PIERRE
HADOT

THE VEIL OF ISIS

An Essay on the History of the Idea of Nature

Translated by Michael Chase

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Preface

I have been thinking about this book for more than forty years. Around 1960 I began to be interested in the various meanings assumed by the secret of nature in antiquity and in modern times. In the years that followed I became passionately enthralled by the philosophy of nature, and I wondered if it were possible that a renewal, and no doubt a metamorphosis, of this type of research might take place in the contemporary world. Absorbed by my teaching and by other tasks, however, I was never able to devote myself intensely to this study. Nevertheless, in the perspective of the research I was then carrying out on Plotinus, I wrote for the Eranos meetings of 1968 a paper on the contribution of Neoplatonism to the philosophy of nature in the West, in which I was able to present a few ideas that were dear to me. I concentrated especially on the case of Goethe, a poet and at the same time a scholar, who seemed to me to offer the model of an approach to nature that was both scientific and aesthetic. It was on this occasion that I encountered the image and the text that were the starting point for the writing of this work.

Let me briefly situate this image and this text within their historical context. From July 16, 1799, to March 7, 1804, the German scholar Alexander von Humboldt, together with the botanist Aimé Bonpland, had embarked on an extraordinary journey of scientific exploration in South America, whence he had brought back a considerable mass of geographical and ethnographical observations. The

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Unveiling Nature's Secrets

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Prometheus and Orpheus

Now that I have told the story of the reception throughout the centuries of antiquity of Heraclitus' saying "Nature loves to hide," we can return to the theme of the secrets of nature.

PHYSICS AS UNVEILING THE SECRETS OF NATURE

If one accepts that nature hides and conceals its secrets from us, then one can adopt several attitudes with regard to it. One can simply reject all research relating to nature. This was the attitude of Socrates, taken up in particular by Arcesilas during the period of the Platonic school that some historians call Skeptical. In the words of Cicero, "Socrates was the first to turn philosophy away from the things that have been hidden and wrapped up by nature itself, with which the philosophers previous to him concerned themselves, and to bring it back to the level of human life."[1] This amounted to a refusal to discuss things that, on the one hand, transcend human beings, because they are inaccessible to their investigative powers, and, on the other hand, have no importance for them, since the only thing that must interest them is the conduct of moral and political life. As would be said, for different reasons, by Seneca, Rousseau, and Nietzsche, if nature has hidden certain things, then it had good reasons to hide them.[2] If, for philosophers such as Socrates, Aristo of Chios, and the Academic Arcesilas, no research on nature is possible, this means that for them, unlike for other philosophical schools, there is no

"physical" part of philosophy, since physics is precisely the study of nature *(phusis)*.

One might also consider mankind capable of unveiling these secrets of nature. From this perspective, physics becomes the part of philosophy that assigns itself the task of discovering what nature wants to conceal from us. This conception of physical philosophy appears explicitly with Antiochus of Ascalon (the end of the second to the beginning of the first century BCE), a Platonist on whose doctrine Cicero reports in his *Academics*.[3] According to Antiochus, the subject of physics is "nature and secret things."

Several models of investigation were available for ancient philosophers and scientists. The choice between these models was guided by the way relations between men and nature were represented, that is, between nature and human activity; it was also oriented by the way the image of the "secrets of nature" was perceived.

If man feels nature to be an enemy, hostile and jealous, which resists him by hiding its secrets, there will then be opposition between nature and human art, based on human reason and will. Man will seek, through technology, to affirm his power, domination, and rights over nature.

If, on the contrary, people consider themselves a part of nature because art is already present in it, there will no longer be opposition between nature and art; instead, human art, especially in its aesthetic aspect, will be in a sense the prolongation of nature, and then there will no longer be any relation of dominance between nature and mankind. The occultation of nature will be perceived not as a resistance that must be conquered but as a mystery into which human beings can be gradually initiated.

JUDICIAL PROCEDURE

If one situates oneself in a relation of hostile opposition, the model of unveiling will be, one might say, judicial. When a judge is in the

presence of a defendant who is hiding a secret, he must try to make him confess it. In antiquity, but also still in the contemporary world, so proud of its progress, a method for accomplishing this is foreseen by the law, or at the least by custom or national interest: torture. As early as the end of the fifth century BCE, the author of the Hippocratic treatise *On Art* was certainly thinking of this judicial model when he declared that one must do violence to Nature to make her reveal what she is hiding from us: "When Nature refuses willingly to hand over the signs [i.e., clinical symptoms], art has found the constraining means by which Nature, violated without damage, can let go of them; then when she is freed, she unveils what must be done to those who are familiar with the art."[4]

To do violence, then, but "without damage," for the doctor's first duty is to do no harm. It has been said of Francis Bacon, the founder of modern experimental science, that he "submits the natural process to juridical categories, in the same way as a civil or penal matter."[5] It is true that Bacon uses the vocabulary of violence, constraint, and even torture as he sketches the program of modern experimental science: "The secrets of nature are better revealed under the torture of experiments than when they follow their natural course."[6] Yet as we can see from the Hippocratic text, this judicial model, as well as the conception of the role of reason it implies, had already existed a millennium before Bacon. Indeed, this judicial model supposes that human reason ultimately has a discretionary power over nature, which would, moreover, be confirmed by biblical revelation, since the God of Genesis speaks these words after the creation of Adam and Eve: "Grow and multiply, and fill the earth, and dominate it. Command the fish of the sea, and the birds of the air, and all the beasts that move upon the earth."[7] This is why Bacon proclaimed at the beginning of the seventeenth century, "Let the human race recover its rights over nature, rights granted to it by divine munificence."[8] This power of reason gives man the authority to proceed in a judicial manner

and interrogate nature by every means if, in some way, it refused to talk.

At the end of the eighteenth century, the same judicial metaphor is found in Kant, in the preface to the second edition of the *Critique of Pure Reason.* For him, physics began to make decisive progress from the moment when, with Francis Bacon, Galileo, Torricelli, and Stahl, it understood that it had to "oblige nature to answer its questions." With regard to nature, reason must behave "not like a student, who lets himself be told whatever the teacher wishes, but like an appointed judge, who forces witnesses to answer the questions he asks them."[9] Cuvier's celebrated formula takes up the same metaphor: "The observer listens to Nature, the experimenter submits it to interrogation and forces it to unveil itself."[10] And even when Bacon says that "nature can be commanded only by obeying it," thus appearing to urge scientists to submit to nature, one cannot help thinking, with Eugenio Garin, evoking the comedies of Plautus, that for Bacon, "man is a tricky servant who studies his master's habits in order to be able to do whatever he wants with him."[11]

Here violence becomes ruse, and the Greek word that denotes ruse is precisely *mēkhanē.* For the Greeks, mechanics first appeared as a technique for tricking nature, particularly by producing movements that appear to be contrary to nature, and by obliging nature to do what it cannot do by itself, by means of artificial and fabricated instruments, or "machines"—scales, winches, levers, pulleys, wedges, screws, gears—which can serve, for instance, for the construction of war machines or automata.

After experimentation and mechanics, the third form of violence is magic. Like mechanics, magic aims to produce in nature movements that do not seem natural, and, at least in its ancient form, it appears as a technique of constraint exerted over the invisible powers, gods or demons, that preside over the phenomena of nature.

THE PHYSICS OF CONTEMPLATION: PROMETHEUS AND ORPHEUS

In opposition to this physics which, utilizing various techniques, artificially modifies the perception of things, there is room for a physics that limits itself to what we might call naive perception, which uses only reasoning, imagination, and artistic discourse or activity to contemplate nature. It was above all this philosophical physics—that of Plato's *Timaeus,* of Aristotle, of the Epicureans and the Stoics, but also that of astronomers such as Ptolemy—which, later on, in modern times and in the Romantic period, was to become the philosophy of nature. Poetry also tried to revive the genesis of the world. Finally, painting too appeared as a means of access to the enigmas of nature.

From this perspective, we could speak with Robert Lenoble of a "physics of contemplation," which would consist of disinterested research, as opposed to a "physics of utilization," which, by technical procedures, aims to tear Nature's secrets away from her, for utilitarian ends.[12]

I shall place the first attitude—the one that wishes to discover the secrets of nature, or the secrets of God, by means of tricks and violence—under the patronage of Prometheus, son of the Titan Iapetos, who, according to Hesiod, stole the secret of fire from the gods in order to improve the life of mankind, and who, according to Aeschylus and Plato, brought man the benefits of technology and civilization.[13] In Francis Bacon, at the dawn of modern science, Prometheus was to appear as the founder of experimental science.[14] Promethean man demands the right of domination over nature, and in the Christian era, the story of Genesis, as we have seen, confirmed him in his certainty of having rights over nature. Whereas Zeus wished to reserve the secret of fire and of the forces of nature for himself, and Prometheus wanted to tear it away from him, the biblical God makes man the "master and possessor of nature."[15] From this perspective, in the

fine phrase of Robert Lenoble, "in the seventeenth century, Prometheus becomes God's lieutenant."[16]

I dedicate the other attitude toward nature to Orpheus, like Pierre de Ronsard, who wrote:

> Filled with divine fire that has heated my heart,
> I wish, more than ever, following in Orpheus' steps,
> To discover the secrets of Nature and the Heavens.[17]

When he links Orpheus to the discovery of the secrets of nature, Ronsard was no doubt thinking of the theogonic poems placed under the patronage of Orpheus, which recount the genealogy of the gods and the world, and hence the birth *(phusis)* of things. He may also have wished to allude to the seductive power which, according to legend, singing and playing the lyre give Orpheus over living and nonliving beings. Orpheus thus penetrates the secrets of nature not through violence but through melody, rhythm, and harmony. Whereas the Promethean attitude is inspired by audacity, boundless curiosity, the will to power, and the search for utility, the Orphic attitude, by contrast, is inspired by respect in the face of mystery and disinterestedness. In the words of Rilke, who is also speaking of Orpheus:

> Song, as you teach it, is not covetousness
> or the quest for something one might finally obtain.
> Song is existence.[18]

As in Seneca, for instance, the Orphic attitude represents the secrets of nature after the model of the mysteries of Eleusis, that is, as the subjects of a progressive revelation.[19] Indeed, it seems that the mysteries of Eleusis were intimately linked to the Orphic tradition.[20] This attitude tries to respect "Nature's modesty," to use Nietzsche's expression.[21]

In the modern period, especially in the seventeenth and eighteenth centuries, we can find these two attitudes in books of emblems, as has been admirably shown by Carlo Ginzburg.[22] Here the Promethean attitude is illustrated, for example, by a man climbing a mountain with the help of Father Time,[23] or else by the motto "Sapere aude," meaning "Dare to know!"[24] which is in praise of the explorer's spirit of adventure and of scientific curiosity. According to Kant, this motto was to be that of the *Aufklärung*, or the Spirit of the Enlightenment.[25] The Orphic attitude, or at least a critical attitude with regard to the Promethean spirit, is expressed in emblems that represent the fall of Icarus with the motto "Altum sapere periculosam," which can be translated very loosely to express all that it implies in the historical and philosophical context as "It is dangerous to aspire to excessively lofty pretensions."[26] Prometheus gnawed by a vulture and Icarus falling into the sea attest to the dangers of audacious curiosity.

By opposing the Promethean to the Orphic attitude, I do not mean to oppose a good and a bad attitude. I simply want, through this recourse to Greek myths, to attract attention to these two orientations that can be manifested in the relations between man and nature—two orientations that are equally essential, do not necessarily exclude each other, and are often found united in the same person. For instance, I consider Plato's *Timaeus* to be a characteristic example of the Orphic attitude, in the first place because Plato represents the world as an object fashioned in an artisanal way, and therefore in a certain sense mechanically—which can lead one to conceive of the world as a machine and God as an engineer—and second, because he proposes a mathematical model of the genesis of natural objects. Moreover, Plato did not in general hesitate to use mechanical models to try to make the movement of the world understandable, as we can glimpse in book 10 of the *Republic* and the cosmic myth of the *Statesman*. The two attitudes I have distinguished thus correspond to our ambiguous relation to nature, and they cannot be separated in too definitive a way.

On the one hand, nature can present itself to us in a hostile aspect, against which we must defend ourselves, and as a set of resources necessary for life, which must be exploited. The moral motive force of the Promethean attitude—which is also that of Aeschylus' *Prometheus*—is the desire to help humanity. In his *Discourse on Method,* Descartes affirms that it was "for the general good of all human beings" that he refused to keep hidden the discoveries he had made in physics.[27] The blind development of technology and industrialization, however, spurred on by the appetite for profit, places our relation to nature, and nature itself, in danger. On the other hand, nature is both a spectacle that fascinates us, even if it terrifies us, and a process that surrounds us. The Orphic attitude, which respects it, seeks to preserve a living perception of nature; at the opposite extreme from the Promethean attitude, however, it often professes a primitivism that is not without danger either.

As I shall have occasion to repeat, the same person can, simultaneously or successively, have several apparently contradictory attitudes with regard to nature. When a scientist is carrying out an experiment, his body perceives the earth, despite the Copernican revolution, as a fixed, immobile base, and he may perhaps take a distracted glance at the sun's "setting." The Orphic attitude and the Promethean attitude may very well succeed each other or coexist or even combine. They nevertheless remain radically and fundamentally opposed.

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The Promethean Attitude

Unveiling Secrets through Technology

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Mechanics and Magic from Antiquity to the Renaissance

The Promethean attitude, which consists of using technical procedures to tear Nature's "secrets" from her in order to dominate and exploit her, has had a gigantic influence. It has engendered our modern civilization and the worldwide expansion of science and industry. In the context of this book, I shall obviously not describe this immense phenomenon, but will merely specify the role that the metaphor of nature's secrets has played in the self-representation of this attitude throughout the ages.

In antiquity, the Promethean attitude appears in three forms: mechanics, magic, and the rudiments of the experimental method, three practices that share the characteristic of seeking to obtain effects alien to what is considered the normal course of nature, effects whose causes elude those who do not operate according to these techniques. At the end of the Middle Ages and the beginning of modern times, these three practices approached and profoundly transformed one another to give birth to experimental science. The motto of the modern world would thus be "Knowledge is power" but also "Power"—that is, fabrication by means of experimentation—"is knowledge."

ANCIENT MECHANICS

The idea of trickery—and, ultimately, of violence—appears in the word "mechanics," since *mēkhanē* signifies "trick." The introduction

to the *Problemata mechanica,* an anonymous work probably elaborated in the Peripatetic school at the end of the third or the beginning of the second century BCE, is perfectly clear on this point:

> Everything that occurs in conformity with nature, but of whose cause we are unaware, provokes astonishment; as does everything that, when it occurs in a manner contrary to nature, is produced by technique [*tekhnē*] in the interest of mankind.
>
> For in many cases, nature produces effects that are contrary to our interests, for nature always acts in the same way, and simply, whereas what is useful to us often changes.
>
> Therefore, when an effect contrary to nature must be produced, we are at a loss because of the difficulty of producing such an effect; and the cooperation of *tekhnē* is required. This is why we call the part of *tekhnē* intended to help us in such difficulties "trickery" [*mēkhanē*]. For the situation is, as the poet Antiphon says, "Through *tekhnē,* we master the things in which we are vanquished by nature."[1]
>
> For so it is when what is lesser masters what is greater, or when what is light moves what is heavy, and all the rest of the problems we call problems of trickery [*mēkhanika*]. They are not completely identical to physical problems [i.e., concerning nature], nor are they fully separated from them, but they are common to mathematical research and to research on physics. For the "how" becomes clear through mathematical research, and the "about what" through research on nature.[2]

Let us keep in mind four fundamental points here. First, mechanics is situated within the perspective of a struggle between man and nature, well expressed in the quotation from the tragedian Antiphon. Technology allows us to regain the upper hand over nature. Next, the goal of mechanics is to serve mankind's practical interests, and therefore to relieve human suffering, but also, it must be admitted, to satisfy the passions, particularly those of kings and the wealthy: hatred, pride, and the taste for pleasure and luxury. Moreover, mechanics is a

technique that consists in tricking nature, by means of instruments fashioned by human beings: machines of all kinds that enable the production of effects apparently contrary to nature. The notion of "mechanics" is thus situated within the perspective of the opposition between "nature" and "art" [*tekhnē*], with "art" being understood here in the sense of a human technique, as opposed to nature. Finally, mechanics is closely linked to mathematics, which allows one to determine *how* to produce a given effect.

Although mechanics seems to be opposed to nature, it is nevertheless, in the words of Philo of Byzantium in the third century BCE, based on the laws or the *logoi* of nature. In other words, it relies on the "reasons" that are immanent in nature, and ultimately on its mathematical qualities (particularly those of the circle) and physical qualities (weight, force) in order to obtain results that seem to be contrary to the course of nature: lifting enormous weights or hurling projectiles over tremendous distances.[3] From this perspective, the secrets of nature are rather the unsuspected resources that can be gleaned from natural processes. We find this idea once again in Francis Bacon, when he says, "Nature can be commanded only by obeying it."[4]

At the end of antiquity, Simplicius clearly recognized the close connection between physics and mechanics, writing: "Physics is useful to the things of life; it supplies their principles to medicine and mechanics, and it comes to the aid of the other techniques, for each of them needs to study nature and the differences with regard to the underlying matter of each of these techniques."[5] Simplicius no doubt means that, for example, a person who works with a given material, such as metal or wood, must know the physical properties of the material.

Over the course of antiquity, there was genuine technical progress from the time of the first Greek philosophers through the Pythagoreans, particularly the philosopher, scientist, technician, and statesman Archytas of Tarentum, until it reached a culminating point in the

Hellenistic and Roman period. Speaking of Archimedes' mechanical inventions, Plutarch traces this art back to Archytas of Tarentum, as well as to Plato's contemporary Eudoxus, insofar as they constructed instruments that made possible the solution of geometric problems.[6] In any case, the idea of making war machines occurred very early on, but so did the idea of constructing works of art, that is, tunnels, aqueducts, and fortifications, and of using instruments to carry out astronomical and geographical observations. The engineers of antiquity knew how to profit from the properties of steam and compressed air, for instance, in the invention of the suction pump and the pressure pump.[7] They also knew how to build automata, which were used in particular to animate statues of the gods, to the astonishment of the faithful.[8]

It was above all at Alexandria in the Hellenistic period, beginning more precisely with the end of the fourth century BCE, under the influence of those enlightened princes the Ptolemies, that the decisive flourishing of technology and mechanics took place, especially within the framework of the library and the museum of Alexandria. This "Mousaion," dedicated to the Muses and financed by the state, was a very lively center of studies, which gathered together a large number of scholars.[9]

This mechanical knowledge was not merely empirical know-how, but was also the subject of theoretical reflection and of the beginnings of a scientific systematization that took the form of axioms and was the work of great mathematicians. We still possess several treatises on mechanics dating from both the Hellenistic and the Roman periods, for instance, those of Archimedes of Syracuse, Hero of Alexandria, Pappus, and Philo of Byzantium.[10] In his excellent work *Les mécaniciens grecs,* Bertrand Gille, criticizing almost universally widespread clichés that represent the Greeks as incapable of advancing the elaboration of technology, has shown that the Greek mechanics truly gave birth to technology.[11]

It is true that philosophers, above all Platonists, affected to despise mechanics. Plato himself had criticized the mathematician, astronomer, and philosopher Eudoxus, who, instead of restricting himself to abstract reasoning, had used instruments in order to make the solution to geometrical problems comprehensible by sensible intuition.[12] To this distrust of sensation was added, among the Platonists, a disdain for the manual labor implied in the construction of machines. As a good Platonist, Plutarch wants us to believe that Archimedes, inventor of the hydraulic organ and of many war machines that were used effectively against the Romans in the siege of Syracuse, considered only abstract speculations to be serious, and held the invention of machines to be nothing more than the distraction of "geometry amusing itself." It was supposedly Hieron, king of Syracuse, who was interested in mechanics and urged Archimedes to make his art known to the multitude through the invention of various machines.

In contrast, the Stoic Posidonius, evoking, without speaking explicitly of mechanics, all the techniques man has developed for his comfort in the course of the ages, such as architecture, ironwork, metallurgy, the exploitation of iron and copper mines, agriculture—in other words, technologies that, like mechanics, are "interested"—affirms that wise men invented them when the pure morals of the Golden Age began to be corrupted.[13] From this perspective, philosophy and wisdom themselves appear as the motive forces of technical progress and civilization. This conception of the sage as inventor and benefactor of humanity is in complete conformity with the popular image of the Seven Sages. For instance, it was said that Thales of Miletus had either predicted an eclipse or diverted the course of a river. Wisdom was thus conceived as skill or know-how.

The phenomenon that characterizes the evolution of our civilization and has been called the "mechanization of the world" consists primarily in the application of mathematics to the knowledge of the natural phenomena of the world.[14] Yet this close connection between

mechanics and mathematics is an inheritance from the mechanics of antiquity, which was based on the physical and mathematical properties of the objects to which it applied by using mathematical formulas that made precise measurements possible. Ancient mechanics "tricked" nature by using the potential supplied by certain geometrical figures, such as the circle, and the inventions of ancient engineers presuppose complex mathematical calculations. They were cognizant only of "figure and motion," to borrow the expression used, for example, by Leibniz to designate what he calls "mechanical reasons."[15]

If we can accept that, in modern times, the mechanistic explanation of the world "by figure and motion" is the heir to the mechanical techniques of antiquity, we must nevertheless not forget that it is also the heir to purely theoretical traditions, which propose precisely a mechanistic explanation of the world, with no involvement of forces or souls that initiate motion: I mean the atomistic theories of Democritus and Epicurus, who also explained phenomena "by figure and motion." The universe, with all its infinite number of worlds, is like an immense game of Lego or Meccano.[16] The chance assembly of these pieces known as atoms—which are dissimilar in form but capable of hooking up with one another—constitutes bodies and worlds. This, to be sure, has to do not with a physics of utilization but with a physics of contemplation, which for Epicurus is intended above all not to explain the world but to appease souls. The Renaissance and modern times, taking up this atomistic hypothesis once again, were to place it in the service of the other tradition, that of the mechanical techniques of the engineers of antiquity, who could not help but agree with it.

ANCIENT MAGIC

Magic has the same finality as mechanics: the goal is to tear nature's secrets from it, that is, to discover the occult processes that enable

mankind to act on nature in order to place it in the service of human interests.[17] However, it relies originally on the belief that natural phenomena are brought about by invisible powers—gods or demons—and that it is therefore possible to modify natural phenomena by forcing the god or demon to do what one wants to accomplish. One acts on the god or demon by calling it by its true name, and then by performing certain actions and rituals, using plants or animals that are considered to be in sympathy with the invisible power one wishes to constrain. The god then becomes the servant of the person who carries out the magical practice, for magic claims to be able to dominate this power in order to have it at its disposal to carry out what it desires.

Practiced from the most distant times, magic found its theoreticians at the end of antiquity. In his *Apology,* the speech in which he defends himself against the accusation of having devoted himself to magical practices in order, it was said, to win himself a fine marriage with Prudentilla, Apuleius displays a great knowledge of the details of these practices, yet he provides little philosophical reflection on the principles and foundations of magic.[18] Saint Augustine goes much further when he tries to explain the power that enabled the magicians of Egypt, in the time of Moses, to fabricate serpents.[19] This magical operation consisted of extracting from the hidden bosom of nature the beings contained within it. All the effects of divine creation, he wrote, all the beings or phenomena that might appear over the course of the ages, potentially exist in the texture of the elements: "As females are great with their litter, the world too is great with the causes of the beings that are to be born."[20] Since the Stoics, these hidden causes had been called "seminal reasons." They were seminal because they were the seeds of beings, and reasons because these seeds deploy themselves and develop in a rational, methodical, and programmatic way. They contain, in a state of involution and virtuality, the various organs that will be brought to their full development in

the future living being. Nature thus becomes an immense reservoir that contains hidden within it the totality of seminal reasons. Here we see the evolution of the notion of a secret of nature, which assumes an ontological meaning under the influence of the Stoic doctrine of seminal reasons. The secrets of nature are genuine beings, or at least possibilities, that are hidden in the "bosom of nature." It is God, says Saint Augustine, who brings it about that "seeds develop their numbers," that is, the entire program they contain, and that "they cause to appear before our eyes visible forms full of beauty, freeing them of the hidden and invisible veils that cover them."[21] There is thus a natural development of things, intrinsic to nature and willed by God. Yet there can also be external interventions that unleash these forces and their program. The magical operation is just such an external intervention: "To use external causes—which, although they are not natural, are nevertheless used in conformity with nature—so that the things that are contained in a hidden way in the secret bosom of nature may burst free and are, as it were, produced outside, deploying the measures, numbers, and weights that they have received, in secret, from Him 'who has disposed all things with measure, number, and weight': of this, not only evil angels but even evil men are capable."[22]

Here, therefore, the secrets of nature are secret forces hidden in the bosom of nature, and the demons, who, according to Augustine, are the true authors of magical operations, are able to unleash them. In this connection, we should recall that Plato in the *Symposium* (203a1) had already established a relation between demons and magic. This idea of a "secret bosom of nature" is found once again in the High Middle Ages, in Johannes Scotus Eriugena,[23] but also in the Renaissance, in the partisans of "natural magic." In this secret bosom of nature all kinds of virtualities and possibilities, albeit hidden, are present; and they can give birth to forms or effects which then become visible as well.

NATURAL MAGIC IN THE LATE MIDDLE AGES AND THE RENAISSANCE

From the end of the twelfth century to the sixteenth century, an abundant magical literature developed in the Latin West: to a large extent, this consisted of works translated from the Arabic. In the Middle Ages, especially in its late stages, and the Renaissance, the notion of a "natural magic" gradually came into its own. The idea caught on as soon as it was thought possible to give a natural, almost scientific explanation for the phenomena that had until then been thought to be the work of demons, who were the only ones to know nature's secrets. Natural magic admits that human beings, too, can know the occult virtues of things. The assistance of demons is not necessary for using the secret virtualities hidden in the bosom of nature. For this to be possible, it was necessary to discover the astral influences and occult qualities of animals and plants, as well as the sympathies and antipathies that exist among the beings of nature.

In the Middle Ages this notion was sketched at the beginning of the thirteenth century by William of Auvergne, who brought the practices of natural magic closer to those of medicine. Roger Bacon, in his opuscule *On the Secret Works of Art and Nature* (1260), continued to reserve the name "magic" for demoniacal magic, but he gives us to understand that "experimental science," or "the art that uses nature as an instrument," can produce effects much more extraordinary than those of magic.

