 4 (but not the population trends in Figure 5). Figure 4 indicates that the secular trend is toward more concentration, yet the trend of the most recent fifty years has been the reverse. The recent dismantling of empires comes after a period of extreme empire-building during the nineteenth century. Earlier history has repeatedly seen a pendulum movement from overconcentration to overfragmentation, compared to the average secular trend. If so, then  $N_A$  might climb up markedly, implying breakups of several of the present largest polities. Russia would be high on the list, given its large size, an ethnic minorities population of 27 million, and divergent economic interests of the various regions.<sup>17</sup>

<sup>17</sup> In particular, Vladivostok is slightly more distant from Moscow than the Thirteen Colonies were from London, and it has traditionally been exploited while being kept on a short leash. Economic advantages of joining the Pacific Rim might override language commonality with Moscow. A separate Russian-speaking state in the Far East may trigger a chain reaction among various non-Russian and Russian regions. In 1995, a mafia-connected local administrator,

However, Figure 4 also presents instances where overconcentration was not followed by relative overfragmentation but by rather small fluctuations that maintained a fairly low fragmentation, compared to the secular average. The period from -500 to +100 offers two such examples. Thus there are also precedents for the world restabilizing at a fairly low level of fragmentation. What we really observe in Figure 4 is typical random fluctuation around an average trend. It would be reckless to imagine regular and hence predictable cycles in these random zigzags. On the majestic scale of secular increase in concentration, even the largest individual empire by itself is but an accident. It's like one day's weather within a regular climatic pattern.

Figure 6 yields further mixed insights. Having already lasted 330 years at half of its maximum size (starting in 1665), the Moscow-centered state is much beyond the observed median duration of 130 years. Very few past polities have lasted into their third century. By this criterion Russia enters a perilous phase. Russia's record-breaking rise time ( $R = 235$  years) improves its chances marginally. In conjunction with the empirical average equation  $D = 25R$ ,<sup>5</sup> the large  $R$  would offer Russia a duration of some 385 years, starting from 1665—that is, up to year 2050. Again, Russia seems to enter a perilous phase, but keep in mind that one half of the large polities have lasted longer than  $25R$ .<sup>5</sup> So could Russia. However, given that duration time is defined as duration at one half of the stable maximum size, Russia could meanwhile continue to contract appreciably at the margins, following the pattern of its geographic predecessor, the Golden Horde.

When all these mixed signals are taken into consideration, further slow contraction seems the likeliest course for Russia. A new increase in Russia's area, though possible, is less likely. Polities that lose momentum rarely recover it.

## Appendix

### Data on Expansion and Contraction of Large Polities

Most areas are measured on historical maps—see sources at the end of the Appendix. For some polities (especially in the 1800s and the 1900s) written descriptions are fitted to known present areas. All areas are in megameters squared ( $Mm^2$ ). Polities are presented in the order of their appearance in Figures 1 to 3 of the main text. Data are tabulated in the following columns:

Date	Area	Source	Notes
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#### 1A. East and South Asia 600–1200

Western Turk — tabulated in T79.

#### T'ang-Chin-Sung

610	3.1	He,W	Sui unification of China since 589
650	3.6	W	T'ang dynasty since 618; He: 3.0 $Mm^2$
660	4.9	He,W	+/- .5 W. Turkestan conquered
670	3.9	W,He	+/- .8 Turkestan lost, Balkash region added
692	4.9	W,He	+/- .5 Turkestan retaken from Tufan
715	5.4	W,He	+/- .3
751	4.6	W,He	+/- .5 Balkash region lost; conflict with Arabs
766	3.6	W,He	+/- .5

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Evgeni Nazdratenko, exerted ruthless political and economic control over the Vladivostok region, with tacit support in Moscow. It remains to be seen whether he will boost the region's separateness or whether revulsion against his tyranny will make people look for tighter control from the metropolis.

