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## DISREGARDING THE ENVIRONMENT: AN ANCIENT TRADITION

by André Corboz

Today, ecology exerts an enormous influence on our daily lives and is a major factor in professional debates within all of the engineering disciplines. Instead of violent, invasive measures, we are belaboring the idea of gentle integration – in architecture, in the construction of infrastructural facilities, and in industry. This agenda of harmonious interaction can go to such extremes that it paralyzes development. It has even led to proposing no change at all as the best solution, a tendency that can be observed especially in German-speaking Europe.

One might claim that we bow down before nature. This attitude is a response to a long history of ignorance regarding the interaction of complex ecological factors. There is also a widespread belief that natural catastrophes have been caused by human beings only since the Industrial Revolution because earlier civilizations were not technically advanced enough to trigger them. Obviously we all know that humankind has long suffered its share of catastrophes: epidemics, earthquakes, volcanic eruptions, drought, extreme precipitation and floods. But the emergence and disastrous after-effects of these catastrophes have not been causally related to human intervention. In order to readjust this assessment of human influence on the environment, let us recall a few of history's "major construction sites" to illustrate how humankind has imposed profound, large-scale change on our life environment.

The first example is the Cheops Pyramid of Giza, on which construction began in about 2650 B.C. Each base side is 230 meters long and the pyramid rises to a height of 146 meters. It consists of approximately 2.6 million cubic meters of gigantic stone blocks, whose total weight is estimated to be some 7 million tons. It covers an area of about 53,000 square meters. Think of

the Place des Vosges in Paris: it is certainly not a small square, but it measures only 12,000 square meters, in other words, four times smaller than the pyramid! The spire of Strasbourg Cathedral is a mere 140 meters tall, four meters less than the Cheops Pyramid. It took about one and half centuries to complete construction on this pyramid 4500 years ago.

In contrast to a pyramid, which is merely a speck in the landscape, other examples are of substantial territorial extent. Hadrian's Wall, erected in northern England in the second century A.D., was some 120 kilometers long and reinforced by 17 military camps; 20 fortresses were built to defend the Antonine Wall, erected in the same century. Even more dramatic are the Upper Germanic and Rhaetian Limes, which extended from the Rhine to the south of Cologne all the way to the Danube, west of Regensburg. The total length of almost 500 kilometers was heavily fortified with over 60 military bases and some 900 watchtowers. These fortifications were built at the end of the first century A.D. and consisted largely of ditches, palisades and, in some parts, walls. The troops themselves built these fortifications with only very primitive tools at their disposal. The Germanic Limes, extending over 450 kilometers along the left shore of the Rhine, consisted only of watchtowers and military bases.

The structures erected in the time of the Roman Empire pale in comparison to the great Chinese Wall, which actually consists of four consecutive walls. These were rebuilt and enlarged several times: under the Chin Dynasty in the 3rd century B.C., during the Han Dynasty from the 2nd to the 1st century B.C., during the Jin Dynasty in the 6th and 7th centuries, and, above all, during the Ming Dynasty, which lasted from the 14th to the 17th centuries. The total length of some 6000

kilometers (the available data are contradictory) includes over 20,000 watchtowers at altitudes between zero and 3000 meters! Being so long, the fortifications were not only beset with complications in the building process, their military use was troublesome as well. Because of its size, it was assumed to be the only structure on earth that could be seen from outer space. However, much to the disappointment of his compatriots, a Chinese astronaut recently declared that he had not been able to see it, which is hardly surprising since this gigantic achievement only measures five to six meters in width!

Noteworthy in this context are also the paved roads of the Roman Empire, extending over a length of 290,000 kilometers. Of these, 85,000 kilometers were main arteries, often with tracks built into them. In many places, the roads had to be carved out of the rock cliffs. However, in the following centuries, road building almost ground to a complete halt. It was not until the 18th century that construction rallied, especially in absolutist France. The school of *Ingénieurs des ponts et chaussées* was founded in 1757 to train engineers, who built 20,000 kilometers of roads in less than 50 years, and in the year of the revolution, in 1789, an additional 20,000 kilometers was under construction.

The engineering feats in France were not restricted to road building; they included canals, such as the “Canal du Midi” in southern France, a waterway between the Mediterranean and the Atlantic. The idea of building the canal, also known as “Canal des deux Mers” and “Canal du Languedoc,” was first proposed in the year 1539, though construction did not begin until 1666. Astonishingly the canal was inaugurated a mere 15 years later – an incredible achievement considering the fact that the canal is 240 kilometers long and that 60 locks had to be built. As many as 12,000 people, men and women, were employed in its construction.