Natural magic made its definitive appearance with Marsilio Ficino, who, on this occasion, took up Plotinian ideas while transforming them.[24] Plotinus had already proposed a purely physical explanation for magic. The spells of magic, he said, are no more surprising than the magic of nature, of which music is one of the best illustrations.[25] For the first magician is Love, who attracts beings toward one another. It is this universal sympathy that makes all magic possible. The

artificial actions of magic may seem to provoke a change in the course of things, but they are nothing other than the magician's use of natural actions and reactions that take place between the parts of the world. "Even without anybody carrying out a magical practice," says Plotinus, "there are many attractions and enchantments [in the world]."[26] Many natural processes seem to be magical processes because they are carried out at a distance: for instance, musical chords, arranged harmoniously, begin to vibrate when one of them is struck.[27] This immediate and spontaneous magic is simply the magic of love. Gardeners "marry" the vine to the elm: such has been the consecrated expression since antiquity.[28] In so doing, however, they merely promote the natural affinity or love which, in a way, joins the two plants together.[29] To exist in the sensible world means to be condemned to undergo all these reciprocal and distant influences that are exerted among all these parts of the universe; it therefore means being subject to passion. Even the stars, as parts of the universe, undergo affections and passions—unconsciously, moreover.[30] This is how they grant prayers or are "charmed" by magical practices, without realizing it, absorbed as they are in the impassibility of contemplation.[31] Universal interaction is thus, for Plotinus, the magic of nature: "All that is in relation to something else is fascinated by that something, for that with which it is in relation fascinates it and moves it."[32]

In the Renaissance, Marsilio Ficino takes up, following Plotinus, this theme of Love the Magician:

> The operation of magic is the attraction of one thing to another by virtue of a natural affinity. Now the parts of this world, like the members of one and the same living being, all depending on the same creator, are connected one to another by the community of a unique nature . . . From their common kinship a common love is born, and from this love a common attraction. But this is true magic

> . . . Thus, the magnet attracts iron, amber attracts straw, and sulfur fire. The sun makes many a flower and leaf turn toward it; the moon has the custom of attracting water, Mars the winds, and various herbs also attract various kinds of animals to themselves. Even in human affairs, each one undergoes the attraction of his own pleasure.[33] The works of magic are therefore works of nature,[34] and art is a mere instrument of nature . . . The ancients attributed this art to the demons, for they knew what the kinship of natural things is, what is fitting for each one, and how to reestablish concord between things, should it come to be wanting . . . And all of nature is called "magician" by virtue of this reciprocal love . . . Consequently, no one can doubt that Love is a magician, since all the power of magic resides in Love, and the work of Love is accomplished by fascination, incantation, and spells.[35]

The pejorative nuance that, in Plotinus, accompanied the idea of a magic of nature has completely disappeared in Ficino. Two causes, it seems to me, explain this change in the value of the notion of magic. First, the Neoplatonists after Plotinus, above all Iamblichus and Proclus, developed, under the influence of the *Chaldaean Oracles*, a new conception of magic which, it must be emphasized, corresponds to a rehabilitation of the role of certain sensible things in the service of the spiritual life of the soul.[36] We thus witness the development in late Neoplatonism of a kind of sacramentalism: certain sensible signs, or "symbols," and certain material rites can, in Neoplatonic theurgy, enable the soul's return to its divine origin. In the process, it was admitted that certain material substances possess a divine energy within them, and an effort was made to decipher the code of universal sympathy, to reconstruct the chains that connect all the degrees of reality, down to the lowest one, with the gods. Second, as Eugenio Garin has shown, from the end of the twelfth century we see the development in the Latin West of a growing interest in works

of magic, accompanied by obscure desires, inherent in every magical procedure, to increase man's power over his fellow man and over matter.[37]

This trend was amplified in the Renaissance under the influence of Hermeticism, which attributes to mankind a wonderful power over nature.[38] "Magnum miraculum est homo," as the Hermetic work *Asclepius* had said: man is a great wonder.[39] Ficino belongs to this trend of thought. For him, "love," "magic," and "nature" take on a whole new meaning. No doubt Plotinus, like Ficino, could have written, "Nature has been called a 'magician' by virtue of the reciprocal love of things for one another." For him, however, this phrase would have had a negative meaning: it would have meant that the beings of the sensible world are nature's prisoners by virtue of the universal interaction that reigns in the world and the passions that beings experience against their will. For Ficino, by contrast, this phrase takes on a positive meaning: love is the great law of the world, and it explains the attractions that exist among all the parts of the world.[40] If such is the secret of the magic of nature, we can seek to know these laws of universal attraction in order to draw the celestial forces into material objects, and especially into the "figures" and "images" that are in harmony and affinity with a transcendent model.[41] The magic of nature thus founds the possibility of a doctrine and a practice that seek to uncover and utilize all these secret correspondences, naturally and rationally. This magic, in a sense natural, is to nature what agriculture is to the spontaneous productions of the earth: it activates and disciplines natural processes by means of the science of sympathies and affinities.[42]

In the three books of his *De occulta philosophia* (1533), Agrippa von Nettesheim collected and synthesized all the natural magic amassed for centuries in the ancient, Arabic, and medieval traditions. Conceiving of magic as the natural philosophy par excellence, he presented it in the context of a vast cosmic system of the Neoplatonic

type, in which the World Soul plays a central part.[43] The possibility of magic was based on the fact that contained within the matter of each thing is an "occult virtue," that hidden power already mentioned by Augustine, which is proper to each thing. The discovery of these occult virtues makes possible the establishment of the series of sympathetic correspondences between things, from planets to metals and stones, by way of living beings, and, by using these sympathies, the achievement of surprising effects. Thanks to magic and, at the same time, to the spiritual ascetics it demands, "it comes to pass that we, who are in nature, can dominate nature."[44]

The profound meaning of the notion of natural magic appears clearly in the summary written by Giambattista della Porta of his own unpublished work entitled "Criptologia": "This book deals with the most profound secrets that are buried in the intimacy of the bosom of nature, for which no natural principles or probable explanations can be found, but which are not, for all that, mere superstition." Della Porta concentrates on uncovering the demoniacal or, by contrast, the natural elements of certain magical recipes. In the two editions of his work *Magia Naturalis* (1558 and 1589), he attempts, in the words of William Eamon, to give "natural explanations of what are thought to be marvelous phenomena."[45] In broad outline, he presents the same universe as his predecessors: a universe endowed with occult qualities, among which attractions and repulsions, correspondences, sympathies, and antipathies are established among all levels of reality.

Like Paracelsus, he thinks that these occult qualities can be discovered by "signatures," willed by God; that is, certain details of the external form of beings, animate or inanimate, which enable us to guess that such-and-such a being will have an influence on such-and-such another. Della Porta conceives of this natural magic as a practical science, able to use nature with a view to mankind's interests. Here, all human activity finds its place: innumerable recipes are

proposed, for instance, in the fields of agriculture and metallurgy. In the latter domain, he makes some very interesting observations.

Insofar as it presents itself as a catalogue of observations of the oddities of nature and of recipes for obtaining extraordinary and astonishing results, natural magic is situated in the tradition of that literature, already very much alive in antiquity, of the secrets and wonders of nature, which I discussed earlier.[46] It differs from it, however, by its use of Neoplatonic metaphysics to explain the correspondences and series, the sympathies and antipathies, which manifest themselves in a universe that is both unified and hierarchical.

The tradition of *magia naturalis* remained alive until the time of German Romanticism. In 1765, for instance, a work titled *Magia Naturalis* was published at Tübingen, whose coauthors included, among others, Prokop Divisch, Friedrich Christoph Oetinger, and Gottlob Friedrich Rösler, and in which the phenomena of electricity and magnetism were interpreted from the perspective of natural magic. These speculations had a great influence on the philosophy of nature of the German Romantics, particularly Franz von Baader.[47]

MECHANICS AND MAGIC IN THE MIDDLE AGES AND THE RENAISSANCE

The kind of mathematical physics known as ancient mechanics continued to be cultivated and even developed in the Middle Ages. The mathematical treatment of mechanical problems appears clearly in the thirteenth century, for instance, in the works attributed to Jordanus Nemerarius, in which one finds, in particular, calculations concerning the raising of weights and the problem of levers. In the fourteenth century, Nicolas Oresme imagined the geometrical representation of the variations in a body's velocity.

Parallel to these applications of a rigorous mathematical method, we also witness, from the thirteenth to the fifteenth centuries, the development of imaginings, aspirations, and hopes, a faith in the future flourishing of technology and mechanics. These imaginings, aspirations, and hopes in fact coincided with those of magic. Roger Bacon, whom I have already mentioned, sketched the program of an "art that uses nature like an instrument," which would be superior to the magic of charlatans.[48] For instance, he imagines ships without oarsmen, flying machines in which a man sits and moves wings analogous to those of a bird, a machine enabling weights to be raised and lowered, a machine capable of dragging a thousand men toward it, another that would allow people to walk on the bottom of the sea, bridges without piers, giant mirrors, apparatuses for seeing distant objects better or provoking optical illusions, and convex mirrors for starting fires.[49] Add to this all the means, such as petroleum, for igniting and maintaining fires, machines for generating terrible noises in the sky, as well as everything that could be realized in the area of magnetism. As far as astronomy was concerned, there would be instruments for establishing a map of the heavens. Finally, one could mention alchemical research, with a view to the fabrication of gold and the prolongation of life.

When we read of all these projects, we might think that Roger Bacon was a true son of Prometheus, who wished to do violence to Nature. Ought we to see in him a precursor to the modern flourishing of technology? In fact, we must resituate these imaginings within the perspective of his Christian vision of history, which is not at all that of a modern person but that of a theologian of the Middle Ages, a Franciscan and professor at Oxford in the thirteenth century, who, moreover, manifests an encyclopedic knowledge. Not only was he a theologian and a philosopher, but also he practiced mathematics, astronomy, and optics. Rather than a "Faustian figure," as Hans Blumenberg would have it, we should speak of him, with Émile Bréhier, as an "enlightened theocrat."[50] Roger Bacon wished to hasten the conversion of the entire world to Christianity, which was threatened

by the imminent appearance of the Antichrist. All these mechanical inventions were to be placed in the service of apologetics. To the infidels, they would appear as genuine miracles, which would persuade them of the need to believe. If, they would say, our human mind cannot comprehend the wonders of nature and of mechanical art, must it not submit itself to the divine truths it does not understand?[51] As far as military inventions were concerned, they should serve the defense of Christianity in its struggle, which might be imminent, against the Antichrist.

Once we resituate them in the context of his vision of the world and of history, Roger Bacon's projects for mechanical inventions are therefore seen as very far removed from a modern mentality. It is highly significant, however, that Bacon could have thought that machines might be used as an apologetical argument. This implies that he understood the importance, both for the mind and for the body, that could be assumed by the discovery of the "secrets of nature," that is, the marvelous possibilities in nature which mechanics, in its further development, was to use to produce prodigious effects. The goal was no longer simply to contemplate the world but to transform it and place it in the service of mankind. This attitude is not an isolated phenomenon. René Taton is right to emphasize that, beginning precisely in the thirteenth century, "a new kind of human being appears: the architect or engineer," and that a growing interest then develops in practical and technical activity. For him, the flourishing of the "mechanical" sciences, such as statics, dynamics, hydrostatics, and magnetism, which we can also observe from the beginning of the thirteenth century, cannot be explained without close contact between Scholastics and technicians, who were the heirs to ancient mechanics. Roger Bacon, for instance, was in contact with a practitioner of the mechanical arts, Pierre de Maricourt, who was himself the author of a treatise on magnetism.[52] We thus witness a growing awareness of the powers of technology and its importance for human life.

This movement continued in the fourteenth and fifteenth centuries, and culminated with the engineers of the Renaissance, including Leonardo da Vinci. Leonardo's projects for mechanical inventions are justifiably famous. His life and activity were much more those of an engineer than of an artist.[53] He imagined an airplane, a submarine, and an assault tank; he built automata, such as the mechanical lion used several times in the princely celebrations of the time. We must not, however, exaggerate his role as a precursor of modern science, any more than we should that of Bacon. His notations, which are sometimes brilliant, are always fragmentary, and his contributions to the solution of problems of physics or mechanics is, in the last analysis, fairly meager.[54]

It is extremely interesting to encounter in Leonardo da Vinci a mind that united within itself the Promethean aspiration to use nature in the service of mankind and the attitude, which I've called "Orphic," of respectful and admiring observation of nature. If he thinks of building a flying machine, he begins by attentively observing and drawing the flight of birds in order to understand its mechanical workings.[55]

This curiosity and desire to invent, which come to light from the thirteenth to the fifteenth centuries, could be compared with the Hellenistic spirit that flourished at Alexandria under the reign of the Ptolemies. In both cases there was the same reaction against abstraction, the same beneficial influence of sovereigns who were enlightened, like the Medicis, or sometimes even extremely learned, like Frederick II of Hohenstaufen or Alfonso X of Castille.[56] In any case, the ferment of scientific work and bold imagination that characterized this period during which mechanics and natural magic converge in their aspirations was to offer a propitious terrain for the scientific revolution of the seventeenth century.

11

Experimental Science and the Mechanization of Nature

In a previous chapter I quoted a text written at the end of the fifth century BCE by the author of the Hippocratic treatise *On Art,* which already considered experimentation a kind of violence inflicted on nature to oblige it to reveal what it hides from us: "When Nature refuses willingly to hand over the signs [i.e., clinical symptoms], art has found the constraining means by which Nature, violated without damage, can let go of them; then, when it is freed, she unveils what must be done to those who are familiar with the art."[1] Here, as I also noted, we already see the analogy between the search for nature's secrets and a judicial and even criminal prosecution, which we find again at the beginning of modern times in Francis Bacon.[2]

ANCIENT AND MEDIEVAL EXPERIMENTATION

The continuation of the Hippocratic text shows that the author intends to speak of medical treatments that force the patient's body to present the symptoms that will make it possible to diagnose a specific illness. Quite obviously, we are far from modern experimentation, which is charged with the rigorous verification of a hypothesis, particularly by precise measurements. Nevertheless, rudimentary experimental techniques continued to be put in practice, particularly by Aristotelians, such as Strato of Lampsacus, with regard to weight and the void;[3] by doctors, who carried out vivisections not only on

animals but also on human beings (prisoners or convicts sentenced to death);[4] by Ptolemy, author of remarkable experiments in the field of optics;[5] and also by John Philoponus, on the ratio of the weight and speed of freely falling bodies.[6] According to Nelly Tsouyopoulos and Mirko Drazen Grmek, Philoponus, who wrote in the sixth century CE, is "the first author to propose the hypothetico-deductive method for solving the problem of induction."[7]

In the last chapter I spoke of the Franciscan Roger Bacon, who thought that his *scientia experimentalis* would surpass the prodigies of magic. This should not, however, mislead us into turning him into the inventor of science and the experimental method. In his time and work, the word *experimentum* did not designate what modern scientists call an "experiment." Here, *experimentum* is above all opposed to abstract and purely rational knowledge. It was instead an immediate knowledge or lived experience that might be either sensible or spiritual. By means of *experimentum,* we may become "experts," skilled at uncovering and using the secrets of nature and at using nature as an instrument. Roger Bacon's experimental science was, fundamentally, nothing other than natural magic, closely linked to mechanics, and, like natural magic, it aimed particularly at realizing extraordinary effects, intended above all to cause admiration and astonishment, which, from Roger Bacon's viewpoint, would be capable of converting the infidels.

THE LEGACY OF MAGIC AND MECHANICS

Historians agree in considering Francis Bacon the first theoretician of the methods and hopes of experimental science. For him, natural magic, which seeks to operate by using the sympathies and antipathies that exist among things, is ultimately useless.[8] If those who practice it "have produced some work, this work is of the kind appropriate to admiration and the taste for novelty, but not to profit

and utility." It may conserve something of natural operations, for instance, in the phenomena of fascination or communication at a distance between minds and bodies. He notes that a genuine natural magic does not yet exist, any more than a genuine metaphysics, from which it might derive, for natural magic presupposes the knowledge of forms.[9] Its task would be to draw up an inventory of all that man has invented and of all that could and should be invented.

To formulate his project of discovering and dominating nature, Bacon, consciously or unconsciously, uses expressions borrowed from the conceptual world of magic or mechanics. Thus, like Augustine describing how magic works, he speaks of what is hidden in the "bosom of nature."[10] He writes, "There is every reason to hope that Nature still keeps hidden in her bosom many secrets of excellent use, which have no kinship or analogy with what has already been invented and completely leave the paths of imagination behind."[11]

Elsewhere he takes up once again the vocabulary of violence traditionally used in both these arts. Bacon wants to show the importance of experimentation for the progress of the sciences. Since antiquity, scholars had contented themselves with collecting observations on natural phenomena. This was how Aristotle had collected his documentation for his *History of Animals.* What counts, however, are not more or less veridical accounts of observations but the experiments one carries out oneself with the help of the mechanical arts: "For as in public life the nature of an individual and the hidden deposition of his mind and his passions are better uncovered when he is disturbed than at any other moment, so the secrets [*occulta*] of nature are better discovered under the torture of the [mechanical] arts than when it proceeds in its natural course."[12] Here, then, we encounter once again the image of unveiling the secrets of nature obtained in a manner analogous to that of a judicial procedure.[13] Nature is a defendant (or a witch?) from whom one extorts confessions.

Nascent science thus shared its hopes and its projects with magic

and mechanics: the goal was to produce all kinds of wonderful and useful effects from the virtualities hidden in nature. In the *New Atlantis,* Francis Bacon imagined a kind of Center of Scientific Research, the "House of Solomon," divided into laboratories devoted to different kinds of problems. The father of this House of Solomon defines the enterprise's priorities as follows: "The goal of our Foundation is to know the causes and secret movements of things and to move back the borders of mankind's empire over things, with a view to realizing everything that is possible."[14] This was a collective undertaking. Each researcher has a well-defined task and contributes to the common work. The father then enumerates the various research projects for his interlocutor. For instance, in vast underground grottos, scientists try to produce new artificial metals; elsewhere, thanks to the addition of vitriol, sulfur, steel, copper, lead, nitrate, and other minerals, fountains are created that imitate natural and thermal springs; in vast buildings others struggle to master the meteorological phenomena of rain, snow, and thunder; in the gardens people try to make plants more precocious or late-blooming, to modify the form of fruits, and to produce completely new plants; or again, in parks and enclosures animals are raised on which experiments of all kind are carried out, including the ingestion of poisons, vivisection, sterilization, modification of their form, color, and size, and the creation of new species. Francis Bacon believed in spontaneous generation, and he imagines that snakes, worms, insects, and fish can be born from putrefied matter.[15] Carolyn Merchant is right to compare this program to that of the natural magic of Giambattista della Porta, who also hoped, for instance, to change the colors of flowers, and above all to create worms, snakes, and fish from putrefactions.[16] This enumeration of projects, moreover, evokes the memory of the lists of imaginary inventions proposed by Roger Bacon or even Leonardo da Vinci. Here, for example, we find the optical instruments able to make distant objects seem close or vice versa, and

to magnify small objects; we also find flying machines, submarines, and automata. As Merchant rightly emphasizes, Francis Bacon's program is a program for the manipulation of the environment and of nature itself, precisely the one that our current period is trying to realize, in a way that risks bringing about disastrous consequences not just for nature but for mankind.[17]

THE MECHANISTIC REVOLUTION OF THE SEVENTEENTH CENTURY

In a letter addressed in 1644 to one of his innumerable correspondents, Father Mersenne, a confirmed partisan of the mechanistic explanation of phenomena, writes that his time "is the father of a universal movement . . . What do you think of these renewals: Do they not give us the premonition of the end of the world?"[18]

In a remarkable passage Robert Lenoble has described the event, of incalculable importance for the history of mankind and of the earth, known as the mechanistic revolution, which began with Galileo:

> The time is coming when, in a few years, Nature will fall from her rank of universal goddess to become—a disgrace that has never yet been known—a machine. This sensational event could well be given a precise date: 1632. This was when Galileo published the *Dialogues on the Two Principal Systems of the World,* and the characters who speak are in the Venice arsenal. That genuine physics could emerge from a discussion among engineers: we can no longer imagine today what was so revolutionary about such a scenario, apparently so anodyne . . . The engineer has conquered the dignity of a scientist, because the art of fabricating has become the prototype of science. This implies a new definition of knowledge, which is no longer contemplation but utilization, and a new attitude of man in the face of Nature: he ceases to look at her as a child looks at his mother, taking her as a model; he wants to conquer her, and become her master and possessor.[19]

Unlike Robert Lenoble, I would not say that "man"—that is, humanity—henceforth has a new attitude with regard to nature. There are several reasons for this. First of all, and generally speaking, we must be very prudent when we wish to define the mentality of an entire period. Also, generally, as I have already said and shall have occasion to repeat,[20] "man"—meaning the same human being—does not have one single attitude toward nature: he can have what one might call a day-to-day perception of it, or an aesthetic perception, or a scientific knowledge. Scientists know perfectly well that the earth revolves around the sun, but they do not think about that when they talk about the sunset. Second, the dominating attitude of modern science is nothing new. This Promethean tendency has long existed among mechanics and magicians; and already in Genesis, God ordered human beings to dominate the earth. What we must say, I think, is that with Francis Bacon, Descartes, Galileo, and Newton, a definitive break, not with the aspirations of magic but with its methods, may have taken place, and these scholars discovered the means of progressing in a decisive and definitive way in this project of dominating nature, limiting themselves to the rigorous analysis of what is measurable and quantifiable in sensible phenomena.

This event—like almost all events—has several concurrent causes. First of all, there is the triumph of the engineers, of which Robert Lenoble speaks. As we have seen, it had been prepared since the end of the Middle Ages and during the Renaissance;[21] it was accelerated by the spectacular nature of the progress in knowledge realized in the fifteenth and sixteenth centuries, thanks to the great discoveries, such as the discovery of America, made by the navigators, and the great inventions, such as printing, made by artisans. The value and dignity

of manual labor increased as a result. It is significant that in 1563 an artisan such as Bernard Palissy wrote a book whose title gives a good statement of its program: *Veritable Recipe by Which All the Men of France Shall be Able to Learn How to Multiply Their Treasures: Item Those Who Have Never Had Knowledge of Letters Shall Be Able to Learn a Philosophy Necessary for All Inhabitants of the Earth.*[22] For him, natural philosophy is learned not from books but from contact with nature, and by working with one's hands. At the beginning of the sixteenth century, Juan Luis Vives, in his book on the teaching of sciences (*De Tradendis Disciplinis,* 1531), and Rabelais, in his *Gargantua* (1533), encouraged students to visit the shops of artisans to observe the techniques and procedures of people who are in direct contact with nature.

The progress achieved in the fabrication of instruments helped make possible in particular the construction of the microscope, from the beginning of the sixteenth century, and of the telescope, in the seventeenth and eighteenth centuries. They revolutionized the possibility of observation, but some naturalists refused to use them, as I shall have occasion to repeat, because they feared that such instruments might interfere with the precise view of things.[23]

At the time this infatuation with practical knowledge brought with it a profound and almost generalized contempt for bookish knowledge and arguments from authority. Henceforth, science was to rely not on what people said either with regard to phenomena—Aristotle had collected a great deal of information of this kind in his works on natural history—or still less on what Aristotle or Galen or Ptolemy said, but on what one can experience, either oneself or collectively, and on what one can fabricate or construct. It was the end of the argument from authority. Truth is the daughter of Time, that is, of the collective efforts of mankind.[24]

The goal was no longer to read, explain texts, and borrow one's knowledge from the ancients, but to make one's reason work on

the occasion of concrete observations and well-thought-out experiments. At the end of his *Discourse on Method,* Descartes wrote that he hoped that those who use their natural reason in all its purity, that is, whose mind has not been spoiled by scholastics, will be better judges of his opinions than those who believe only in old books.[25]

The mechanistic revolution was thus closely linked to what we might call the democratization of knowledge. Science was no longer the prerogative of a few initiates, as was the case with magic, or of a few privileged people, students or university professors; it was accessible by right to all of mankind. Francis Bacon in his *Novum Organum* and Descartes in the *Discourse on Method* consider that the method they propose is an instrument that enables any mind to accede to scientific knowledge. When we draw a circle by hand, it may be drawn more or less well; this depends on the hand's skill. Drawing a circle, however, no longer depends on the qualities of the hand if we draw it with a compass. The scientific method is a compass that enables all talents to be equalized.[26]

Moreover, as Francis Bacon had already glimpsed in the *New Atlantis,* scientific discoveries are the product not of isolated work but of collaboration among scientists. Thus, in the seventeenth century we witness the flourishing of academies of science, in which the work of various scientists was presented and discussed.

With Galileo, a radical change was introduced into the definition of mechanics. Whereas throughout antiquity and in the Middle Ages, mechanics was the science of artificial objects, that is, objects fabricated by human beings to force nature to act in mankind's service and in a way that was "against nature"—although it was well known that the laws of nature had to be used with a view to this goal[27]—henceforth, with Galileo, physics and mechanics began to be definitively identified. On the one hand, mechanics consists in the application of the laws of nature, and, on the other, in order to study nature, Galilean physics made use of the calculations and mathemat-

ical notions that ancient mechanics used to build artificial objects. The scientist therefore operated like an engineer, who had to reconstruct the gears and functions of the machine known as nature.

This process is clearly stated by Descartes in a chapter of his *Principles of Philosophy* titled "How Can We Achieve Knowledge of the Figures, Size, and Movements of Insensible Bodies?" Descartes answers this question as follows. First, he recognizes that the smallest parts of bodies are insensible, that is, they cannot be perceived by means of the senses. The only clear and distinct ideas we can have of material realities are the notions of shape, size, and movement. But the rules concerning these notions are those of geometry and mechanics. All the knowledge human beings can have of nature can be derived only from these rules. In this research, says Descartes,

> the example of several bodies composed by the artifice of men has been a great help to me; for I do not recognize any difference between the machines made by artisans and the various bodies that nature alone composes, except that the effects of machines depend only on the arrangement of certain tubes or springs or other instruments which, since they must have some proportion with the hands of those who make them, are always so large that their figures and movements can be seen, whereas the tubes or strings that cause the effects of natural bodies are ordinarily too small to be perceived by our senses. It is, moreover, certain that all the rules of mechanics belong to physics, so that everything that is artificial is likewise natural. For instance, when a watch marks the time by means of the wheels of which it consists, this is no less natural for it than it is for a tree to produce fruit. This is why, just as a watchmaker, seeing a watch he has not made, can ordinarily judge, from whichever of its parts he considers, what are all the others that he does not see; so, by considering the effects and sensible parts of natural bodies, I have tried to come to know what those of their parts that are insensible must be.[28]

Descartes and the mechanists thus reject the traditional distinction between the procedures of human art and natural processes. In the article "Nature" in his *Philosophical Dictionary,* Voltaire gave a good summary of this situation: "My poor child, do you want me to tell you the truth? I've been given a name that does not suit me: for I am called *nature,* yet I am all art."

Henceforth the machine, rather than the living organism, is the model that serves to conceive and explain nature, and from this perspective God appears as the builder of the world's machine, who is external to it: the great engineer, architect, or watchmaker. Such expressions appear frequently in the seventeenth and eighteenth centuries.[29] Then there are Voltaire's well-known lines:

> The universe embarrasses me, and I cannot imagine
> that such a clock should exist without a clockmaker.[30]

It is true that in antiquity, authors both pagan and Christian—Lucretius, Calcidius, and Lactantius, for instance—had spoken of nature as a *machine.*[31] Yet it is also true that by using this metaphor, these authors only wished to allude to the beautiful organization of nature. In Christian writers such as Lactantius, however, this metaphor could open the door to a mechanistic conception of the universe. When, in 1377, the comparison of nature to a clock occurs in Nicolas Oresme, the specifically mechanistic perspective becomes clearer.[32] In 1599, at the end of the dedicatory epistle that precedes his translation of Pseudo-Aristotle's *Mechanical Questions,* Monantheuil declares that the universe is God's instrument, insofar as it is the biggest, most powerful, and most structured of all machines, and because it is the system *(complexio)* of all bodies.[33] This metaphor was to assume its full importance and significance in Mersenne and Descartes.

