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Humans in Nature: Toward a Physiocentric Philosophy

WHAT IS THE QUESTION TO WHICH humans are the answer? Narrowly speaking, this was the riddle the Sphinx posed to Oedipus: “What walks on four feet in the morning, two at noon, and three in the evening?” When Oedipus knew the answer—man—the beast was defeated. But thousands of years of our history, and especially the scope of environmental damage in the last few hundred, have changed the beast’s appearance and posed the riddle anew. Before we give our answer, we must first understand the environmental beast’s question. As an approach, in this essay I explore the cultural and conceptual history of nature in the Western tradition and the reasons and chance for a shift toward a philosophy of nature centered in nature, in *physis* rather than *anthropos*.¹

HUMBOLDT’S DISCOVERY

Alexander von Humboldt, the scientist and explorer, has been called the second European discoverer of America, particularly of South America. Today, we might rather recall Humboldt as a discoverer of humanity itself in nature. Even in the present we usually take for granted that “here we are as human beings,” and that some of us refer ourselves, scientifically, to the rest of the world around us. The universe then appears to be our environ-

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ment, the human habitat. This approach is consistent with the anthropocentric dualism of being and having, namely, to *be* human and to *have* everything else at our disposal. Quite differently, Humboldt accepted the riddle of the Sphinx as an open question. How, then, did he look for an answer?

In his comprehensive work, *Cosmos—Outline of a Physical Description of the World*,² Humboldt started with the universe as the great garden of the world (*Weltgarten*). He presented its cosmogony and cosmology, and only finally pointed out that among and with many other celestial bodies in that great garden there is also a little planet called Earth. Humboldt proceeded to describe how this planet emerged from the sun and how it continues to depend on the sun's light and warmth. Next, the elements of life—earth, water, air, and fire (or energy)—are considered with respect to their physical and chemical properties. These elements then give birth to or become alive in the biosphere so that “the geography of organic life . . . directly follows the description of the anorganic phenomena on Earth,”³ with the same forces and basic substances prevailing in both spheres. Finally, humans are recognized as part of the biosphere, which itself is part of Earth and which again Humboldt points out as a particular place within the great garden of the universe.

Humboldt's answer to the riddle of the Sphinx is Copernican. He neither presumes that Earth is the center of the universe, nor that humanity is the center, but openly accepts the question of how and where we fit into the world. His answer is that we participate in the whole as part of a part of a part of it, and that we find ourselves at our place within a family of living beings, or together with others. These others are essentially *with* us, not around or for us. In accord with Humboldt I call them the co-natural world, instead of the “environment” with its unfortunate anthropocentric connotation.

Humboldt went further, and this next step may justify attributing to him the modern scientific self-recognition of humanity in nature. Thus far humanity has been identified materially as part of the biosphere, but a truly holistic⁴ description must consider “nature . . . in both spheres of her being, in the material as well as in the spiritual.”⁵ Humanity is organically equipped with reason, as a fish is with the faculty to swim. As Immanuel Kant wrote,

“Reason is a gift of nature.”⁶ In the study of the history of language, a preeminent tool of reason, Humboldt specifically considered humanity as a living natural whole (*lebendiges Naturganze*).⁷ In fact, he wrote that “language is . . . part of the natural history of mind” (*Naturkunde des Geistes*).⁸ “The natural history of mind” sounds strange to the modern philosophical ear, but is not the perception of nature itself a natural process, so that human awareness—and that of other beings—of the co-natural world and of the whole itself must be considered within the description of nature? In this sense, the first part of the second volume of Humboldt’s *Cosmos* deals with the perception of nature in the poetry and visual arts of *Homo sapiens*. A historical outline of the scientific perception of nature follows in the second part.

Humboldt asserted that nature should not be conceived “as if mind were not included in the whole of nature” (*als wäre das Geistige nicht auch in dem Naturganzen enthalten*).⁹ Among the millions of species, nature rather has produced quite a few with faculties of language (many more have consciousness, and all, as we know, have DNA, a “syntactic language”). One has a particular awareness of the whole, so that nature recognizes herself by means of reason in the human mind. In fact, after billions of years in natural history, one of the many beings that had emerged from evolution raised its head and, in Greek antiquity, called the whole what it is: *cosmos* and *physis*. Humboldt’s approach to science bears a chance to avoid the basic inconsistency of modern science as otherwise developed, that is, to comprehend the world except for a blind spot with respect to the most basic fact of that comprehension—namely, that the world includes scientists who strive to comprehend it.

The mainstream of modern science did not absorb Humboldt’s Copernican insight but has only replaced geocentrism with anthropocentrism—one wrong answer for another. I state this easily, observing the environmental crisis of industrial society, but the challenge to develop a truly Copernican science still seems almost beyond human capacity. Even the theory of evolution has yet to be well understood as the basis of a natural history of the human mind. With respect to the recognition of the scientist within scientific knowledge, quantum theory in Niels Bohr’s understanding seems most advanced, but the industrial economy is still based

on classical physics. While the Copernican challenge to Western thought five hundred years ago evoked a development that comprises anthropocentrism as well as evolution and quantum theory, this development has impetus apart from such elements. Identifying this development further may help in considering the chances to stand up for the Copernican challenge within the next five hundred years—time scales of centuries being required for the profound penetration of major ideas into human cultures.

