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The rising numbers of humankind

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For a very long time, humankind comprised just a few hundred thousand individuals at most, and it was not until thirty to forty thousand years ago—almost yesterday in human history—that the population passed the one million mark. It has continued to grow since, reaching a billion in about 1800, and six billion in 1999 (figure 1). But how exactly did it get there?

Population in ancient prehistory

About three million years ago, the *genus* Homo emerged from the primates of East Africa. What set it apart was the ability to make and purposefully use tools from wood and flint, and especially its new form of social behaviour: no longer did it eat food on the spot, but took it back to a family encampment for sharing with the group. The territory occupied by these first humans, evidenced by the stone tools they have left behind, stretches over little more than four million square kilometres of savanna shrubland between Ethiopia and Zimbabwe.

The likely approximate size of this first human population was 100,000, probably already divided into distinct groups. They emerged just as the Earth was entering an ice age, which, like any climatic change, resulted in the disappearance of many species and the emergence of new ones. Human genetic evolution was very rapid, and related mainly to the brain. Weighing less than 500 grams at the start, it added a kilogram in under three million years. This development of the brain gave its owners such an advantage in natural selection that at each stage, their closest rivals were eliminated. So, Homo habilis disappeared as Homo ergaster emerged, spreading throughout Africa, and thence across Europe and Asia in the form close to Homo erectus.

The standard method for estimating prehistoric population distribution is to attribute to a given area the population density recorded in a recent period among people of a similar culture living in a similar environment and climate. In the palaeolithic era, population distribution was much more closely linked to the size of the territory populated and to climatic variations than to the still very primitive technology. It therefore remained very sparse despite odd technical leaps like learning to control fire. The total numbers of Homo ergaster and Homo erectus may be very roughly estimated at between 500,000 and 700,000 in the old world (Eurasia and Africa), which were the only populated areas at the time. Then, between 300 000 and 200 000 BCE (Before Christian / Common Era), three distinct, hominid population groups developed at the same time but far apart, separated by the oceanic rise in the last two interglacial periods: modern man (Homo sapiens) in Africa and Southern Asia (perhaps 800,000 individuals), Neanderthal man in Europe (perhaps 250,000), and Java man in Indonesia (perhaps 100,000).

With the last ice flood, around 70 000 BCE, falling sea levels brought the three hominid population groups into contact. Homo sapiens asserted his supremacy everywhere, squeezing out first Java man, then Neanderthal man, and spreading between 50 000 and 40 000 BCE across the as yet unpopulated continental land masses: Australia, the two Americas and later on, Siberia. The world population at this time may have totalled 1.5 million, including 1 million in Africa and Asia, 50,000 in Australia, 300,000 in America and 150,000 in Europe, the latter two continents being still largely under ice.

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CONTENTS

Population in recent prehistory

Table – World population by broad regions at different dates (millions)

Region / Date	-400	CE	500	1000	1300	1400	1500	1700	1800	1900	2000
China (incl. Korea)	19	70	32	56	83	70	84	150	330	415	1,273
India (incl. Pakistan and Bangladesh)	30	46	33	40	100	74	95	175	190	290	1,320
Southwest Asia	42	47	45	33	21	19	23	30	28	38	259
Japan	0,1	0,3	2	7	7	8	8	28	30	44	126
Rest of Asia	3	5	8	19	29	29	33	53	68	115	653
Europe (incl. Russia)	32	43	41	43	86	65	84	125	195	422	782
North Africa	10	13	12	10	9	8	8	9	9	23	143
Rest of Africa	7	12	20	30	60	60	78	97	92	95	657
North America	1	2	2	2	3	3	3	2	5	90	307
Central and South America	7	10	13	16	29	36	39	10	19	75	512
Oceania	1	1	1	1	2	2	3	3	2	6	30
World	**152**	**250**	**205**	**257**	**429**	**374**	**458**	**682**	**968**	**1,613**	**6,062**

Around 40 000 BCE, technological progress in the form of the invention of the spear-thrower, the harpoon, the bow and arrow vastly improved the efficiency of hunting and fishing, and became the main engine of population growth, especially in Europe. Taking advantage of the falling sea level, which greatly narrowed the strait between Sicily and Tunisia, two waves of Europeans migrated to North Africa, around 20 000 BCE and 12 000 BCE. They populated it from the Canaries to Egypt, stretching even as far as Arabia. At the height of the Late Palaeolithic Age, from 10 000 to 9000 BCE, the population of Europe may have stood at 200,000 people. The sudden climatic warming which occurred around 8650 BCE halted their growth, and the beginning of the Mesolithic era saw the population decrease then increase rapidly with the cultural adaptation to the new climate and the repopulation of Northern Europe as the ice melted. Around 7000 BCE, it is likely that Europe had close to 400,000 inhabitants.

