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A Short Natural History of the Last Millennium

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Overview

When one contemplates the enormous processes of nature, a millennium is a short period of time. In order to grasp the fundamental natural realities of our age, we must look considerably deeper into the past, for everything that the last millennium has brought and the future will bestow was configured tens of thousands of years ago when the earth was going through an “ice age.” For the most part, the state of the earth today was shaped by the impact and after-effects of the last ice age (the Würm or Weichsel glaciation) as well as the rapid onset of human-induced changes at its conclusion. But our history as a biological species reaches much farther back, at least 120-150 millennia to an age when brawny Neanderthals (Homo neanderthalensis) still roamed Europe. Our distant ancestors, significantly weaker than this other decidedly robust species of human, either still lived in Africa or were gradually developing into “upright man” (Homo erectus) from a Central Asian line. Scholarly controversy over the history of the human species has currently arisen again. Regardless of how matters actually played out, it is nevertheless safe to assume that our predecessors were by nature hunters and gatherers who ranged over wide distances. After the last major warm stage (also called the “Interglacial”) some 120,000 years ago, when rhinoceroses inhabited the Rhein and the Thames and the megafauna in our region had a distinctly African look, the glaciers once again advanced massively from the North ushering in the final ice age to date and spreading well-nigh Arctic conditions across almost all of Europe. The ice cap started from Scandinavia and forced its way almost to the edge of the Central German Uplands. It covered vast expanses of the North Sea and the Baltic in its entirety. The ice locked in so much water that sea levels dropped more than 100 meters. Thus, the Thames became a tributary of the Rhine, with the Elbe flowing into it as well, before this central water system reached the North Sea and was ultimately rechanneled into the Atlantic by the ice. In the South, Alpine glaciers penetrated far into the plains for the fourth time over the last two million years. Their advance halted in the region just outside of Munich. Twelve thousand years ago they melted off again fairly rapidly. The great glacier melt occurred so quickly that almost unimaginable torrents of

water gushed down Alpine rivers like the Isar, the Inn or the Rhone, creating, for now, the final shape of the present river valleys. The lakes of the Alpine Foreland and the northeastern lowlands surrounding the Baltic Sea also date from the last ice age. Even the oldest among them are therefore only about 10,000 years “young,” which is indeed recent in comparison to the rivers. The Danube or the Rhine, for example, existed long before the onset of the ice age. As rivers, they are thousands of times older than the great majority of lakes, in other words millions of years old. At the end of the last ice age the climate began to warm with such extreme abruptness that, for example, the ice core drillings from Greenland for this transitional period show only a steep increase of 15 to 20 degrees that can no longer even be subdivided into 100-year intervals. Although there are a number of theories and conjectures about the causes of this extremely rapid climatic change, one possibility can be excluded with certainty, namely, that human beings were responsible for the temperature spiking into a warm stage. At that time there were still so few humans that they assuredly did not influence the immense sequences of natural events. During that period, however, they may already have been exterminating the first animal species. It is equally unknown why and how, shortly after the sharp rise in temperature, agriculture was invented in the so-called fertile crescent, the transitional region between Arabia and Africa. The ensuing settlement of mankind truly changed conditions for the long term. Almost simultaneously sizeable groups of people settled in the Nile valley in Lower Egypt, along the Indus and the main rivers of present-day China. Agriculture became an invasive technology that conquered wide stretches of Europe, Asia and North Africa in only a few centuries and radically changed the way humans lived. It is assumed that the Indios of Central and South America discovered new agricultural field crops, i.e., maize and potatoes, altogether independently of the developments in Eurasia, while the North American Indians as well as the Indios in all of South America east of the Andes developed no agriculture, or none worth mentioning, prior to the arrival of the white man. The Aborigines of Australia likewise did not practice agriculture. This is highly remarkable because the Papuas of New Guinea, with whom they are quite closely related,

had produced high yielding horticultural crops in isolated mountainous regions of their island, which remained connected with Australia until the sea level rose at the end of ice age.