THE COPERNICAN TURN IN THE RENAISSANCE

The Copernican turn is usually dated 1543, the year Nicolaus Copernicus's book on the revolutions of the celestial bodies was published. In it he maintained, of course, that Earth and the other planets orbited the sun while the outer sphere remained fixed. Astronomically, this view revived Aristarchus's heliocentric system, which had been rejected for good physical reasons in antiquity. Neither Copernicus, who knew the former discussion, nor—almost one century later—Galileo had much better physical evidence in favor of the heliocentric idea than Aristarchus in the third century B.C. Newton had such evidence in his celestial mechanics, but the Copernican doctrine was no longer disputed in his time. Scientifically, the issue was not settled before 1686. That Copernicus had been largely accepted long before—mainly through Galileo's protoscientific and rhetorical exposition—shows that the Copernican issue was not fundamentally scientific. Rather, the Copernican turn was a broader cultural matter.

Galileo knew for what he fought: it was not astronomy, but the autonomy of modern man to locate himself in an open universe, no matter what the traditional authorities said. Although this claim was not presented for the first time in 1543, Copernicus's book definitively expressed the emerging spirit.

When did the Copernican turn begin? In modern times, artists usually have been most sensitive to what is emerging in history. For instance, the Impressionists were the first to paint their own painting apart from what they painted in particular, about a third to half a century before Einstein's relativity theory and Bohr's interpretation of quantum mechanics. To paint a tree as well as its paintedness, or form of perception, is basically the same idea as to

consider an experimental setup as part of the physical reality of the observed object. Going back in time from when Copernicus read proofs on his deathbed, we find Leonardo da Vinci and Raphael in Florence; Antonello in Messina; Albrecht Dürer in Nürnberg; and Giovanni Bellini, Giorgione, and Titian in Venice. Looking into some of the faces in their portraits, we immediately know what happened. We see modern man at his best: open-minded and free to take up quarters in an open world.

Observing how the painters relate the saints as well as humanity to the co-natural world clarifies my meaning.¹⁰ Jan van Eyck's *The Virgin and Child with Chancellor Rolin*, painted about 1434 in the Netherlands, provides an early example. The Virgin is painted without a halo, and the chancellor approaches her size. Kneeling before her in adoration, he is the donor of the painting. Between them we look along a river into the landscape; a bridge crosses the river, and there is a city on both sides. The Virgin and the chancellor appear on a balcony, below a roof but open to the world outside. Some people are shown who have turned their backs to the celebrities and look down the river and to the city. Mary and the chancellor seem a little too big to fit into the world shown behind them.

The formerly dominant religious paintings, which portrayed the biblical characters or later saints, had been gradually invaded by landscapes, animals, and plants in the background. Van Eyck took a further step. Man himself now came into the picture, into his own portrayal of the universe. We do not only live among other things and beings, but we begin to consider in these paintings how we put ourselves in the world, together with the sacred figures who had become the paradigms of humanity. Giovanni Bellini's *Madonna with Child*, painted in 1510 when he was eighty-two years old, illustrates how the saints are gradually indented into the world: Mary sits on the earth in a broad imaginary landscape with trees, mountains, animals, and people, holding the child. A screen behind still shields them, but only slightly, from the secular world. A little earlier Raphael had already omitted the screen in his *Alba Madonna*, showing Mary as a young woman in the country.

A little later than van Eyck, Rogier van der Weyden (1400–1464) painted almost the same scenery in *St. Luke Drawing the*

Virgin. The Virgin sits on the left, St. Luke stands on the right, and again there is a river. In the city some fifteen people, engaged in various activities, can now be identified individually, in contrast to van Eyck's painting. Moreover, St. Luke, looking like a similarly educated and modern man as the chancellor, draws Mary. Formerly only the holy figures had been painted in the manner that St. Luke uses to draw Mary in the painting, but now this activity was itself painted as a process that took place in nature. Rogier painted how painters related themselves to the saints, embedding into the world the painting of the former painters who painted only the saints apart from the world. I am not suggesting that he intended this reflection, but this is what I now observe when I step back once more behind the artist who portrayed a painter at work.

When Albrecht Dürer painted his self-portrait as a twenty-seven-year-old man in 1498, he even more appeared—at least individually—on his own Copernican turn. As the art historian Erwin Panofsky observed, this was “perhaps the first autonomous self-portrait at all,” that is, painted for no other reason than self-recognition.¹¹ Three years earlier Dürer had returned from his first trip to Italy, where he had met Bellini in Venice and had become conscious of himself as a painter. Dürer looks at the viewer from the left side of the painting. On the right side behind him we can identify a landscape that he had seen and painted on his trip to Venice. He thus paints himself as someone who became aware of himself when he set out into the world as a painter and related himself to the co-natural world.¹²

Leonardo da Vinci's *Ginevra de Benci* (circa 1474) provides an earlier example of a completely secular painting of a person fitting into an open world. The beautiful lady is shown with a dense, tree-like broom behind her. Beside the shrub, further in the background, Leonardo paints a lake, trees, and a distant city. This is not a portrait of a lady with a scenic background, as if the lady stood in front of a picture of a landscape. Rather, the lady fits into the landscape, participates in it, or at least is embedded into the co-natural world that is already cultivated by humanity.