Given the very close relationships that, since antiquity, had linked mathematics and mechanics, this image of nature as a mechanism

had as its fundamental consequence the appearance, thanks to Kepler, Galileo, Descartes, Huygens, and Newton, of a mathematical physics, which restricted itself to the quantifiable and measurable data of phenomena and aimed to formulate the laws that regulate them in the form of equations. For Galileo, for instance, the world is a book written in a language that cannot be understood unless we know its characters, which are none other than mathematical figures.[34] Beginning with this decisive turn toward the mathematization of nature, the way was open for the possibility of the evolution of science toward modern physics.

SECRETS OF NATURE

The scientific revolution did not put an end to the use of the metaphor of the secrets of nature; scholars continued to have recourse to it. For instance, in his *Life of Descartes,* written at the end of the seventeenth century, Adrien Baillet says with regard to Father Mersenne, "Never was a mortal more curious than he to penetrate all the secrets of nature and to bring all the sciences and all the arts to perfection."[35] Pascal, for instance, writes, "The secrets of nature are hidden; although it always acts, one does not always discover its effects."[36] Without using the word "secret," Molière, in *The Imaginary Invalid* of 1672, has Beraldus say:

> The workings of our machine are mysteries so far,
> in which men see not a whit:
> . . . nature has placed before our eyes
> veils too thick for us to know one bit.

Paradoxically, it was at the beginning of the seventeenth century, at the time of the scientific revolution currently under discussion, a time when nature was losing its value as active subject and ceasing to be imagined as a goddess, that it appears depicted on the frontispiece

of a great many scientific handbooks in the form of Isis unveiling herself.[37]

The secrets of nature, however, are no longer the occult and invisible qualities, hidden forces, and unsuspected possibilities that lie beyond appearances and that nature conceals from us. Thanks to the microscope and the telescope, mankind was first able to see unknown material entities. The secrets of nature were finally uncovered, and man became the "master of God's works," in the words of Kepler.[38] One of the pioneers of research carried out with the help of the microscope, Anton van Leeuwenhoek, published his observations in a book titled *Arcana Naturae Detecta.*[39] These "secrets of nature unveiled" are, for instance, the realities he describes in his work: animalcules, now called "infusoria" or else blood corpuscles, bacteria, or spermatozoa. All these discoveries raised entirely new problems for biology. The secrets of nature also included the uneven terrain of the moon, the stars of the Milky Way, the satellite of Jupiter that Galileo discovered with the help of a telescope, and sunspots.

The secrets of nature were the mechanisms and the hidden workings behind appearances, mechanisms one hoped to discover by means of instruments that developed the power of the senses, but also, and above all, thanks to experimentation and mathematical calculations, which made possible the formulation of the equations that govern the motions of matter, and hence the reproduction of the effects caused by the machines that made up the great machine of the world.[40]

THE CHRISTIAN INSPIRATION OF MECHANISM

The Christian character of this mechanistic revolution of the seventeenth century cannot be overemphasized. In the first place, the project of dominating nature which characterizes it, and which, moreover, was not, as we have seen, alien to pagan antiquity, echoes God's

exhortation to Adam and Eve: "Subjugate the earth." We have seen how Francis Bacon considered that the mission of science consisted in giving man the rights over nature that God had conceded to him. Through original sin, man had lost both his state of innocence and his power over nature. Of these two losses, religion could repair the first and science the second.[41] Opposing it to the speculative philosophy taught in the schools, Descartes proposed a practical philosophy which, aware of the force and the actions of fire and the other elements, as well as of the other bodies that surround us, would render us, as it were, "masters and possessors of nature." He considered that it was his duty to make his physics known for the general good of mankind.[42]

The image of the world as a machine corresponded perfectly to the Christian idea of a creative God, absolutely transcendent over his work. Moreover, a biblical text, "He arranged all things with measure, number, and weight," even seemed to invite scientists to retain only the mathematical elements as essential.[43] Saint Augustine had cited this biblical text in support of the cosmological conception of Plato, who, he said, "presents God as utilizing numbers to fashion the earth."[44] Here, Augustine was echoing Plutarch's affirmation, "According to Plato, God never ceases doing geometry."[45] In the seventeenth and eighteenth centuries, God was also conceived as a geometer[46] and a mathematician;[47] and especially in the seventeenth century, scientists such as Bacon, Mersenne, Descartes, and Pascal had the impression of a profound harmony between their mechanistic vision of the world and their religious faith.

Nevertheless, I cannot share the optimism of Robert Lenoble, who contrasts the eighteenth century, during which there reigned a feeling of guilt caused by the opposition of religion and science, and the seventeenth century, which offers "that ever so rare example" of "human growth occurring in peace and agreement with God."[48] According to him, the seventeenth century rediscovered the emotional equilibrium of the thirteenth century, "when science and religion walked hand in hand." To realize the falsity of this description, it suffices to recall Galileo's condemnation by the Inquisition and the uncertainty, if not anguish, that it henceforth caused to weigh on scientific research. Descartes, for example, insisted heavily on the hypothetical nature of his theories and hesitated to publish his *Treatise on the World*.[49] Let us say instead that scientists of the seventeenth century may have been encouraged in their scientific activities by their Christian faith, but they were not encouraged at all by the ecclesiastical authorities, who claimed to represent religion.

DIVINE SECRETS

These scientists found a way to escape condemnation by means of the theological doctrine of the absolute liberty of divine omnipotence, which the late Middle Ages had developed to exalt God's transcendence, and which continued to be widely accepted. To understand the importance this theological doctrine had at the time, we must return to the text by Descartes cited earlier.[50] Mechanistic explanation consisted in trying to define how specific parts of the world machine worked, to explain in this way how they appear to us the way they do, but without our being able to know whether they actually work in the way that has been reconstructed. Mechanistic explanation is thus hypothetical. It hypothesizes a certain function, defined, if possible, by a mathematical ratio, to explain the phenomenon we have before our eyes. It is possible, however, that the workings may in fact be different, and that another hypothesis may be conceivable. Descartes puts things quite clearly: just as a clockmaker can make two clocks that look the same but have a different mechanism, so God can create different worlds that are apparently identical, but which he makes function with a different mechanism: "God has an infinity of means, by each of which he may have brought it

about that all the things in this world appear as they now appear, without it being possible for the human mind to know which of all these means he has chosen to use in making them."[51]

Descartes therefore claims only to describe an ideal and possible world of phenomena. Even if phenomena in fact occur in accordance with a different process, it would nevertheless remain true that they could be reproduced according to the mechanism that had been defined, which, as Descartes observes, could be useful in medicine and the other arts.[52] What matters is not the knowledge of what actually causes a given effect—for this we cannot know—but the possibility of reproducing such an effect.

Let us note in passing that we can recognize here two methodological principles inherited from antiquity, which I will have occasion to discuss later: on the one hand, the possibility of proposing a plurality of explanations for the same phenomenon, and on the other, the necessity of choosing in every case an explanation that is in conformity with phenomena, or of "saving the phenomena," if we may so translate the Greek formula *sōzein ta phainomena*.[53]

Let us return, however, to our theological principle. It appears in the Latin text of the *Principles of Philosophy,* where Descartes claims that ultimately, on the subject of the mechanistic explanations he has proposed, one can have only a "moral certainty," that is, "a certainty that suffices for the conduct of life, but which remains uncertain, if it is considered from the viewpoint of divine omnipotence."[54]

As Richard Goulet points out, this doctrine of divine omnipotence was implied throughout Jewish and Christian beliefs, as Galen the physician in the second century and Porphyry in the fourth century of our era were well aware.[55] Against the creationist doctrine of Moses, Galen affirms that there are things that are impossible by nature, which God does not undertake to do.[56] As far as Porphyry is concerned, the Christian dogma of the Resurrection, or the idea of God annihilating the world he had created, implied in his view the complete arbitrariness of divine omnipotence: "It will be replied: 'God can do everything.' But this is not true. God cannot do everything. He cannot bring it about that Homer was not a poet, that Ilion was not destroyed, or that two and two make one hundred instead of four."[57]

According to theological voluntarism, by contrast, if two plus two are four, it is because God so willed it. There is no intelligible necessity to impose itself on God's absolute power: "The mathematical truths that you call eternal have been established by God and depend entirely on him, as do all other creatures. Indeed, to say that these truths are independent of God is to speak of him as a Jupiter or a Saturn, and to subject him to the Styx and the Fates."[58]

God has established these truths "as a king establishes laws in his kingdom," as Descartes wrote on April 15, 1630, to Father Mersenne. This doctrine of complete divine freedom had two consequences. First of all, it is possible that phenomena, or that which appears to us, may be produced by processes different from those we can reconstruct mathematically and according to the laws of mechanics. We must renounce the idea of an absolutely certain science that knows genuine causes. The result is that we can observe and measure natural phenomena, but we cannot truly understand their causes. Seventeenth-century scientists found a sufficient motive for renouncing worries about the finalities and essence of phenomena in theological reasons; it was enough for them to determine how these phenomena occur according to the laws of mechanics. This is perhaps what Father Mersenne meant when he wrote, "We see only the bark and the surface of nature without being able to enter into it."[59]

In addition—and here we return to the theme of the fear of the Inquisition—seventeenth-century scientists found in this doctrine of theological voluntarism a way to escape the fulminations of the ecclesiastical magisterium. By affirming that "God has an infinity of means, by each of which he may have brought it about that all the

things in this world appear as they now appear, without it being possible for the human mind to know which of all these means he has chosen to use in making them," Descartes hints not that he is not affirming that things actually happen as he has tried to demonstrate but that he can only propose a likely rational explanation.[60] This is what Galileo had refused to admit. As Eduard Jan Dijksterhuis rightly notes, Cardinal Bellarmino had indeed advised Galileo to content himself with affirming that apparent motions are better explained mathematically if the earth's revolution around the sun is accepted, and that this was therefore a mere hypothesis, and thus to admit that it could not be affirmed with absolute certainty that things really do occur in that way.[61]

The idea of the complete freedom of the creative will also bring us back to the ancient doctrine of the divine secret. Seneca had said: "Are these hypotheses true? Only the gods know, they who possess the knowledge of the truth. For us, it is possible only to investigate these domains and to make progress in these hidden things, with the help of conjectures, no doubt deprived of the certainty of discovering, but not bereft of all hope."[62]

Yet the night of the secret concealed by the free and omnipotent Christian God is still more impenetrable. For the God of the Stoics was himself Reason: he was rational necessity, choosing the best of worlds and repeating it endlessly, by means of the eternal return, whereas the "omnipotent" God is the creator, entirely free, of any world he might choose among infinite and indifferent possibilities, a world in which rational necessity is itself God's free creation. Rational necessity thus depends on a choice that is ultimately quite arbitrary.[63]

THE "RETIRED ENGINEER"

The harmony—which was, moreover, quite fragile—between religion and science was to be short-lived, for the religious justification

of mechanism, of which I have just spoken, bore its own negation within it and was soon to lose all meaning. First of all, the mechanism of phenomena could very well be studied while putting God in parentheses. Ultimately, in the system of mechanism, the role of God was limited simply to giving the initial shove that set in motion the constitutive process of the world machine and its functioning. This is why Pascal reproached Descartes: "I cannot forgive Descartes; throughout his philosophy, he would have liked to do without God, but he could not prevent himself from making him give an initial flick to set the world in motion; after this, he had no more need for God."[64]

It has also been said that in Newton's system, God is in the situation of a "retired engineer," who no longer has any reason to intervene.[65] God thus gradually became a useless hypothesis. Laplace is said to have replied to Napoleon, who asked him the role of God in his *System of the World,* "Sire, I did not need this hypothesis."[66]

There was also the seed of self-destruction in the doctrine of theological voluntarism that was closely connected to the mechanistic approach to nature. The intention had been to exalt divine transcendence by affirming the absolute freedom of God's will. Yet as Leibniz remarked in his controversy with Clarke on the subject of Newton's physics, there is an absolute equivalence between the system of absolute will, accepted by the mechanists, and the Epicurean system of absolute chance: "Will without reason would be the Epicureans' chance."[67]

Ultimately, on both sides, there is complete irrationality, since the world's appearance has no rational justification, either in voluntarist absolutism or in the uncaused deviations of Epicurean atoms. On neither side could any rational decision be made between possibilities that are completely indifferent, in the case either of Epicurean atoms or of Newton's absolute space. Beginning with the end of the eighteenth century, and especially in the nineteenth century, mechanistic science, which did without the consideration of causes and

ends and stuck to the phenomena, was totally indifferent to the problem of the existence or nonexistence of God and the way he may have created the world.

"THE DEATH OF NATURE"

The extraordinarily complex phenomenon of the mechanistic revolution, which I have described all too briefly, has been the subject of many studies. Some of them have spoken, with regard to this phenomenon, of a "death of nature." This is, for instance, the title of a highly interesting book by Carolyn Merchant.[68]

It is a striking expression, but ultimately rather imprecise. It might simply mean the disappearance of the image that philosophers and scientists had of nature before the mechanistic revolution. This is indeed what happened, and the philosophers of the seventeenth century were aware of it. Until then, nature had been represented as an active subject, whether it was God himself or a power subordinate to God and acting as his instrument. In his *Treatise on the World,* Descartes expressly rejects this representation: "By Nature, I do not by any means understand here some Goddess or any other kind of imaginary power, but . . . I use this word to signify Matter itself."[69] In fact, for Descartes, the word "Nature" can designate either divine action upon Matter, or Matter itself, or the totality of laws established by God within Matter. Robert Boyle devoted a treatise to the notion of nature in 1686. He absolutely rejects the idea of a Nature conceived as a personality. Instead of saying, "Nature does this or that," it is better, according to him, to say, "Such-and-such a thing was done according to nature, that is, according to the system of laws established by God."[70]

We may wonder, however, whether the transformation of the idea of nature in the mind of a tiny group of philosophers and scientists was really able to provoke a radical transformation of man's attitude

with regard to nature or a "death of nature." It was not until the beginning of the nineteenth century, from the time when production began to be industrialized and the flourishing of technology became universal, that man's relation to nature was gradually modified in depth. In the eighteenth century, some philosophers had a premonition of this evolution and proposed a different approach to nature.[71] Yet in the seventeenth and eighteenth centuries, in the artistic works often commissioned by scientists themselves, nature continued to be personalized. Paradoxically, as we shall soon see, it was precisely in the frontispieces of scientific handbooks that nature appeared personified in the form of the goddess Isis.[72] In addition, Isis/Nature became the subject of a veritable cult in the revolutionary and Romantic periods.

12

Criticism of the Promethean Attitude

In the Middle Ages and in modern times, mechanics, magicians, and scientists tried to tear from nature what they called its secrets. Yet there were powerful currents of thought that sought to restrain what was considered inordinate audacity precisely insofar as it was Promethean, since it sought to do violence to nature by artificial means.

VAIN CURIOSITY

Already in antiquity, and precisely in the story of Prometheus, who, having stolen the secret of fire from the gods, was delivered over to eternal torture, and in that of Icarus, who, flying artificially like a bird, wished to rise up as far as the sun but fell into the sea, there appeared in mythic form the presentiment of the danger represented by audacity, or hubris, for whoever sought to know the divine secrets. As I have already said, in the emblem books of the sixteenth and seventeenth centuries, these two figures symbolized the dangers of curiosity or the pretension to dominate nature.[1]

First of all, I must mention the philosophical tradition that was opposed to vain curiosity, which distracts the soul from caring about its moral life.[2] As we have seen, this was already Socrates' position, which consisted in the complete rejection of research on nature.[3] Other philosophers, while they recognized the importance of physical research, were afraid of seeing man absorb himself in it. Seneca,

although he wrote a work dealing with "natural questions," thought that wishing to know more than one needs is a form of intemperance.[4] In this regard he may have been influenced by Demetrius the Cynic, from whom he quotes remarks that tend in exactly the same direction. There are many questions concerning nature, said Demetrius, which it is both impossible and useless to resolve: "Truth is hidden in the depths of the abyss, hidden in darkness."[5] Nature, however, is not jealous of its secrets, for it has placed all that leads us to happiness and moral progress within our view, and quite close to us. This must be enough for us.

As far as the Epicureans are concerned, physical research interested them only insofar as it produced peace of mind by freeing man from fear of the gods and of death. Epicurus wrote: "If we were not troubled by our apprehensions concerning celestial phenomena and death, fearing lest it be something for us because of our ignorance of the limits of pain and pleasures, we would have no need of the study of nature."[6]

The idea of God as creator, as we glimpse it in the *Timaeus*, could lead people scrupulously to respect the divine secret of the fabrication of the universe and to renounce putting forth hypotheses concerning the production of natural phenomena. Philo of Alexandria, the Jewish Platonist, speaks of the "limits of knowledge," and advises human beings to know themselves instead of imagining that they know the origin of the world.[7] We cannot be so proud as to pierce this divine secret, like those so-called sages who not only boast that they know what each being is but, out of bravado, add the knowledge of causes "as if they had been present at creation . . . as if they had been the Creator's advisers in its fabrication."[8] It is much better to seek to know ourselves. A few centuries later, Augustine condemns curiosity as the "concupiscence of the eyes" and as a need to have new experiences, even if painful.[9] We succumb to curiosity by attending spectacles and practicing magic, but also by seeking to know

works of nature that are beyond our grasp, and by asking God for miracles.

For Jews and Christians, as we have seen, God's words to Adam, as recounted in the Genesis story, conferred on him a right of domination over the earth and the right to make use of inferior creatures, and had therefore, at the end of the Middle Ages, in the Renaissance, and in modern times, urged man, especially once he had observed the progress of science owing to the application of the scientific method, to seek to discover the secrets of nature and devote himself to scientific research.[10] Scientists of the seventeenth century, however, were forced to recognize a limit to this undertaking: the need to stop, after the study of phenomena, before the impenetrable secret of the divine will, which chose this world from among all possible worlds.

THE CRITIQUE OF TECHNIQUES THAT FORCE NATURE

In the second place, doubts had been raised since antiquity about the legitimacy of any technique that forces nature. In his *Memorabilia*, Xenophon recounts that Socrates doubted that research on nature was disinterested, and he suspected that those who sought to know divine things believed that once they knew "through what necessities each thing comes into being," they could, when they wished, produce wind, rain, the seasons, and whatever such things they might need.[11] Thus, already in this period, we can foresee science's Promethean ambitions.

We have seen Cicero mention the scruples of Empiricist doctors, who were afraid that, when uncovered by dissection, "organs, deprived of their envelopes[,] might be modified."[12] Entrails look different in a living being and a dead body; already altered by emotions, they are changed even more as a result of death.[13] This view of the Empiricist doctors is also reported by Celsus, the Latin encyclopedist who wrote in the first century of our era. For them, vivisection,

carried out on criminals by the Dogmatic doctors Herophilus and Erasistratus in the Hellenistic period, was an act of cruelty: "An art charged with watching over mankind's health has inflicted upon someone not merely death but the most atrocious death." This death was, moreover, useless, "for what is sought at the cost of so much violence cannot be known."[14]

In addition to these methodological and moral doubts, there were also fears that could be called ecological. Magicians and experimenters sought to tear the veil away from Nature. Yet if Nature hides herself, does she not have her reasons? Does she not want to protect us in this way from the dangers that await us lest, once we have dominated and mastered her, we may be threatened by our own technical progress?

These fears bore in particular on the exploitation of mines and the digging of subterranean galleries. From the perspective of human decadence after the Golden Age, Ovid had seen in these techniques a characteristic of the complete immorality of people of the Age of Iron: "Mankind was no longer content to ask the fruitful earth for harvests and the food she owed, but he penetrated as far as her entrails; he tore from her what she had hidden, . . . the treasures that aggravate our evils. Soon pernicious iron and gold, more pernicious than iron, came forth to the light of day. Following them, came war."[15]

Seneca repeats the same theme. Instead of contemplating the immensity of the universe, we dig up the earth to extract what is hidden within it, that is, what is harmful, instead of being content with the good things it offers us: "God the father has placed within our reach whatever would be good for us. He did not wait for us to carry out our investigations, but gave to us spontaneously, burying harmful things as deep as possible. We can complain only about ourselves. We have uncovered what will cause our downfall against the will of Nature, who had hidden it from us."[16] Unlike Posidonius, whom he crit-

icizes sharply, Seneca considers technical progress, at any rate—not the progress of knowledge—a danger to moral life, since its motive force is the love of luxury and pleasure.[17]

In the second half of the first century CE, Pliny the Elder, in his *Natural History,* was to take up the same grievances.[18] He worries about the moral consequences of technical progress, which leads to luxury and finally to the decadence of morals, instead of being content with the satisfaction of mankind's essential needs.[19] Mining research has cupidity as its motive force when its object is gold and silver and hatred when its goal is iron. This is all the more unacceptable because the earth offers us, on its surface, all that is necessary for our life and health: "How innocent and happy our life would be, nay, how refined it would be, if we only lusted for what is on the earth's surface; that is, what is right at our feet." Apart from these moralizing considerations, we also see in Pliny the emergence of fears concerning the danger that mankind's undertakings cause nature to incur. He worries about the consequences that mines excavated within the earth will have on the mountains.[20] Here the image of the earth's maternity steps in. For Pliny, earthquakes seem to be a manifestation of the "indignation of this sacred mother," for we are penetrating inside her entrails to tear from her the objects of our lust. The anonymous author of the poem "Etna" also deplores that human beings, instead of giving themselves over to disinterested scientific research, which should be their primary concern, prefer to torture the earth to tear her treasures from her.[21]

PRIMITIVISM

All this corresponds to a tendency that has been called primitivism, which was inspired by the myth of the Golden Age, that is, the image of an ideal primitive life.[22] Here, the perfection of the human race was situated at the origin of time, and technical progress was a sign

of decadence. The Golden Age was the age of Kronos, as evoked by Hesiod in *Works and Days.*[23] People then lived like gods under the reign of Dike, or Justice, their hearts free from care. There was no private property. The earth was fruitful and could feed human beings, who had no need to work. For Empedocles, the first men, under the reign of Aphrodite, knew no war and were vegetarians.[24] We find this theme of the Golden Age among the Romans as well. Ovid praises this ideal time in his *Metamorphoses.*[25] With neither repression nor laws, good faith and virtue were the norm. There were no judges, no navigation, commerce, war, or weapons. The earth produced fruits and harvests without being cultivated. After such a good start, however, the human race degenerated. The golden race was succeeded by the races of silver, bronze, and iron. This last race, which corresponds to mankind's present state, is so bad that Justice, Good Faith, and Virtue have fled and risen back up to Olympus. Civilization now begins to flourish: boats are built, seas are crisscrossed, fields are delimited by surveying. Mines are dug to tear from the earth what she has hidden, and weapons can henceforth be constructed. This theory of degeneracy is linked to that of the world's growing old, which was accepted both by an Epicurean such as Lucretius, who speaks of the earth as "exhausted and tired of generating,"[26] and by a Stoic such as Seneca,[27] who foresees the final cataclysm, which would, moreover, be followed by a new world period in which the same ages of humanity would be reproduced.

Following Posidonius, Seneca evokes a Golden Age when kingship was exercised by sages, and when people lived very simply, without technology or luxury.[28] Gradually, however, degeneracy insinuated itself among mankind. Kingship was transformed into tyranny. Wise men such as the Seven Sages, of whom Solon, for instance, was a member, then had to invent laws. The decline of morals also had the result that mankind was no longer able to be content with primitive simplicity. According to Posidonius, it was once again the sages who

sought to remedy this evil by inventing the various technologies. On this last point, Seneca no longer agrees with Posidonius. If, as is said, Democritus invented the vault and the keystone, it was not because he was a sage but because he was a man; for the sage must concern himself only with morality and the disinterested knowledge of nature. In addition, as Seneca remarks, Posidonius had to admit that although the sages invented new techniques, they did not practice them, but confided them to humble craftsmen. Finally, he gives an idyllic description of the Golden Age. Nature, like a mother, protected mankind. There was no private property, but everything was fraternally shared. The earth was more fertile. People slept under the stars, and thus contemplated the nocturnal sky and the movements of the stars. Nevertheless, these first men were not sages, for it was their ignorance that accounted for their innocence.

In fact, this primitivism and praise of the simple life was common to almost all the other philosophical schools. The Cynics and Epicureans in particular agreed to reject the superfluous, luxury, and wealth. Diogenes the Cynic threw away his cup after seeing a child drink from his hands, declaring that "the life accorded to mankind by the gods is easy, but this ease escapes their notice, for they seek honey cakes, perfumes, and other such refinements."[29] For Diogenes, Zeus was right to punish Prometheus for discovering fire, for fire was the origin of man's effeminacy and taste for luxury.[30] As far as Epicurus is concerned, he accepted only necessary and natural desires, which implies a rejection of civilization's refinements.

The most remarkable text from antiquity on primitivism is found in a Hermetic work that is hard to date (perhaps after the fourth century CE), and whose title is *Kore Kosmou* (a term designating Isis as the "pupil of the world's eye" or the "virgin of the world").[31] Mōmos, that is, criticism personified, reproaches Hermes for having given human bodies to the souls created by God, thus producing rash and arrogant beings who will be able, in their audacity, to see "nature's

beautiful mysteries."[32] They will explore all that is hidden: "Men will tear out the roots of plants, and will examine the qualities of juices. They will scrutinize the nature of stones, and they will open down the middle not only those living beings that have no reason; nay, they will dissect their fellow men, in their desire to examine how they have been formed."[33] They will venture onto the sea by constructing boats; they will reach the ends of the earth and will rise up to the stars. For Mōmos there is only one way to humiliate man in his arrogance and limitless audacity: that is, to fill him with worries and cares. Men will be devoured by the thirst to realize their projects, and when they fail, they will be tormented by grief and sadness. Here we think of Hyginus' fable, quoted by Heidegger in *Being and Time,* which tells that it was Care that modeled the clay of which mankind is made.[34] This is probably an allusion to Prometheus, commonly considered in antiquity to be the creator of mankind, for "Prometheus" means "the foreseer" but also "worried." In any case, we are in the presence here of a deep psychological truth, for it is Promethean desire and projects, and in particular technical projects, that generate worry.