Traffic networks of this kind are found not only in Europe. In South America, the Incas created

45,000 kilometers of pathways primarily in order to control their empire. The messengers who used them could cover incredible distances of up to 200 kilometers a day. And as in China, the network extended between altitudes from zero to 4000 meters above sea level. These interventions in the territory can certainly compete with the dimensions of such projects today, although it took much longer to build them given the technical means available at the time, which were still almost as primitive in the 18th century as they had been 4000 years earlier.

One might of course argue that the above-mentioned examples do not offer proof of environmental violation. Some examples of intervention have, in fact, had consequences that are not simply neutral but actually positive, as in the countless regions where irrigation and drainage ensured the survival of the population. In Europe, the Benedictines harnessed the water of the Po River in the 10th and 11th centuries, turning the plains into an extremely fruitful agrarian region, while the vineyards of Lavaux on the northern slopes of Lake Geneva are indebted to the initiative of the Cistercians. Steep, terraced slopes of this kind are, incidentally, also found in the Far East for the cultivation of rice, as well as in South America. The most impressive example of territory reclaimed from the water is undoubtedly the area of Holland, which is for the most part an “artificial” landscape whose construction began in the 11th century.

But even at the beginnings of human civilization, inroads were made on the environment that had catastrophic consequences. The first instance goes back to about 6000 B.C. when the inhabitants of Europe changed from being a hunting and gathering society to a less nomadic existence as farmers and shepherds, who cultivated the land and raised cattle. However, it was not until some 3000 years later that they began to exploit “nature” on a large scale with the discovery of metal as a raw material. The mining of copper and iron at that time, along with the invention of bronze, which

is an alloy of copper and tin, introduced the first truly devastating treatment of the landscape. In the period between the 18th and 14th centuries B.C., the Hittites cleared so much lumber for the processing of iron ore that their woodlands became wastelands, the consequences of which are still visible in Turkey today. Similar developments took place in Iran and in the Caucasus. Much later, in the 19th century, the commercial mining of asbestos was so intense in Québec, in the Thedford Mines for example, that today slag heaps cover an area of 10 times 20 kilometers and rise 50 to 80 meters above the landscape. Most of the mines began operations in 1876 and were mechanized after 1890. Many have been shut down just recently. One can only speculate about the long-term consequences of such a vast accumulation of contaminated material.

Another example is the Styrian Erzberg in the Austrian Alps. There, open pit mining of the largest iron ore deposits in central Europe, rising to a height of 1300 meters, dates back to Roman times. Over the centuries, the Erzberg, once a mountain, has shrunk to the size of a hill.

In other regions, the conquest of the seas led to deforestation. The Dalmatian coast is largely denuded of trees – some islands have become barren heaps of rock – mainly because of the occupation by the city state Venice, which cut down the forests of Dalmatia in order to build its shipping fleet and to shore up the city itself with untold thousands of wooden piles. The vast steppes of the Spanish plains are the consequence of similar developments. Only by destroying the forests was it possible to build the great Armada for an empire in which the sun never set. Subsequently, herds of sheep accelerated the process by destroying the remaining vegetation. The amount of wood that was consumed in those days is dramatically illustrated by the fact that 3000 ancient oak trees were required to build one large seagoing vessel in the royal shipyards of 18th century France.

Emigration and immigration also influence the ecology of a territory. The emigration of Germans

to Eastern Europe meant that the number of inhabitants per square kilometer increased from 4.5 in the year 800 to 25 in year 1320. Because of overpopulation, epidemics, and wars in the mid 14th century, over two thirds of the fields lay fallow a mere 100 years later. In the year 1300, there were 170,000 villages; by 1450, 40,000 of those had vanished. Scientific, technical, and economic developments have brought about a profound transformation of the relationship between population density and agricultural production. In the 19th century a farmer cultivated one hectare of land on average; the average today is 200 hectares. Such structural change has had a lasting impact on our idea of nature and the way we relate to our environment.

To understand the change in attitude toward “nature” from the Neolithic Period to the Industrial Revolution, one must realize that it is not a given, as we have been repeatedly told since the triumphant onslaught of positivism. Every civilization and its culture determines what nature is. Nature is what culture makes of it.

According to Cicero, “All dominion, too, over the resources of the earth belongs to man. We enjoy the mountains and the plains, the rivers and the lakes are ours, we sow the crops and trees, we give fertility to the land by conveying water to it, we confine the streams, we straighten or divert their course – in short, by means of our hands we endeavor to create in nature a kind of second nature.” (De Natura Deorum, II, LX)

Cicero’s description of the pragmatic and constructive relationship of the ancients to nature, which could almost have been written today, gave way in the Middle Ages to an ethical/religious approach. This has had a greater influence on our relationship to the environment than many would be willing to admit. Since antiquity, encroachment upon the landscape in Europe has been under divine protection, as it were.<sup>1</sup> The scriptures exhort Adam’s descendents to “have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moves upon the

earth.” The right to dominion bestowed upon humankind also involved a special responsibility for “creation.” St. John Chrysostomos compares man to a provincial governor, who must not abuse his power. However, abuse, especially of power, was part and parcel of daily life. Some of the above-mentioned historical examples clearly testify to the great gap between the moral principles of Christianity and their implementation.