790	3.1	W,He	Turkestan lost to Tufan
860	4.1	W,He	+/- .3 E. Turkestan recovered
885	2.6?	Pr	Peasant revolution
895	1.5?	Pr	Szechuan and Chekiang independent
907	.8?	Pr	Takeover by Later Liang
923	1.3?	Pr	Later T'ang and Sha-T'o Turkic rule
936	.8?	Pr	Chin dynasty; North ceded to Kitan/Liao
947	.5?	Pr	Kitan/Liao conquest of Peijing
958	.8	He,Pr	N. Sung recovery between Yangtse and Hoangho
980	3.1	He,Pr	S. China and Annam conquered
1127	2.1	He,Pr,W	Jurchen capture of Sung capital: S.Sung period
1204	1.8	W	Losses to Jurchen
1279	.0	Pr	Mongol conquest from 1273 on
Kanyakubia (Kanaudj, Harsha)			
606	.05	Se,Du	State formation in N. India
612	.3?		Harsha's coronation
625	1.0		Peak size reached?
648	1.0	KH,EB	Harsha's death; rapid fragmentation follows
Tufan			
620	2.8	W	State formation in Tibet
670	3.6	W,He	Turkestan taken from T'ang
692	2.4	W,He	Turkestan lost
790	4.0	W,He	+/- .3 Expansion N. and E. since 780
800	4.6	W,He	+/- .3 Expansion to Ganges?
860	2.8	W,He	India, Turkestan lost
1140	2.6	He	+/- .3 W,KH: collapse by 900?
1234	1.4	He	
1290	.0	He	Mongol conquest
Uigur			
630	?	Pr	Revolt against W. Turks
762	?	He,Pr	Claims to Chinese throne
800	3.1	He	Mongolia, parts of Turkestan
840	.0	He	Pushed west by Kirghiz
Khmer			
800	.65	He,KH,W	Foundation
1140	.8	He,W	+/- .1
1290	1.0	He,W	
1415	.4	He	
1760	.25	He	
1880	.0		French conquest
Pratihara			
836	.3?	D	
860	1.0?	D,W	
910	.3?	D	
Liao (Kitan)			
744	?	Pr	First conflicts of Kitan with Chin
910	1.3?	Pr	Control of W. Mongolia, Manchuria, Korea
947	2.6	He,Pr	+/- .5 Conquest of Peijing, Tungus region

1125	.0	He,Pr	Defeated by Jurchen
1130	1.0	He,W	W. Liao founded in Balkash region
1218	.0	He,W	

## Jurchen (Chin)

1110	.0	Pr	Tungus revolt against Liao
1125	1.3	Pr	Liao defeated
1126	2.3	W	Sung capital taken
1234	.0	Pr	Mongol conquest from 1210 on

*1B. Europe north of Mediterranean 600–1200*

Avar — tabulated in T79.

## Frankish

482	.1	KH	Unification by Chlodwig in Belgium
486	.25	KH	Conquest of Île-de-France
507	.5	KH	Conquest of Aquitania, Alemania
511	[.5]	KH	Partition, loose federation
539	[.7]	KH	Conquest of Rhone valley, Bavaria
558	.7	KH	Recentralization until 561
620	.6	KH	Recentralization until 639
687	.4	KH	Recentralization by Carolingians; Aquitania lost
740	.7	KH	Alemania, Aquitania recovered; partition 741–747
768	.75	KH	Charlemagne's rule begins
814	1.2	KH	Charlemagne's death
843	.35	KH	Permanent partition; largest component: W. Frankish
870	.4	KH	W. Frankish
880	.4	KH	Effective splintering
987	.0	KH	Formal dissolution into duchies

Lotharingia and E. Frankish kingdom remained at .4 or less, and also faded by 900.

## Khazar

679	.0	KH	State formation
900	1.0	KH	+/- .25. Peak period?
965	.8	KH	Kiev takes Sarkel
969	.0	KH	Kiev takes Itil, Khazar capital

## Kiev

858	.0	KH	Varangians reach Kiev; state formation in Ukraine
882	1.3	KH	+/- .5 Novgorod subjected
1000	2.1	KH	+/- .3 Peak size
1054	.5	KH	+/- .2 Fragmentation
1113	1.0	KH	+/- .5 Recovery until 1132
1150	.3?	KH	Decline

## German “Roman” Empire

Due to feudal organization the realm controlled by the emperor is hard to define, much less measure. It is estimated to peak around 1050 at about 1.0 Mm<sup>2</sup>; after 1250 it is negligible compared to the Mongol empire.

## France

The same applies to France, where the king's effective realm was reduced to almost nothing around 1100 and may have reached at most 0.4 Mm<sup>2</sup> around 1250.

*1C. Mediterranean 600–1200*

Visigoth and Byzantine — tabulated in T79.