MODERN FEARS: ROUSSEAU AND GOETHE

These protests continued down through the centuries and increased as the sciences and technology developed. I shall consider only a few examples. In 1530, Agrippa von Nettesheim, though a fervent partisan of natural magic, gave a virulent critique of the artifices of civilization and the manipulations carried out against nature in the various scientific and artisanal activities, for instance, the search for precious metals in mines or the enslavement of animals in agriculture.[35]

In the eighteenth century, we note the emergence of doubts about the evolution of scientific knowledge. In the first place, there was the

discouraged attitude of Diderot, who by no means rejected what he called experimental philosophy but did not believe that the scientists' efforts to build this new Tower of Babel might someday achieve their goal: "When we come to compare the infinite multitude of the phenomena of nature with the limits of our understanding and weakness of our organs, can we ever expect anything else from the slowness of our labors, their long and frequent interruptions, and the rarity of creative geniuses, than a few broken and separated pieces of the great chain that links all things together?"[36]

In Jean-Jacques Rousseau we find a remarkable echo of ancient worries and criticisms, particularly those expressed by Ovid, Seneca, and Pliny. In his discourse of 1750, he peremptorily answered "no" to the question proposed by the Academy of Dijon: "Did the restoration of sciences and arts contribute to the purification of morals?" Quite to the contrary, science and art have corrupted them, for mankind has refused to listen to nature's warnings:

> The thick veil with which she [i.e., eternal wisdom] has covered all her operations seemed sufficiently to warn us that she did not intend us for vain investigations. Yet have we been able to profit from a single one of her lessons, or is there one that we have neglected with impunity? O peoples, know therefore that Nature has wished to preserve us from science, as a mother snatches a dangerous weapon from the arms of her child; that all the secrets she hides from you are so many evils from which she protects you; and that the difficulty you experience in learning is not the least of her blessings.[37]

Nevertheless, Rousseau does not believe that we can return to the Golden Age of a state of nature, for the first human beings lived in a kind of unconsciousness and apathy, without communication among them. In addition, for him, the Golden Age could never have existed, since "the stupid men of the initial times were unable to profit from it," and it "has escaped the attention of the enlightened

men of later times."[38] We cannot go back and suppress the progress of the sciences and the arts, even if it has led to the softening of morals, depravation, and hypocrisy. Yet we must be aware of the evil caused by unveiling the secrets of nature. It is therefore by perfecting "art" that we will be able to "repair the damage that art, once it had begun, did to nature."[39]

Rousseau thus saw in the idea of the secrets of nature a warning that Nature gave mankind about the dangers represented for him by sciences, technology, and civilization. Yet he accepted that Nature should allow herself to be unveiled by experimental science and the advances of civilization, albeit at man's risk and peril. In his *Anthropology*, Kant gave a good summary of Rousseau's thought on this point:

> With regard to the hypochondriacal [i.e., dark-colored] portrait that Rousseau sketches of the human race taking the risk of leaving the state of nature: we must not see in this advice to return to it and to take the path into the forests once more. This is not his genuine opinion, but he wished to express the difficulty for our race of reaching its destination by following the route of a continuous approach. Such an opinion is not to be considered a castle in Spain: the experience of ancient and modern times must embarrass every individual who reflects and make the progress of our race doubtful . . . Rousseau did not think that man should return to the state of nature, but rather that he should take a retrospective glance at it from the level he has reached today.[40]

Rousseau may also have been influenced by the Epicurean description given by Lucretius in his poem on the evolution of mankind. On the one hand, Lucretius here describes the first human beings as completely bereft of astonishment, and seemingly completely ignorant of the common good.[41] On the other hand, he distinguishes two periods in the development of culture.[42] In the first stage, it was

through need and necessity, and not through the desire for knowledge, that people were constrained to discover the things that were indispensable for life, that is, natural and necessary things. In a second phase, the desires that were not necessary led to the invention of technologies such as navigation, weaving, and metallurgy, intended to produce things which, if they are desired in an immoderate way, generate luxury and war: "The human race works ceaselessly and in vain, and consumes itself in vain cares. For man does not know where possession must stop, and what is the limit true pleasure can reach."[43]

For Rousseau, the arts are born from mankind's passions, from ambition, avarice, and vain curiosity. In Lucretius, as in Rousseau, reason must therefore learn to moderate desires and "repair the damage that art, once it had begun, did to nature." Happiness consists not in exaggerated well-being but in a life that is simple and close to nature. Ultimately, Rousseau doubts that mankind can reach the truth: "Are we therefore born to die, tied to the edge of the well where truth has retired?"[44]

A few years later Goethe would criticize experimental science from a wholly different perspective. He fits into another tradition, that of the Empiricist doctors mentioned by Cicero who rejected dissection because it disturbed the phenomena it was intended to observe. For him, everything that is artificial is incapable of unveiling Nature, for the excellent reason that Nature, paradoxically, is "mysterious in broad daylight," and that, as I shall have occasion to repeat, her real veil consists in having no veil; in other words, she hides because we do not know how to see her, although she is right before our eyes:

> You instruments, you mock me, I can see,
> With wheel and pulley, cylinder and cords:
> I faced the gate, you were to be the key,
> But cannot lift the bolts, however shrewd your wards.
> Mysterious in broad daylight, never

> Will Nature be defrauded of her veil.
> What to your spirit she reveal not, that you fail
> to torture out of her with screw or lever.[45]

Goethe thus contradicts Francis Bacon, who sought to force Nature to talk under the torture of experimentation. For Goethe, rather than talk, "Nature keeps silent under torture." However, as the Gospels advise, she replies frankly to questions she is asked forthrightly. "Her answer to an honest question is: Yes! Yes! No! No! All the rest comes from the evil One."[46]

When assisted by mechanical means, observation disturbs the "healthy" vision of natural phenomena: "Microscope and telescope are only good for confusing healthy reason."[47] Furthermore, "man in himself, insofar as he uses healthy reason, is the greatest and most exact instrument that can exist. And precisely the greatest disorder of the new physics consists in the fact that men have been separated from experiences and have wished to recognize Nature only in what is shown by artificial instruments, and even to delimit and prescribe the effects she can carry out."[48]

For Goethe, the only real way to discover the secrets of nature is through perception and the aesthetic description of perception. Only nature—that is, mankind's senses, understood as free from all intermediaries—can see nature. Even observation, which disturbs the phenomenon and immobilizes it, prevents us from seeing living reality. In this regard, Goethe wrote a delightful poem on the dragonfly:

> The changeful dragonfly
> Flutters around the fountain;
> Long it delights my view.

It is now dark, now light; now red, now blue. Yet when it stops, and one seizes it in one's hand, one no longer sees anything but a funereal

blue: "This is what is in store for you, O you who dissect your pleasure."[49]

CONTEMPORARY FEARS

In the twentieth century, scientists and philosophers expressed the same fears with regard to the mechanization of nature. Some have spoken of the "disenchantment of the world" or the "death of nature." I cannot enter into the details of the abundant literature that has been devoted to this problem, though Georges Duhamel, Aldous Huxley, Rainer Maria Rilke, and many others should be cited. Two lectures on this theme delivered November 17 and 18, 1953, are particularly significant, the first by Martin Heidegger and the second by the physicist Werner Heisenberg. Heidegger insists forcefully in his lecture on what I have called the Promethean character of contemporary technology.[50] In his view, this is a violent approach aimed at obtaining nature's unveiling: "The unveiling that rules over modern technology is a provocation [*herausfordern*] by which nature is summoned to hand over an energy which, as such, can be extracted and accumulated."[51] Catherine Chevalley gives an excellent summary of Heidegger's position with regard to this phenomenon: "The contemporary period is one in which man perceives everything in the form of a device and an exploitable supply, including himself, and simultaneously loses his own being."[52] For Heidegger, mankind must return to Greek *poiēsis*, which is also a form of unveiling, or making-something-come-to-light.[53] Thus, for contemporary man, art could be a means for rediscovering his authentic relation to being and to himself. In his lecture titled "The Image of Nature in Contemporary Physics," Heisenberg denounces the same danger: "We live in a world so completely transformed by man that we everywhere encounter structures of which he is the author: the use of instruments in daily life, the preparation of food by machines, the transformation of the

countryside . . . , so that man no longer encounters anything but himself."[54] Unlike Heidegger, he does not think that it is technology in itself that constitutes the danger; it is rather the fact that mankind has not yet been able to adapt itself to its new conditions of life.

Fifty years later, we must indeed admit that mankind, far from having mastered this situation, finds itself, on the contrary, faced with still more serious dangers. Technology is engendering a way of life and ways of thinking that have as their consequence the ever-increasing mechanization of human beings themselves. It is impossible, however, to stop the implacable progress of this kind of civilization. In the process, mankind risks losing its soul as well as its body.

13

Physics as a Conjectural Science

I have distinguished two methods of unveiling the secrets of nature: one I called Promethean and one I called Orphic. In Part V I sketched the history of the former method, which extends from the beginnings of Greek mechanics to the mechanistic revolution of the seventeenth century and opened the way for the technological and industrialized world in which we live.

The time has now come to describe the other method, which seeks to discover the secrets of nature while confining itself to perception, without the help of instruments, and using the resources of philosophical and poetic discourse or those of the pictorial arts. From Plato's *Timaeus* to Paul Claudel's *Art poétique,* but also to Roger Caillois's *Esthétique généralisée,* we will now discover another tradition, whose method of approaching nature differs radically from the Promethean tradition.

At certain moments, however, the two traditions meet and complete each other. Already sketched in Plato's *Timaeus,* this reciprocal influence becomes more specific in the research on nature of a Stoic such as Seneca, appears clearly in the engineers and artists of the Renaissance such as Leonardo da Vinci and Albrecht Dürer, and continues to live on down to the present day, whether in the mathematical vision of nature or again in the definition of "maxims" or fundamental laws of nature's behavior and action.

PLATO'S *TIMAEUS*

The *Timaeus* is the archetypal model of what I have called the Orphic attitude. The birth of the world and all natural processes are divine secrets. Human beings, by contrast, can understand only what they can produce by their own art. They therefore have no technical means for discovering the secrets of the construction carried out by the gods. Plato writes: "If one wished to test this by checking it against experience, one would ignore the difference between the human and the divine condition; for only a god knows well how different elements can be mixed together into a Whole, in order to dissociate them later, and he is also the only one capable of this. Yet no man is capable of doing either one at present, and no doubt he will never be so in the future."[1]

The only means accessible to mankind is discourse. From this perspective, when it comes to the secret of the fashioning of the world, we should try to imitate the generation of the universe—that is, by a divine being—through the generation of discourse; in other words, we should try to rediscover the genetic movement of things in the motion of discourse. This is why the *Timaeus* is presented as a *poiēsis*, that is, as both a discourse and a poem, or an artistic game that imitates the artistic game of that poet of the universe, the divinity.[2] Thus, Plato believes that the god World is born in his discourse ("this god who once was truly born one day, and who has just been born in our discourse").[3]

We here encounter for the first time a theme that will play a vital role in our story: that of the work of art, the discourse or poem, as a means of knowing Nature. Such knowledge, in the words of Paul Claudel, is nothing other than "being born together," for the artist espouses Nature's creative movement, and the event of the birth of a work of art is ultimately a mere moment in the event of the birth of Nature.[4]

Nevertheless, says Plato, this discourse belongs to the literary genre of "likely myth."[5] As Francis MacDonald Cornford has remarked, Plato seems to be alluding here to the fact that his dialogue takes its place in the series of great theogonic poems of the pre-Socratics, alongside Hesiod, Xenophanes, and Parmenides, who had used the word "likely" or even "lies" with regard to their work.[6] Plato speaks with irony of his own effort, but this irony does nothing to diminish the importance he gives to this game that consists in forging a likely myth. In any case, Plato insists on the approximate and merely likely character of all that can be said about the overall process of the generation of the universe:

> If, then, on several points and many questions—the gods and the generation of the universe—it is impossible for us to propose explanations that are completely coherent within themselves in every point and perfectly exact, don't be surprised! But if we come upon some that do not yield to any others in likeliness, we must be satisfied with this, remembering that I who now speak, and you who are my judges, are mere human beings, so that if we are presented with a likely myth in these matters, it is not fitting to seek further.[7]

As far as particular natural processes are concerned, Plato also insists on the fact that all he claims to risk is an explanation that is merely likely. While discussing metals, he makes the following remark: "And likewise for all the other bodies of the same kind, it is not very difficult to speak about them when we pursue the genre of 'likely fables.' When, as a kind of respite, and abandoning discourse that pertains to eternal beings, we examine a likely one concerning the birth of things, and thereby obtain pleasure without remorse, we introduce a moderate and reasonable pleasure into our lives."[8] The *Timaeus* is thus a story that lays claim to mere likelihood. This is why, from the perspective of Aristotle's *Poetics*, it is of the order of poetry

rather than that of history, for it tells not what really happened—only a god could do that—but what could or should have happened.[9]

Plato thus describes an ideal genesis, and, for instance, when it comes to determining which triangles are involved in the constitution of the elements, he thinks that to answer this question, we must inquire which are the most beautiful scalene triangles. He notes, moreover, that he will consider anyone who can discover more beautiful ones not an enemy but a friend, thus indicating both the limits of his hypotheses and his disinterested search for the truth.

The goal of this likely discourse is to supply a model in the modern sense of the term, that is, a possible schema that enables us to consider the genesis of the world. Descartes adopted the same procedure, for other reasons—namely, out of fear of the Inquisition—when, in his *Discourse on Method*,[10] he presented his *Treatise on the World* as "a fable feigned for pleasure, bereft of any claim to historicity," in the words of Étienne Gilson, commenting on the following text by Descartes: "I resolved . . . to speak only of what would happen in a new [world], if God now created somewhere in the space of the imagination enough matter to compose it . . . After that, I showed how most of the matter of this chaos should, as a result of these laws, be disposed and arranged in a certain way that would make it similar to our heavens."[11]

In the *Timaeus*, as Jürgen Mittelstrass pointed out, Plato does not try to give an exact account of the world such as it is.[12] Instead, he aims to show how the world would appear to us if it were fashioned rationally, that is, in the image of the model constituted by the Ideas.

At the beginning of this chapter I spoke of the meeting points between the two methods of approaching nature. Plato's *Timaeus* provides us with the first example, for this comparison between Plato and Descartes allows us to glimpse, despite the almost insurmountable distance between their methods, an analogous procedure. Like "idealist" explanations, mechanistic explanations claim mere likelihood and are only hypothetical. They hypothesize a certain mode of functioning, defined, if possible, by a mathematical ratio, to explain the effect that appears before our eyes. As we have seen, however, they accept that in reality, beneath the same appearance, the mode of functioning can be different, and another hypothesis may be possible.[13]

In his description, Plato begins, like the geometers, from indemonstrable axioms, in particular the principle of causality and the distinction between "being" and "becoming," as Proclus points out.[14] He then uses mythical elements such as the Demiurge, the Nursemaid, the Mixing Bowl, and mathematical elements, for instance, the triangles intended to explain the composition of the elements.[15] As Luc Brisson and F. Walter Meyerstein have shown, the *Timaeus* thus appears as the model of future scientific theories, even contemporary ones, particularly because it has its starting point in axioms that are indemonstrable in themselves but are capable of helping to construct a reasonable and likely representation of the universe; that is, ultimately, to "invent" it.[16]

There is another point of contact between the two methods: the idea that mathematical models can account for phenomena. Plato's geometer God, as we have seen, became the eternal geometer of the Enlightenment.[17] The structure of reality was thus mathematical. What had been an unverifiable hypothesis in Plato, however, was to become rigorous calculation among the mechanists.

THE CONJECTURAL NATURE OF PHYSICS

In antiquity, physics was a discourse and not—with very rare exceptions, to which I have alluded—an experimental practice.[18] It was a discourse, but a conjectural discourse. The conjectural nature of physics, in its totality or at least in its details, seems indeed to have been recognized not only by the Platonists but also by all the philo-

sophical schools of antiquity. As far as Aristotle and his school are concerned, Simplicius (sixth century CE), the commentator on the *Physics,* notes that by defining what characterizes a rigorous demonstration and by affirming that it must start from principles that are obvious in themselves, Aristotle implicitly suggested that physics is only conjectural in nature, since it does not fulfill these criteria. In this context, Simplicius cites Theophrastus, Aristotle's disciple, who said that we must not despise physics because of this but must begin with it, since it is best adapted to our human nature and our capacities.[19] It is hard to say whether, in this passage, we should attribute the affirmation of the conjectural nature of natural research to Theophrastus, but this is quite possible, since Proclus tells us that Theophrastus sought to explain the origin of thunder, wind, storms, rain, snow, and hail in a likely way.[20] It was especially in this kind of question that all the schools renounced dogmatism and accepted the possibility of a plurality of explanations.

In his *Lucullus,* Cicero insists on the conjectural character of research on nature, detailing all the questions that confront philosophers with regard to the things that are invisible and inaccessible to us: the earth's location, the inhabitants and mountains of the moon, the existence of human beings at the poles, the earth's rotation on its axis, the dimensions of the sun, the existence and nature of the soul, atoms and the void, the plurality of worlds, and the origin of the images in dreams. "The sage," he says, "will fear to judge in a rash way, and he will think he has done well if, in these kinds of matters, he discovers something likely."[21] He rightly emphasizes that opinions may vary on these problems within each philosophical school.

In the *Natural Questions* of the Stoic Seneca, we find the same attitude with regard to terrestrial and celestial phenomena. For him there is no orthodox Stoic doctrine concerning physical problems; instead he chooses the explanation that seems to him most likely. Strabo, also of Stoic tendencies, insists on the state of concealment in which the causes of physical phenomena lie hidden *(epikrupsis tōn aitiōn).*[22] Marcus Aurelius also alludes to this attitude: "Things are, in a way, hidden by such a veil, that some philosophers—no small number of them, and not the least, either—have thought that they cannot be grasped; and moreover, the Stoics themselves have considered them hard to grasp."[23]

A work falsely attributed to Galen, but which may be contemporary with him, defined science as a solid, firm knowledge, free of error, and based on reason, and concludes that it cannot be found in philosophy, especially when it discourses upon nature, or in medicine, which is a mere art.[24]

Obviously, the Neoplatonists were faithful to the Platonic tradition that considers nature a derivative, inferior reality, sensible and therefore difficult to know. Proclus repeats several times that *phusiologia,* or the study of *phusis,* is an *eikotologia,* or likely discourse.[25] Whether in the domain of terrestrial bodies, which are subject to becoming, or of celestial bodies, we must be content with what is approximate, for we reside very far away and very low within the universe. This approximate character of the knowledge of nature appears clearly in the astronomical hypotheses that result in identical conclusions from different hypotheses. Some claim to "save the appearances (or the phenomena)" *(sōzein ta phainomena)* by means of the theory of eccentrics; others affirm the same thing by means of epicycles, and still others, finally, by means of spheres that rotate in opposite directions.[26]

MULTIPLE EXPLANATIONS OF A SINGLE PHENOMENON

Epicurus, who obviously held fast to the fundamental principles of his physics—atoms and the void, since they enabled him to forgo the hypothesis of divine creation—was happy to admit that throughout an entire section of physics, it is possible to propose different explanations for the same phenomenon, for instance, solstices or eclipses; multiple explanations, then, each of which must agree with appear-

ances.[27] Lucretius, as a faithful disciple of Epicurus, set forth this principle with maximum clarity:

> To determine with certainty which of these explanations is true in our world is difficult. What I am setting forth, however, is what might be true and could exist in the totality of all worlds, among the different worlds each one of which has been produced differently. As far as the stars' motion is concerned, by proposing several explanations, I strive to set forth the causes that might exist in the totality of all the worlds. In our world as elsewhere, however, there must necessarily be one single cause that makes the stars move. Yet to teach what this cause is, is not possible for one who advances only one step at a time.[28]

It is interesting to note in Lucretius that this theory of multiple explanations involves the Epicurean idea of the plurality of worlds. The proposed explanations are hypotheses that correspond to different types of the formation of worlds. This procedure is similar to that of Descartes, who claimed "to speak only of what would happen in a new [world]."

This theory of multiple explanations also corresponds to another aspect of the ancient conception of physics, which I will discuss later on. Physics is conceived as a spiritual exercise, which, particularly among the Epicureans, was intended to ensure peace of mind by suppressing fear of the gods and of death. To propose multiple explanations, all of which are likely, because they can all account for the phenomena that can be observed, is therefore to help the soul remain in serenity.

"SAVING THE PHENOMENA"

Another point of contact between the two approaches to nature, the methodological principle of ancient astronomers, *sōzein ta phainomena* (save the phenomena)—that is, to propose explanations that enable us to account for what appears to us—continued to be accepted by the first mechanistic physicists, but its meaning changed completely. Simplicius attributes it to Plato, but in fact, as Jürgen Mittelstrass has shown, this principle goes back to the astronomer Eudoxus.[29] In any case, in order to understand its meaning, we must recall that for the ancients, the stars were divine and were moved by divine intelligences. Their movements had to be perfect, regular, and therefore circular. Upon observation, however, the stars' motions appear irregular, and therefore irrational. Speaking of the motion of planets like Venus and Mars, Pliny the Elder saw "secrets of nature" in them.[30] To explain this discord between sensible appearances and what was considered to be the truth concerning the divine stars, it was necessary to imagine a geometrical model that could show how regular circular movements could appear irregular to a human observer. Thanks to these hypotheses, it was thus possible to "save the phenomena" (or the appearances), that is, to reconcile theoretical postulates and sensible evidence. More and more refined systems of circular movements were invented by supposing that the earth was impassible at the center of the universe, or, on the contrary, like Heraclides of Pontus, that the earth was in motion and the sun immobile. Astronomers willingly accepted the possibility of multiple hypotheses, each of which could, in its way, "save the phenomena," without the possibility of determining what really occurs in the heavens.[31] In the words of Simplicius, "to disagree on these hypotheses cannot give rise to reproaches, for what we propose is to know what must be laid down as hypotheses in order for phenomena to be saved. It is therefore not surprising if some have sought to save the phenomena by means of certain hypotheses and others by means of other hypotheses."[32]

The same conception was stated in the sixteenth century by the Lutheran theologian Osiander in his prologue to Copernicus's *De*

Revolutionibus, with regard to the latter's heliocentric hypothesis: "It is not necessary that these hypotheses be true; what is more, it is not necessary that they be probable, but it is enough for them to propose a calculus that agrees with observations [that is, the phenomena] . . . Let no one expect anything certain from astronomy, as far as hypotheses are concerned, for it can propose no such thing."[33]

The principle of "saving the phenomena" thus still seems to be alive. It is true, however, that Osiander, like Cardinal Bellarmino, whom I mentioned earlier with regard to Galileo,[34] was a theologian who sought to minimize the importance of Copernicus's theses, for fear of entering into conflict with the Christian faith, which upheld geocentrism. Yet his attitude provoked a genuine scandal, not only among Copernicus's friends such as Tiedemann Giese, but also with Kepler and Giordano Bruno, because they held Copernicus's hypothesis to be fundamentally true.[35] At the beginning of the seventeenth century, the principle of "saving the phenomena" changed its meaning completely. For Kepler and Galileo, the "phenomena" are no longer just celestial phenomena; they are the phenomena of nature.[36] The difference between the status of celestial objects and the status of earthly objects was abolished. The stars were no longer divine beings. Astronomy and physics met. Henceforth, the goal would be to seek to explain physical phenomena, whether celestial or terrestrial, not by possible mathematic models that might have equivalent probability, but by mathematical models that are empirically verifiable, and that observation and experience are able to confirm. Science wants to be exact; this is why the word "hypothesis" would henceforth be tinged with suspicion. Kepler wanted to establish an "astronomy without hypotheses,"[37] and Newton wrote the famous saying, "I have not yet been able to deduce the reason for these properties of weight from the phenomena, and *hypotheses non fingo,* I do not imagine hypotheses."[38] Newton here understands the word "hypothesis" in the sense of an unverifiable construction: where experimentation is not yet possible for the moment, we must reject arbitrary speculations. He prefers to use the word "theory" to designate the model that experimentation is supposed to verify.

This ideal of a verifiable experimental science is still, in principle, that of modern science, although the gigantic progress of science has led scientists to correct an over-simplistic realism. Clearly, however, this progress in observation and experimentation can always put in question what had been taken for granted. In this perspective, the truth is only the correction of an error, or, what amounts to the same thing, it is the daughter of Time.

VIII

From the Secret of Nature to the Mystery of Existence

Terror and Wonder

20

Isis Has No Veils

In 1814, when the archduke Karl August returned from a trip to England, there was a celebration at Weimar to mark his homecoming. Goethe had the town's drawing school decorated with eight paintings that were intended to symbolize the various arts and the protection Karl August accorded to them.[1] Among these symbolic figures executed in the style of emblems was one that represented *Genius Unveiling a Bust of Nature*, with Nature represented in her traditional aspect as Isis/Artemis (Fig. 17). In the distant background, behind the figure, a landscape could be seen, which contrasted strongly with the somewhat artificial atmosphere created by this statue of Nature unveiled. Goethe used these same pictures to decorate his own house for the jubilee of Karl August on September 3, 1825, and for his own jubilee, or more precisely for the anniversary of his entry into the service of the archduke, on November 7 of the same year.

"GENIUS UNVEILING A BUST OF NATURE"

It is very interesting to observe how the same emblem is susceptible of contradictory interpretations. Contemporaries, referring to the notion current at the end of the seventeenth century and during the eighteenth century, interpreted the gesture of Genius unveiling Nature as an allusion to Goethe's scientific activity. On the occasion of Goethe's jubilee, the poet Gerhardt, commenting on this emblem in

verse, praised the alliance of poetry and science in Goethe: "Not content with sounding the golden lyre, the poet penetrates within Nature, and dares to raise the magic veil of Isis."[2] The illustration that Alexander von Humboldt had placed at the beginning of his 1808 *Essay on the Geography of Plants* had already alluded to this traditional representation of the unveiling of Isis. Ultimately, however, for Goethe, as we shall see throughout this chapter, Isis had no veil.

In fact, Goethe himself, when he imagined this emblem, was thinking of something quite different from the traditional cliché of Science unveiling Nature. In the first place, in the group of pictures painted to honor Karl August and intended to represent the various arts, this emblem was symbolic of sculpture. The brochure published at Weimar in 1825, which was anonymous, but probably inspired by Goethe, gives the following description of it: "A young boy, kneeling in a modest attitude, unveils the bust of Nature, which is represented symbolically. This bust of white marble alludes immediately to sculpture, as the most perfect representation of creation's most perfect product."[3] Here, the bust of Isis/Artemis symbolizes both sculpture, the art which "represents" Nature perfectly, and Nature herself, who sculpts forms.

It was Goethe himself, however, who revealed the true meaning he attributed to this figure. He composed a series of poems, related to each of the eight pictures I have mentioned, and collected under the title *Die Kunst* (Art).[4] Around March 1826, he devoted three quatrains to "Genius Unveiling a Bust of Nature," which reveal his genuine attitude with regard to the notion of a secret of nature and the metaphor of the veil of Isis. Not long afterward, he took up one of these quatrains in another collection of poetry, titled *Gentle Epigrams,* in a context that gives a fairly good idea of the meaning these figures and quatrains had for him. I first quote the three quatrains:

Respect the mystery;
Let not your eyes give way to lust.

Nature the Sphinx, a monstrous thing,
Will terrify you with her innumerable breasts.

Seek no secret initiation
beneath the veil; leave alone what is fixed.
If you want to live, poor fool,
Look only behind you, toward empty space.