The rapid termination of the last ice age was immediately followed by the longest interglacial of our present geological age, which is called the Holocene. It lasted for nearly two millennia. In comparison with the glacial period that followed, the temperature was elevated by roughly 7° C. In Europe and regions that were particularly affected by glaciation in North America, where the ice sheet was roughly twice the size of the one covering Europe/Northwest Asia, the vast boreal forests spread. Not until the deep permafrost soil had thawed sufficiently after an interval, did they follow the retreating ice. Perhaps these vast expanses of frozen ground, together comprising an area greater than all of Australia, emitted so much methane and carbon dioxide during the period that a natural greenhouse gas effect occurred, producing the post-glacial thermal optimum for the entire earth. In any event, the spread of the forests also spelled extinction for much of the megafauna that had flourished on the highly fertile ice-age tundra and reached astonishing sizes. For example, the giant deer: its antlers expanded to shovel-shaped forms at the ends, spanned over three meters and weighed more than 50 kilograms. It was also more massive than the largest of the still extant deer, the northern moose of Eurasia and North America. Its size and its antlers, which, like all deer antlers grow in only a few months and are later shed, usually at the end of the winter, provide evidence that the ice age tundra must have been far more fertile than the meadows, bogs and forests that replaced it in post glacial times. How else could the deer have metabolized the mineral substances for such enormous antlers in a matter of months? Ice-age soil and the flora it supported were extremely rich in nutrients. Its “legacy” can still be seen in the loess and loess-clay soil which provides optimal growing conditions for grain in the regions where it occurs and to the extent that there is suitable weather. The glacial wind that blew eastward, predominantly between the two vast ice sheets of Northern Europe and the mountain massifs of the Alps and Central Asia, deposited the loess. Although a substantial amount has been

lost to erosion, this fertile ice-age soil has enabled productive farming for millennia in Northern China, where in places loess deposits are still dozens of meters deep. Huang Ho, the “Yellow River,” is aptly named after the cargo of loess it carries most of the year. The glacial wind blew for thousands of years. As a result, one can justify the claim that the ice age in western Europe was responsible for the great fertility of the Far East, from Mongolia to the Yellow Sea. In the opposite direction the trade winds bear dust from the deserts of North Africa in the same manner, thereby bestowing fertility on the rain forests of Amazonia. The Sirocco blows dust as a natural fertilizer from the Sahara Desert into the Mediterranean Sea. Absent such fertilization the Mediterranean would exhibit an almost tropically weak productivity of fish and other marine animals. Only river estuaries supply nutrients, but since the rivers carried much less water during actual ice ages (glacials) than during more temperate periods, their fertilizing effect also fell off: globally, precipitation had decreased markedly because so much water had been trapped as ice on both poles. It was probably during the ice age that the migration of salmon and other fish originated because seasonal fluctuations in rivers were much stronger than during periods with more evenly distributed precipitation and steady groundwater flows. To a significant extent this was blocked by the permafrost, and for long months of frost during the ice-age winters no water flowed at all over wide regions. However, a dry, cold climate such as this must have been far more agreeable for humans and the animals that remained active in winter, because humidity withdraws heat from bodies much faster and wet fur no longer insulates. Ice-age humans had little need for firewood since the meat of the large animals contained a lot of fat, and a rich berry harvest in the fall enabled them to accumulate a reservoir of body fat. The great bears that lived during the period in species even bigger than those of today utilized the nutritious berries to create stores of fat for their long winter hibernation. The change from summer to winter, however, forced most animals to undertake extended migrations. Humans had to follow them in order to survive. Settlement was entirely unsuited to the natural development of the human species. Indeed, it entailed grave difficulties. This still holds true today. Repeatedly, mankind’s

deeply-rooted nomadism erupts. As we examine the changes over the last thousand years, we must also bear in mind that they represent only a tiny episode in the natural history of humankind.

The natural “givens” have a double affect on us. First, through the immediate circumstances and their current fluctuations. Second, via innate tendencies and needs. As an external framework and inner constraints, these function as counteracting forces to economic, social and political developments which can manifest as pressure. Nature limits the options, even when we attempt to disregard them.