How man himself takes up residence on Earth without anymore relating himself to the religious paradigms is also the topic of Giorgione, Titian's great predecessor, who died in his early thirties in the plague of 1510. *Il Tramonto*, for instance, painted probably

around 1504, shows several men at a lake between mountains, a knight killing an animal, and two wanderers facing another creature in the water. Giorgione is supposed to have thought of St. George, St. Rochus, and St. Gottardus in this painting. If so, it is surprising how completely the saints have turned into human beings. Moreover, the subject seems to be nature herself. The whole scenery is animated; even the rocks seem to participate emotionally. In the background a city fits into the landscape. A similar Giorgione work, *The Tempest*, is frequently considered the beginning of modern secular Western painting.

Consciously locating ourselves in the world coincides with a growing self-esteem with respect to the religious paradigms. The entry of donors into a religious picture makes this self-esteem conspicuous. First they appear as tiny figures, adoring the saints like mice from the bottom of the picture. Then the donors enlarge until they reach the size of the saints. Palma il Vecchio even let Joseph put his hand on the shoulder of one donor, a man of his size who is placed in the picture only a little below the *Sacra Conversazione*. It is as if man were grown up and now felt like taking the lead himself.

The Renaissance outlook of an open mind into an open world—which men and women can enter from the closed sphere of their former being to find their own place to settle down in self-esteem and confidence—spread in Europe during the sixteenth and seventeenth centuries. A learned man who spent his twenties mainly in Italy, Copernicus was sensitive to the spirit of the age. Belief in the geocentric system, or the closed world of the Middle Ages in which everybody and everything belonged somewhere, receded only in the seventeenth century. Of course, the openness of the mind, the world, and the future demanded a struggle against the old authorities, and, as far as openness was achieved, steps had to be taken on newly opened paths to make oneself at home in modern times. Some new security about one's location in the world had to replace the security implied in the geocentric system. In retrospect, this basic new security was dominantly found in the anthropocentric substitute for geocentricism. It would in turn begin to fade in the more recent transformation of the Western wealth society into a society primarily at risk from itself.

In the environmental crisis, other ideas that meet the Copernican challenge could also get their chances. For instance, a truly Copernican answer to the Copernican challenge was developed by Giordano Bruno, who was burnt in 1600 for insisting on God's infinity as a property of the world. Bruno referred to Actaeon's fate in Greek mythology.¹³ Actaeon, a hunter, was strolling around in the forest one day after a successful hunt and happened to enter into a sacred grove where Artemis (Diana), the virgin goddess, was bathing in a pond. Suddenly, in view of Artemis, Actaeon became inflamed with love for her. He was changed into a deer, from the hunter into what he hunted. As such, he was killed by his own dogs.

Bruno compared Actaeon's hunt to the search for knowledge, Artemis to nature, and her twin brother Apollo to God. Actaeon's thoughts meet their object in the things and beings of nature. As the knowing subject, he is not part of the object. Then he gains an awareness of nature herself, Artemis, the nature of being, beyond the things and beings of nature. This changes him from knowing to being known. He looks no more for others, but he is looked for himself. In view of nature herself, he is made to feel like those whom he had previously made his object, being with them instead of objectifying them. Now, by falling in love with the goddess, he has the experience of belonging to nature, like those other beings of nature. He recognizes himself in the experience of others, loving neither himself nor the others *per se* but the goddess, nature, to whom they together belong and who relates them to one another.

Could the environmental crisis have come about if we had felt ourselves how we treated others, the co-natural world? I think not. In being like others, our experience would not be restricted to having them. Science and technology have not reached that degree of maturity yet, but as researchers look more for the knowledge of maintenance instead of the knowledge of destruction, Bruno's approach may become a paradigm. If we became aware of ourselves in treating the co-natural world scientifically and technologically, a solution to this paradox might emerge.

SCIENCE FOR THE FUTURE

Francis Bacon (1561–1626) is frequently considered the first spokesman of industrial society as developed so far, as well as an anthro-

pocentric guidepost toward environmental misery. Bacon did ignore our being part of nature. He proposed that nature must be examined like a prisoner at the bar: the scientist is the judge, and the rest of the world is exposed without pity to his art of extorting information from the indictee. This position could not be understood if Bacon had considered the judge himself as subject to the suit. Referring to Proteus, the prophetic old man of the sea in Greek legend who demonstrated his capacities to convert himself into any shape only when seized and held, Bacon openly recommended investigating nature not free and unbound, but bound and brutalized (*naturae constrictae et vexatae*).¹⁴ Industrial society's blackout of its own belonging to nature, and its exploitation of nature as that which we are not, are essentially Baconian.

Yet Bacon had other and, in my view, better ideas that do not deserve to be abolished together with his anthropocentrism.¹⁵ In particular, I credit Bacon with two basic suggestions on the Renaissance philosophy of nature that should be maintained beyond the environmental crisis. One is that nature must essentially be considered not for what it is but for what it is to be in the future. This differs from the Greek tradition. For Plato, knowledge referred to "ideas," and these expressed being. Others, like Heraclitus, emphasized change, but Greek philosophy did not get beyond "becoming to be" (*genesis eis ousian*).

Bacon interpreted nature as production, like an artist bringing forth his work. To understand "genius and industry" (*ingenium et industria*), Bacon wrote, it will not do to know what the artist's material was at the outset and, apart from that, only the finished work. Instead, one ought to watch how the artist proceeds and how his work comes about. "The same is true for the observation of nature."¹⁶ What we should be interested to find out in the study of nature then is also, according to Bacon, her "*ingenium et industria*." This interest makes sense only when we care what nature can become.

