

DESCARTES' BONES

Russell Shorto



Doubleday

DESCARTES'
BONES



A
SKELETAL
HISTORY
of the
CONFLICT
between
FAITH AND REASON

RUSSELL SHORTO

DOUBLEDAY

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For my mother

*“what can we bequeath
save our deposèd bodies to the ground?”*

—RICHARD II, III, 2

Preface

PHILIPPE MENNECIER, THE DIRECTOR OF CONSERVATION AT the Musée de l'homme, the great anthropology museum in Paris, is a tall, narrow man, thin of hair, with wire-rimmed glasses and the aspect of a bird of prey. Suitably enough, his office is something of an aerie, a low-ceilinged, rectangular box built as an afterthought on the roof of the museum's headquarters, which you get to by climbing a portable metal staircase. Up here, he has surely one of the grandest workplace vistas on earth, taking in much of the Paris skyline. The view also gives a metaphorical frame to the work that Mennecier and his staff do: on one side, so close you can't get a full picture of it, is the Eiffel Tower, that nineteenth-century obelisk to reason and order; on the other is the Passy Cemetery, one of those wondrous Parisian cemeteries that, with their tangle of paths and tombs and high surrounding wall, resemble medieval cities in miniature, but ones populated by the dead rather than the living.

Death and order: that sums up the work that goes on here. The museum is not on the standard tourist itinerary, but it's a place for which the French have a particular fondness. It was founded in the early nineteenth century, as part of the first burst of enthusiasm for the search for human origins, when explorer-scientists—hale, moustachioed, fanatically dedicated—combed the far reaches of the earth for anthropological specimens and human remains. Reflecting those origins, the museum has a certain feel. You might think of it as a temple devoted to the cult of evolution, which brings reason to bear on the conundrum of life and death by using bones to tell the modern story of who we are and how we got here. The cemetery below, meanwhile, with its mute stone crosses, gives another version.

Echoing the views and their bookended representations of reason and mortality, Mennecier's office is cluttered with computer equipment and human remains—a tray randomly placed on a shelf neatly holds six human skulls, as if six were a standard set. But Mennecier is not himself an anthropologist but a linguist, as he made a point of noting when we first met. And what languages are his specialities? "*Esquimau et russe,*" he declaimed with a flourish: Eskimo and Russian. To properly appreciate this response you should know that it had already been established that he didn't speak English. What could be more exquisitely right for a French linguist than that he profess no working knowledge of the world's dominant language but be one of the leading experts on the Eskimo dialect spoken exclusively in eastern Greenland and author of the only Tunumiisut-French grammar? On top of which, his pursuit of Inuit language variations around the earth's northern reaches eventually led him to Siberia, so that he became fluent in Russian and now, as a sideline, translates contemporary Russian novels into French.

All of which is to say that Mennecier is a French intellectual. To many people in this age of universal dumbing down, that would be considered a slur, suggesting things like arrogance and a focus on narrow, cerebral, navel-gazing concerns. But the term can also encompass a way of looking at the world that is becoming sadly rare—call it a serious commitment to idiosyncrasy. People who are configured this way can give you a headache, but they can also delight you with their inexorable weirdness. They work the way a joke does, pulling you unexpectedly off the easy chair that is your customary vantage point. They make you remember, if only for a moment, what a wild place the world

really is. So I was happy to ride this wave for the next few minutes, to listen to a little discourse on the seven Eskimo dialects, how they divide into two families, what linguistic markers separate them, and the efforts to preserve the dialects and their cultures.

Eventually, we clattered back down the metal staircase to the floor below. Here, two women in lab coats sat at a table handling human bones: long leg bones with porous, knobby joints; skulls of a slightly sickening orangey-brown hue. In the next room we passed a group of maybe four dozen complete human skeletons hanging on hooks, with a single gorilla skeleton standing in front of them like a short, thick sergeant drilling a lanky squadron. As we went back out through the entry to the museum area, we walked by a bust of Pierre-Paul Broca, the nineteenth-century anthropologist and pioneer of brain study. We headed downstairs, passing the main exhibition floor of the museum, with its quaint permanent exhibition, an almost aggressively confident display devoted to human evolution, in which a succession of dramatically lit dioramas hit the milestones in the march of bipedalism, from *Australopithecus*, with its wide arching plates of bone across the eyes, to Cro-Magnon, with its voluminous cranial capacity and frontal bulge, to their more delicate modern cousins.