As long as humans roamed as nomadic clans or kinship groups and supported themselves through hunting and gathering, they retained an extensive and unrestricted degree of freedom. Thus, the “free life” of “noble savages” was particularly extolled and glorified during the Age of Romanticism. Even today, greater freedom is often cited as a pretext for “dropping out” or when nature is held up “as a model.” In reality the very freedom of the nomads was exceptionally limited by the constraints of nature. The most beautiful location was useless if it couldn’t offer sufficient food and water. A person who views the remaining jungles of our day with the necessary critical distance cannot fail to realize that as a human being one could not survive there for a longer period without outside help. Therefore, the subjugation of the “wilderness” that rendered civilization with permanent human settlements possible, can be traced to very specific regions and clearly identifiable circumstances. After the ice age humans did not disperse over the globe “evenly” by any means. Vast spaces remained thinly populated or were only used temporarily, for example, the Amazon rainforests or the northern taiga which is the largest terrestrial biome. In the early historic period the Sahara with its oases was already more densely populated over a wide area than the Amazon or Siberia. If one takes natural conditions into account, it also comes as no surprise that humans were attracted to mountainous terrain. In early times cultures and advanced civilizations developed at frigid altitudes where the natural

environment guaranteed agricultural productivity and a healthy climate. This holds true for the highlands of the Andes in South America, for Tibet, the Altai region, the Caucasus and other high Asian ranges, as well as the Alps, whose name originally denoted something like “high-lying pastures.” Mankind’s development over the first 10,000 years following the last ice age adhered very closely to the basic model of soil fertility and climate as established by nature. The dispersion of humans can also be linked directly to these natural conditions and their fluctuations. The formation of settled communities and the resulting strong population growth began roughly at the middle of the last 10,000 years and at the climatic midpoint between the frigid North and the Tropics. The Mediterranean region (*Mediterraneis* derives from the Latin *medius terrae*) was actually quite tellingly named. Between 5,000 and 2,000 years ago it was indeed the favorably situated middle ground between the frozen North where “Boreas,” the north wind, originated and blew in cold air, and the hot South where the Ethiops lived, the “people with burned faces.” During the postglacial thermal optimum, however, matters were still quite different. At that time, Central Asia apparently offered the most favorable living conditions because it was the Uralo-Altaic peoples, the Caucasians with their Indo-European tribes, who expanded massively from this inner Asian center and literally inundated the entire area of northern Eurasia all the way to the Far East, as well as the region of southwestern Asia. Joint research into languages and language families together with the distribution and dispersion of genes put modern investigators onto the trail of this Uralo-Altaic center (Cavalli-Sforza 2001). The greater Caucasian region coincides with both of the most fundamental achievements of sedentary mankind, namely, the domestication of key wild animals native to the region and the cultivation of grain. Cattle, sheep and goats originated there, as did barley, wheat and rye. Very early on, beer and wine were “invented” here, probably at the time wild grasses were taken under cultivation and developed into grain. The chief fruit trees also originated in the region. Meanwhile, Africa supplied either no crops at all or only second-tier, much “younger” ones, and none of the domesticated animals with the exception of the globally almost insignificant Guinea hen. However, in the North of the

continent where the roots of mankind lie, there was highly intensive experimentation with every conceivable breed of animal during ancient Egyptian times. If one examines Bössneck's (1992) revealing book on the fauna of ancient Egypt, a comparison with the late-Czarist and Soviet model farm in Askania-Nova virtually imposes itself. Here, at the beginning of the 20th century or 3,000 years after ancient Egypt, a renewed attempt was undertaken to domesticate wild African animals. It failed again!