Local traditions that survived Christianization have had as much of an impact as the scriptures themselves. The attitude toward the Alps in ancient times and in the Middle Ages is especially revealing: the Alps were the quintessential territory of disaster. Lucretius speaks of the horror and dread that fill such terrifying places as mountains and deep forests. These places were terrifying because of the wild animals and especially the dragons and monsters, pictures of which were still published in books with scientific ambitions as late as the 18th century. For example, in his *Museum diluvianum* (1716), Johann Jakob Scheuchzer speaks of a fabled creature in human shape, “as had been seen in the year 1696 in the Alps of the southern Grisons.” Many eyewitness accounts of such monsters are, incidentally, irrefutable since the authors do not restrict themselves to oral testimony, claiming instead to have seen the monsters with their own eyes.

So how did the inhabitants of the Alps relate to their environment in those days, especially the farmers and those living high up in the mountains, who were poor, uneducated, and raised in the spirit of traditions dating to the Stone Age? Not only did they have to fight off dragons and devils but wolves and bears as well, though there’s talk today of introducing them into the region again – the wolves and bears, that is, for there seem to be certain misgivings about the dragons. The mountain inhabitants daily faced other threats as well, such as landslides, avalanches, floods, and forest fires. What we call the environment represented a ceaseless menace to these people, and their relationship to nature was one of sheer

survival. Christianity certainly tried to combat the horrors of the Alps by “blessing” the peaks, the hills, and the valleys with chapels and processions. From a secular point of view, one might also say that a heathen, mythical idea of menacing nature had been replaced or complemented by another truth.

Not until the Age of Enlightenment did perception change, thanks to two views of nature, which appear contradictory at first sight. One view is found in Albrecht von Haller’s didactic poem, “Die Alpen,” of 1729. The poet describes the harmony of life in the mountains, modeling his argument after Virgil’s “Georgics” and after the adventures of Telemach by Fénelon, a theme that Rousseau took up again in his draft of a constitution for Corsica. Alongside this humanist ideal of the simple life, a second scientific approach emerged, as illustrated by Horace-Bénédict de Saussure in his *Voyages dans les Alpes* (1776–96), a pioneering work in geology. On the one hand, nature becomes a subject to which one can relate personally; and on the other, an object that must be subjected to scientific method. The first approach is the very source of Romanticism, which saw in the territory of the Alps the quintessential sublime experience. Without this attitude toward the Alps, the development of tourism and its attendant facilities such as cable cars, railways, hotels, and roads would have been inconceivable – a development that has had a greater, more enduring impact on the territory than all previous human intervention together. The second view of nature, advanced by positivism and its quantifying perception of nature, ensured its efficient exploitation.

On the basis of this brief historical outline, one can at least understand why the subject of ecology did not become an issue much sooner. Awareness of the emergence of “nature” as the subject and object of human perception is relatively new. It was only through the conceptual framework of psychoanalysis that it became common to distinguish between projection and perception. Nature was taken for granted, and its “nature” dictated by

the prevailing attitude. And so, just as Absolutism claimed to derive its power from divine right and therefore could do no wrong, it was the goal of intervention in the territory to bestow upon it royal or imperial character. Louis XIV had Versailles built on swampy terrain. He had it cleared, filled, altered, and redesigned, a demonstration of personal power that was subsequently emulated by all the other rulers in Europe. Peter the Great did exactly the same thing when he founded St. Petersburg in 1703, building the city on land that we would consider utterly unsuitable, on swampy floodlands with an extremely raw climate – which did not prevent him from calling his new capital city paradise! Shortly after the United States acquired independence, the decision was made to base future planning on a geometrical grid. Begun in 1785, this territorial grid did not reach the Pacific Coast until the year 1910. It was a project undertaken in almost complete ignorance of the topography and the features of the earth, the ground underneath, and the climate – more precisely, it was a project violently forced upon the entire land. American democracy has put its stamp on its territory in a fashion that echoes the exercise of power practiced by Absolutism. At the close of this essay, one is reticent about quoting the famous words of the German poet Hölderlin: “Man dwells poetically.” The will to power, but above all the necessity to survive, have compelled peoples to construct their territory – usually in contradiction to today’s knowledge of the ecology. Many of the above-mentioned examples exert a fascination through the impact of their unique vision and design. If we could manage to combine this will to design with the findings of ecological research, Hölderlin’s words could become a beacon for us all.

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1 Jean-Claude Guillebaud, *Le principe d'humanité* (Paris, Editions du Seuil), 2001, p.69