Indeed, Bacon firmly maintains that the goal of science lies not in itself—the knowledge of being—but in the provision of new means and inventions for human life.¹⁷ If this is so, we then want to know what can be brought forth or produced from a given state in nature, not what it is. This does not necessarily imply that we consider the nonhuman world as only a resource for human pur-

poses. As soon as we refrain from anthropocentrism, the new paradigm can be considered with the question: What is it—if not industrial destruction—that humanity is due to bring about in nature, to which it belongs, assuming that in the history of nature we are not supposed to leave the world as if we had not been here, which is not possible anyway? Perhaps this is the contemporary restatement of the Sphinx's question.

With respect to Renaissance consciousness, knowledge of the means and inventions that we can produce in nature promised equipment for the ways to proceed with an open mind into an open world. Bacon also used the word progress, which later narrowed an open proceeding to a particular track no longer open to changes in orientation. Bacon promised that progress in the sciences would provide the means and inventions.¹⁸

The second Baconian idea I want to save from the anthropocentric fallacy is the unity of order in nature and society. This idea appears in his legal approach to scientific knowledge, which for us must not necessarily imply the use of violence that is recommended by Bacon. On the contrary, a modern understanding of a legal order is a frame for freedom and peace, excluding violence. Bringing this approach to bear in science and technology at today's level of legal and political culture could prove a great step in Copernicanism.

Moreover, Bacon had a coherent idea of political order in society and nature. The most primitive political ambition, he thought, is to come to power in one's own country. Having achieved this—as Bacon himself had—the next and more noble ambition is to bring one's own country into power internationally. Bacon's idea—which he conceived when he turned to science after losing office—was to extend power to a third level on top of the two political levels of human domination within humanity, namely, the domination of humanity over nature.¹⁹ If we take this to mean human domination in nature, considering our own participation in nature, and if we interpret domination more broadly as political order, Bacon's idea means that the social order of life is to be embedded in a more comprehensive order of nature in which humanity relates itself to the co-natural world. The laws of nature do not then essentially differ from the laws of justice. Both belong to a more comprehensive common order. Because the basic issue

in the environmental crisis is precisely to embed societal order—especially economic production and consumption—into the order of nature, Bacon’s approach could offer a chance to fit together what has fallen apart.

Baconians may be unhappy to give up anthropocentrism and to reduce domination to its objective—order—but my question is, to what extent can Bacon’s views, which have led us into the environmental crisis, also lead us out of it? Relating the laws of justice to the laws of nature meets the objection that we should not commit naturalistic fallacies, i.e., draw conclusions from what “is” as to what “ought to be.” But this rule applies only insofar as the statements about nature remain strictly descriptive, and this is not the case in Bacon’s concept of nature as something to be. There is no fallacy in a prescriptive inference from a prescriptive description. Bacon’s legal approach in establishing the rules on how to produce in nature shows that the dichotomy between the two kinds of laws was far from what he intended. In a letter to the king Bacon argued explicitly that the rules of nature and the true rules of politics are related:

I do not find it strange . . . that when Heraclitus . . . had set forth a certain book which is not now extant, many men took it for a discourse of nature, and many others took it for a treatise of policy and matter of estate. For there is a great affinity and consent between the rules of nature, and the true rules of policy: the one being nothing else but an order in the government of the world, and the other an order in the government of an estate.²⁰

The observation of this affinity was certainly intended to recommend Bacon, the scientist, as an advisor to the king. In any case, the affinity between the two orders becomes a challenge to contemporary politics not generally expected from Bacon. But nowadays it is a common experience that politics becomes very unpolitical when exclusively concerned with human affairs, if not only with those of the politicians; at the same time science and technology again and again prove to be the most relevant political activities in industrial society. For instance, no modern foreign minister has influenced international relations to the extent that Otto Hahn, Fritz Strassmann, and Lise Meitner did with their discovery of nuclear fission, and no minister of economics or labor has ever

been as effective in these fields as the applied physicists of Silicon Valley. This would not have surprised Bacon, and he can remind us that the two orders are interlinked.

To overcome the barrier, it must be observed as a political fact that industrial society still considers science as describing what nature is, not what it is to be, and still considers the experiment as a means to find out what nature is. Both assumptions are essentially wrong in a philosophical analysis. Rather, the rules of nature as conceived in modern science are a canon for proceeding when something is to be produced; and the experiment confirms that the rules of production of some effect have been made available.

Simple as these seem, the error in modern self-awareness of science is tough. It is always hard to understand why certain mistakes seem indispensable in one's own self-appreciation, individually as well as socially. With respect to the political character of science and technology, I believe that, because the goals of science and technology have become doubtful in many fields, industrial society does not want to be reminded that these not only provide the means to go somewhere but are themselves moving ahead. Science itself proves to be not as scientific as its results, so to speak. In such a situation a historical anamnesis of what had once been the goals might prove helpful, and this involves reconsidering the idea of progress.