For this reason a much broader "Asiatic cultural triangle" with an apex in the Ural-Altai region must be superimposed on the "fertile crescent" where agriculture sprang up in the West. The eastern leg of the triangle stretches from the apex to China and Japan, while the western side extends via the Caucasus to Europe, present-day Turkey and into the Eastern Mediterranean. A baseline running through Persia and India connects the two legs of this great Asiatic triangle, where all major human impulses, innovations and discoveries originated – including written language. And all historical events notwithstanding, this Asiatic triangle has retained its central position, even if the center of gravity repeatedly shifted over the ages. The greatest human population by far is concentrated along the baseline: Europe, the Middle East, India and China, totaling some 3 billion people. Located in the area surrounding the apex and along the western baseline are the most important energy reserves by a considerable margin. The three most influential world views and schools of thought emerged from this triangle: Sino-Japanese eastern thought; Islam in the Southwest; and the Christian/rational views of the West. During the roughly thousand years surrounding the turn of the era (our time reckoning) these three world views took shape in the Far East under comparatively stable natural living conditions, in the Southwest where one was plagued by – but had to accept – rapid fluctuations of good times and bad, and in the European West with its orientation toward changing nature using metal, tools and technology. No region of continental dimensions is as rich in ores and simultaneously as riven and cleft as Europe. Nowhere else did the deserts advance as rapidly as in the southwest Asian area that

naturally separates Europe from Asia. Up until pre-Roman times the Central Asian deserts could still be utilized as pastureland. They were home to the wild camels that were bred into Bactrian camels. The Sahara was still green to a large extent, a savanna and steppe land that was rich in game. At the peak of Roman power, grain thrived so well in the hinterlands of Carthage that the city had to be destroyed in order to secure this “bread basket” for Rome. Prior to this time, advanced civilizations had flourished under favorable climatic conditions in the Land of Two Rivers, the Tigris and the Euphrates, and analogously on the Indus and the lower course of the Nile. An increasingly arid climate resulted in salinization and a drop in production. The onslaught of the barbarians was not the sole reason that the power of Rome melted away, for the empire had fought successfully to expand and endure for hundreds of years. During the first centuries of the Common Era massive climatic changes occurred, at least in the European/West Asiatic region. There is every justification for characterizing them as a glacial period. What ensued is known historically as “the turmoil of the Völkerwanderung,” from which the “Middle Ages” of European history arose. Our review will commence at this point because from here onward there are ample records on nature as well.

Numerous civilizations have had to and continue to struggle with the vicissitudes of nature, especially those that are dependent on productive farmland or artificial irrigation. The uneven distribution of warmth and precipitation and the resulting availability of water have always exerted a substantial influence on the weal and woe of civilizations, peoples and power. In his superb book, “Guns, Germs, and Steel,” Jared Diamond presents a detailed description and provides convincing reasons why there are special regions of the world that destiny apparently favors, where innovation originated and power centers established themselves. Although climate and soil as natural fundamentals are missing from the list contained in his title (guns, germs, and iron/steel), we will show that weaponry as well as pathogens only achieved their effects in conjunction with climatic change. Population growth and population pressure led to expansion

and made conquest possible. The “productivity” of the population was dependent on the productivity of nature and determined whether the empires that were established were to endure or rapidly disappear again. Or whether the population led an almost uneventful life with few needs and remained politically and historically insignificant for centuries. Thus, it is probably only if we consider environmental changes that we will be able to understand why the greatest contiguous empire, the vast realm of the Mongols under Genghis Khan, was so short-lived, while China and Japan remained “stable” for thousands of years in spite of the differences in their sizes and natural conditions, and why from the outset Europe repeatedly resorted to the sea in order to extend its sphere of influence. Meanwhile in Africa, with its close proximity to Europe, time seemed to have stood still in a manner similar to faraway Australia until Europeans also pushed their way into these two continents a mere 200 years ago. On the other side of Africa, South America had already been “colonized” 300 years earlier, and along the coast of North America the Basques were active at least 1,000 years ago, with the “Norsemen,” the Vikings, following shortly thereafter. At approximately the same time East-West trade had already developed in Eurasia via the silk route, and another thousand years earlier the Phoenicians sailed out of the Mediterranean and into the Atlantic. All of these events can be attributed just as little to “coincidences” of history as, for example, the increased strength of the Germanic tribes, their advances and the destruction of the Western Roman Empire came about by chance, or the well nigh explosive initial expansion of Islam. Historical science searches for “reasons,” as does natural history. And there is an awareness that even abundant, comprehensive knowledge of the causes cannot adequately account for all of the events or the times at which they occurred. Our examination of natural history will also have to content itself with identifying possibilities or probabilities. Every age that we view as a cross-current to the flow of time already has a previous history of its own. But in every case the present always retains a degree of freedom with respect to the further course that history will take. Those who view such freedom as the sole criterion of history, however, will wind up with a disjointed succession of events that is just about as exciting

as memorizing dates for a school history class.