If you succeed in making your intuition
First penetrate within,
Then return toward the outside,
Then you will be instructed in the best way.[5]

The second quatrain is reproduced in book 6 of the *Zahme Xenien,* following two stanzas, the first one of which criticizes Newton's theory of colors, while the second is directed against Symbolist historians of myths, such as Georg Friedrich Creuzer:[6]

If you, despised suitors
Do not silence your out-of-tune lyre,
Then I give up completely.
Isis shows herself without a veil,
But mankind has cataracts.

Symbols explained by history:[7]
He who grants them importance is quite mad.
He endlessly carries out sterile research
And lets the world's wealth escape.

Seek no secret initiation
beneath the veil; leave alone what is fixed.
If you want to live, poor fool,
Look only behind you, toward empty space.[8]

The first stanza just quoted may seem somewhat obscure. The suitors would appear to be the scientists who would like to unveil Isis by means of experimentation, like Newton; but they are despised, because they are unable to see, as is suggested by the following lines about Isis, who has no veils. In part 1 of *Faust,* Goethe had vehemently criticized experimentation, artificial observation, and the pretension of tearing her veil away from Nature: "Mysterious in broad daylight, Nature does not let herself be robbed of her veil, and what she does not wish to reveal to your mind, you could not constrain her to do with levers and screws."[9]

Goethe particularly reproached Newton for carrying out experiments on light, for instance, by passing it through a prism, experiments which, in his view, profoundly disturbed the true luminous phenomenon. In one of the subsequent stanzas, he declares, still against Newton: "To divide the unity of eternal light we must consider senseless." In general, he criticized experiments for trying to discover, by violent and mechanical means, something hidden behind phenomena, or behind the appearance of things.

Yet the group of brief poems from the *Gentle Epigrams* now under discussion was also aimed at other adversaries. In one manuscript, the poem "Seek No Secret Initiation" bears the note "To the Symbolist,"[10] and the poem that precedes it begins with the words: "Historical symbols." This is an allusion to the Symbolists of the school of Georg Friedrich Creuzer, against whom Goethe leveled a reproach analogous to the one he leveled against the experimenters. In the words of Mephistopheles in a paralipomenon to part 2 of *Faust,* with regard to the death of Euphorion:

> Others think that it [the story of Euphorion] must not be understood in a coarse and immediate way. There is something hidden behind it. One might easily guess the presence of mysteries, and perhaps of mystifications as well: something Hindu or Egyptian, and he who holds them tight and blends everything together well, who takes pleasure in moving etymologically in every which way, that is the man we need. We too say this, and our deepest desire is to be faithful disciples of the new Symbolism.[11]

"There is something hidden behind it." This is the mistaken belief of both experimenters and Symbolists. The former practice a hermeneutics of nature that seeks to discover what lies hidden behind phenomena, while the latter also propose a hermeneutics, this time of myth, which tries to uncover the hidden meaning of mythic images, by discovering a historical background, whether Hindu or Egyptian, behind the myths.

We ought not to be surprised by this unexpected parallel between experimenting scientists and interpreters of mythology. We recall that for Porphyry, Nature wraps herself up in natural forms as well as in myths. Symbolists and experimenters allow what is most important to escape: the "free space" for the Genius who unveils the statue of Isis, or the "wealth of the world" for whoever tries to explain myths and symbols historically. They think the form is veiled, and they must find something else behind the veil. Yet the reason they seek something behind what they think is a veil is that they do not understand that everything is right before their eyes, and that the natural or mythical form they see has its reason within itself, and that we ought not to try to understand by means of anything other than itself; the veil is over their eyes, not over the eyes of Isis. To see Isis, all we have to do is look. She reveals herself without veils; she consists entirely in the splendor of her appearance.

Let us now reread the quatrains devoted to the image of "Genius Unveiling a Bust of Nature." They need to be explained by each other. For instance, the first quatrain warns the young child who is unveil-

ing the statue of Isis that he is going to be frightened by her monstrous appearance. The second one, taking up the threat of death that hangs over a sacrilegious unveiling, urges the child, if he wants to live, to turn toward what is behind him, in other words, according to the drawing that accompanies the poem, toward the landscape of mountains and trees that appears in the background of the picture. We thus have here a critique of the traditional interpretation of the unveiling of the statue of Artemis/Isis. Nature is alive and moving, not an immobile statue. The so-called search for the secrets of nature by experimentation reaches not living nature, but something fixed. As Mephistopheles tells the student, the experimenter, wishing to understand living beings, chases the spiritual bond out of them, and leaves only pieces behind.[12] When he turns around, the child will see Nature no longer in her "fixed" form, but alive, as Nature in the process of becoming. We must not seek Nature anywhere other than where she is; we must not look for something dead beyond visible appearances.

"If you want to live, poor fool." Ancient Isis had said, "No mortal has raised my *peplos*." He who raises the goddess's veil therefore risks death. In Goethe's view, however, the death in question is, as it were, a spiritual one. By representing Nature as being hidden by a veil, one risks being hypnotized by what is supposed to be hidden beneath the veil, and above all, one risks petrifying oneself, and no longer perceiving the process of becoming and living Nature. "To respect the mystery" means contenting ourselves with seeing Nature as she is, without forcing her by experimentation, which attacks Nature's normal mode of functioning, and forces her to transform herself into states that are artificial and contrary to nature. For Goethe, the only valid instrument capable of enabling us to know nature are mankind's senses: perception guided by reason, and above all the aesthetic perception of nature. For him, as we have seen, art is the best interpreter of nature.[13]

GOETHE'S SCIENTIFIC METHOD

The idea of a secret of nature and the image of the veil of Isis presuppose the distinction between external appearance and a reality situated behind this appearance.[14] This is why Goethe rejected the opposition between internal and external, as expressed in the following verses by the Swiss poet Albrecht von Haller:

> Within Nature
> no created mind can penetrate.
> Happy is he to whom she shows
> only her external envelope.[15]

For Goethe, to admit that Nature refuses to unveil herself means either to resign oneself to ignorance, or, by contrast, to authorize the experimenter's violence. He radically contradicts Haller's affirmations:

> Nature gives all with generosity and benevolence.
> She has no pit
> or shell.
> She is all at once.[16]

This generosity and benevolence are the precise opposite of the attitude of a Nature who refuses to let herself be seen, and who "loves to hide." This corresponds precisely to the representation of a veilless Isis. There is no opposition between the phenomenon and that which is hidden in the phenomenon.

Why, then, in the last quatrain of the poem "Genius Unveiling a Bust of Nature," do we find an opposition between the internal and the external?

> If you succeed in making your intuition [*Anschauen*]
> First penetrate within,

Then return toward the outside,
Then you will be instructed in the best way.

How can it be possible to go within, and then return to the outside? If Goethe expresses himself in this way, it is because he is thinking, not of the movement of experimental knowledge, which starts out from external phenomena to discover a kind of internal mechanism that explains phenomena, but of the movement of intuitive thought that embraces the movement of genesis and growth, *phusis* in the Greek sense, or the formative impulse, *nisus formativus*,[17] which goes precisely from the internal to the external. Form is not *Gestalt*, an immobile configuration, but *Bildung*, formation or growth. Goethe himself tells us that what he loved in Kant's *Critique of the Faculty of Judgment* was the analogy that appears in it between the life of art and the life of nature, "their own way of acting from the inside to the outside."[18] There is something Bergsonian in this theory of nature's living intuition, "which can be reached if we ourselves remain mobile and supple."[19] Goethe's scientific method consists in an attentive perception of the movement of formation.[20] It is above all a morphology. We must pay attention to each particular form, and observe it for a long time. Then we must try to perceive these forms in their connection with other forms, thereby disclosing a sequence or series in which they take their place genetically, in order to see forms in their metamorphosis, see them being born from one another, and above all—this is what counts most for Goethe—to discover the simple and fundamental form, or *Urform*, from which the series of transformations develops. This is how we will discover that the formation of plants is in fact a metamorphosis of the leaf; that the formation of the bones of the skull is a metamorphosis of the vertebrae; that the formation of colors is a metamorphosis of light as it enters into relation with darkness through the intermediary of an opaque medium. Goethe calls the phenomenon at the origin of the process

of metamorphosis the *Urphänomen*, or originary phenomenon, because there is nothing beyond it in the phenomena that appear to us, and, at the same time, by starting from it we can return to shed light on the most banal instances of day-to-day experience.[21] Using this method, Goethe hoped to discover an ideal prototype, for example, the originary plant from which all possible plants might be constructed.[22] The sensible perception of nature is thus transfigured into an intellectual perception that discovers the primordial phenomenon we perceive in the sensible phenomenon. As Goethe says in the preface to the *Theory of Colors*, to look at the world attentively is already to construct a theory.[23] "The blue of the sky reveals to us the fundamental law of chromatics. It is useless to seek behind phenomena, for they themselves are the theory."[24]

"MYSTERY IN BROAD DAYLIGHT"

Isis is thus without veils, and there is no secret of Nature in the proper sense of the term. Goethe, however, does use with regard to nature the German word *Geheimnis*, meaning "secret," but he adds to it the adjective *offenbares* or *öffentliches*. We could translate this as "secret in broad daylight," or "manifest secret"; but it is better to translate the word *Geheimnis* as "mystery" rather than as "secret," for it can have both of these meanings in German. On the one hand, the notion of "secret" presupposes the presence of something hidden which can be discovered and unveiled, but which then ceases to be a secret, and this is precisely what Goethe rejects. On the other hand, "mystery" makes us think of something that always remains mysterious, even if it is revealed. The expression chosen by Goethe alludes to a passage from Paul's Letter to the Romans (16:24), where he speaks of a "revealed mystery"—in Martin Luther's German, "das Geheimnis, das nun offenbart ist," or in Greek, *mustēriou phanērōthentos*. What Goethe retained from this expression was not

its religious content, but precisely the contrast between visibility and mystery.

This theme of a "mystery in broad daylight" recurs in the most diverse ways in the poet's work. For instance, as early as 1777, in the poem "Winter Journey in the Harz," with regard to a mountain:

> O mountain of unexplored bosom,
> Mysterious in broad daylight,
> Above the astonished world.[25]

As we have just seen, however, it is above all with regard to Nature in general that Goethe, especially in his old age, liked to use this expression. For instance, rejecting the opposition between an inside and outside of nature, he writes:

> Nothing is within, nothing without,
> What is inside is also outside.
> Seize, then, with no delay,
> The sacred mystery in broad daylight.[26]

This notion applies perfectly to originary phenomena. We can say that they are "in broad daylight," because they are open to everyone's eyes; they appear precisely as phenomena: leaves, vertebrae, the play of light and darkness.

Yet we can also say that they are a "mystery." First of all, we usually fail to perceive their meaning, despite their obviousness. Only the person who knows how to see, and who expands sense perception by means of intuition, recognizes in these phenomena the *Urphänomene* or originary phenomena, that let us glimpse the fundamental laws of universal metamorphosis. In his diary for the year 1790, Goethe mentions the observation he made, in the dunes of the Lido near Venice, of a sheep's skull.[27] This observation confirmed his theory regarding the formation of the bone of the skull from the bones of the vertebrae, but above all it reminded him once again, as

he emphasizes, that "Nature has no mystery [*Geheimnis*] that she does not place somewhere fully naked before the eyes of the attentive observer." And yet, we must learn how to look: "What is most difficult of all? That which seems to be easiest: To see with your eyes what is right before your eyes!"[28]

Beyond this initial consideration, however, the originary phenomena are above all a mystery because they constitute an impassable barrier to human knowledge. They can help to explain all kinds of phenomena, yet they themselves cannot be explained:

> The supreme point that a person can achieve is astonishment. When an originary phenomenon gives rise to this astonishment in him, he must consider himself satisfied: nothing greater can be conceded to him, and he must not further seek something else behind the phenomenon. Here is the limit. In general, however, the sight of an originary phenomenon is not enough for people; they need more. They are like children who, after looking in a mirror, immediately turn it around to see what is behind it.[29]

Here, the notion of an originary phenomenon merges with that of a symbol, insofar as symbols "show" something ineffable. For example—although this is only an initial stage—magnetism is an originary phenomenon, to which it is sufficient to allude in order to explain all kinds of phenomena; this is why it can serve as a "symbol" for all sorts of other things, for which we no longer have to seek words to express them.[30] Yet Goethe goes further. Alluding to what Kant calls the aesthetic Idea,[31] Goethe affirms that the symbol (and therefore the originary phenomenon), insofar as it is a form and an image, lets us understand a multitude of meanings, but itself remains ultimately inexpressible.[32] It is "the revelation, alive and immediate, of the unexplorable."[33]

Goethe conceived of symbols and originary phenomena as emblems, hieroglyphs, or the silent language of nature. With regard to

the forms of the shells of which, he says, are sacred objects to him, he writes: "According to my own way of searching, knowing, and enjoying, I always stick with symbols." In a conversation with Falk, he says: "I would like to lose the habit of speaking, and express myself, like Nature the artist, in eloquent designs."[34]

We might discern a tendency in Goethe to renounce causal explanations—the cause hidden behind the effect—and discourse that unfolds in formulas and maxims, in order to privilege, by contrast, the immediate perception of the meaning that may be assumed by a concrete individual figure, form, design, emblem, or hieroglyph—such as a spiral or a leaf—which in fact represents a universal law: "This fig tree, this little snake, this cocoon . . . , all these things are signatures, heavy with meaning. Yes, he who could decipher their meaning exactly, would soon be able to do without all writing and all words. Yes, the more I think about it, the more it seems to me that there is something useless, idle, and even fatuous, I might say, in human discourse, so that we are terrified by Nature's silent seriousness, and by her silence."[35] Symbols are not the vehicle of conceptual content, but they allow something to shine through that is beyond all expression, and that can be grasped only by intuition.

Goethe always assumes a solemn tone when he speaks of originary phenomena as of an impassable limit: "Let him who explores nature leave the originary phenomena in their eternal rest and their eternal splendor."[36] Moreover, Goethe considers that only a genius is able to discover and contemplate the originary phenomena.[37] We must therefore respect and venerate these phenomena, which allow us to glimpse an inconceivable, unexplorable, unfathomable transcendence, never directly accessible to human knowledge, but of which we can have a premonition by means of reflections and symbols.[38] Thus Faust, at the beginning of part 2 of *Faust,* is forced to turn his back to the sun that blinds him, but he looks in ecstasy at the waterfall, where he sees the light of the day-star reflected in a rainbow:

"In the colored reflections we have life."[39] In *Pandora,* Prometheus praises Eos (the dawn), who gently accustoms our feeble eyes to the light so that the shafts launched by the sun do not blind man, who is meant to see things that are illuminated, but not light itself.[40] And in his *Maxims and Reflections,* Goethe compares his approach as a scientist to that of a man who, having risen early, waits impatiently for the dawn at daybreak, and for sunrise at dawn, but is blinded when the latter appears.[41]

Obviously, when Goethe declares that Isis has no veils, we must understand this critique of the traditional metaphor in a metaphorical sense. For Goethe, in fact, the veil does not hide anything. It is not opaque, but transparent and luminous, "woven," as is said in the poem "Dedication," "from the morning mist and the light of the sun."[42] It does not hide, but reveals, diffusing a transcendent light. Paradoxically, we could say that if Isis is without veils, it is because she is entirely form, that is, entirely veil; she is inseparable from her veils and her forms.

Form is a veil, veil is form, for Nature is the genesis of forms. The notion of form is essential here. Goethe reproached his old friend Friedrich Heinrich Jacobi for proposing a formless God in his book *On Divine Things and Their Revelation,* and claiming that Nature conceals God. In his *Tag- und Jahreshefte* (1811), he states that this book contradicts the way of seeing the world that is innate and deeply imprinted within him: to see God in Nature and Nature in God.[43] In the letter he wrote to Jacobi, expressing his disagreement, he presents himself ironically as a worshipper of Artemis of Ephesus.[44] He thereby alludes to a passage from the Acts of the Apostles, which narrates the uprising of the people of Ephesus against Saint Paul, stirred up by the tradesmen who feared that his preaching might put an end to the trade in the little silver temples they fashioned: "I am one of those Ephesian goldsmiths, who has devoted his whole life to contemplating, admiring, and venerating the wonderful

temple of the goddess and to imitating her forms, full of mysteries, and who cannot feel a favorable impression when some apostle wants to impose some other god, and, what is worse, a god without form." The poem "Great Is the Diana of the Ephesians" is an echo of this opposition to Jacobi. Goethe rejects a formless God, not because he attributes to him a particular form, but because for him, God is inseparable from Nature; that is, he is inseparable from the forms, both visible and mysterious, that God/Nature constantly engenders. Nature reveals herself in the metamorphoses of her multiple forms. As Diderot had said, in the playful tones of a man of the eighteenth century: "It is obvious that Nature was not able to maintain so much resemblance in her parts and effect so much variety in forms, without often making sensible in one organized being what she has hidden in another. She is a woman who loves to dress up, and whose various disguises, allowing now one part, now another to escape, give some hope to those who follow her assiduously that they may one day come to know her entire person."[45]

Goethe took up this image, in a mystical tone, in the *Divan:*

> You may hide beneath a thousand forms.
> And yet, Oh beloved! I recognize you right away.
> You can cover yourself with magic veils, all-present One!
> I recognize you right away.[46]

Here the beloved is both Suleika—that is, Marianne of Willemer—God, and Nature. In Goethe's mind, the phrase "You may hide beneath a thousand forms" in fact means "You can take on a thousand forms, but they reveal you instead of hiding you."

Perhaps now we can better understand in what sense the Nature that appears in originary phenomena is a "mystery in broad daylight." On the one hand, in these originary phenomena, which explain other phenomena, Nature appears clearly to perception, or to the senses that are illuminated by intuition. On the other hand, these

phenomena are a limit that cannot be exceeded: one cannot go beyond them and submit them to an explanation. Yet, in this absence of reasons why, we sense a mystery, which Goethe called "the unexplorable."

Here we have, it seems to me, a sketch of a radical transformation of the notion of a secret of nature. Traditionally, it was admitted that there existed hidden forces or secret mechanisms that first magic, then science, were able gradually to discover, and whose secret or mystery progressively disappeared. This time, there is no secret to discover; nothing is hidden, and we see everything, but what we see is crowned in mystery, and ineffably shows the ineffable and unexplorable. Here we see the first glimmers of the dawn of a new relation to nature. The basic feeling will no longer be curiosity, the desire to know, or to solve a problem, but admiration, veneration, and perhaps anguish as well, in the face of the unfathomable mystery of existence.

21

The Sacred Shudder

In conformity with mythological schemes of the classical period, the traditional and conventional iconographic theme of the unveiling of Isis, which appears in scientific books in the seventeenth and eighteenth centuries, did not imply any metaphysical affirmation with regard to nature. Isis simply represented natural phenomena, and her unveiling symbolized the progress of a science dominated by a mechanistic conception of nature. At the end of the eighteenth century, however, the motif of Isis/Nature was to invade literature and philosophy and bring about a radical change in attitude with regard to nature, under the influence of various factors, in particular Freemasonry.

THE EVOLUTION OF THE ATTITUDE TOWARD NATURE

First of all, we must examine Robert Lenoble's idea that the mechanization of the world brought about "delayed-action anguish."[1] He meant by this that the mechanistic revolution had brought about, within the collective imagination, a kind of separation of man from Mother Nature, and hence his maturity, and that such transformations are always accompanied by a feeling of anguish. Yet this was a "delayed-action" anguish because this crisis, which should have occurred in the seventeenth century, did not begin to manifest itself until the eighteenth. Only gradually did people become aware of the

upheaval that the mechanistic and then the industrial revolutions were to bring about in the human condition. Gradually the need was felt for a renewed contact with nature.

Be that as it may, one of the first symptoms of the evolution to which I am alluding was the appearance of an aesthetic approach to nature, which allows us to know nature in a different way from the scientific approach. As we have seen, around 1750, Baumgarten laid claim, in the face of the *veritas logica* of the mechanized sciences, to a *veritas aesthetica,* which could be found in the artistic vision of nature.[2] We glimpsed this aesthetic approach in Goethe, but we could find it as easily in Rousseau, Kant, Schiller, Schelling, and German Romanticism.

Aesthetic perception always contains an emotional element of pleasure, admiration, enthusiasm, or terror. To recognize a proper value for the aesthetic approach to nature necessarily also means introducing an emotional, sentimental, and irrational element into the relation between mankind and nature. This evolution is already sketched in Rousseau, in whom we can clearly observe how feeling and emotion in the presence of the All are substituted for the search for the secrets of nature. The way Rousseau describes his experience of nature brought about a transformation of sensibility throughout his epoch:

> Soon, from the surface of the earth, I raised my ideas to all the beings of nature, the universal system of things; and the universal being that embraces all things. Then, my mind lost in this immensity, I did not think, I did not reason, I did not philosophize: with a kind of voluptuous pleasure, I felt myself overwhelmed by the weight of this universe . . . I loved to lose myself in space in my imagination; my heart, enclosed within the limits of beings, did not have enough room; I was suffocating within the universe, and would have wished to launch myself forth into the infinite. I think that *if I had unveiled*

all the mysteries of nature, I would have felt myself to be in a situation less delicious than this stunning ecstasy to which my mind abandoned itself without restraint, and which, in the agitation of my transports, sometimes made me cry out: Oh great Being! Oh great Being! without being able to say or think anything more.[3]

I feel ecstasies, inexpressible raptures, when I melt, so to speak, into the system of beings, and when I identify myself with the whole of nature.

[The contemplator] knows and feels nothing, except in the all.[4]

Here we clearly see curiosity with regard to the secrets of nature superseded by an emotional experience that invades one's entire being and consists in feeling oneself to be part of the All. This lived experience was one of the essential components of the phenomenon we are studying. In 1777, F. L. Stolberg already spoke in this regard of the need for an emotional disposition he called "fullness of the heart" ("Fülle des Herzens").[5] This does not, moreover, exclude the existence of clear and rational procedures. The two attitudes coexist, for instance, in Goethe. Kant himself did not hesitate to speak of the "sacred shudder" we must feel in the presence of Nature, and of the "ever-renewed admiration and veneration" we feel when viewing the starry sky. We might say that from Schelling to Heidegger by way of Nietzsche, this experience, accompanied by anguish or terror, pleasure or astonishment, was to become an integral part of certain trends in philosophy.

THE ISIS OF PLUTARCH AND PROCLUS

So far I have not yet discussed two ancient texts concerning Isis, one by Plutarch and the other by Proclus. Plutarch's treatise *Isis and Osiris* is devoted to an allegorical and philosophical interpretation of

Egyptian mythology. For him, there really was a philosophy of the Egyptians, which was hidden in myths and stories that allow the truth only to be glimpsed, as is suggested, he says, by the sphinxes placed at the entrances of sanctuaries, symbolizing an enigmatic wisdom. For instance, we can glimpse this "enigmatic wisdom," he claims, in the inscription on the statue of Neith, the divinity honored at Saïs, who was assimilated to the Greek Athena and to Isis: "At Saïs, the seated statue of Athena, whom they identified with Isis, bears this inscription: 'I am all that has been, that is, and that shall be; no mortal has yet raised my veil [*peplos*].'"[6]

A few centuries later, we find the text of this inscription once again in Proclus, commenting on Plato, *Timaeus,* 21e. This time he situates the inscription within the sanctuary of the goddess and gives it a more developed form: "That which is, that which shall be, that which was, I am that. No one has raised my tunic [*khitōn*]. The fruit I have engendered is the sun [Horus]."[7]

As was noted by John Gwyn Griffiths in his commentary on Plutarch's treatise *Isis and Osiris,* the phrase "I am that which is, that which has been, and that which shall be" is a claim of universal power, usually reserved for Atum and Re, and it recalls the words of Seth to Horus: "I am Yesterday, I am Today, I am Tomorrow, which is not yet."[8] Potentially and virtually, Isis is all things. The allusion in Proclus to Horus and to the tunic that has not been raised indicates that Isis is being presented as a virgin mother. In Plutarch's view, Isis is the feminine aspect of nature, for the Logos leads her to receive all forms and all figures.[9] Plutarch may have been thinking of the idea of a secret of nature when he spoke of the veil of Isis; yet this does not appear explicitly.

This impossibility of raising the *peplos* of Isis, and the fact that she engendered the sun all by herself, allude to the goddess's virginal character. We must note, however, that the converse motif also ex-

isted in antiquity, but it was the goddess herself who raised her tunic. Françoise Dunand has recalled the existence of Greco-Egyptian terra cottas in which we see the goddess, wearing the Isiac crown, raising her dress with both hands.[10] This gesture of Baubo, which I shall discuss later on, is also that of the women at festivals of Bubastis, in honor of the goddess Bastet (whom Herodotus identifies with Artemis).[11] Dunand concludes from this that this representation of Isis is of Isis Bubastis, the goddess of fecundity. Moreover, a magical papyrus alludes to the *peplos* of Isis. In order to know whether a love charm has had an effect, the following prayer must be recited: "Isis, pure virgin, give me a sign that may let me know the accomplishment, uncover your sacred *peplos*."[12]

Iconography does not seem to have taken very seriously the warning given by the goddess in Plutarch and in Proclus: "No mortal has yet raised my veil." For the Isis of the seventeenth century and the beginning of the eighteenth was in fact nothing other than Nature as subject to the will of mankind; however only her mechanical and mathematical aspects were discovered. Yet we can discern an allusion to this threat in the frontispiece to the *Physics* of Segner, which I have mentioned, as well as in the engraving by Heinrich Füssli at the beginning of Erasmus Darwin's poem *The Temple of Nature, or The Origin of Society* (Fig. 18).[13] In the engraving a kneeling woman makes gestures of terror while another woman, no doubt a priestess, unveils a statue of Isis/Artemis before her. This image, moreover, corresponds only partially to the poem's content, for, as Irwin Primer has shown, Darwin wished to oppose the religion of terror, which is that of human beings left in ignorance, to the love and confidence that enlightened philosophers feel for nature.[14]

In any case, the warning Isis gives to those who would seek to unveil her was taken very seriously by philosophers and poets at the end of the eighteenth century. The figure of Isis was to undergo a radical change in meaning: henceforth amazement, astonishment,

and even anguish in the face of Isis/Nature was to be one of the favorite themes of certain literary works.