## Cordoba

756	.5	KH	Secession from Caliphate
1000	.6	KH	Entire Iberia held
1031	.1?	KH	Fragmentation begins in 1010

## Fatimid-Ayyubid-Mameluk

893	.0	F	Fatimid movement begins in Tunisia
909	1.8	F,E	
914	1.9	E	
921	2.8	F	
930	1.8	F	
969	4.1	E	Egypt conquered
972	2.1	F,E,R	+ or -.5
1000	1.4	F,HZ	+ or -.1
1050	1.0	F,E	+ or -.1 Zirid independence
1070	.5	HZ	
1150	.85	R	
1171	.65	E	Takeover by Ayyubids (Saladin)
1174	1.45	E	
1193	1.5	E,R	+ or -.1 Saladin dies
1200	1.7	HZ	
1250	1.65	E	
1252	1.8	E	Mameluk takeover
1300	2.1	HZ	Mongols repulsed in 1260
1400	1.6	HZ,E	
1500	1.2	HZ,E	Ottoman conquest around 1520

## Almoravid-Almohad

1050	.0	F	Almoravid expansion begins
1150	2.3	F	Almohad takeover begins in 1147
1163	1.5	F	
1269	.0	KH	Collapse

*1D. Western Asia 600–1200*

Sassanid — tabulated in T79.

## Islamic Caliphate

622	.05	E	Hejira: Medina
625	.21	E	+ or -.05
628	.4	E	+/- .1 Conquest of Arabia
632	2.1	E,Pu	+/- .5 Mohamed's death
634	2.8	E	Advance into Syria
644	4.1	E	Mesopotamia, Egypt
655	6.4	Pu	W. Iran, Tripolitania, Armenia
661	6.7	E,R	Omayyid dynasty begins
700	9.0	E	E. Iran, Maghreb

720	11.1	E,Pu	Transoxania, Indus, Spain
750	11.1	E,Pu	Abbasid dynasty begins. R: 10.1
756	10.3	KH	Cordoba secedes
787	10.6	E	Baghdad founded in 762
800	8.3	E,R	N. Africa secedes
847	4.6	E	Formal suzerainty over 9.5
885	1.8	E	Formal suzerainty over 8.3
900	1.0	E	Formal suzerainty over 6.2
945	.0	KH	Caliphs lose political control
Tahirid			
800?	1.0?	KH	Emergence as separate state
875	.5?	KH	Separation of Samanids
960?	.0?	KH	Takeover by Ghaznavids
Samanid			
819	[.8]	KH	Emergence as viceroy for Tahirids
875	.95	E,KH	Independence
900	1.95	E	
908	2.7	E	
928	2.85	E	
944	2.35	E	
962	2.05	E	
994	.95	E	
999	.0	KH	Demise
Bujid (Buwahid)			
932	.0	KH	Emergence
945	1.3?	KH	Takeover from Caliphs
980	1.6	R	Reassertion of Iranian culture
1030	.65	R	
1055	.0	R,KH	Collapse
Ghaznavid			
962	.15	E	First Turkic dynasty in Iran
994	1.1	E	
1006	1.4	E	
1018	2.1	E,R	+ or -.3
1025	2.65	E	
1029	3.4	E,R	
1037	2.25	E	Losses to Seljuks
1055	1.75	E	
1090	1.0	R	
1151	.9	E	
1186	.0	KH	Destruction by Ghor (in India)
Seljuk			
970	.08	E	
1016	.10	E	
1037	1.8	E	
1040	2.6	E,W	+ or -.5
1055	3.1	E	
1080	3.9	E,R	+ or -.3 Anatolia conquered
1136	3.1	E	

1138	1.1	E	Khwarizm effectively independent
1150	.7	E	
1194	.5	E,R	Collapse begins
Khwarizm (Chorezm)			
1138	1.2	E	Vice-royalty effectively independent
1200	1.25	Hz	Formal independence
1210	2.3	E	
1215	2.8	E	
1218	3.6	E	R: 4.0
1220	2.1	E	
1240	.0	KH	Mongol conquest

2A. *Africa and America 1200–1600*

Mali			
1250	.1?	L	Independence of Malinki from Soso
1380	1.1	F,L	Eastern conquests; peak size
1500	.4	L	Timbuktu lost in 1433
Inca			
1250	.005?	E	
1438	.05	E	
1463	.2	E	
1471	.45	E	
1493	1.9	E	
1527	2.0	E	
1535	.0	E	Spanish conquest from 1532 on
Aztec			
1440	.015	E	
1468	.08	E	
1481	.10	E	
1502	.17	E	
1520	.22	E	Spanish conquest
Songhai			
1550	.8	F	Peak size?