Finally we could descend no further. The basement was in the process of being remodeled, and the fresh plasterwork and exposed bulbs gave it the pleasingly appropriate feel of a catacomb. My host produced a set of keys and opened a storage room door. Once we were inside, he unlocked a wall cabinet and pulled out a finely polished, curiously elegant wooden box whose lid was fastened with metal hasps. He unsnapped these; there was a flourish of gauzy white paper, then he reached in and extracted the object I had come to see.

It was small, smooth, surprisingly light. The color varied: in places it had been rubbed to a pearlescent gloss while other areas were deeply grimed; but mostly it had the look of old parchment. And indeed it was an object with stories to tell, not only figuratively but literally. More than two centuries ago someone had written a lofty poem in Latin on its crown, the letters of which were now faded to a watery brown. Another inscription, right across the forehead, hinted darkly—and in Swedish—of a theft. Tightly scrawled signatures of three of the men who had owned it through the ages were faintly visible on the sides. It was the skull of René Descartes, the so-called father of modern philosophy and one of the more consequential humans who ever lived. Mennecier set it on a table before me. “*Voilà philosophe,*” he said drily.

THREE YEARS EARLIER, while sitting in the Main Reading Room of the New York Public Library plowing through a volume of seventeenth-century philosophy, I had chanced upon the fact that sixteen years after his death in 1650, Descartes had suffered the indignity of having his bones dug up after which people began taking pieces of his remains.

Why do certain thoughts stick in the mind? They seem to have no practical value but stand out from sheer strangeness. Typically you'll entertain them for a while, like a child's toy found between sofa cushions, then forget them, uselessness having defeated novelty. Certainly this item about Descartes' bones seemed a pristine example of a useless piece of information. And yet I fell in love with it, the way you can only fall in love with something truly odd that you find buried in a very old book. It had happened to me only a few times: you have the feeling, improbable but strong, of having uncovered a dormant seed, one that was planted in just that spot by someone now long dead who knew, or hoped, that one day you would find it, water it, and bring it to life.

So I pursued it, first in off moments, in books, then, as it took hold, moving my family to Europe for a year, where I spent long days in the postmodern cloisters of the Bibliothèque nationale in Paris, contacted philosophers and historians, traveled from the house in the Loire Valley where Descartes was born (which still stands) to the house in Stockholm where he died (which also still stands), and followed the trail of the bones across western Europe. Eventually I found myself standing in the basement of a museum in Paris, staring into a skull's blasted eye sockets, like Hamlet contemplating poor Yorick.

As I investigated, the story of Descartes' bones unfurled before me and stretched across the centuries, and it revealed itself to be more than a curiosity. Today Descartes is most readily thought of as a mathematician—the inventor of analytical geometry—and as creator of the modern philosophical puzzle of dualism, which holds that the mind and its thoughts exist in a different category or somehow on a different plane from the physical world, so that neither can be translated into the other and understood in terms of the other. On this score, he has long since been put in his place: the prevailing wisdom in neuroscience and philosophy is that Descartes was dead wrong in conjuring up his two dissimilar substances. Mind and body—mind and brain—aren't fundamentally different after all. This notion has all sorts of consequences, which are being explored by philosophers, linguists, spiritual thinkers, computer scientists, and others.

But during his lifetime, and in the decades following, Descartes loomed larger. He was seen by many of his contemporaries as the man who laid the intellectual foundation for the whole modern program, which grounds everything from morality to law to politics and social organization on reason and the individual perception of reason. There is truth in this view of Descartes' influence. His famous "method"—which involved questioning assumptions, taking no assertion on faith, and building our understanding of the world on provable observations rather than tradition—became the basis for the scientific method. His reorientation of knowledge so that it was no longer based on collective authority (what the king decrees, what the church demands) but on a newly empowered *self*—the individual mind and its "good sense"—became a starting point for the development of democracy, psychology, and much else that we think of as modern.

What I began to realize was that people who lived in the generations that followed Descartes treated his bones as symbols—relics—of the new turn the world had taken. Yet, because they differed as to what this new turn was and what it meant, they treated the bones in different ways. The story on which I became fixated—small, weird, serpentine, insignificant—intersects some of the grandest events imaginable: the birth of science, the rise of democracy, the philosophical mind-body problem, the ongoing confusion over the terrains of science and religion. The story crisscrosses Europe and encompasses people from all walks of life—Louis XIV, a Swedish casino operator, poets and priests, philosophers and physicists—as these people used the bones, stole them, sold them, revered them, tussled over them, passed them from hand to hand.