THE MASONIC ISIS

One of the prime causes of this evolution does indeed seem to have been the new meaning that Freemasonry was to give to the figure of Isis.[15] The powerful intellectual and social movement of Freemasonry, which flourished at the beginning of the eighteenth century, aimed both to spread the ideals of Enlightenment philosophy and to proclaim itself the heir to the mystery traditions of antiquity, particularly Egyptian traditions. Thus, in Masonic mythology, the figure gradually came to have a role of prime importance.[16] In the last decade of the eighteenth century, the vogue for Egyptian mysteries, or "Egyptomania," was to gain considerable popularity. As Jan Assmann has admirably shown, it was especially in the milieu surrounding the Viennese lodge "Zur wahren Eintracht" (True Harmony) that a new interpretation of Isis/Nature was to develop.[17] In 1787, Karl Leonhard Reinhold, who became affiliated with this lodge in 1783, wrote a treatise on the Hebrew mysteries in which, taking up speculations developed at the end of the seventeenth and the beginning of the eighteenth centuries by John Spencer and William Warburton, he sought to show that the God of the philosophers—and of the Freemasons—was already well known to the Egyptians, and that Moses had borrowed the content of his revelation from Egyptian wisdom, although he concealed it in the rites and ceremonies of the Hebrew religion.[18] From this perspective, Reinhold assimilates the self-description of Isis/Nature of which Plutarch speaks, "I am all that has been, that is, and that shall be," to that of Yahweh on Sinai, "I am who I am." This was a forced interpretation, since Isis says that she is all that exists, whereas Yahweh, by contrast, entrenches himself in his selfhood, or his ego.[19] Whether the affirmation is of being or the self, however,

there is above all the refusal to speak the name, for when Isis proclaims that she is all that exists, it becomes apparent that the being of divinity, as Assmann notes, "is too universal to be designated by a name."[20]

We can see the considerable transformation that takes place in the representation of Nature. Through her assimilation to Yahweh, she becomes an anonymous divinity. Isis refuses to speak her name and to be unveiled. She hides herself not by concealing the cause of any specific natural phenomenon but by herself becoming the absolute mystery or enigma that cannot be penetrated, the divinity who is nameless, whether she is being or beyond being.

Assmann was right to place this new meaning of Isis/Nature in relation with the Spinozist movement that characterized the German pre-Romantic period.[21] In particular, he brings up the motto "Hen kai pan," which Lessing had engraved in 1780 on the walls of the cottage of J. W. L. Gleim's garden at Halberstadt. As Friedrich Heinrich Jacobi showed when, in 1785, he published the letters on Spinoza he had written to Moses Mendelssohn, the phrase "One and All" was in fact a declaration of faith in favor of Spinoza's famous "deus sive natura."[22] Spinoza had spoken of "that eternal and infinite Being whom we call God or Nature." We are thus in the presence of an identification between God and Nature, the One and the All, and God and the cosmos. From this perspective, Isis/Nature becomes a cosmic god, object of a cosmotheism.[23] Identified with Yahweh, Isis/Nature was surrounded with the same aura of mystery as he, and she was meant to inspire terror, veneration, and respect. As in the mysteries of Eleusis, she may be contemplated only at the end of a lengthy initiation.[24] Then, as Aristotle said with regard to Eleusis, all learning [*mathein*] ceases, and there is henceforth only an experience [*pathein*], which, in the case of Isis/Nature assimilated to Yahweh, can only be an experience of the ineffable.[25]

At the end of the eighteenth century, Isis thus assumes multiple meanings. She represents Nature, the object of science, but also Nature conceived as the mother of all beings, and finally Nature as infinite, divinized, ineffable, and anonymous, or universal Being. She is also identified with Truth, which is conceived as the ultimate, and perhaps inaccessible, object of the efforts of human knowledge.

It was probably under the emphasis of these Masonic representations that Isis/Nature was the object of a cult during the French Revolution. In the decorations of revolutionary festivals, particularly as staged by the painter David, intended to educate the people, Nature appears with the features of Isis, as the mother of all beings.[26] It is to this same Masonic influence that we must attribute the presence of a statue of Isis/Artemis in the gardens of Potsdam, at the time of Friedrich-Wilhelm II, king of Prussia.[27]

THE ISIS OF GERMAN PRE-ROMANTICISM AND ROMANTICISM

The transformation of the approach to nature that took place at the end of the eighteenth century appears clearly in Kant.[28] Here we witness the encounter of two opposing attitudes. On the one hand, in the *Critique of Pure Reason* (1781), we find the mechanistic, judicial, and violent one: reason, as Francis Bacon would have it, should behave toward nature "not like a student, who lets himself be told whatever the teacher wishes, but like an appointed judge, who forces witnesses to answer the questions he asks them."[29] On the other hand, in the *Critique of the Faculty of Judgment* (1790), we find the aesthetic approach, filled with veneration, respect, and fear, which is expressed in Kant's commentary on the illustration placed by the physicist Segner at the beginning of his treatise on physics.[30] Kant writes:

> Perhaps no one has said anything more sublime, or expressed a thought more sublimely, than in that inscription on the temple of Isis (Mother Nature): "I am all that is, all that was, and all that shall be, and no mortal has lifted my veil." Segner utilized this idea in an illustration full of meaning that he placed at the beginning of his *Physics*, in order to fill his disciple, whom he was already on the verge of introducing into this temple, with a sacred shudder [*Schauer*], which is to dispose the spirit to solemn attention.[31]

In fact, I think that these two attitudes seem reconcilable to Kant, and probably to Segner as well. For in the illustration in Segner's book, as we have seen with regard to the iconography of Isis/Nature,[32] one of the children is measuring her steps, which seems to mean that by using a mechanistic and mathematical method, man can comprehend only Nature's footprints—that is, her most external effects—but not Nature herself. Yet as is implied by the motto "Qua licet," this research can take place only within allowed limits. Indeed, another child puts his finger to his lips, signifying that we can only be silent in the face of the ineffable, for Nature herself, unlike her footsteps, is an unknowable mystery. In the face of this unfathomable and inaccessible Nature, we can only feel a sacred shudder.

The veiled and terrifying image of Isis reappears in Schiller's poem titled "The Veiled Statue at Saïs," written in 1795.[33] The poem depicts a young man with an avid desire to know the Truth, who penetrates within the temple of Saïs and learns that it is precisely Truth that is hidden beneath the goddess's veil. The hierophant warns him away, for no mortal has the right to raise it: "This veil, no doubt light to the hand, is terribly heavy for your conscience." Yet the imprudent youth returns to the temple at night. He is seized by terror, and an inner voice tries to hold him back, but he raises the veil and falls senseless: "For all time, the serenity had gone from his life. A deep melancholy carried him off to an early grave . . . Woe to whoever approaches the

Truth by the paths of guilt." This poem inspired some hostility, particularly on the part of Johann Gottfried von Herder, who could not accept that the desire to see the truth was a fault.[34]

First of all, we can interpret this poem from the perspective of the pessimism, which we could call Idealist, that is expressed in other works by Schiller. Here, as Schiller says explicitly, Isis represents Truth, as in some allegorical representations from the eighteenth century.[35] More precisely, this Truth may be the Truth on the subject of nature, but it is also Truth on the subject of the concrete situation of mankind. In either case, Schiller implies that this Truth is so hideous that one can no longer live after having known it. From the same perspective, "The Words of Illusion," written in 1799, speaks of Right, Happiness, and Truth. It is an illusion to think that Right will triumph, for it must fight an eternal combat; an illusion to think that a noble-hearted being can achieve Happiness, for it is only a stranger on this earth; an illusion to think that the Truth will appear to earthly understanding. "No mortal hand may raise her veil," writes Schiller. "We can only make conjectures and suppositions."[36]

In Schiller's poem "Kassandra" (1802), Cassandra wonders, during the celebration in honor of Achilles' wedding to Polyxena, daughter of Priam:

> Is it wise to raise the veil
> Where terror, threatening, dwells?
> Life is naught but error,
> And knowledge is but death.[37]

We might think that we already hear Nietzsche, whom I will discuss in the next chapter. Life is celebration, joy, appearance, and illusion; Death is Truth, which consists in knowing, like Cassandra, that all this joy will be destroyed. Only illusion, art, and poetry enable us to live. Here on earth, we can achieve neither Truth nor Happiness, which are as it were forbidden fruit, to the point that for man, Truth

is terrifying and dangerous. Schiller's pessimism is quite certainly the price he paid for his idealism: Truth, Nature, Beauty, and the Good are not of this world, or rather they are to be found only in the inner world, that is, ultimately, in moral conscience:

> Therefore, noble soul, tear yourself away from illusion
> and maintain your heavenly faith,
> What no ear has perceived, what eyes have not seen,
> The Beautiful, the True—still exists!
> It is not outside, where fools seek it,
> It is within you: you bring it forth eternally![38]

And again:

> It is in the sacred silence of the spaces of the heart
> that you must flee, far from life's harassing pursuit.
> Freedom exists only in the kingdom of dreams
> And the Good flourishes only in the poet's song.[39]

In "The Veiled Statue at Saïs," however, the veiled statue may also symbolize Nature herself: the Masonic Isis that Schiller knew through Reinhold's work. He too, paraphrasing K. L. Reinhold, had written an essay titled "Moses' Mission," which accepted the identification of Isis and Yahweh.[40] When Schiller writes, "Woe to whoever approaches the Truth by the paths of guilt," we can assume that the guilt consists in failing to assume the requisite disposition of respect toward the goddess, in failing to wait for initiation, in failing to feel the "sacred shudder" of which Kant spoke, in not staying within the allowed limits, and in unveiling by means of violence. If this is the case, then the spirit of this poem would not be so far from that of "The Gods of Greece," which I have discussed.[41] To brutally tear away her secrets from Nature, or her veil from Isis, to seek the truth at any cost and by every means, especially by technology and the mechanization of nature, is to risk killing poetry and the Ideal, and creating a disenchanted world.

It was certainly in opposition to Schiller's poem that Schlegel called upon his contemporaries to confront the danger and surmount their terror: "It is time to tear the veil off Isis and reveal what is secret. He who cannot bear the vision of the goddess, let him flee or perish."[42] In his essay "The Disciples at Saïs," Novalis echoes Schlegel: "If it is true that no mortal can lift the veil, as is indicated by the inscription I see down there, then we will just have to try to become immortal. Whoever gives up trying to raise the veil is no true disciple of Saïs."[43] This allusion to immortality—that is, ultimately, to the power of the spirit[44]—allows us to glimpse how the theme of the veil of Isis was interpreted in the Romantic period within the perspective of an Idealist philosophy. To unveil Isis was to realize that Nature is nothing other than Spirit unaware of itself, that the Non-Ego known as Nature is ultimately identical to the Ego, and that Nature is the genesis of the Spirit. Despite the profound differences that exist between the various Romantic philosophies, whether of Fichte, Schelling, Hegel, or even of Novalis, the same basic tendency, from different perspectives, to identify Nature and Spirit remains constant.

Novalis's study "The Disciples at Saïs" remained unfinished. In the material Novalis had collected with a view to writing it, he expressed the meaning that the German Romantics gave to the unveiling of Isis in a striking way: "One of them succeeded—he raised the veil of the goddess of Saïs. Yet what did he see? He saw—wonder of wonders!—himself."[45] For Novalis, the exploration of inner life will enable us to descend to the sources of nature. It is by returning to ourselves that we can understand nature, and nature is, in a way, a mirror of the spirit. This idea can be found throughout Romantic philosophy.[46] Later on, Bergson would become the heir to this tradition: for him, it is by seizing the genesis of nature in "duration" that the spirit becomes aware of the fact that it itself has sought to realize itself

through nature's becoming, and that there is consequently an identity between inner life and universal life.

This theme was particularly dear to Schelling. At the same time that he rediscovers, in his definition of nature, the ancient meaning of *phusis,* that is, of productivity and spontaneous blossoming, he conceives of mankind "as the conscious becoming of natural productivity."[47] I have already mentioned this crucial text: "What we call nature is a poem whose marvelous and mysterious writing remains undecipherable for us. Yet if we could solve this enigma, we would discover therein the Odyssey of the Spirit, which, the victim of a remarkable illusion, flees itself even as it seeks itself, for it only appears through the World like meaning through words."[48]

For Hegel as well, the unveiling of Isis was the spirit's return to itself. For him, however, this process was situated within historical becoming. The formula of Saïs, "No man has lifted my veil," means that Nature is a reality that differs from itself, that it is something other than its immediate appearance, and that it has an inner part that is hidden.[49] Moreover, he criticizes Goethe, who had refused to distinguish an inside and an outside of Nature.[50] For Hegel, however, the occultation of Nature is particular to the Egyptian historical moment. She unveils herself—that is, suppresses herself—in Greek thought, which puts an end to the "enigma." It is not without significance that the Egyptian Sphinx is killed by the Greek Oedipus. The Sphinx dies when mankind is defined in Greek thought, and man defines himself by discovering that the inside of nature is none other than himself,[51] which is to say, that which we think is other than we, nature, is nothing other than what we are, that is, the Spirit.

Let me add another suggestion by Novalis to these Romantic variations on the theme of Isis. It is found in the story of Hyacinth and Rosebud, told by one of the disciples of Saïs. Hyacinth abandons his fiancée, Rosebud, to travel to a distant land in search of the Veiled

Virgin, Mother of All Things. After a long journey, he arrives at her temple, but when he raises the veil of the "celestial Virgin," it is Rosebud who leaps into his arms. The image of Sophie, Novalis's young fiancée who died prematurely, and to whom he dedicated a religious cult throughout his life, comes to coincide with that of Isis, or infinite Nature perceived as the Eternal Feminine. This time, it is love that appears as the best initiation into Isis/Nature. A passage from "The Disciples at Saïs" can help us interpret this new perspective. One of the disciples, the "young man with sparkling eyes," expresses Novalis's deepest thought when he presents the knowledge of nature as absolutely inseparable from an emotional element, or a "sweet anguish," of which only poets are capable:

> What heart would not leap for joy, when the most secret life of Nature fills it with all its fullness, and when this powerful feeling, for which language has no other name than love and pleasure, dilates within it . . . [S]huddering with a sweet anguish, it plunges into the dark and delightful bosom of Nature; it feels its miserable personality being fused, submerged in waves of pleasure, and . . . all that subsists is a center of incommensurable, genesic force, a whirlpool where everything is swallowed up into the vast ocean?[52]

No one can understand Nature "unless a profound and multiple kinship with all bodies impels him to mix himself by emotion with all natural beings, to melt into them, as it were, through feeling."[53] The unveiling of Isis thus appears as a cosmic ecstasy, accompanied by veneration and respect:

> He who possesses a true and practiced feeling of nature enjoys Nature as he studies her . . . When he is near her [Nature], he feels as if he were in the arms of a chaste fiancée, and to her alone he confides, in the sweet hours of intimacy, the thoughts on which he has tarried.

> How happy he is, this son, this favorite of Nature, whom she permits to contemplate her, in her duality, as a power of fecundation and childbirth, and in her unity, as an infinite and eternal hymen. The life of that man will be a profusion of delights and an uninterrupted sequence of pleasures, and his religion can be called a true and authentic naturalism.[54]

If Novalis and Schlegel had opposed Schiller, the poet Clemens Brentano attacked them in turn in a quatrain, making cruel fun of the ecstasies, terrors, and metaphysical speculations of the first Romantics:

> It is enough for your hair to stand on end with fear
> For you to call that pure knowledge!
> And if you call that "raising the veil of Isis,"
> What you raise without modesty is only your apron.[55]

In Brentano's view, the Romantics content themselves with emotions instead of reflection and research. Shudders and fright take the place of thought for them. And if they identify Nature with the ego, this is only a pretext for them to unveil their moods and to pour forth their effusions and confessions. Brentano may also have had in view the exhibitionism that can be discerned in Schlegel's "Lucinda."[56]

The veil of Isis was interpreted in a wholly different way by P. S. Ballanche in 1830. For him, Isis always remains veiled. The Egyptian priests, he says, never remove the veil that covers the statue, and they have never seen her without veils. For him, this means that the knowledge of truth is not the result of a gesture of revealing a readymade reality, that is, a teaching received passively; instead, man must find the truth, actively, by himself and in himself: "The Egyptian priests therefore teach nothing, for they believe that all is within mankind; all they do is remove the obstacles." The truth is in mankind's heart.[57]

THE FEELING OF THE SUBLIME AND THE SACRED SHUDDER

Another factor in the transformation of the relation of philosophers and poets to nature was the quite particular attention that the eighteenth century devoted to the feeling of the sublime.[58] It was above all in England that this aesthetic notion was the subject of research, which culminated in particular in Edmund Burke's work *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful,* published in 1756.[59] For Burke, the sublime terrifies us by the impression of danger or infinity, but this feeling of fright is transformed into delight once we have the impression that we are safe.[60]

Kant speaks of the "astonishment, which borders on terror, that seizes the spectator at the sight of mountains rising to the sky, or of deep gorges through which water rages."[61] For him, the sublime is felt only if we place ourselves in the presence of bare reality, through a purely aesthetic vision, which does not involve any finalistic considerations: "When one calls the sight of the starry sky sublime, we must . . . look at it simply as one sees it: as a vast vault that includes everything . . . ; we must succeed in seeing the ocean alone, as poets do, but according to what its appearance shows."[62]

Without any appearance of the word "sublime," we glimpse the presence of this feeling in the famous phrase that appears at the end of the *Critique of Pure Reason:* "Two things fill the soul with ever-renewed and ever-growing admiration and veneration, the more frequently and constantly reflection applies itself to them: the starry sky above me and the moral law within me." In this famous text, I think I perceive a structure analogous to that of a passage from Seneca in which he also associates the moral conscience—that of the sage—with the spectacle of the world: "I look upon wisdom with the same stupefaction with which, at other times, I look at the world, this world that I often contemplate as if I were seeing it for the first time."[63]

It is from this perspective of the sublime that Kant, as we have seen, understands the inscription at Saïs, and that, in a famous note to his *Critique of the Faculty of Judgment,* he sets in relation to the illustration Segner uses at the beginning of his treatise on physics, and which, says Kant, lets us understand that we can approach nature only with a "sacred shudder."[64] Already in 1779 the image of Isis veiled, chosen by the Egyptians to represent Nature, was, for Honoré Lacombe de Prézel, author of the *Iconological Dictionary,* a "simple, yet divine expression."[65]

It was also in the perspective of the sublime that the Isis of Saïs, that is, the mystery of Nature, was perceived by Schiller: "All that is wrapped up and full of mystery contributes to fright, and therefore is susceptible to sublimity. Of this kind is the inscription that could be read at Saïs in Egypt, on the temple of Isis: 'I am all that has been, that is, and all that shall be; no mortal has yet raised my veil.'"[66]

We can also find in Schopenhauer a reflection on the feeling of the sublime which has the merit of recognizing the twofold aspect of this feeling. On the one hand, the contemplation of infinity crushes us, whether it is the duration of the world or the nighttime vision of the immensity of the universe: we then feel that our individuality is no more than "a drop in the ocean."[67] On the other hand, we realize that all these worlds exist only in our representation; that is, they are modifications of the eternal subject of knowledge, that pure subject with which we become merged when we forget our individuality. We then feel that "we are one with the world, and that consequently its infinity lifts us up, far from crushing us . . . There is a delight here that transcends our own individuality; it is the feeling of the sublime."[68]

The theme of the sublime and the shudder was also dear to Goethe. In *Wilhelm Meister's Travels,* he describes the attentive perception of a starry sky: "The most transparent night shone and shimmered with all its stars, enveloping the spectator, who had the

impression of contemplating, for the first time, the immense vault of the sky in all its splendor." If the spectator has the impression of seeing "for the first time," says Goethe, it is because he is usually incapable of seeing, blinded as he is by the worries of his heart and the cares of daily life. Goethe describes the emotion that seizes the spectator as he perceives the existence of the world in its naked reality: "Filled with amazement and astonishment, he closed his eyes. The prodigious immensity [*das Ungeheure*] ceases to be sublime, and transcends our capacity of experience, and threatens to annihilate us. 'What am I in the face of the all?' he asks himself within. 'How can I subsist before it, in the midst of it?'"[69]

We have seen that, for Goethe, the knowledge of nature culminates in the discovery of originary phenomena, which explain other phenomena and have no explanation themselves.[70] Once he reaches these originary phenomena, a person need only contemplate, admire, and be astonished, but this astonishment can go as far as terror and anguish:

> We are terrified by the silent gravity of Nature, and by her silence.[71]
>
> The immediate apperception of originary phenomena plunges us into a kind of anguish.
>
> Faced by originary phenomena, when, once unveiled, they appear to our senses, we feel a kind of fear, which may go as far as anguish.[72]

Nature then appears to us as an *Ungeheures,* an ambiguous term that designates as much what is prodigious as what is monstrous.[73] We recall the quatrain from the poem "Genius Unveiling a Bust of Nature":

> Respect the mystery,
> Let not your eyes give in to lust.
> Nature the Sphinx, a monstrous thing [*Ungeheures*],
> Will terrify you with her innumerable breasts.[74]

Finally, for Goethe in his old age, this anguish was not a depressing feeling. Quite the contrary: for one who is capable of bearing it, it is the most elevated state man can attain. At the moment when, to evoke the figure of Helen, Faust is about to venture forth into solitude, out of space and time, there where there is no path, in the terrifying kingdom of the Mothers, who preside over the formation and the transformation of things, he cries out:

> It is not in torpor that I seek my salvation.
> The shudder [*Schaudern*] is the best part of man.
> However dearly the world makes him pay for this feeling,
> It is with emotion that man feels, deep within, the terrifying
> [*das Ungeheure*].[75]

To specify the precise relation that may exist between the myth of the Mothers and the Goethean doctrine of nature would take us too far afield, into a lengthy study.[76] What is essential for us is that the four lines I have just quoted remind us of what Goethe says elsewhere, about the anguish that seizes man in the presence of originary phenomena. Above all, they reveal to us Goethe's concept of the human condition. To be fully human means having the courage to become aware of what is terrible, unfathomable, and enigmatic in the world and in existence, and not to refuse the shudder and the anguish that seize human beings in the face of mystery. Such an attitude presupposes tearing oneself away completely from daily habits, and a complete change of scenery. It is this change of scenery that makes us see things as though we were seeing them for the first time, and which produces as much admiration as terror. This change of scenery does not, moreover, correspond to a loss of contact with the real. On the contrary, it means to become aware of reality and the mystery of existence that is hidden from us by the habits of daily life.

I must add that in Goethe, this feeling of anguish can be provoked by the presence of what is existent, real, and experienced. This, it

seems to me, is what is suggested by a passage from *Elective Affinities,* in which Goethe speaks of a series of *tableaux vivants:* "The attitudes were so right, the colors so harmoniously distributed, the lighting so cleverly arranged, that one truly thought oneself to be in another world, except for the fact that the presence of the real, substituted for appearance, produced a kind of impression of anguish."[77]

In addition to this experience of anguish in the face of originary phenomena, we sometimes observe an ambiguous feeling with regard to Nature in Goethe. This is already noticeable in *Werther.* The hero of the novel recounts how the inebriating spectacle of universal life had been transformed for him into a terrifying vision of the universal metamorphosis of things, of that force, of "that devouring monster [*Ungeheuer*] . . . that is hidden within all of nature."[78] We find the same ambiguity in his review of Johann Georg Sulzer's book *The Fine Arts.* To Sulzer, who affirms that everything in nature conspires to provide us with pleasant sensations, Goethe replies:

> Does that which produces unpleasant sensations in us not belong to the plane of Nature as much as that which is most pleasant in her?
>
> Are furious storms, floods, rains of fire, subterranean lava, and death in all the elements not witnesses to the eternal life of nature and are just as true as the sun rising magnificently over opulent vineyards and aromatic orange orchards?
>
> What we see of nature is strength that devours strength: nothing remains present, everything passes, a thousand seeds are crushed, at every instant a thousand seeds are born, . . . beautiful and ugly, good and bad, all existing beside one another with the same rights.[79]

At the same time, the philosopher Carl Gustav Carus wrote, "Every genuine study of nature cannot but lead man to the threshold of higher mysteries, and fill him with a horror that is all the more sacred."[80]

Nevertheless, this feeling of terror in the face of nature is not new.

We cannot write its history here, but we can briefly recall that in antiquity, people spoke of this emotion quite particularly with regard to initiation into the mysteries of Eleusis, which were linked to the vegetation goddesses Demeter and Kore. Concerning them, Plutarch speaks of "shudders," "trembling," "sweat," and "fright."[81] Lucretius, confronted by the vision of nature as Epicurus revealed it, felt, as in a mysteric revelation, both "sacred shudder and divine pleasure."[82] Seneca experienced a feeling of stupor in the face of the world he was contemplating, as if he were seeing it for the first time.[83] It seems to me that this attitude toward nature disappeared at the end of antiquity and in the Middle Ages, perhaps under the influence of Christianity. It reappears at the Renaissance. As we have seen, Spenser, in his poem *The Faerie Queene,* where Nature appears personified, hints that if this Nature is veiled, it is either in order to frighten mortals by her terrifying aspect or else so as not to blind them by her splendor.[84] From the seventeenth century, everyone knows the famous remark by Pascal, a cry which seems to me, moreover, to be quite isolated in its time, but in which Robert Lenoble wished to see the first cry of modern anguish: "The eternal silence of these infinite spaces frightens me."[85] We could also find this first cry of modern anguish in the monologue that Pascal places in the mouth of a man deprived of the light of revelation: "When I look at the whole mute universe, and at man without enlightenment, left to his own resources without knowing who put him there, what he came to do, what will happen to him when he dies, incapable of any knowledge, I become frightened, like a man who has been carried asleep to some awful desert island, and who wakes up without knowing where he is, and without any means of getting out of there."[86]

It seems to me, however, that before the second half of the eighteenth century, never did the expression either of the feeling of anguish or of the feeling of wonder at nature display such intensity as the one that then began to come to light. Under the influence of the

Masonic Isis and the Romantic Isis, and of the cosmotheism they helped to develop, the relation with nature became much more affective, more emotional, and, above all, ambivalent, made up of terror and wonder, anguish and pleasure. The unveiling of the statue of Isis tended more and more to lose its meaning of discovering the secrets of nature and gave way to stupefaction in the face of mystery.