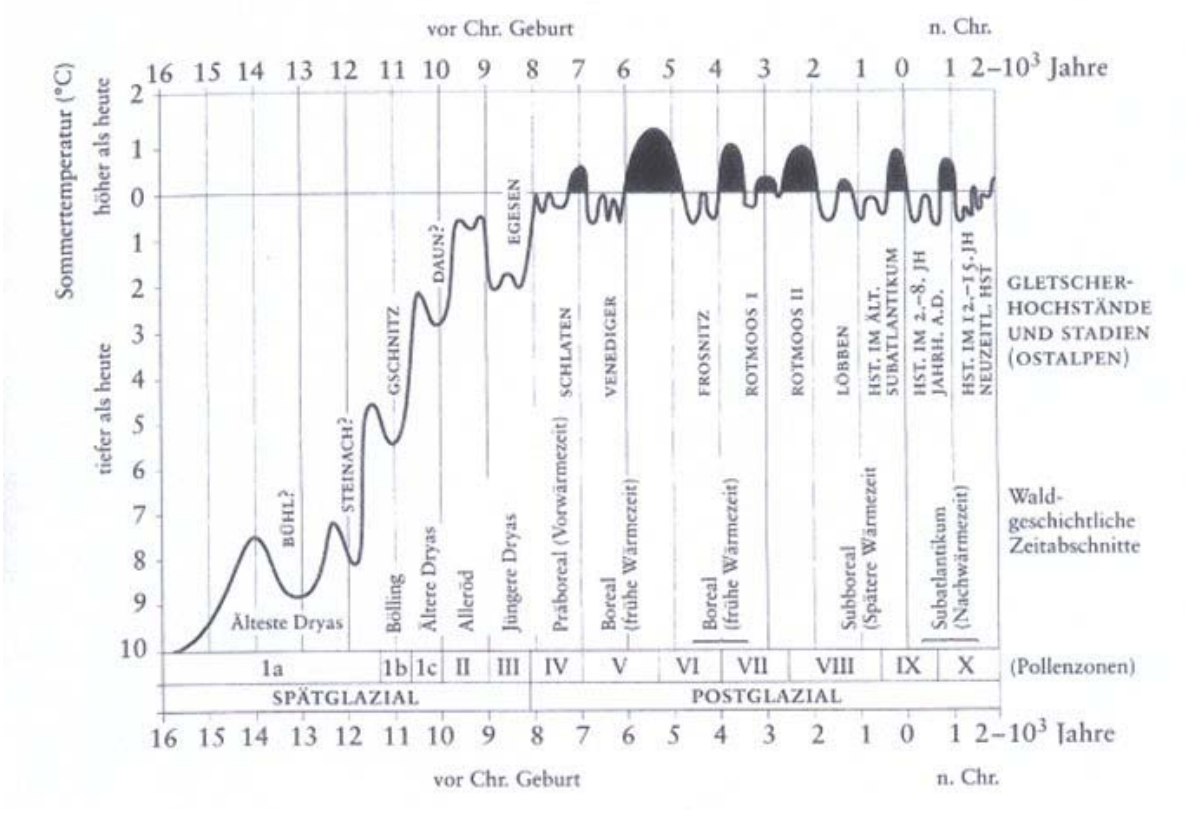

Fig. 1: The course of late-glacial and post-glacial climate development in Central Europe based on pollen analysis results (conducted by Kahlke 1994, modified).