PROGRESS INTO AN OPEN WORLD

Progress originally meant simply to start, to set out from fixed relations. The European crusaders set out for the Holy Land, and the European explorers set out around the world. Science set out to continue inside nature what the explorers had started externally. Like Columbus sailing for India, Bacon had a definite idea of how to venture into the Renaissance open world, namely, by means of progress in science and technology, and he also conceived where this progress should lead. The true end of knowledge, he declared, "is a restitution and reinvesting (in great part) of man to the sovereignty and power (for whensoever he shall be able to call the creatures by their true names he shall again command them) which he had in his first state of creation."²¹

Bacon's "first state of creation" alludes to a paradise as conceived in the Jewish Old Testament, where man was entrusted with dominion over nature in the name of the creator and was instructed to name the other creatures. This power was restricted after the Fall when man had to work for his own. To restore human sovereignty, as in paradise, by means of science and technology thus means that the end of knowledge is a compensation for the loss that we suffered by eating from the tree of knowledge. Progress was conceived as a dodge back into paradise, which would even include the restitution of immortality: "And to speak plainly and clearly," Bacon continued, "it is a discovery of all operations and possibilities of operations from immortality (if it were possible) to the meanest mechanical practice."²² In this paradise, moreover, the Lord was no longer required to rule, because human inventions could be considered as "new creations" (*novae creationes*), by man stepping into God's shoes. Technological man became deified in humanity (*hominem homini Deum esse*),²³ especially with respect to those peoples (savages, developing countries) who had not yet entered the occidental path of progress back into paradise.

The idea of progress to paradise thus entered into our cultural history. At the outset there was just the Renaissance openness to "set out" in itself, fresh and clean like a morning—whatever the day brings, we should never forget that in any case we are lucky to be on the way. At least, that is the way I feel about the Renaissance outset. As Leibniz, the philosopher of perfection, put it, "A certain uneasiness in longing for the good together with a continuous and uninterrupted progress to the greatest goods is even better than to possess the good" (*un progres continuel et non interrompu à des plus grands biens*).²⁴ Appetite feels better than satiety, as long as one is not starving. Apart from the happiness of being on the way in itself, Leibniz to some extent also considered where this progress might lead. He could imagine that humanity in time might reach a greater perfection than we are now able to imagine, but this was not his main concern.²⁵ Rather, his essential idea with respect to progress was that striving for perfection is itself an element of perfection. "Without perpetual progress and novelty there is neither thought nor pleasure."²⁶

Progress also became a political idea. Understandably, it was turned against the traditional authorities. Soon enough, progress was also used to build the self-esteem of some with respect to others. French poet Charles Perrault (1628–1703), who gave classic form to many children’s tales, felt compelled to prove again and again the superiority of modern times to antiquity. This quarrel was unnecessary because the point could be settled by observing, as his countryman Pascal did, that humanity can learn in the way that an individual learns. Although the moderns may know many things better than the ancients, a grown-up is not in every respect better than the child that he or she was before.

Politically more detrimental than presumptuous attitudes in regard to antiquity was the emergence of Eurocentrism. Feeling progress and that progress should lead to a particular kind of perfection made hard the appreciation of other people’s ways of life. For instance, the so-called savages were, according to European standards, not as advanced as the Europeans. Those who thought, as the social philosopher Abbé St. Pierre (1658–1743) did, that humanity as a whole was on the road to (occidental!) reason could not help but observe different degrees of advancement (in Europeanism) when they looked around the world. The French economist and administrator Turgot (1727–1781) even drew a map of progress that showed Europe favorably in front of the underdeveloped savages as well as the stagnant Chinese. And Voltaire comforted the Brazilians in considering them as simply not yet fully developed to humanity; some day they would also have their Newtons and Lockes, though somewhat behind the Europeans.²⁷ These views sound familiar, naive, and superstitious in light of the failures of twentieth-century development policies intended to let developing countries “catch up” with the industrialized ones.²⁸ We see that Eurocentrism is not only a political issue but is rooted in our modern consciousness. The depth of the roots may explain why occidental rationality seems even more overwhelming for other cultures than the political and economic power of the industrialized countries.

To what extent are environmental and other failures rooted in the original approach itself? What was meant and what went wrong can be distinguished in the philosophy of progress of the mathematician, social theorist, and political leader the Marquis de

Condorcet (1743–1794).²⁹ Wrapped in the spirit of the French Enlightenment, Condorcet believed in the perfectibility of humanity. This idea, held in common by Marxists and, to various degrees, by those in the biotechnology endeavor, rings several bells when it now arises. Condorcet's point, however, was that it is a mistake "to consider man as being shaped by the actually prevailing state of civilization as natural."³⁰ Instead, natural should be defined as what is to be and what is possibly to come if we set out for the better. To give an example that Condorcet himself used: For the time being, superiority is generally to the advantage of those who are superior and to the disadvantage of those who are inferior. Many people believe that this is "natural," and in saying so believe that such is life, that it must be faced and will never be different since what is natural must be accepted as such.

Condorcet might not disagree with this understanding of "natural," but he refused to accept as "natural" the idea that the use of superiority was to the advantage of only the superior. And should we not agree with him? Will human affairs ever change for the better if we simply accept their shortcomings—no matter how common—as natural and therefore inevitable? Condorcet did not refrain from the hope that if a natural state is to come, "superiority will turn into an advantage even for those who do not have it."³¹ Is this not a goal that we should accept?

To consider nature—like Bacon and unlike industrial society—as something to come was a common idea to the philosophers of the Enlightenment and of the French Revolution. "In the name of nature they requested beings and military commanders, officials and priests to respect human life."³² This confidence in nature was based on the scientific experience that the universe had proved to be in good order. "Why should this principle less apply to the development of man's intellectual and moral capacities than to the other processes in nature?"³³ Not only the laws of the nonhuman world but also "human rights are written in the book of nature."³⁴ Nature has planted the seed for better social relations into our hearts, waiting only for enlightenment and freedom to develop.³⁵

Apart from the optimism with respect to reason and revolution, I agree with Condorcet's position. We must be careful not to lose hope when we abandon optimism. Condorcet's optimism, however, was fatal. When Condorcet refers to breeding better animals,

for instance, as a parallel to human perfectibility by education, and when he assumed that the human life span would continuously increase,³⁶ he is on a straight line from Francis Bacon—even from Roger Bacon in the thirteenth century—to modern biotechnology. Condorcet did thoroughly condemn genocide by European colonialism and proposed reparations in the form of access for underdeveloped peoples to participate in European Enlightenment. Well-meant as this notion was, spiritual imperialism is not so far from military and economic imperialism as Condorcet seems to have thought.