With the Neolithic era in the Middle East—from 10 000 to 8000 BCE—came sedentariness, hand-hoe cropping, stock-rearing, pottery-making and navigation, resulting in a tenfold increase in the population from 0.5 to 5 million inhabitants. From Anatolia, Neolithic peoples migrated to Greece, settling near what would become Thessaloniki, and from this densely-populated settlement sent out two streams that propagated Neolithic culture in Europe: one sea-borne, investing the coastal regions as far as England, the other across land, moving up the Danube to occupy the central part of the continent. By around 4000 BCE, the Neolithic culture had spread across Europe, with a population of perhaps 2 million, rising so rapidly that it could well have topped 23 million by around 2000 BCE, when the advent of the Bronze Age brought a population decline.

India has been little studied. Neolithic culture first emerged there in the Punjab, which also rapidly developed into a major population centre, rising from perhaps 0.7 to 20 million between 4000 and 2000 BCE. From 8000 BCE, a Neolithic culture also developed in the Huang Ho river basin (China), extending towards the east, then the south where corn gave way to rice. Here, again, the population rose from 0.8 to 20 million between 4000 and 2000 BCE. Other Neolithic civilizations developed somewhat later in Mexico and on the high plateaux of the Andes, likewise bringing a population surge. Finally other partial civilizations developed around pottery and primitive farming from 12 000 BCE in Japan and 8500 BCE in the African Sahel. Between 6000 BCE and 4000 BCE, therefore, the Earth's population is thought to have risen from just short of 7 million to over 30 million, and may even possibly have reached 100 million by 2000 BCE.

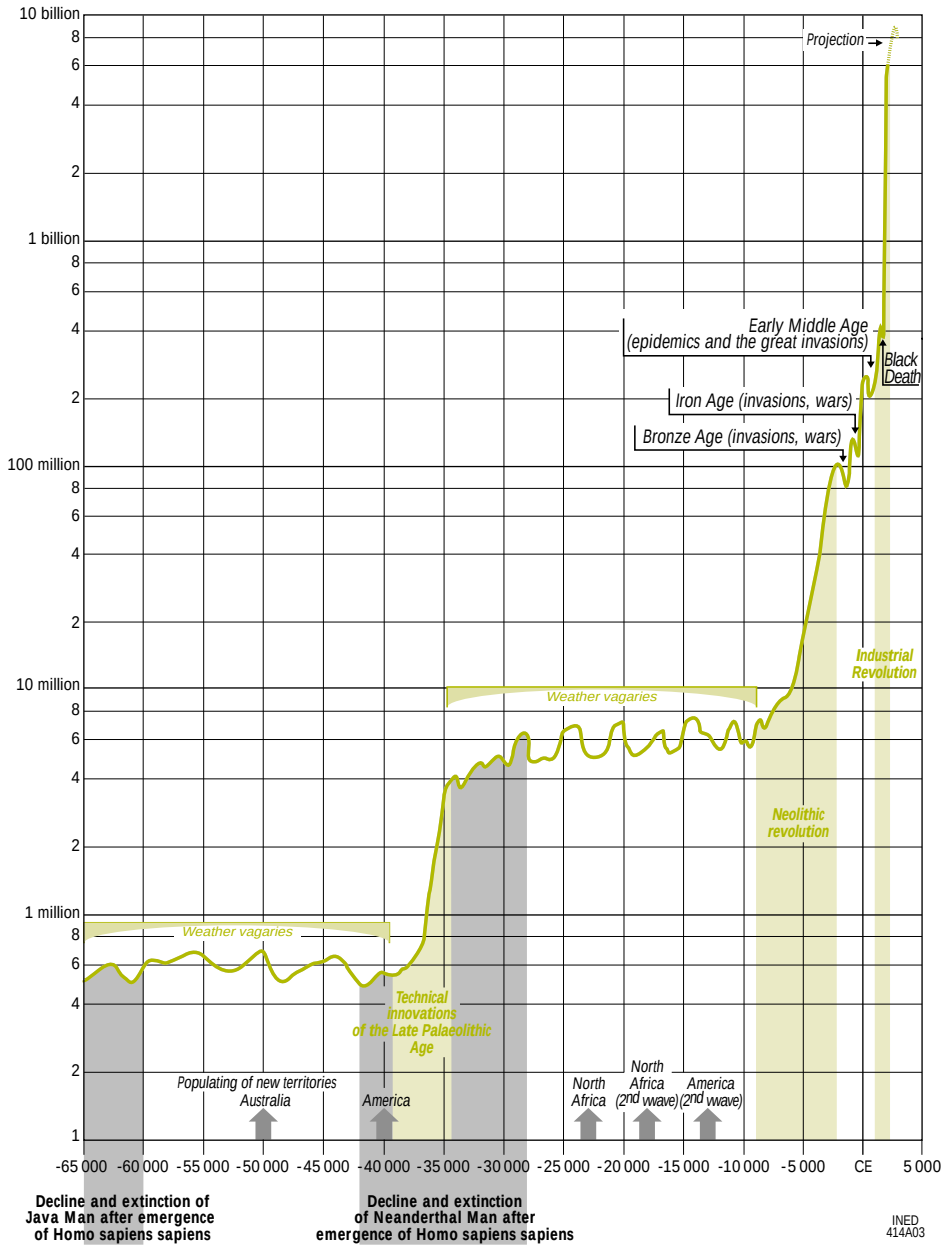
Population settlement from Antiquity to the modern day