2B. *Europe north of Mediterranean 1200–1600*

Lithuania-Poland			
1263	.1	C	Lithuania unified
1345	.3	C	Expansion to Belarus
1380	.7	C	NW Ukraine
1425	.8	C	
1520	1.0	M	Lithuanian-Polish Union
1580	1.05	M	
1650	1.1	M	
1670	.9	M	
1770	.8	M	
1772	.65	M	First partition
1795	.0		Second and third partition



## Golden Horde

1310	6.0	He,Hk	+/- .3 Formal independence; autonomy within Mongol empire since 1260
1350	5.4	Pr	E. Ukraine lost to Lithuania
1380	3.5	Pr	First major defeat by Moscow
1400	.0	Pr	Conquest by Timur
1410	2.5?	Pr	Restoration
1500	1.3?	Pr	Power shift to Kazan around 1440; losses in the south
1552	.0		Muscovy conquers Kazan

## Muscovy-Russia-USSR (numerous sources — detailed graphs in T68 and T88)

1300	.02	C	Muscovy begins to expand
1359	.05	C	
1360	.19	M	
1425	.43	C	
1474	.52	C	
1478	1.24	M	Novgorod conquered
1487	1.57	M	
1505	2.5	M	All Russian lands, Karelia, Komi
1584	5.1	M	Kazan; Tatar and Finno-Ugric lands on the Volga
1650	9.7		Siberia up to Enisei
1689	14.0	C,M	E. Siberia, NE Ukraine
1725	15.0	C,M	Baltic coast
1796	15.5	M,C	Kamchatka, Chukchi, W. Ukraine and Belarus
1825	18.4	M	Finland, E. Poland, Transcaucasia
1840	19.4	C	Kazakhstan, Alaska
1870	20.5	C,M	Amur, Sakhalin seized; Alaska sold
1895	22.8	C,M	Central Asia; peak size
1906	22.5	EB	S. Sakhalin lost to Japan
1921	21.6		Poland, Finland, Baltic states independent
1935	21.8		Tyva annexed
1945	22.3		W. Ukraine and Belarus, Baltic states annexed
			S. Sakhalin retaken
1991	17.1		Soviet "union republics" independent

*2C. Mediterranean 1200–1600*

## Ottoman (detailed graph in T68)

1307	.025	M	State formation E. of Constantinople
1359	.07	M	Coast of Marmara Sea conquered
1382	.30	M	Macedonia, Bulgaria
1451	.69	M	Valachia, SW and NE Anatolia
1481	1.22	M	Constantinople, Moldavia, Bosnia, Greece, Crimea, SE Anatolia
1521	3.4	M,EB	Syria, Egypt, Algier, Hejaz, Yemen
1571	4.7	M,EB	Hungary, Tripoli, Mesopotamia, Tunisia
1683	5.2	M	Transcaucasia, W. Iran; Yemen lost; peak size
1730	4.5	M	Hungary, Azerbaijan, W. Iran lost
1817	4.25	M	Crimea, Georgia lost
1829	5.2	M	Sudan conquered; Romania lost
1850	5.2	M	Greece, Algeria lost; penetration of Fezzan

1885	4.45	M	Bosnia, Bulgaria, Sudan, Egypt, Tunisia lost; Nejd, Yemen, S. Fezzan won
1913	2.55	M	Tripoli, Fezzan, Albania, Macedonia lost
1921	.78		Arabia, Syria, Mesopotamia lost; Turkish Republic
Spain			
1482	.35	E	
1500	.5		Haiti
1512	.8		Naples, Cuba
1640	7.1		S. and Central American coast
1780	13.7		Advance inland
1810	13.7		Peak size
1830	.9		Latin America independent
1895	.95		
1900	.55		Philippines lost
1915	.80		Sahara conquered
1975	.505		Sahara lost