Yet it wasn't until two or more years after my first exposure to the fact that Descartes' bones were dug up and passed around that I got an inkling of the real source of my interest. In college I studied Western philosophy. Like numberless humanities undergraduates before and since, I spent those four years reveling in the work of philosophers, poets, novelists, artists: the men and women who created the mental space that I have lived in ever since, the architects of the modern mind.

Many of us used to think that "modern" was a given, a common ground. And by modern I don't just mean the big things—science, reason, democracy—that we associate with the word but all the reactions to and offshoots of these concepts, too, from Romantic poetry to the Sex Pistols, from Internet dating to hedge fund trading. For better or worse, all of this is somehow bound up together

and tied to who we are—and mainly, we think, it's for the better. Don't we?

Apparently a lot of people do not. Today, the very idea of modern society—which, at least in theory, relies on the tool of reason and notions such as equality to solve problems and lumber forward—seems to be under assault from several directions. Islamic terrorism, which is not just anti-Western but antimodern, is of course a dominant concern in the West, but other forms of religious intolerance—Christian, Jewish, Hindu—seem to be flourishing as well.

If these constitute a right wing of attack on modernity, there are other threats. Within secular Western society there are those who say that modernity is passé, that in a postmodern world developments such as globalization, the Internet, and asymmetrical warfare mean that the old virtues of the modern era—the idea of “progress,” for example: the notion that you can get a reasonably objective view of things and then make decisions and move forward to something better—are out the window. To some, modernity has come to be synonymous with colonialism, the exploitation of non-Western peoples, the use of science and technology for inhuman purposes, environmental catastrophe. Many secularists also see religion itself as an enemy, arguing that it promotes war, division, and prejudice. Responding to the upsurge of faith-based fundamentalism, Richard Dawkins, Christopher Hitchens, and others have written secularist manifestos against religion, some of which have become best sellers.

In the perennial conflict between faith and reason, we tend to think of the one as old and the other new, but today both the left and the right rely on Descartes. His remains—his metaphorical remains but also his actual bones—are so elemental that both of these competing camps put them to use. It is not surprising that the archetypal modern philosopher would be godfather to the left; since Cartesianism was based on doubt, on questioning everything until you reach a bedrock of fact, it can be seen as the root not only of the scientific method but of self-government, the modern idea of individual rights, and of the equally modern distrust of authority. At the same time, another element of Descartes' philosophy—what is known as Cartesian dualism, the notion that our minds (and souls) exist separately from the physical world—has been embraced by the right. Conservative thinkers—monarchs, theologians, philosophers—have followed Descartes' mind-body distinction to buttress their argument that there is an eternal realm of thought, belief, and ideals that can't be touched by the prying fingers of science and that human morality and earthly power are grounded in this timeless sphere.

Most people seem to be caught between these tidal currents—the pull to faith and tradition in this dangerous world, the argument that religion is at the core of the world's problems and only a revived commitment to individual freedoms and rights will steer humanity into a better future. They are troubled by religious fundamentalisms, with their dead and deadly certainty. But they can appreciate some of the criticisms of modernity, both from the right and from the left. You might say that there is not so much a split as a three-way divide in the world today. Colin Slee, the dean of the Anglican diocese of Southwark in London, put it this way in talking about the new society that he sees coming into being in England: “You have a triangle with fundamentalist secularists in one corner, fundamentalist faith people in another, and then the intelligent, thinking liberals of Anglicanism, Roman Catholicism, baptism, methodism, other faiths—and, indeed, thinking atheists—in the other corner.”

If the West is heading toward some kind of crisis, it's worth asking ourselves a few basic questions. Modern society as we normally define it—a secular culture built around tolerance, reason, and democratic values—occupies a rather small portion of the world, and there are signs that it is shrinking. Is modernity the inexorable force of progress that we tend to assume? Is it a mere moment

of human history that is fast fading? If it is something to value, how can we rediscover it, separate the good and the bad in it, make it relevant and vital?


Eventually it occurred to me that the trail of Descartes' bones was a path through the landscape of the modern centuries. Following the bones was a way of retracing my own intellectual upbringing, reminding myself of what we've been through in the past four hundred years. This book is not an exhaustive survey of modernity but a record of a journey. It proceeds from the conviction that the idiosyncrasy is a serious business.

What's more, its focus on bones isn't accidental. Following the trail of Descartes' bones showed me that philosophy, which we think of as an arid discipline, isn't all abstraction but is braided into human history and comes not just out of the human mind but out of the human body as well. Abstract thinking is an excellent and necessary tool, but the loftiest thoughts are rooted in our physical being, in the curious way our hearts that love are entangled with our hearts that pump blood, in the fact that we die. While it's not a biography, the story does involve a man—whom history has caricatured as a virtually disembodied human brain but who turns out to be surprisingly full-blooded and substantial. Indeed, there is a sense in which Descartes' philosophy, for all its abstraction, sprang from places of human warmth: from his own body, for one, and also from the love he felt for the person who mattered most to him. It was a small, tender love that, in its quiet intimacy, nearly—but not quite—escaped the prying lens of history. Maybe it's true of every human exploration: dig deep enough and you find a love story.