Since Antiquity, the emergence of writing in a region has been rapidly followed by enumeration of all countable things—temple workers, taxpayers, soldiers, citizens, etc. A part of these enumerations—albeit vanishingly small, and hard to interpret—have come down to us, giving us our first documentary data to work on, and thorough, methodical studies enable estimates to be made for the countries concerned, especially the Chinese and Roman Empires. These are more substantive than estimates of the prehistoric eras could ever be. Unfortunately, the same copious, detailed data are not available for India, Japan and Iran, even less so for the Americas, and are virtually non-existent for sub-Saharan Africa. It can be estimated that, after rising to 250 million in the 1st century CE (Christian / Common Era), the total world population decreased to 200 million by the end of Antiquity, around 500 CE.

Evidence for the Middle Ages is very patchy. With some gaps, China has the most consistent series; the data in Japan and India remain unreliable; European data is sparse and very disparate. What little is available for the Early Middle Ages is almost always given in hearths (families), and is not easy to interpret, especially after the Black Death in the mid-14th century. From this point on, however, there is more plentiful evidence. Likewise the Middle East and North Africa. Sub-Saharan Africa, however, remains an elusive case. By the end of the 15th century, then, the world population was nearing an estimated half a billion people. From 1500 onwards, we have for almost all countries in the world, if not censuses, then at least descriptions which give some idea of population distribution and estimates for the period from 1500 to 1700 are more re-

liable. China maintains its census system, India has its first documented estimates, enabling its population to be estimated at 145 million in 1595, Japan begins producing reliable documents like the shumon-aratamechô—temple registers that record all individuals living in the village or district. Not only does the number of censuses in Europe increase, but parish registers now recording Protestants as well as Catholics (but not until the 18th century for the Orthodox Church) enable microchanges in population to be investigated. In the Middle East and North Africa, the Ottoman Empire's taxation returns provide increasingly reliable and usable information. Sub-Saharan Africa remains unexplored territory apart from the coastal regions, and there mainly through the slave trade, which is itself an obstacle to any significant development. As for America and Australia, while some schools of thought have placed credence in a high pre-European population density, further examination of the documents they have used reveals very significant biases in their work. It is a legitimate conjecture that the two Americas had barely more than forty-odd million inhabitants, and Australia little over 300,000. Having regard to the significant population losses of both continents, and the relatively slow increases in India and Europe, it can be mooted that notwithstanding the doubling in the Chinese population, the world population was still less than 700 million in 1700.