Condorcet's gasping totalitarian optimism may reflect an imminent sense of his personal fate. He had supported the French Revolution but opposed the death penalty and consequently the regicide. Persecuted, Condorcet wrote his epochal review of human progress in the span of a few weeks, then he left his shelter and was found frozen to death in early 1794. Considering his technocratic phantasms in the context of his personal situation, they seem like morbid dreams. So do many modern technological developments, civil and military, which are equally as high tech as Condorcet's visions.

Where then will we find the breath for a Copernican existence in nature to come, toward which the Renaissance spirit set out? I will conclude this essay by reapproaching Humboldt, now from the eighteenth century, by backing his Copernicanism with Immanuel Kant's idea about nature's intention in human history.

PROCEEDING TO NATURE IN HISTORY

In his *General Theory of Heaven* (1755), Kant challenged Newton's compromise with Bishop Bentley. In this compromise, theology left the explanation of the planetary movements to science, while science accepted theological competence to explain how the planetary system had come into being. Kant, however, not only edged science into the domain that Newton had left to theology but based his theory on a different concept of nature. While Newton and Bentley considered nature, as Kant put it, as "an obstinate subject" that must be forced into order, Kant conceived the beings of nature to be akin by a common origin and by themselves apt to an orderly constitution.³⁷ It is true that, in the West, before mod-

ern science the nonhuman world had not been expected to be deliberately ordered. In fact, even in heaven the planets had been termed “the wanderers,” moving back and forth irregularly, as it seemed. The discovery of this formerly hidden order, however, convinced Kant that nature was not the obstinate subject it had been considered, and in his philosophy he ventured to explain how its order is constituted.

Kant did not doubt that as humans are a part of nature, human history equally is. Modern historians, however, tend to miss this point. After the unexpected recognition of the orderly structure of the nonhuman world, the challenge for Kant became whether perhaps even in human history—apparently the realm of unreason and arbitrariness—a corresponding order could be found. To consider one and the same nature to embrace the human and the nonhuman world aligned with traditional thought from Plato to Bacon and then on to the philosophers who looked for human rights written in the book of nature. But the success of modern science had become a particular test for that unity. After publishing the first edition of the *Critique of Pure Reason* (1781), Kant set out to accept the challenge in his *Idea of a General History in a Cosmopolitan Intention* (1784), looking for an intention of nature (*Naturabsicht*) in the apparently erratic course of human history.³⁸ The idea of nature in Kant’s philosophy of history does not fit together with deterministic nature as opposed to human freedom in the first two *Critiques*. Yet it serves as Kant’s turning point from these to the *Critique of Judgement* and to his post-critical, more “organic” philosophy. It was Johann Gottfried Herder who provided the inspiration for Kant’s decisive change with his *Ideas in the Philosophy of History of Mankind* (1784–1791). Kant’s aggressive review of Herder’s *Ideas* seems to indicate that Kant did not appreciate that his former student had been ahead of him here.

The search for an intention of nature in human history does not presume nature to be intentional like humans. Kant accepted epigenesis rather than preformation. The former assumed the existence not only of actual properties but also of dispositions to become what has not yet been developed, i.e., the existence or reality of possibilities. For humans, Kant deemed the natural dispositions to be reason, freedom, sociability, selfishness, and a moral sense, though this last was considered rather crude.

With respect to the five dispositions, Kant's "idea" of 1784 was not that they would develop by themselves, like the different branches of a tree, but that humanity is developing by means of the conflict between sociability and selfishness. As he put it: "Man does not like his companions, but he cannot escape them either."³⁹ Driven by vanity and avarice, he competes with them, and this competition produces culture as the specific human contribution to the evolution of nature. In contrast to Adam Smith's shallow optimism, Kant did not assume that the individual pursuit of happiness would produce the common good. With respect to happiness, Kant wondered if humans might be better off if they lived modestly like sheep, but as such they would not fill humanity's ecological niche or the space which is left open for humanity in nature, namely "reasonable Nature" (*vernünftige Natur*).⁴⁰ Nature fitted us with reason and the freedom to use it,⁴¹ not to become happy, but to develop this particular disposition by means of the conflict between the individual and society. The outcome, Kant suggested, should be a civil society in a legal state of nature, this being "intended" by nature in cosmopolitan human history. But this is only our *chance* in the history of nature, and it is up to us to seize it.