*2D. Asia 1200–1600*

Mongol-Yüan			
1200	1.0	W	+/- .7 Estimate for largest Mongol state
1206	4	W	Unification of Mongolia
1215	5	He	N. China, Tarim basin conquered
1222	11	He	Central Asia, Iran
1227	13.5	W,He,Hk	+/-1.5 Genghis Khan's death
1250	18.5	He,W	Russia
1260	20	He	Mesopotamia
1280	22	He,W	+/- .5 Hk:27.5 S. China
1294	23.5	He,W	+/- .3 Tibet conquered; Kublai's death
1309	24	He,W	+/-1.0 Last formal reunification
1310	11	He,W	+/- .7 Break-up; largest successor state: Yüan in China and Mongolia
1351	10	Eb	+/-1.5 Revolt in China begins
1368	5	Eb	+/-1.5 China lost; Tibet unclear
1400	1		+/-1.0 Collapse in Mongolia?
Delhi			
1040	.2?	Du	Hindu sultanate
1190	.35	Se	Muslim invasion and takeover
1206	.8	Se,Du	Formal independence from Ghor
1228	1.6	Se,Du	Ranging from Indus to Ganges delta
1300	1.7	Se,Du	Gujerat conquered
1310	2.7	Se,Du	Expansion south to Godawari River
1312	3.2	Se,Du	Entire Dekkan conquered
1340	2.8	Se,Du	Bengal and S. Dekkan lost
1350	1.8	W	N. Dekkan lost
1398	.8?	Se,W	Fragmentation
Chagatai			
1310	3.5	He,Hk	+/-1.0 Formal independence; autonomous since 1260
1320	2.5?	Pr	Transoxania lost
1350	3.5?	Pr	Transoxania retaken
1369	2.5?	Pr	Transoxania lost to Timur

500

*Expansion and Contraction Patterns*

1390	.0	Pr	Submission to Timur
Il-Khan			
1250	[3.4]	He	Autonomy within Mongol empire
1310	3.75	He	Independence
1370	.0	He	Contraction from 1330 on
Ming			
1351	.0	Eb	Revolt against Mongols begins
1368	3.1	W,He	Ming control of China
1400	3.9	W,He	Annan, Yunnan conquered
1450	6.5	W	Annan lost; gains in Kansu and Mongolia
1513	3.9	W,He	Losses in the north
1616	3.6	Eb	+/- .3 Manchu attacks begin
1644	2.3	Eb	+/- .8 Manchu conquest of N. China
1690	.0	Eb	Manchu conquest of SW China
Timur			
1363	.0	He,W	Start of formation
1405	4.4	He	Peak size; Timur's death
1415	2.7	He	
1500	.0		End of Timurids
Mogul			
1519	.03?	D,Du	Babar takes Kabul
1525	.8?	D	Start of Mogul empire formation in India
1560	.8	Se,Du	Mogul restoration
1580	1.7	Se,Du	Gondwana, Rasputana, Gujerat, Bengal
1600	3.4	Se,Du	Kashmir, Sind, N. Dekkan, Beluchistan
1690	4.0	D,Du	S. Dekkan
1710	2.5?	Se,D,Du	Rajputana independent
1770	.2?	D,Du	Near-complete loss of control
1798	.0		
<i>3A. Non-Eurocentric polities 1600–1996</i>			
Manchu-PRC			
1600	.3	KH	Unification of Manchu core
1620	2.0	KH	Control of Manchuria
1635	3.4	KH	Inner Mongolia, Korea
1645	4.9	KH	N. China
1650	6.5	KH	Central China, Kansu
1660	7.2	KH	S. China
1700	8.8	KH	Outer Mongolia
1725	10.6	KH	Tibet
1760	13.2	KH	E. Turkestan
1770	13.7	KH	Burma
1790	14.7	He,KH	+/- .3 Nepal, Annam
1840	14.2	He,KH	
1860	13.4	KH,He	+/- .5 Amur, Balkash regions lost to Russia
1865	12.4	KH	E. Turkestan independent
1877	13.4	KH	E. Turkestan subjected again
1890	11.9	KH,He	Burma, Nepal, Tonking, Korea lost
1900	11.4	He,KH	+/- .3 Russia penetrates Manchuria
1912	7.7	KH	Rep. of China; Mongolia, Tibet independent