Figure 1 – Population growth over 65,000 years

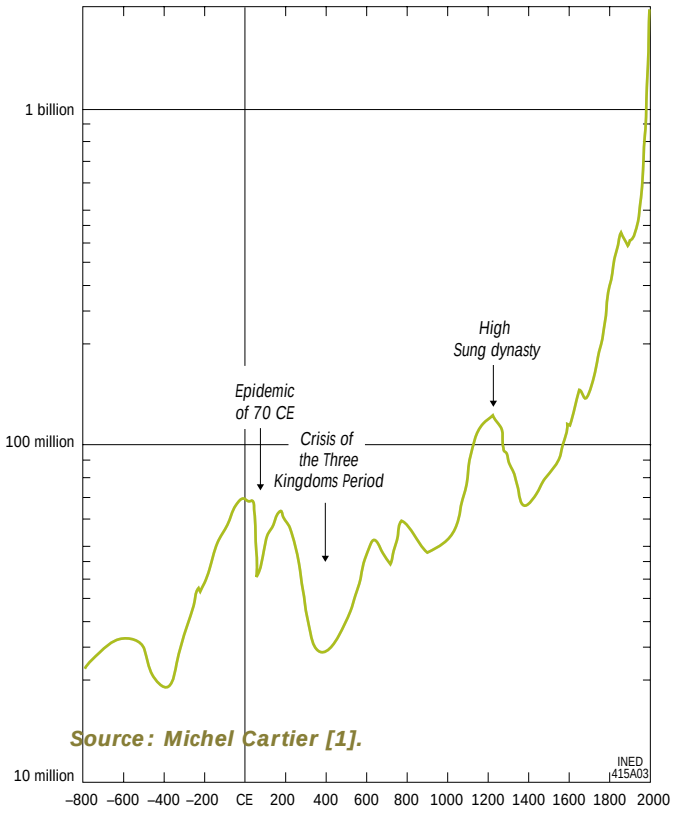


The population of China more than doubled in the 18th century, like those of Europe and the Americas, while those of Japan, India, the Middle East and North Africa stagnated. Sub-Saharan Africa's population also stagnated, or declined, but here because of the growing slave trade. All centuries combined, the volume of captives shipped to America can be estimated at 12 million, plus 6 million to the Arab countries. The world population is estimated to have been close to one billion by 1800.

In the 18th century, humankind entered a new era—demographic transition—which was to lead it into a phase of unprecedented growth. This vital revolution, which would stretch out over three centuries, would take humankind from a high fertility, high mortality pre-transitional stage into a low fertility, low mortality post-transitional stage. Almost wherever it occurred, the population transition began with a mortality decline driven by economic and medical progress, while fertility remained high for one or two generations. This produced an excess of births over deaths, driving rapid population growth. Once birth limitation had become more widespread, the lower birth rate would again more or less offset the death rate and the excess would be reduced or eliminated.

Population growth in beleaguered 19th century China, then still in its pre-transitional stage, slowed to

Figure 2 – Population trends in China over 3,000 years



Population fluctuations down history: the example of China

World population totals are usually given at selected dates at sufficiently long intervals between prehistory and modern times, and the curve connecting these points gives a mistaken impression of near-exponential steady growth. In fact, if the points are more tightly plotted, the curve ceases to display any regularity. Looking at the large totalities whose development has been best recorded since antiquity, like China, Europe, the Middle East or Japan (which between them account for over half of humankind), it is clear that these populations have fluctuated widely.

China is the best-known example, where a remarkable set of censuses dating from the start of the "common era" have recorded quite bewildering alternating periods of growth and decline over 2,000 years (figure 2) [1]. Periods of peace, in which the spread of technical progress and trade are easier, tend to be periods of prosperity, whereas destructive periods of war, which exacerbate severe food shortages and facilitate the spread of epidemic diseases, are frequently periods of economic and demographic decline. Occasionally, but not often, epidemics may be suspected, like that of 70 CE, which slashed China's population by 30% within the space of years. The description left by a doctor, Ko-Hong, suggests that this may have been smallpox, which had recently arrived in China. It is reasonable to assume that it had the same effects on the rest of the world population at the time.

a halt in mid-century, then began to fall. Although likewise still pre-transitional, Japan, India, the Middle East and North Africa saw their populations grow by one-half. Despite the abolition of the slave trade, sub-Saharan Africa, prey to colonization and much-beleaguered, continued to stagnate, whereas the Americas experienced a population boom due to mass immigration from Europe, rising fourfold in South America and 18-fold in North America. Australia's population tripled for the same reason. Despite this migration drain, Europe, in mid-demographic transition with significantly falling mortality, would more than double its population over the century and by 1900, the world population topped 1.6 billion.

In the first half of the 19th century, China's population was still stagnating, but mainly as a result of revolutions and wars. Despite conflicts, the populations of Japan, India, the Middle East and North Africa experienced rapid growth due to mortality decline. Likewise sub-Saharan Africa where the big endemic diseases were on the wane. Despite suffering the highest death tolls of the two world wars, and an all-round sharp drop in fertility, Europe's population increased as the result of a mortality decline. North America mirrored that trend, but to a lesser extent, due to its lesser involvement in the world wars and a steady if reduced flow of immigration. Likewise Australia. By mid-century, the world had 2.5 billion people. The sharp all-round mortality decline, especially from its still-high levels in the developing world, produced a growth spurt which peaked at 2% a year in the Sixties. As birth limitation gained a rapid foothold in almost all countries, growth slowed, but still remains at 1.2% a year today. The total world population stood at just over 6 billion in 2000. The developments described here are illustrated in the table. The figures make no pretence of accuracy, they are merely orders of magnitude. By around 2040 or 2050, the world population could be approaching 9 billion, and if fertility continues to decline, could be posting very much slower, zero or even negative growth.

REFERENCE

[1] Michel CARTIER - "La population de la Chine au fil des siècles", in: Isabelle ATTANÉ (ed.) - *La Chine au seuil de XXIe siècle, questions de population, questions de société,* coll. "Les cahiers de l'Ined", no.148, Ined, 2002, p. 21-31

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