Kant's philosophy of history lacks totalitarian optimism as well as the presumptuousness of the philosophers of perfection by progress, and at the same time is truly Copernican. The question is how we locate ourselves in nature, or what is our ecological niche, and not what the rest of the world has to offer to please us. In fact, in his later philosophy Kant's conception of nature tends to become non-anthropocentric. There is no being in nature, Kant maintained in his *Critique of Judgement*, that may presume to be the purpose of everything.⁴² Rather, those who appreciate the beauty of nature admire and love the other living beings—including the plants—even if it is to their individual disadvantage,⁴³ because a circle exists of "mutual dependency of all beings, man not being exempted."⁴⁴

To the challenge of whether in human history an order corresponds to the one in nature outside humanity, Kant answered that in spite of present disorder there is the chance of an order of natural law that may be reached in the future. In accordance with the Renaissance tradition, nature is again conceived of as what is

to be. Along the same lines as and following Leibniz,⁴⁵ Kant conceived of the co-natural world as art,⁴⁶ and the reasonability of its order as art's intentionality. Correspondingly, a work of art is as perfect as it looks natural so that the creative power of nature is effective in the productive capacity of the artist, too. Art is the evolution of nature in freedom, which of course includes "abstract" as well as "concrete" art as far as its naturality goes.⁴⁷

To conceive of nature as what is to be intended applies equally to the "laws of nature" in science, once they are—as mentioned earlier—identified as a canon of rules for how human intentions in nature can be implemented. Kant provides the paradigm, that something is known as soon as it can be deliberately produced, in a famous formulation in the *Critique of Judgement*: In science we want to find out "what we are able so to subject to our observation or experiment that we could ourselves produce it like nature, or at least produce it according to similar laws. For we have complete insight only into what we can make and accomplish according to our conceptions."⁴⁸ In other words, being is known as being produced. Scientific knowledge is practical knowledge. Science does not simply deal with matters of fact but with matters of effecting facts.

Kant's philosophy of history may be considered a "*physiodicee*," a justification of nature for bothering us with enormous confusion compared to the reasonability of the co-natural world. Nature is justified by the chance humans have finally to create peace in a legal order of natural rights.

CONCLUSION

This *tour d'horizon* of the cultural and conceptual history of nature in the West leads to the view that the human challenge is to justify how we proceed to locate ourselves in an open cosmos, which centers neither on Earth nor on humanity but on its own nature, nature herself. Oedipus must broaden his answer.

Our present state is to live without peace, to live in violence, alienation, and disorder. To endure this state and to use nature's gifts of human disposition, we have the chance in the future to recover what has been lost. We are actually living in evil, but

better circumstances and ultimately peace may emerge from this intermediate state between nature lost and nature recovered.

Apparently, we need the industrial economy to treat problems we would not have without the industrial economy. More generally, we will need science and technology to treat problems that we would not have without science and technology. And we need to diffuse a new understanding of nature, including our own nature, in order to drive our science.

Finally, the environmental crisis reminds us that peace is not a matter of humanity being a closed society, but rather ought to be found in siting ourselves in the whole of nature. We might succeed in so doing within the next five hundred years.

ENDNOTES

¹Many questions must be left open in this survey. A more comprehensive picture will appear in Klaus Michael Meyer-Abich, *Praktische Naturphilosophie* (Munich: C. H. Beck, 1997).

²Alexander von Humboldt, *Kosmos. Entwurf einer physischen Weltbeschreibung*, 5 vols. (Stuttgart/Tübingen: Cotta, 1845–1862).

³Quotations from non-English texts are given in the author's translation, except for *The Critique of Judgement* on page 231. Humboldt, *Kosmos. Entwurf einer physischen Welt-beschreibung*, Vol. I, 367f.

⁴The term "holistic" is used in its philosophical sense within the philosophy of nature, as developed by Jan Christiaan Smuts, *Holism and Evolution* (London: Macmillan and Co., 1926) and Adolf Meyer-Abich, *Ideen und Ideale der biologischen Erkenntnis—Beiträge zur Theorie und Geschichte der biologischen Ideologien* (Leipzig: J. A. Barth, 1934). Contemporary discussions about holism could benefit from using the term in a more specific sense.

⁵Humboldt, *Kosmos. Entwurf einer physischen Weltbeschreibung*, Vol. I, 32.

⁶Kant quotations refer to the pagination of the first (A) or second (B) German edition of the particular paper or book. Immanuel Kant, *Idee zu einer allgemeinen Geschichte in weltbürgerlicher Absicht (Idea of a General History in a Cosmopolitan Intention)*. *Werke in sechs Bänden*, Vol. 6, ed. W. Weischedel (Darmstadt: Wissenschaftliche Buchgesellschaft, 1964 [1784]), A 390.

⁷Humboldt, *Kosmos. Entwurf einer physischen Weltbeschreibung*, Vol. II, 143.

⁸*Ibid.*, Vol. I, 383f.

⁹*Ibid.*, Vol. I, 69.