The question of how the future could turn out for us or how it should not turn out requires us to take our bearings based on a history with causes and reasons, because nothing that occurs is totally new. This applies to climate change as well as to political and social changes within societies and states. If the human race as a whole is growing, but our populations and Europe's share of the world population are shrinking, it is inevitable that other conclusions will emerge for confronting global change than would apply to rapidly developing populations such as India, China or Brazil. Doubtless we need an outlook for the future; the present alone is insufficient. Inapplicable or even erroneous conclusions drawn from history can be corrected by using better data and more thorough research. If putative relationships do not exist in the assumed form then the conclusions drawn from them can be modified. The era immediately preceding our present

times was most assuredly not the only right state for the earth, as history teaches us in any event. But what happened in earlier times and under what conditions can at least enable us to reflect judiciously on the expectations, hopes and fears of the present. If for no other reason, the past is informative because it has already taken place, and people reacted to it. We can ask ourselves how we would react or behave under analogous circumstances. In his most recent book, “Collapse” (2006), Jared Diamond presents the history of selected cultures. Some perished, others survived. What did they do right or wrong? His interpretations invite a critical examination where the real question isn’t whether he is correct or not, but rather what these scenarios imply for the future. For the progress of knowledge and sufficiently good prospects for the future are based on correcting errors and not on blind faith in irrevocable truths or stubborn adherence to opinions once recognized as “sound.” The present always consists of the past and the future simultaneously. Human history and natural history admit change as an unalterable reality. During the last 10,000 years stability emerged over the short term at best and perhaps only *appeared* to emerge, because we are not yet able to identify the true extent of the changes. Climate has been fluctuating since the last ice age, and quite significantly at that (Fig. 1). The last two major fluctuations, that is, the Medieval Warm Period and the Little Ice Age, fell within the last millennium. A thousand years ago it was at least as warm as it is today.

During the last 500 years extremely cold winters suppressed average temperatures up into the 19th century and drastically changed agricultural production conditions across wide stretches of Europe. But is the region we will examine here, i.e., greater Europe with a surface area of roughly 10 million km^2, large enough for a global perspective? Even if this question had to be answered in the negative, it changes nothing about the fact that Europe, for those of us who live in Europe, is of primary importance. No one would deny a population the prerogative of viewing the present and the future in relationship to itself. If other populations raise such an accusation, they are thereby already making judgments that are equally subjective. China, with a history at least as long as the one we Europeans can report, is at liberty to use its own standards to evaluate

past and present and draw conclusions for the future. This applies for all ethnic groups and civilizations. What proves to be much more problematic, however, is our standard approach of seemingly not thinking first of ourselves, but rather attempting from the outset to make pronouncements that are correct for the entire world. In contrast, if the various benefits and losses resulting from change were each portrayed fairly, the measures necessary for the future could be negotiated and implemented more easily. In this respect as well, history offers many informative examples of winners and losers. At first, the destruction of the Western Roman Empire benefited the Germanic tribes that were pressing south-westward into warmer territories. Subsequently, however, the power vacuum in North Africa permitted a rapid expansion by the Arabs and Islam. Who then profited from the climate change that was active in the background? Who lost? And how long did the shifts in spheres of power and influence last? Nowadays, in turn, we tend to assume that humanity has come to rest, even though it is a known fact that masses of Africans are pushing into Europe, as are Latin Americans into North America, and Asians into the entire world. The migration problem will remain unresolved as long as only “qualified individuals” are welcome, while the broad masses must be held off with force. When millions of Europeans emigrated to North and South America a good hundred years ago and Europeanized the double continent of America – as well as Australia on the other side of the globe – they didn’t ask whether the native Indian population or the Aborigines approved. And now we, the Europeans in Europe and in the “new Europes” (Crosby, 1986) of the Americas and Australia, are acting as if it were outrageous that others are trying to come to us in the same way! In almost every case the underlying cause of such tension is a build-up of population pressure. This, too, is a result of the favorable climate during the last 150 years and not merely the allure of “the affluent” facilitated by migration. Thus, as we cast a worried eye on the future, we have a wide array of good reasons for examining the past more closely than we have until now. It was shaped as nature changed and then shaped again as mankind changed nature. Our past consists of human history and natural history simultaneously. To illustrate this will be the central purpose of my review of the last

millennium, which is important for us simply because it is the most recent one and served as the foundation for our contemporary times.