1920	2.5 <sup>2</sup>	KH	Fragmentation; Japanese conquest begins
1949	8.5	KH	PRC; unification of China
1950	9.7	KH	Conquest of Tibet
USA (detailed graph in T68)			
1690	.11	M	+/- .02 Estimate for the 13 Colonies
1763	.65	M	Up to Proclamation Line; up to Johnson's Line: 1.55
1790	2.31		
1803	4.46		Louisiana purchase
1820	4.64		Florida
1848	7.75		Texas, Oregon, Mexican "cession"
1853	7.83		Gadsden "purchase"
1867	9.36		Alaska
1899	9.67		Philippines, Hawaii, Puerto Rico
1945	9.37		Philippines independent
Argentina			
1816	1.4 <sup>2</sup>	LK	Independence from Spain; about one half of the present area effectively controlled by settlers
1880	2.78		Full control of present territory
Brazil			
1822	5.0 <sup>2</sup>	LK	Independence from Portugal; about one half of the present area effectively controlled by settlers
1900	8.51		Full control of present territory
Australia			
1945	7.68		Counted independent when joining the UN
Canada			
1945	9.98		Counted independent when joining the UN
India			
1947	3.19		Independent from Britain

### 3B. Eurocentric politics 1600–1996

Russia, Spain, Ottoman, Poland: see Table 2B,C.

France			
1530	.45	Hm,EB	Metropolitan France before expansion overseas
1610	1.0		Conquests in Canada
1670	3.4		Louisiana, India
1763	.7		Colonies in India, Canada lost
1800	2.1		Louisiana expansion
1803	.7		Louisiana sold
1813	2.1		Control in parts of Europe
1815	.7		Return to old borders
1830	.8		Algerian coast
1840	1.1		Gabon
1850	1.5		Inland Algeria

1880	3.1		W. Africa, Sahara, Vietnam
1895	8.7		Central Africa, Indochina
1915	10.8		Morocco, Sahara
1920	11.5		Cameroons, Togo from Germany
1946	11.3		Syria, Lebanon independent
1955	10.6		Indochina lost
1960	3.1		Retreat from Africa
1962	.7		Present borders
Britain			
1600	.3	EB	British isles
1650	.6		Newfoundland; conquest of India begins
1714	2.0		American colonies, Nova Scotia, Hudson Bay
1750	3.9		Advance in India, Canada
1800	8.0		Half of India, Canada, Australia
1837	14		Most of Canada, Australia
1850	23		All of Canada, Australia, India; most of Pakistan
1880	24.5		Nigeria
1910	31.8		Egypt, Sudan, S. Africa
1920	35.5		SW Africa, Tanganyika; peak size from EB 1952:4:175, with Egypt added and Antarctican zones subtracted
1936	34.5		Egypt independent
1950	9.5		Dominions, Burma, India, Pakistan independent; SWA
1960	5		Sudan, Nigeria, etc. independent
1970	1		Decolonization near-complete
1980	.3		UK plus small islands
Portugal			
1200	.08	E	
1470	.10	E	
1500	.13?	E	Overseas expansion begins
1580	.6?	E	Posts on coasts of Brazil, Africa, India
1581	.0		Spanish conquest
1640	.8?	LK,E	Restoration; colonies on Brazilian, African, Indian coasts
1780	4.0?	LK,E	Penetration inland
1820	5.5	LK,E	Effective control over coastal half of Brazil and coastal quarter of Angola and Mozambique
1822	.5		Brazil independent
1900	2.1	EB	Inland Angola and Mozambique
1975	.089		Colonies lost

*Sources for Appendix*

- C = Chew (1967)  
 D = Davies (1949)  
 Du = Dunbar (1937)  
 Eb = Eberhardt (1950)  
 EB = *Encyclopedia Britannica*, various editions, especially 1952  
 E = Engel (1953–1962)  
 F = Fage (1958)  
 Hk = Haack (1973)

Hm = Hammond, Inc. (1968)  
 Hz = Hazard (1954)  
 He = Herrmann (1966)  
 KH = Kinder and Hilgemann (1964/1966)  
 L = Levtzion (1973)  
 M = Muir (1961)  
 P = Palmer (1957)  
 Pr = Prawdin (1961)  
 Pu = Putzger (1961)  
 R = Roolvink (1957)  
 Se = Sellmann (1954)  
 Sh = Shepherd (1956)  
 W = Stier et al. (1956 and 1963)  
 T68 = Taagepera (1968)  
 T79 = Taagepera (1979)  
 T88 = Taagepera (1988)

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