22

Nature as Sphinx

Nietzsche alluded several times, directly or indirectly, to Heraclitus' aphorism "Nature loves to hide." For instance, he claims that "the dithyrambic dramaturge"—that is, Wagner—has seen Nature naked, or again that thanks to him, "Nature, wanting to conceal herself, reveals the essence of her contradictions."[1] Yet the most important allusion to this theme is found at the end of the preface to the second edition (1886) of *The Gay Science*—it was, moreover, to be repeated, except for one phrase, in the epilogue of *Nietzsche contra Wagner* (Christmas 1888). Here, Nietzsche mentions an art which—unlike that of Wagner, whom he had once adored—and unlike the Romantic art of the North, would have no heavy pretensions to the sublime, but would be an "art for artists only." It would be an art that would be "ironic," "light," and "fleeting," more precisely an art full of gaiety, a luminous art, an art of the South.[2]

THE WILL TO TRUTH AND THE ADORATION OF APPEARANCES

It is in this context that Nietzsche evokes both Heraclitus' saying and the statue of Isis:

> And as far as our future is concerned: we shall scarcely be found following the footsteps of those young Egyptians who, at night, make

> temples unsafe, embrace statues, and seek to unveil, discover, and expose to broad daylight absolutely everything that there are good reasons to keep hidden. No, this bad taste, this will to truth, to "truth at all costs," this adolescent madness in the love of truth—we've had enough of it: for that, we are too experienced, too serious, too joyous, too weather-beaten, too profound. We no longer believe that the truth is still the truth, if its veils are taken away from it—we've lived too long to believe that. For us today it is a question of decency, that one doesn't want to see everything in its nudity, doesn't want to get involved in everything, or to understand everything, or "know" everything.[3] "Is it true that the good Lord is everywhere?" a little girl asked her mother. "I find that indecent!" A hint to philosophers! We should have more respect for the modesty with which Nature hides behind enigmas and colorful uncertainties. Perhaps Truth is a woman who has reasons for not wanting to let her reasons be seen? Perhaps her name, if we were to speak Greek, is Baubo?—Oh, those Greeks! They knew about *living:* for this, it is necessary to stop courageously at the surface, at the drapery, at the skin, to worship appearances, to believe in forms, sounds, and words, and the entire Olympus of appearances! Those Greeks were superficial—*out of profundity!* . . . Isn't it precisely in this sense that we are Greeks? Worshippers of forms, sounds, and words? And precisely in this sense—artists?[4]

The broad outlines of this passage are fairly clear: Nietzsche opposes the will to truth at all costs to the will to stay at the surface, or the world of appearances: that is, ultimately, art, the world of forms, sounds, and words. What is the meaning of this opposition? To understand it, we must recall that for Nietzsche, knowledge is normally in the service of life, so that our representations are a function of our vital needs. They are errors that are useful for the preservation of the species. "We have set up for ourselves a world in which we can live—

by accepting bodies, lines, surfaces, causes and effects, movement and rest, form and content: without these articles of faith, no man today could bear to live! Yet this is still not the same thing as to prove them. Life is not an argument: among the preconditions of life, there might very well be error."[5]

We thus forge illusions that correspond to our perspectives as living beings. These representations engendered by the necessities of life, these vital errors, are opposed by what Jean Granier calls Originary Truth: that is, the vision or knowledge of the world "as it is," a knowledge that wants to be free of all anthropomorphism, or an inhuman knowledge.[6] For the core of reality is a blind game of destruction and creation, gratuitous and eternal. For Nietzsche, to will the truth at all costs, to wish for knowledge for its own sake, and to renounce vital illusions would be to risk destroying humanity. Man could not survive. He cannot do without the vital illusion, and the entire world of myths and values without which he cannot live. The pure Truth is the negation of Life. The will to truth is fundamentally a will to death.[7]

In Nietzsche's view, however, the will to truth and the worship of appearances are both radically opposed and deeply interdependent, as is shown in the draft Nietzsche wrote of the preface to *The Gay Science,* by certain phrases he eliminated when he published the final version:

> This gaiety is hiding something, this will for what is superficial betrays a knowledge, a science of depth, this depth exhales its breath, a cold breath that makes one shudder . . . Let me finally admit it: we men of depth need our gaiety too much not to make it suspect . . . No, there is something pessimistic in us that gives itself away even in our gaiety, we know how to give that appearance—for we love appearance; nay, we worship it—but because with regard to "being" itself, we have our own suspicions . . . Oh, if you could fully understand why it is precisely we that need art, an art that is mocking, divine, and serene.[8]

This draft thus reveals that the will to gaiety and superficiality emanates from a knowledge, or what Nietzsche calls a knowledge of depth, a knowledge of what the core of things is really like; that is, ultimately, a will to truth that is the basis for pessimism. The "men of depth" are pessimists.

Nietzsche thus accepts, in the face of the "will to the truth at all costs,"[9] another will to truth, which he calls "the knowledge of depth." Yet how can we distinguish them? In paragraph 370 of *The Gay Science,* titled "What Is Romanticism?" Nietzsche opposes precisely Romantic pessimism—that of Schopenhauer and Wagner, in which he believed in his youth—to Dionysian pessimism, to which his inner development has led him. Romantic pessimism is the symptom of an impoverishment of life. The core of things appears as suffering, pain, contradiction, and this knowledge provokes disgust with life. Such pessimism then leads, "by means of art and knowledge," to the negation of the will to live, and to a sad renunciation, which would be "rest, calm, a sea of oil, deliverance from the self, or else drunkenness, convulsion, numbness, and madness." This is the attitude that inspires Romantic art. Nietzsche now feels nothing but revulsion for this "country-fair racket."[10] The will to truth at all costs is thus a morbid tendency of hostility to life, an attitude against nature. Dionysian pessimism, Nietzsche's pessimism, by contrast, is an overabundance of life. The core of things is just as terrible, but from this horror, appearance is born, a wonderful world of forms and sounds, the art of nature and the art of mankind. This is the game of Dionysus: to create and to destroy even the most sacred things. Yet whereas Romantic pessimism says "No" to the world, Nietzsche's Dionysian pessimism says "Yes" to the world, in all its splendor and horror, with audacity, lucidity, and enthusiasm.

Whereas the published preface gives the impression that gaiety and the worship of appearance are born from the refusal of knowledge, or a refusal of the will to Truth, the draft reveals that this gaiety is, on the contrary, the consequence of knowledge and a will to Truth, but both of them are Dionysian: they have engendered suspicion with regard to being, and hence pessimism. In the words of the *Posthumous Fragments:* "It seems that we are gay because we are monstrously sad. We are serious, we know the abyss. This is why we defend ourselves against all that is serious."[11]

For Nietzsche, art does not mean the fine arts but refers to the entire activity of creation and production linked to life and nature, as has been shown by Jean Granier, who writes, "Nature is the artist *par excellence*."[12] Human art has a cosmic meaning; it is one of the forms of the game of nature: "It is a force of nature."[13] It is the entire world of forms, illusions, and representations linked to the vital needs, all that Nietzsche calls "the Olympus of appearances," but also all that is on the surface, as opposed to depth: skin, or the drapery of a veil. This worship of appearances and this gaiety are thus indissolubly connected to the terrifying knowledge of Truth, whose cold breath gives us the shivers: "He who has looked deeply into the world senses how much wisdom there is in mankind's remaining superficial. It is his instinct for preservation that teaches him to be hasty, light, and false."[14]

Already in *The Birth of Tragedy,* Nietzsche recognized the existence among the Greeks of this profound relation between knowledge of Truth and worship of appearance: "The Greek knew and experienced the terrors and horrors of existence; in order simply to live, he had to interpose between this world and himself that shining dream-creation, the Olympian world."[15] This creation of the gods is an artistic creation: it corresponds, says Nietzsche, to the instinct that creates art. Truth and the illusion that enables us to live are inseparable.

THE VEIL OF ISIS AND NATURE AS SPHINX

In the preface to *The Gay Science,* the reflections on the will to Truth and the worship of appearance are placed in the perspective of the unveiling of the statue of the Isis of Saïs. Nietzsche refuses to imitate "those young Egyptians who seek to unveil what there are good reasons to keep hidden."

He may be recalling the triumphant declarations of Schlegel, "He who cannot bear the vision of the goddess, let him flee or perish," and of Novalis, "He who refuses to raise the goddess's veil is no true disciple." For Novalis and other Romantics, to unveil Isis was, as we have seen, to rediscover one's own self.[16] Nietzsche is probably alluding to this when he speaks of the "austere men" who claim to "contemplate reality without veils." It is true that these "austere men" appear, according to the description Nietzsche gives of them, to be less Romantics than realists and objectivists, who claim to liberate themselves from all passion in the search for truth. Nevertheless, he writes with regard to them: "So reality stands unveiled before you alone, and perhaps you yourselves are the best part thereof—O beloved images of Saïs! Yet are you not, in your most unveiled state, highly passionate and dark beings . . . and always too similar to a love-smitten artist?"[17] The exclamation "O beloved images of Saïs!" is obviously ironic. It evokes what the "austere men" are thinking of when they affirm that by unveiling Nature, they unveil their own selves.

In the preface to *The Gay Science,* however, Nietzsche seems above all to be thinking of Schiller's poem "The Veiled Statue at Saïs," which I discussed in a previous chapter: a poem that features a young man consumed by the desire to unveil the statue of Isis because the hierophant told him that the Truth was hiding behind the goddess's veil. He penetrates into the temple at night and decides to tear away

the veil, only to die of sorrow, without saying a word about his vision.[18] With regard to this reminiscence of Schiller in Nietzsche, Charles Andler cites the end of Schiller's "Kassandra," "Only error is life. And knowledge is death," which could indeed sum up Nietzsche's thinking.[19] Yet Schiller's pessimism is a Romantic pessimism that takes refuge in the Ideal and the renunciation of life.

In any case, Nietzsche resolutely subscribes to the attitude of all those who, like Rousseau and Goethe, have refused to tear the veil away from Isis: "We should have more respect for the modesty with which Nature hides behind enigmas and colorful uncertainties."

In this last line we recognize an echo of Heraclitus' aphorism, of which I have spoken throughout this book, but also an attitude that is completely analogous to that of Goethe when he recommends respect for the mystery and advises the Genius not to unveil the statue of Isis.[20] In other words, says Goethe, the statue of Nature as Sphinx, a terrifying and "monstrous thing," that Sphinx to which the "enigmas" Nietzsche speaks of certainly allude:

> Respect the mystery,
> Let not your eyes give in to lust.
> Nature the Sphinx, a monstrous thing,
> Will terrify you with her innumerable breasts.[21]

This image of Nature as Sphinx in Goethe's poem no doubt led Nietzsche to represent Nature metaphorically, no longer, as the tradition we have been examining would have it, with the features of Isis but rather with those of the Sphinx. This terrifying figure appears in a rather unexpected context very early in one of Nietzsche's youthful works, "The State among the Greeks" (1872), written while he was still under the influence of Schopenhauer. His point is to explain the sense of shame the Greeks felt with regard to work and to slavery: "In this feeling of shame there is hidden the unconscious knowledge that the genuine goal of existence demands these previous conditions

[that is, labor and above all slavery], but that in this demand there resides all there is of horror and animal ferocity in Nature the Sphinx,[22] who nevertheless offers forth so beautifully her young girl's body,[23] thus glorifying free civilized and artistic life."[24] And, Nietzsche continues, "culture, which is above all an authentic need for art, rests on a terrifying foundation." In *The Birth of Tragedy,* he also identifies nature and the Sphinx when discussing Oedipus: "The same man who solves the riddle of nature, that Sphinx with a twofold essence, will also break nature's most sacred laws."[25] In this regard, it is not a matter of indifference that Nietzsche here speaks of the secrets of nature and of the violence against nature implied by their unveiling: "How could one force Nature to give up her secrets, unless by resisting her victoriously, that is, by doing what is against nature in an act that is contrary to nature?"[26] In any case, the Sphinx's twofold aspect, a ferocious beast with the bust of a girl, symbolizes the twofold aspect of Nature: beauty and ferocity, giving rise to wonder and horror within us. Thus, civilization in its twin aspects—atrocious (that of slavery) and radiant (that of artistic creation)—reflects the duplicity of the Sphinx, of Nature, and of the Being that is simultaneously the terrifying and destructive abyss of the Truth and the illusory and seductive appearance of Life.

Let us now return to the preface of *The Gay Science.* The refusal expressed there to unveil what is hidden leads to the resolute decision to stick to that which veils, that which is not hidden, appearance and epidermis, according to the model of the Greeks: "Oh, those Greeks! They knew all about *living:* something for which it is necessary to stop courageously at the surface, at drapery, at skin, to adore appearance, to believe in forms, sounds, and words, in the entire Olympus of appearance! Those Greeks were superficial—out of profundity!"[27]

The Greeks were superficial out of profundity, says Nietzsche. Yet profundity, as I have said, is precisely the vision of the world as it is. The Greeks knew the truth: they knew the terrors and horrors of ex-

istence. Yet it was precisely for this reason that they knew how to live. To know how to live means knowing how to construct or create for oneself a universe in which one can live, a universe of forms, sounds, and illusions as well, and dreams, and myths. "To create, for us, is to veil the truth of nature."[28] We thus glimpse the meaning that must be given to this formula: to respect Nature's modesty is in fact to know that she must, we might say, remain artistically veiled: "We no longer believe that the truth remains the truth if its veils are removed—we have lived too much to believe in that."

This respect for the modesty of Nature was already expressed implicitly in this passage from *The Birth of Tragedy* which opposed the artist, that is, the person who adores appearance, to the theoretician, who seeks the truth at all costs: "Whenever the truth is unveiled, the artist will always cling with rapt gaze to what still remains a veil even after such an unveiling; but the theoretician enjoys and finds satisfaction in the discarded veil, and finds the highest object of his pleasure in the process of an ever-happy unveiling that succeeds through his own efforts."[29]

One could say that the Orphic attitude is clearly opposed here to the Promethean attitude. In any case, Nietzsche always remained faithful to his fundamental intuition: truth is inseparable from its veils; appearances, forms, and vital illusion are inseparable from the truth. "The truth is truth only through the non-truth that veils it."[30] From the perspective of the metaphor of Nature as Sphinx, not to unveil Nature is to let the young girl's bosom, a symbol of beauty and art, hide the ferocious, terrifying beast, the symbol of Truth.

THE "MODESTY" OF TRUTH AND BAUBO

By identifying Truth with veiled Isis, Nietzsche is faithful to the pre-Romantic and Romantic problematic, for example, that of Schiller. In this problematic, however, veiled Isis was also Nature. This is why

Nietzsche moves without difficulty from Truth to Nature and from Nature to Truth, all the more easily in that the image of the veil makes him think of the aphorism of Heraclitus, "Nature loves to hide." Nietzsche writes: "We should have more respect for the *modesty* with which Nature hides behind enigmas and colorful uncertainties. Perhaps Truth is a woman who has reasons [*Gründe*] for not wanting to let her reasons [*Gründe*] be seen? Perhaps her name, if we were to speak Greek, is Baubo?"[31] Truth and Nature represent the terrifying ground of reality, which, in the will to knowledge at any cost, one would like to separate from its veil, that is, from the world of appearance, form, and art.

The expressions used here to speak of the modesty of Truth are problematic and cannot be understood, I believe, unless we become aware of all the irony they contain. First of all, the "enigmas" and "colorful uncertainties" of Nature are presented as veils by means of which she protects her modesty, but they also give the impression of being means of seduction. This makes one think of a posthumous poem that relates to Truth: "Truth is a woman. Nothing more. Clever in her modesty . . . You have to force her, that prudish Nature!"[32] As always in Nietzsche the formulas and images are ambiguous.[33] Should Truth's modesty be respected or should it be forced? As I have said, the knowledge of depth reconciles extremes: to have the heroic courage to unveil the truth of the world as it is, as a power of death and a power of creation, and, at the same time, respect the modesty of Truth, veiling it by art and beauty, since vital illusion and the veils of appearance are inseparable from truth.

Yet why does Nietzsche say that Nature is a woman who might have good reasons [*Gründe*] not to let her reasons [*Gründe*] be seen, whereas, in the context of modesty, we would have expected to find, instead of the second *Gründe*, a word designating the female sexual organs? To eliminate this paradox, Marc B. de Launay proposes the following translation: "Isn't truth a woman who has good reasons to

hide behind, in order not to let her behind be seen?"[34] Yet several objections can be raised against this translation. The translation of *Gründe* by "behind" runs into two obstacles: First, *Gründe* is plural, whereas "behind" is singular. In addition, to give the German word *Gründe* the physiological or anatomical meaning of the French *fondement* is, it seems to me, impossible, all the more so in that it would not be an exhibition of the female sexual organs. I think, for my part, that by means of this repetition, Nietzsche wanted to renounce the metaphor ironically, after he had merely sketched it. The Truth can be compared to a woman, but nevertheless we must not forget that it is the Truth. Nietzsche certainly wanted to surprise the reader, who was expecting a word with sexual connotations, and instead finds only a repetition of the word "reasons." For in the classical representation of the Truth, what is most essential, most intimate, and most profound are its reasons, or the rational principles which, in theory, are supposed to give it its validity. But the will to truth at all costs wants to account for everything, and seeks out the deepest reasons. Playing with the word *Grund* once more, Nietzsche denounces the danger of this attitude in a posthumous poem: "One goes to his last resting place [*zugrunde*] if one always goes to the ultimate reasons [*Gründen*]."[35] This is another way of denouncing the inhuman and dangerous character of the will to truth at all costs. Just as Rousseau, from a different perspective, declared that nature "wished to preserve us from science, as a mother snatches a dangerous weapon from the hands of her child,"[36] so Truth, according to Nietzsche, has good reasons to conceal her ultimate reasons, or her essence, since knowing them is dangerous for mankind. We must therefore respect her "modesty," that is, as the Greeks did, "stop courageously at the surface, . . . believe in forms, sounds, and words, and in the entire Olympus of appearance," or the aesthetic aspect of nature.

From the perspective of the metaphor of the statue of Isis, the

Truth must thus remain veiled, and not be separated from the veil of illusion, error, and beauty that enables us not to perish when we discover it, like the young man in the temple of Saïs. Yet why, then, does Nietzsche add, "Perhaps her name, if we were to speak Greek, is Baubo?" What was he thinking of when he invoked this name? In Greek literature, Baubo appears in two different contexts.

First of all, she is a female mythological figure, linked to the mysteries of Eleusis, and therefore to the story of Demeter and Kore.[37] According to an Orphic poem, Demeter, in tears after the abduction of her daughter and searching everywhere for her, was received at Eleusis into a human home and burst out laughing when Baubo "hoisted up her *peplos* and displayed her genitals."[38] This was the very gesture, as we have seen, also made by Isis Bubastis.[39] It is rather surprising that Nietzsche, speaking of the modesty of Nature and of Truth, designates Truth by the name of a woman famous for her immodest gesture.[40]

Baubo was also a terrifying nocturnal demon, identified with the Gorgon. Nietzsche may have known this figure, for his friend Erwin Rohde had discussed her in his book *Psyche*.[41] Baubo's terrifying aspect might accord perfectly with Nietzsche's idea of the Truth. Yet this figure has no relation with its immediate context, that is, with the problem of veiling and unveiling.

Finally, one may wonder if, rather than thinking of the Baubo of Greek tradition, Nietzsche was not recalling the Baubo evoked by Goethe in his *Walpurgisnacht:* "Old Baubo comes alone, riding on a sow."[42] Several times, when Nietzsche speaks of the Truth, he says that she is an old woman. In this context we can cite Nietzsche's poem "In the South," which is part of the collection of poems titled *Songs of Prince Outlaw,* which Nietzsche placed precisely at the end of *The Gay Science*.[43] The prince imagines that he is flying like a bird of the North toward the South, that is, that he is escaping from the fog of Romanticism to reach the light and heat of the Mediterranean

world. He confides the following secret: "I hesitate to admit it, but in the North I loved a little woman, old enough to make you shudder—the name of this old woman was Truth." By evoking this love for the old lady Truth, Nietzsche alludes to his initial enthusiasm for the will to truth at all costs, following Schopenhauer and Wagner. We also encounter this old woman in the aphorisms of *The Gay Science:* "Humanity! Was there ever a more hideous old woman among all old women? (unless it was 'Truth': a question for philosophers)."[44] If the Truth is a woman, she is, for Nietzsche, a "hideous" old woman, "old enough to make you shudder." "Truth is ugly: we have art so that the truth may not kill us."[45]

From this metaphorical perspective, if the Truth has good reasons not to let her "reasons" be seen, it is because she is a horrible and frightening old sorceress who must be kept hidden under the veil of appearance and art. To respect Truth's modesty means above all to respect the "measure" that allows the will to truth to coexist with the will to appearance, which thus enables us to grasp and to perceive that truth and lies, death and life, horror and beauty are indissoluble.[46] According to the image to which Nietzsche held fast all his life, the world is nothing other than the eternal game of Dionysus, who pitilessly and ceaselessly creates and destroys a universe of forms and appearances.[47]

With regard to the figure of Baubo, we must admit that, more than any other author, Nietzsche made rather frequent allusions to the sexual aspect implied in the metaphor of the veil of Isis. The psychological causes and consequences of these representations would have to be analyzed; as I said in the preface, however, since I am neither a psychiatrist nor a psychoanalyst, I do not feel qualified to undertake such an interpretation, and important studies on this subject already exist. I shall limit myself to pointing out a few possible signposts in this research. Knowledge has traditionally been assimilated to the unveiling of the feminine body and to sexual possession.[48] In *Being and Nothingness,* Jean-Paul Sartre described these representations, that is, these metaphors, under the name of "the Actaeon complex." For him, vision is delectation, and to see is to deflower: "One tears away Nature's veils, and unveils her (cf. Schiller's 'Veil of Saïs')[49]: all research always includes the idea of a nudity that one brings to light by setting aside the obstacles that cover it, as Actaeon separates the branches to get a better view of Diana at her bath.[50] Knowledge, moreover, is a hunt: Bacon calls it the hunt of Pan. The scholar is the hunter who catches a pale nudity and violates it with his glance."[51]

As we have seen, Diderot and Goethe likened the metamorphoses of Nature to the successive disguises of a woman.[52] Montesquieu, for his part, compared Nature (and Truth as well, for that matter) to a girl who, after having long refused, surrenders herself unexpectedly in an instant.[53]

DIONYSIAN ECSTASY

One could say that Nietzsche, if he had wanted to translate Heraclitus' aphorism, would have used formulas such as Nature (or Truth) loves to veil herself, loves to lie, loves illusion, loves to create works of art. The knowledge of depth consists in having the courage to admit that the Truth is completely inhuman, and that Life demands error, or illusion: that veil that must not be torn away from Truth, that young girl's bosom that conceals the animal ferocity of the Sphinx.

Nietzsche thus takes his place—but with astonishing originality that renews all its meaning—in the movement of ideas, which, beginning with the mid-eighteenth century, recognized, in reaction against an exclusively scientific approach, the value and legitimacy of an aesthetic approach to nature. Here, human art appears as a means to knowledge of nature, since nature itself is artistic creation:

> "To what depth does art penetrate the intimacy of the world? And are there, outside of the artist, other artistic forms?" This question was, as is well known, my *point de départ:* and I answered "Yes" to the second question; and to the first, "The world itself is entirely art." The absolute will to knowledge, truth, and wisdom appeared to me, in this world of appearance, as an outrage to the fundamental metaphysical will, as contrary to nature; and rightly, [the] point of wisdom turns against the sage. The unnatural character of wisdom is revealed in its hostility to art: to want to know, precisely where appearance constitutes salvation—what a reversal, what an instinct for nothingness![54]

And also: "The world as a work of art engendering itself!"[55]

Above all, Nietzsche takes up, while renewing it totally, the vision, simultaneously tragic and enthusiastic, of the mystery of being that was sketched in Goethe and Schelling.[56] In his youth, on the occasion of a class on Heraclitus, Nietzsche already seems to allude to his own feeling of existence when he writes: "Eternal becoming initially has a terrifying and worrisome aspect. The strongest sensation to which it can be compared is that felt by someone who, lost at sea or during an earthquake, sees everything moving around him. A stupefying strength was needed to transform this effect into its contrary, into an impression of sublimity and delighted astonishment."[57]

Somewhat later, in the spring of 1888, this feeling of terror and pleasure, which he now calls "Dionysian," is transfigured into an enthusiastic consent to reality: "An ecstatic yes said to the total character of life, always like unto itself in the midst of what changes, equally powerful, equally blessed: the great pantheistic sym-pathy in joy and in pain, which approves and sanctifies even the most terrible and problematic properties of life, starting out from an eternal will to procreation, to fecundity, to eternity: a unitary feeling of the necessity of creating and destroying."[58]

The knowledge of depth implies a transcendence of individuality. This is what Nietzsche affirms when speaking of Goethe: "Such a spirit stands tall in the midst of the universe with a joyous and confident fatalism, with the deep conviction that only the individual is condemned, but that all will be saved and reconciled in the Totality—he no longer says no. Yet such a faith is the highest of all possible faiths: I have baptized it with the name of Dionysus."[59] And "to go beyond myself and yourself. To feel in a cosmic way," to see things from the perspective of eternity (*sub specie aeternitatis*—perhaps we return here to the position of Schopenhauer's absolute spectator), that eternity which is, for Nietzsche, the eternal return.[60] Man must therefore abandon his partial and partisan viewpoint in order to raise himself up to a cosmic perspective, or to the viewpoint of universal nature, in order to be able to say "an ecstatic yes" to nature in its totality, in the indissoluble union of truth and appearance. This is Dionysian ecstasy.

23

From the Secret of Nature to the Mystery of Being

Beginning with the end of the eighteenth century, not only did the quest for the secrets of nature, as we have seen, give way to an affective experience of anguish or wonder in the face of the ineffable,[1] but also, throughout the philosophical tradition that extends from the Romantic period to the present day, the very notion of a secret of nature was to be replaced by that of the mystery of being or existence.

SCHELLING: THE MYSTERY OF EXISTENCE AND ANGUISH

We can already observe this change in perspective in the third version (probably dating from 1815) of Schelling's *Ages of the World,* an ambitious work that the philosopher, after several attempts at writing, finally resigned himself to leaving unpublished.[2] Here he takes up his doctrine of the three divine powers, present in various forms in his other works, and he tries to analyze the phases of God's becoming, that is, ultimately, of the emergence of reality. Describing the movement of systole and diastole, Schelling recognizes in it the "initial pulsation of the beginning of that alternating movement that animates all visible nature," which we can observe, for instance, in the life of a plant, whose entire activity consists of giving birth to a seed, to commence the production of a seed from it once again.[3] The movement of being and the movement of life are thus intimately linked. Yet in order for being to posit itself, appear, and reveal itself, it

must first of all be enclosed within itself, so that there may be a subject, that is, a basis or foundation *(Grund)*, for such revelation. Revelation presupposes an initial moment in which being denies itself, retracts, or contracts its essence. It certainly seems as though Schelling is the heir to Boehme here, for whom the first principle of deity is fire, wrath, anger, and fury, and the first moment of nature is a contraction that is "terrible, bitter, burning and cold, jealous and angry."[4] As Schelling writes, "Development presupposes envelopment."[5]

One passage from *The Ages of the World* must particularly capture our attention. It clearly reveals the transformation of the notion of a secret of nature, which becomes a moment in the self-positing of being and the fundamental mystery of existence: "This tendency to *enclose being* is acknowledged by the expressions of everyday speech, especially when we say that *nature evades our glance and conceals from us her mysteries.* It is only when constrained by a higher force that she would cause all that becomes to emerge from its hiding place."[6]

Here we move from nature that hides to being that encloses itself. This original negation, says Schelling, is "the nurturing mother of the entire visible universe,"[7] and we can subsequently observe its effects in all the phenomena of envelopment, in space and in bodies. If it has been said that nature hides, it is because "nature is attached by its roots to the blind, obscure, and inexpressible side of God."[8] All expansion constitutes a victory over this resistance, or this will to enclosure. In other words, for Schelling, the secret of nature represents not a problem that science might solve but the original mystery of Being, its impenetrable and unexplorable character. In this perspective, "Nature loves to hide" means that "Being is originally in a state of contraction and non-deployment." Moreover, the notion of Nature in Schelling has an ambiguous character, since, as in the statement just cited, it can designate "physical" nature, but it often refers to what Vladimir Jankélévitch calls "theosophical Nature, in which

Schelling recognizes the occult divinity of God."[9] In any case, we may say with Jankélévitch, "Here, Nature is nothing other than the *Grund* [foundation] or the hidden mystery of existence."[10]

In his *Aphorisms on the Philosophy of Nature* (1806), Schelling had evoked the anguish that seizes us in the presence of existence, when we separate it from all the familiar forms that conceal it from us. "To whoever might consider it, disregarding its species and form, simple being-there (what is simply called *existence*), if one considers it purely, should appear like a miracle and fill the soul with astonishment. Just as it is undeniably by this pure 'being-there' that, in the most ancient forebodings, souls were seized by fright and a kind of *sacred terror*."[11]

For Schelling, it is the very genesis of being that explains this impenetrable and terrifying character of existence. It is rooted in the first moment of being, which Schelling calls the foundation *(Grund)*: an original opacity, or a refusal to appear and unveil itself, an opacity and refusal that must be transcended. As Jan Assmann has demonstrated, in the eighteenth century, the inscription from Saïs, "I am all that has been, that is, and that shall be," was assimilated to Yahweh's declaration to Moses, one of whose multiple interpretations would be "I am who I am," interpreting them both as the divinity's refusal to say its name, that is, to make itself known.[12] Schelling, who understands Yahweh's declaration in the sense of "I will be who I will be," was perhaps influenced by this idea when he posited refusal and negation at the origin of being.[13]

In any case, for the Schelling of the third version of *The Ages of the World*, being deploys itself only by a struggle against itself, and this is what explains the distressing and terrifying character of existence. For him, existence is tragic: "Anguish is the fundamental feeling of every living creature, and all that lives is born and greeted only in the midst of a violent struggle."[14] The foundation of things, for him as for Boehme, as for Schopenhauer, is "sadness," "suffering," "madness," dispositions that must be conquered but are nevertheless inherent in existence.[15]

Schelling makes fun of the philosophers who have long bent everyone's ears with their effusions on the harmony of the cosmos.[16] In fact, in his view, the frightening and the terrible are the true substantial foundation of existence. "The fundamental substance of every living being and of all existence," writes Karl Löwith, "is, for Schelling as for Nietzsche, that which terrifies: a power and a blind force, a barbaric principle that may be transcended but never canceled, and which is the basis of all that is great and beautiful."[17] For Schelling, Heraclitus' aphorism "Nature loves to hide" means that Nature originally represents a resistance to evolution, insofar as it is a will to remain within itself. "Nature's modesty" was to become the mystery of being, and this mystery was distressing and terrifying. Goethe and Schelling thus seem to me to be at the origin of a tradition in which there is an impenetrable mystery of existence that provokes anguish. The goal is no longer to vanquish the difficulties and obstacles that Nature opposes to our knowledge but to recognize that it is inherent in nature—or the world, or being-in-the-world, or Being—to be inexplicable, so that one of the essential dimensions of human existence will henceforth be both wonder and anguish, the "sacred shudder," as Goethe and Kant would say, in the face of unfathomable mystery and enigma.