- ¹⁰A thorough study of the Renaissance spirit as expressed in portraits has been presented by Gottfried Boehm, *Bildnis und Individuum—Über den Ursprung der Portraitmalerei in der italienischen Renaissance* (Munich: Prestel, 1985).
- ¹¹Erwin Panofsky, *Das Leben und die Kunst Albrecht Dürers* (Munich: Rogner und Bernhard, 1977 [1943]), 56.
- ¹²I am indebted to Richard Hoppe-Sailer and Frank Fehrenbach at my institute for a stimulating discussion of Copernicanism in Renaissance printing, and to Richard Hoppe-Sailer particularly for pointing out Dürer's self-portrait to me.
- ¹³Cf. Giordano Bruno, *Eroici Furori—Von den heroischen Leidenschaften*, ed. Christiane Bacmeister (Hamburg: Felix Meiner Verlag, 1989 [1585]), Part I, Dialogue 4.
- ¹⁴Francis Bacon, *Novum Organum, The Works of Francis Bacon*, Vol. I, ed. J. Spedding, R. L. Ellis, and D. D. Heath (London: Longman et al., 1858), 141.
- ¹⁵The idea of a non-anthropocentric Baconian science has been put forward by Wolf Krohm, "Die Natur als Labyrinth, die Erkenntnis als Inquisition, das Handeln als Macht—Bacon's Philosophie der Naturerkenntnis betrachtet in ihren Metaphern," in L. Schäfer and E. Ströker, eds., *Naturauffassungen in Philosophie, Wissenschaft, Technik* (Freiburg/Munich: K. Alber Verlag, 1994).
- ¹⁶Francis Bacon, *Of the Interpretation of Nature: The Works of Francis Bacon*, Vol. II, ed. J. Spedding, R. L. Ellis, and D. D. Heath (London: Longman et al., 1859), section 41.
- ¹⁷Bacon, *Novum Organum, The Works of Francis Bacon*, Vol. I, section 81.
- ¹⁸*Ibid.*, section 128.
- ¹⁹*Ibid.*, section 129.
- ²⁰Francis Bacon, *The Letters and the Life of Francis Bacon*, Vol. III, ed. J. Spedding (London: Longman et al., 1868), 90.
- ²¹Bacon, *Of the Interpretation of Nature: The Works of Francis Bacon*, Vol. II, 222.
- ²²*Ibid.*
- ²³Bacon, *Novum Organum, The Works of Francis Bacon*, Vol. I, section 129.
- ²⁴Gottfried Wilhelm Leibniz, *Nouveaux essais sur l'entendement humain—Neue Abhandlungen über den menschlichen Verstand. Philosophische Schriften*, Vol. III/1, ed. W. von Engelhardt and H. H. Holz (Darmstadt: Wissenschaftliche Buchgesellschaft, 1959), chap. 21, section 36.
- ²⁵Gottfried Wilhelm Leibniz, *Essais de théodicée—Die Theodizee. Philosophische Schriften*, Vol. II/2, ed. H. Herring (Darmstadt: Wissenschaftliche Buchgesellschaft, 1985), section 341.
- ²⁶Gottfried Wilhelm Leibniz, *Confessio Philosophi—Ein Dialog*, ed. von Otto Saame (Frankfurt/Main: Klostermann, 1967), 101.
- ²⁷Cf. Voltaire, "VII Entretien: Que l'Europe moderne vaut mieux que l'Europe ancienne," in *Oeuvres complètes de Voltaire. Tome 36: Dialogues et entretiens philosophiques* (Gotha: Ch.-G. Ettinger, 1786), 271.

- ²⁸See Arnulf Grübler, "Time for a Change: On the Patterns of Diffusion of Innovation," *Dædalus* 125 (3) (Summer 1996).
- ²⁹On responses to utopian views, see Robert W. Kates, "Population, Technology, and the Human Environment: A Thread Through Time," *Dædalus* 125 (3) (Summer 1996).
- ³⁰Condorcet, *Esquisse d'un tableau historique des progrès de l'esprit humain—Entwurf einer historischen Darstellung der Fortschritte des menschlichen Geistes*, ed. W. Alff (Frankfurt/Main: Suhrkamp, 1976 [1795]), 78.
- ³¹*Ibid.*, 203.
- ³²*Ibid.*, 159.
- ³³*Ibid.*, 193.
- ³⁴*Ibid.*, 121.
- ³⁵*Ibid.*, 212.
- ³⁶*Ibid.*, 219ff.
- ³⁷Immanuel Kant, *Allgemeine Naturgeschichte und Theorie des Himmels. . . Werke in sechs Bänden*, Vol. 1, ed. W. Weischedel (Darmstadt: Wissenschaftliche Buchgesellschaft, 1960 [1755]), A 194.
- ³⁸Kant, *Idee zu einer allgemeinen Geschichte in weltbürgerlicher Absicht*, A 387.
- ³⁹*Ibid.*, A 393.
- ⁴⁰*Ibid.*
- ⁴¹*Ibid.*, A 390.
- ⁴²Immanuel Kant, *Kritik der Urteilskraft. Werke in sechs Bänden*, Vol. 5, ed. W. Weischedel (Darmstadt: Wissenschaftliche Buchgesellschaft, 1957 [1790]), B 382.
- ⁴³*Ibid.*, B 166f.
- ⁴⁴Immanuel Kant, *Kant's handschriftlicher Nachlaß. Vol. VIII: Opus postumum. Erste Hälfte (Convolut I bis VI). Kant's gesammelte Schriften Vol. XXI*, ed. Preußische Akademie der Wissenschaften (Berlin/Leipzig: Walter de Gruyter & Co., 1936, reprint 1973), 570.
- ⁴⁵Gottfried Wilhelm Leibniz, "De ipsa natura sive de vi insita actionibusque creaturarum—Über die Natur an sich oder über die den erschaffenen Dingen innewohnende Kraft und Tätigkeit," in H. Herring, ed., *Philosophische Schriften*, Vol. IV (Darmstadt: Wissenschaftliche Buchgesellschaft, 1992), section 2, 275.
- ⁴⁶In Kant, *Kritik der Urteilskraft. Werke in sechs Bänden*, B 77, 270.
- ⁴⁷*Ibid.*, B 200.
- ⁴⁸Immanuel Kant, *The Critique of Judgement*, trans. J. C. Meredith (Oxford: Oxford University Press, 1952), B 309.