HERACLITUS' APHORISM IN HEIDEGGER

In our contemporary world, people no longer speak of secrets of nature, and Isis has gone off, along with her veil, to the land of dreams. Yet Heraclitus' aphorism is still alive, and still continues to nourish reflection. Heidegger brings Heraclitus' aphorism up to date.[18] He identifies Heraclitus' *phusis* with what he calls Being, and he gives several rather different but convergent translations of it:[19] "Being

loves to make itself invisible";[20] "A veiling is an integral part of unveiling";[21] "Being (appearing when it flourishes) inclines by itself to its self-sealing";[22] "Hiding-itself belongs to the predilection of Being."[23] Again, there are the two formulas cited by Alain Renault: "Being slips away by showing itself in beings as such" and "Being withdraws insofar as it discloses itself in beings."[24] These various translations should be replaced within the context of the evolution, often unexpected, of Heidegger's thought: here the notion of Being, in particular, is subject to perpetual becoming. Such an undertaking would go beyond the framework of this study. Therefore I shall retain from these Heideggerian formulas only what relates to the general perspective of the present work.

To understand the meaning of these translations of Heraclitus' aphorism, we must try to glimpse what the words "Being" and "being" mean for Heidegger. In his view, we are used to paying attention only to determinate objects: a man, a dog, a star, a table. These are what Heidegger calls beings. Beings interest people only by their qualities, their usefulness, or their finality. They are mere things, in relation with other things. The fact that beings *are* does not interest people: "It matters little to the man plunged within everyday existence that things are, or that they are founded by Being. Only beings interest him, but the Being of beings remains foreign to him. 'The weather is bad.' The bad weather is enough for us: this 'is' has no weight . . . All human behavior makes this antinomy burst forth: that man knows beings, but forgets Being."[25]

Here we have a radical opposition between being-with-a-small-*b* (being) and Being-with-a-capital-*B*. The latter is not one thing among others but is actuality or presence. What appears are beings, and what does not appear is the act of appearing itself, that is, Being. What is manifest are the beings that are present; what is hidden is the Presence that makes beings appear; what we completely forget is their surging-forth before us.

This paradox founds the Heideggerian exegesis of Heraclitus' fragment. Heidegger understands the word *phusis* from the perspective of the original meaning it had in Greek: "What does the word *phusis* say? It says that which flourishes from itself . . . , the action of unfolding while opening and, within the act of this unfolding, to make its appearance, to maintain itself within this appearing and to remain there."[26]

He describes this process as an *Aufgehen,* that is, as the action of dawning, growing, or appearing. For Heidegger, the Western idea of nature, in its origins, results from the Greek vision of being as a dawning or an emergence.[27] Heidegger thus understands the three words of Heraclitus' aphorism as meaning that the "dawning," or unveiling, that is, *phusis,* is inseparable from a veiling (Schelling had already said, "Development presupposes an envelopment"):

> Heraclitus means that to restrain oneself, to keep oneself in reserve, is a part of being. By no means does he thereby say that being is nothing other than concealing itself, but rather this: no doubt being unfolds as *phusis,* or unveiling, or as that which is manifest in itself, but its unveiling is inseparable from a veiling. Without veiling, how could unveiling still be possible? We now say: being dispenses itself to us, but in such a way that at the same time it conceals from us its essence. Such is the meaning of the words "the history of being."[28]

Yet this theme authorizes many variations. Sometimes, as in the *Principle of Reason,* which has just been cited, we hear of what Heidegger calls "the history of being." This, then, denotes the decline of thought into forgetfulness of Being, which characterizes the history of philosophy. The history of philosophy thus becomes "an approach to the veiling of Being in its forgetfulness."[29]

At other times, we hear of the antinomy, internal to Being, between veiling and unveiling. In an attempt to make understood what Heraclitus' aphorism represents for him, Heidegger says:

> What does that mean? It has been thought, and it continues to be thought, that it is: since being is difficult to reach, one must expend a great deal of effort in order to flush it out of its hiding place, and make it lose its taste, if one may say so, for hiding.
>
> It is time—for the need is growing—to think the contrary: to withdraw, to shelter oneself in one's own retreat belongs to the predilection of being, that is, that in which it has consolidated its unfolding. And the unfolding of being is to disclose itself, to blossom into the openness of non-retreat . . . *phusis.* Only that which, following its unfolding, opens and discloses itself, and cannot help but disclose itself, only that can love to close itself once more . . . Only that which is an opening of disclosure can be re-closure. And that is why it is not appropriate to "transcend" the *kruptesthai* of *phusis,* or to extirpate it; much heavier is the task of leaving to *phusis,* in all the purity of its unfolding, *kruptesthai* as an integral part of *phusis.* Being is the openness of disclosure that closes itself.[30]

In Heidegger's view, Heraclitus' aphorism is linked to his own doctrine of *a-lētheia,* according to the Heideggerian etymology of the Greek word that designates truth: *a-lētheia* means non-forgetfulness, or non-veiling. Yet truth, conceived as unveiling, also presupposes a veiling. *Phusis* is also an unveiling that is veiling, or a blossoming that is concealment: to bloom is to veil oneself; to veil oneself is to manifest oneself. This is why Heidegger calls Being the Secret, Enigma, or Mystery *(Geheimnis).*[31] The movement, sketched from Goethe to Nietzsche, to recognize that Nature or Truth is inseparable from its veils is further accentuated.

It is inherent in mankind to forget Being. In order to live, man must interest himself in beings. Hypnotized by his care for things, which he considers readymade, man cannot pay attention to their blossoming, their surging-forth, or their *phusis,* their nature in the etymological sense of the term. In the words of Jean Wahl: "This act [i.e., the forgetting of Being in favor of beings] constitutes us, in a

sense; we always accomplish it; it is our destiny as human beings to accomplish it. We are always the murderers of Being."[32] We can say of Heidegger's Being what Plotinus said of the One: "It is not absent from anything, and yet it is absent from everything, so that although it is present, it is not present, except for those who are capable of receiving it."[33] Its presence is, as it were, a presence/absence. This forgetting of Being explains man's situation: he "wanders." "The agitation that flees mystery to take refuge in current reality and pushes mankind from one day-to-day object to another, making him miss the mystery, is wandering."[34] To borrow the vocabulary used in *Being and Time,* man lives habitually in inauthenticity, but he can, seldom and precariously, accede to authenticity and lucidity by confronting the mystery of Being.

Philosophers and scholars of previous centuries spoke, for the most part, of unveiling Nature and discovering her secrets. Here, Being, which has taken nature's place, is not to be discovered, but it is both what makes things appear and what does not appear. It is "blossoming": that is the absolute enigma. In the study I have mentioned, Alain Renault applies the following formula to this subject: "Here, Being itself is the sphinx."[35]

Was Heidegger right to interpret Heraclitus' aphorism in this way? He was certainly right to understand *phusis* in the sense of "blossoming," or the action of making things appear. He was also right to recognize in this aphorism Heraclitus' method of trying to grasp the identity of contraries. I do not think, however, that Heraclitus could have conceived of Being *(einai)* as blossoming and making-things-appear, that is, that he identified it with *phusis.*

ANGUISH, NAUSEA, WONDERMENT

We also find in Heidegger the feeling of anguish that we have seen appear in German Pre-Romanticism and Romanticism, for instance, in Goethe and Schiller. Heidegger analyzed this feeling above all

in *Being and Time.* Alphonse de Waehlens admirably summarized Heidegger's thought in these terms:

> What appalls us in the face of this world . . . to which we are handed over defenseless and without succor is . . . the brute, naked, inexorable, and insurmountable fact of our being-in-the-world. What makes me withdraw in anguish is this externality in which I am plunged in order to make my career as an existent within it, without having willed it, and without being able to stop its progress. Anguish is born from our condition and reveals it. It is the genuine feeling of the original situation.[36]

As in Schelling, terror or anguish is thus produced by pure being-there, that is, by being-in-the-world, perceived in its nudity, and separated from the usual environment of our daily life, in which we take refuge in order to be safe from anguish. Also included in this anguish in the face of being-in-the-world is the awareness of the fact that being-in-the-world is being-for-death, and, more profoundly, that Being is inseparable from Nothingness. Jean Wahl thought that the great difference that exists between Kierkegaardian anguish and Heideggerian anguish consists in the fact that the former is of a psychological and religious order—it is brought about by the consciousness of sin—whereas the latter is "linked to the cosmic fact," or the consciousness of an existence that stands out against a background of nothingness.[37] Alphonse de Waehlens corrects this affirmation by specifying that anguish as Heidegger conceives it is also of a "spiritual" order insofar as this anguish in the face of the world is ultimately "the anguish of mankind in the face of his own solitude."[38]

The feeling of anguish has continued to maintain its place in philosophies since Heidegger. In his novel *Nausea,* Sartre describes his hero's becoming aware of being-in-the-world in the garden of Bouville, in front of a tree stump: here we note that what brings on Sartre's nausea is indeed a natural being. We may wonder if an object fashioned by human beings would have the same effect. What brings

about anguish is the inexplicable character of nature's presence. In this experience, all beings lose their diversity, their individuality; they are the pure act of existence: "We had no reason to be there, none of us did." He then discovers the fundamental absurdity of existence: "Nothing—not even a deep, secret delirium of nature—could explain it." For "to exist is *to be there,* simply . . . No necessary being can explain existence . . . All is gratuitous: this garden, this town, and myself. When we happen to realize this, it turns our stomach and everything starts to float . . . That's what nausea is." Sartre's description of becoming aware of existence is almost a caricature: the objects he sees become "monstrous, soft pastes in disorder—frighteningly and obscenely nude." He writes, "We were a bunch of embarrassed existents, embarrassed by ourselves . . . each confused, vaguely worried existent felt superfluous with regard to the others."[39]

In fact, however, becoming aware of the inexplicable and contingent character of our being in the world, by experiencing the pure, brute presence of a given object in the world, does not necessarily give rise to anguish. If a tree stump in the Bouville garden could cause anguish in Sartre at the beginning of the century (1902), an insect in a watering can could just as well bring about the ecstatic wonderment of Hugo von Hofmannsthal:

> The other night I found under a walnut tree a half-full watering can that a young gardener had forgotten there, and this watering can, with the water in it, hidden by the tree's shadow, with a water bug paddling from one shore to the other of that dark water: this combination of trivialities exposes me to such a presence of the infinite, traversing me from the roots of my hair to the base of my heels, that I feel like bursting out in words which I know, if I had found them, would have floored those cherubim in whom I do not believe.[40]

As far as I know, the feeling of anguish does not play an important part in the philosophy of Maurice Merleau-Ponty, who preferred to speak of "philosophical astonishment."[41] And yet, he too presents the

existence of the world as an inexplicable mystery, at the end of the preface to his book *The Phenomenology of Perception:* "The world and reason do not present a problem; let us say, if you will, that they are mysterious, but this mystery defines them, and there can be no question of dissipating it by some solution. It is beyond solutions. True philosophy is relearning to see the world."[42]

By opposing "problem" to "mystery," Merleau-Ponty was probably alluding to the interesting distinction made by the Christian existentialist Gabriel Marcel. For him, a problem refers to something external to us. We can solve it more or less easily, but it disappears once its solution has been found: "By contrast, mystery is something in which I find myself engaged, and whose essence is, consequently, not to be entirely before me."[43] It cannot therefore be either solved or explained: I am implicated in it and can only experience it.

Merleau-Ponty's declaration definitively eliminates the notion of a secret of nature, conceived as a kind of detective story that it would suffice to unravel for the problem to be solved and curiosity satisfied. It may, however, recall Goethe's attitude with regard to the *Urphänomene,* or originary phenomena, for which there is no explanation and before which we must be silently astonished. For his part, Merleau-Ponty sees in philosophy that which "awakens us to what is problematic in itself about the world's existence, and our own, to the point where we are forever cured of searching, as Bergson used to say, 'in the master's notebook,'"[44] that is, to see in the phenomena of the world the copy of models present in a thought that would be transcendent to the world. For philosophy must not hide the mystery of existence through the intervention of a God or a necessary Being who could explain the world's contingence. The world's existence is not a problem that could be solved by a solution, but it is an inexplicable mystery. All explanations "seem quite prosaic to the philosopher in comparison with this surging-forth of phenomena on all the levels of the world and of that continuous birth that he is busy describing."[45] If we can judge from the pages that follow this passage in his *Praise of Philosophy,* which allude to a new definition of the sacred, I would tend to admit that if all explanations are "prosaic," becoming aware of the inexplicable mystery of the world's surging-forth is "sacred."

At the end of his *Tractatus Logico-Philosophicus* (6.44), Wittgenstein also evokes the existence or being-there of the world: "It is not how [*wie*] the world is that is the mystical, but *the fact that* [*daß*] it is."

"How the world is" is the arrangement of facts internal to the world, that is, the object of science, and thus something that can be the object of language that makes sense, or that is "sayable." "The fact that the world is" corresponds to the world's existence, that is, to something that, for Wittgenstein, is inexpressible and can only be shown. Indeed, this is how Wittgenstein defines "the mystical": "There is something inexpressible; it shows itself, and that is the mystical" (6.5222). In a study written about fifty years ago, I distinguished four types of use of language in Wittgenstein.[46] First, there is the *representative* or sensible use: these are the propositions that have a logical form, that is, a possible meaning, because they are formed from signs, all of which have a signification. Then there is the *tautological* or analytical use, bereft of any content of meaning: these are logical propositions themselves. There is also the use we could call *nonsensical,* which engenders pseudo-propositions. Most philosophical propositions sin against the laws of grammar and logical syntax; they contain signs that have no signification, and they therefore have no logical form or meaning. Finally, there is the use we could call indicative.[47] This use is legitimate for Wittgenstein; the proposition does not represent anything, but it shows us something it cannot express.

Thanks to this indicative use of language, we can speak of an experience of the world's existence. It is indeed an experience, and even an affective experience, for Wittgenstein speaks of a "mystical" feel-

ing with regard to what he calls the "feeling of the world." In his *Lecture on Ethics* (1929–1930), he alludes to an experience that is "his" experience, and that consists in being amazed at the world's existence.[48] It is thus amazement, and not nausea, that Wittgenstein feels in the presence of the world's existence. Yet the world's existence is, for him, totally inexplicable, since it cannot be stated in a representative proposition.

As we have seen, Merleau-Ponty said that with regard to the world, we cannot formulate a problem that would then admit of a solution and could thus be dissipated. Wittgenstein takes his place in the same perspective. The impossibility of answering eliminates the possibility of the question: "With regard to an answer that cannot be formulated, one cannot formulate a question either" (6.5). Merleau-Ponty said that our relation to the world is of the order not of a problem (where we must understand "as is the case in scientific research") but of a mystery. Here, the word Wittgenstein uses is not "problem" but "enigma": "*The Enigma* does not exist" (6.5). Indeed, it could be thought that just as science gradually solves particular problems concerning the facts that constitute the world, so, with regard to the world in its totality, the problem of its existence could be solved; there would thus also be Enigma in itself to solve. Yet since, from the perspective of language use, no solution whatsoever with regard to the world can be expressed, the result is that "with regard to an answer that cannot be formulated, no question can be formulated either," and that, as a consequence, "the Enigma does not exist." For Wittgenstein, as for Merleau-Ponty, metaphysical hypotheses do not contribute any solution: "The soul's temporal immortality, that is, its eternal survival after its death, is not by any means guaranteed, but above all its supposition does not even provide what one would hope to be able to obtain by it. Is any enigma solved because I survive eternally? Isn't this eternal life just as enigmatic as this present life?" (6.432).

As a whole, the world is inexplicable (6.371–372): Wittgenstein reproaches modern science for giving the impression that everything has been explained, whereas this is by no means the case: for we cannot step outside the world in order to treat it as an object of study. We are in the world as we are in language.

For Merleau-Ponty, the world is an unsolvable mystery, and he draws the conclusion that "philosophy is relearning how to see the world." For his part, Wittgenstein, at the end of the *Tractatus,* advises the reader to transcend all the book's propositions, and he will then see the world in a correct way (6.54). We could say—obviously with a great deal of simplification—that for both authors, "to see the world" means to return to the perception of the world as it appears to us: phenomenological and aesthetic perception in Merleau-Ponty, aesthetic perception and ethical attitude in Wittgenstein, since for him, the world and life (in the ethical sense) coincide. We might perhaps discern a certain kinship between the correct vision of the world according to Wittgenstein and the disinterested vision of the world according to Schopenhauer. Speaking of the disinterested contemplation of the world, thus liberated from the principle of reason, Schopenhauer had evoked the Spinozist formula: to conceive of things in the perspective of eternity *(sub specie aeternitatis),*[49] in order to illustrate the idea that the individual who contemplates in this way transcends his individuality and identifies himself with the eternal subject of consciousness. The author of the *Tractatus* writes in his turn, "To contemplate the world *sub specie aeternitatis* is to contemplate it as a whole—but a limited whole.[50] The feeling of the world as a limited whole constitutes the mystical feeling" (6.45). According to Wittgenstein, eternity must be understood not as indefinite temporal duration but as intemporality: "He lives eternally who lives in the present" (6.4311). The "correct vision of the world" would thus perhaps be disinterested, that is, aesthetic and ethical, perception of the world in the present moment: that is, as if it were perceived for the

first and last time, and thus, ultimately, in a kind of intemporality. We thus return to the experience of amazement that Wittgenstein felt in the face of the world, which I discussed earlier.

I have only sketched this comparison between two very different philosophers, Merleau-Ponty and Wittgenstein, in order to allow a glimpse of a specific tendency in twentieth-century philosophy, which consists in renouncing abstract explanations of the world's existence, to open the possibility of an experience of the mystery of existence in the world, and of a lived contact with the inexplicable surging-forth of reality, or *phusis* in the original meaning of the word.

Conclusion

We have now covered nearly twenty-five centuries, and we cannot help being astonished by the extraordinary longevity of the formulas, representations, and images that were invented by ancient Greece. It could be said, for instance, that the thought of Heidegger, writing in the twentieth century, was to a large extent inspired by reflection on the aphorism of which I have spoken throughout this book, which dates from the fifth century BCE. How could we help but think here of what Nietzsche said of the "good maxim": "A good maxim is too hard for the teeth of time, and all the millennia cannot succeed in consuming it, though it always serves as nourishment; it is thereby the great paradox of literature: the imperishable in the midst of all that changes, the food that always remains appreciated, like salt, and, again like salt, never becomes insipid."[1]

A good maxim endlessly nourishes an entire series of generations, but its nutritive substance has undergone many an unexpected mutation over the centuries. Thus, we have seen how Heraclitus' three little words meant successively that all that lives tends to die; that nature is hard to know; that it wraps itself in sensible forms and myths; and that it hides occult virtues within it; but also that Being is originally in a state of contraction and non-unfolding; and finally, with Heidegger, that Being itself unveils as it veils itself. These three little words have served successively to explain the difficulties of the science of nature; to justify the allegorical exegesis of biblical texts, or to

defend paganism; to criticize the violence done to nature by technology and mechanization of the world; to explain the anguish that his being-in-the-world inspires in modern man. Thus, throughout the centuries, the same formula has assumed new meanings. To write the history of its reception is to write the history of a series of misunderstandings, but creative misunderstandings, insofar as these three little words have served to express, but also perhaps to cause to appear, ever new perspectives on reality, and also some very diverse attitudes with regard to nature, from admiration to hostility to anguish.

The same holds true for the metaphor of the secrets of nature. It remained alive through the meanderings of the history of the science of nature, both at the time of the mechanistic revolution and during the expansion of Romanticism; yet it implies a whole set of representations, some conceptual, others imaginative, which evolved considerably over the course of the centuries. Originally, it presupposed that the gods jealously keep to themselves the secrets of the fashioning of natural beings. With the personification of nature, which took place beginning in the fourth century of our era, it was imagined that Nature herself refused to unveil her secrets. This metaphorical representation could mean that nature conceals within itself virtualities or hidden seminal reasons, which can manifest themselves or be brought to light under the constraint of magic and mechanics. It can also mean that natural phenomena are hard to know, particularly in their invisible aspects, whether in the case of atoms or the internal parts of the body. This is why, when the microscope opened up the world of the infinitely small to mankind, scientists were able to proclaim that they had discovered the secrets of nature. At that time—that is, in the seventeenth century, at the beginning of the mechanistic revolution—we can detect two levels in the representation of the secrets of nature. On the one hand, there were the natural phenomena that are discovered by observation armed with instruments but also, and above all, the mathematical laws of their workings; and on the other hand, there were the impenetrable divine decisions that brought it about that a given universe was created, among all the possible ones.

Throughout our story we have been able to observe two fundamental attitudes with regard to the secrets of nature: one voluntarist, the other contemplative. I placed the former under the patronage of Prometheus, who, by devoting himself to the service of mankind, steals divine secrets by ruse or by violence. This attitude, moreover, laid claim very early to its legitimacy by affirming mankind's right to dominate nature—conferred on man by the God of Genesis—and to submit it, if necessary, to a judicial procedure and even to torture, in order to make it hand over its secrets: Francis Bacon's famous metaphor would still be used by Kant and by Cuvier. Magic, mechanics, and technology take their place within this tradition, and each, moreover, has as its goal, each in its own way, to defend mankind's vital interests. Metaphorically, Nature's refusal to hand over her secrets is interpreted as a hostile attitude toward mankind. Nature opposes man, and must be conquered and tamed. As far as the other attitude is concerned, I placed it under the patronage of Orpheus. This time, if Nature seeks to hide, it is, in particular, because the discovery of her secrets is dangerous for man. By intervening technologically in natural processes, man risks discovering them and, what is worse, unleashing unforeseeable consequences. From this perspective, it is the philosophical or the aesthetic approach, rational discourse and art, two attitudes that have their end in themselves and presuppose a disinterested approach, that will be the best means of knowing nature. Besides scientific truth, we will thus have to allow for an aesthetic truth, which provides an authentic knowledge of nature.

In themselves, both these attitudes are completely legitimate, even if we can discern serious possible deviations within each of them. However opposed they may be, moreover, they do not mutually exclude each other completely. In particular, modern scientists who,

like Jacques Monod, practice a science henceforth linked inseparably with technology, nevertheless proclaim the absolute value of disinterested science, or basic research that has knowledge in itself as its goal.

Yet our story has also been that of the life and death not of nature but of the idea of secrets of nature. Although this idea was still very much alive after the heyday of the mechanistic revolution, it gradually disappeared, under the influence of two factors. On the one hand, the idea of a secret of nature was, whether one likes it or not, associated with a certain personalization of nature, and it implied an opposition between a visible husk and a hidden core, or between an outer and an inner part. The progress of science and rationalism has put an end to these representations. On the other hand, scientific progress has led philosophers to divert their attention from the explanation of physical phenomena, henceforth abandoned to science, to concentrate on the problem of being itself.

Here again we encounter an ancient text that has played a crucial role in the formation of our Western thought. This time the subject is the self-definition of the goddess of Saïs, whom Plutarch assimilates to Isis: "I am all that has been, that is, and that shall be; no mortal has yet raised my veil." Under the influence of the Masonic exegesis of this text, at the end of the eighteenth century, Isis, who until then had been an allegorical personification of Nature, henceforth became the symbol of universal being, infinite and ineffable. The veil of Isis then no longer signifies the secrets of nature but rather the mystery of existence. At the same time, however, the Isis who was seen unveiled, and in a way submissive, on the frontispiece of scientific works of the seventeenth and eighteenth centuries, since she represented nature as the object of observations, experiments, and scientific calculations, now becomes an object of veneration, respect, and even of terror. The warning of the goddess of Saïs was taken seriously: no mortal has lifted my veil. The allegory of the veil of Isis

thus provided the Romantics with a literary means for expressing emotions which, to be sure, were not completely new, but which had become more and more intense since the time of Rousseau, Goethe, and Schelling: both amazement and terror before the existence of the world and of mankind within the world. There was henceforth no longer any question of solving particular riddles concerning the workings of natural phenomena, but rather of becoming aware of what is radically problematic and mysterious in the surging-forth of the totality of the real. We can observe the permanence of this tradition down to our own time.

The reader will have noticed, by the way, the themes that seduced me and on which I have tarried perhaps a bit too long: one idea, one experience. An idea: nature is art and art is nature, human art being only a special case of the art of nature, an idea that, I believe, enables us better to understand both what art can be and what nature can be. An experience—that of Rousseau, Goethe, Hölderlin, van Gogh, and many others—an experience that consists in becoming intensely aware of the fact that we are a part of nature, and that in this sense we ourselves are this infinite, ineffable nature that completely surrounds us. Let us recall Hölderlin: "To be but one with all living things, to return, by a radiant self-forgetfulness, to the All of Nature"; and Nietzsche: "To go beyond myself and yourself. To experience things in a cosmic way."