That said, it shouldn't be surprising that we begin not with love or history or philosophy but with death.



The Man Who Died

 IN THE SOUTHERN EDGE OF STOCKHOLM'S OLD TOWN stands a four-story building that was constructed during the busy, fussy period called the Baroque. Its redbrick façade is ornamented with sandstone cherubs and crests. Two upright cannons flank the entry; bearded busts gaze down sternly on those who approach the door. If you could somehow ignore the designer handbag shop and the upscale "Glenfiddich Warehouse" restaurant/bar occupying the ground floor, and the streams of tourists moving past on a summer afternoon, the structure would probably seem very much of the year—1630—when a merchant named Erik von der Linde built it.

In the dead of night in the dead of winter in the year 1650, the most solemn rite of passage was playing out on an upper floor of this building. People hurried between rooms, past windows that looked out onto the dark, icy harbor below, exchanging information and worried looks. But if the occasion was grave, it wasn't quiet. For someone close to death, the man who lay in bed—not quite fifty-four years old, small-boned, ashen, the center of everyone's attention—was alarmingly active. It was his fury that gave him these last bursts of adrenaline. His friend and protégé Pierre Chanut, the French ambassador to Sweden, in whose house he lay dying, was at his side constantly, trying to manage the man's anger while feeling doubly guilty: it was he who had urged René Descartes to come to this frozen land and he who had first contracted a fever, through which Descartes had nursed him before catching it himself.

Chanut fervently believed that Descartes was in the process of transforming the world with his revolutionary thinking. In this he was essentially correct. A change took place in the middle of the 1600s. People began to employ a new, sweeping kind of doubt, to question some of their most basic beliefs. The change was in a way more profound than the American and French revolutions, the Industrial Revolution, or the information age, because it underlay all of them and affected the very structure of people's thought—the way they perceived the world, the universe, and themselves in it. And the person most closely identified with this transformation was the man who lay dying in the Swedish winter. Pierre Chanut couldn't have known the scope of the future, but he knew, as did many others, that something staggeringly significant was afoot and that Descartes was at its center. It had been now dawned on the diplomat that, in bringing the philosopher here, he had unwittingly engineered a catastrophe.

The fever had given way to pneumonia; the patient's breath was ragged, his eyes wandering. Chanut had wanted to call the court physician, but Descartes raged against that idea. Finally, from her fairy-tale palace on the other side of the small island in the harbor that was the center of Stockholm, Christina, the twenty-three-year-old queen of Sweden, who would go down as one of the most remarkable personalities in European history (there is, for starters, the centuries-old line of serious speculation that she was in fact a king), sent her physician to attend him. It was Christina who, with

Chanut, had coaxed the intellectual celebrity northward in the first place.

The doctor, a Dutchman named Wullens, approached the bed reluctantly. There was a sharp exchange in which the philosopher made it venomously clear he thought the physician an ass. The encounter climaxed when Wullens proposed bloodletting, whereupon the patient erupted with a theatrical cry—"Gentlemen, spare French blood!"—and ordered the man out. Wullens departed washing his hands of the business, muttering as he went a rather fatuous piece of consolation from the Roman poet Horace: "He who saves someone against his will does the same as to kill him."

The rage had two components. First, the philosopher had known Wullens during his long years in the Dutch provinces. One of the early public airings of Descartes' philosophy had come at Leiden University, and it caused an uproar among those who considered it a challenge to the whole system of education and thought that had been in existence throughout Europe for centuries. Wullens had stood with those who opposed the new philosophy. Descartes never forgot an enemy.

But there was another reason for the anger. In a peculiar way, much of Descartes' career had been a kind of chess match with death, and for a long time he had actually convinced himself that he had the upper hand. He had been a sickly child, with a pale complexion and a dry cough that he had inherited from his mother, who died when he was a year old. His father—a jurist and a man of power and ambition—seems to have despised the child's weakness and favored his older brother. The family doctors didn't bother to hide from the boy their conviction that he would die young.

When he was ten, however, Descartes was sent off to the Jesuit college of La Flèche in Anjou, one of the finest educational establishments in Europe. There, to his surprise, he flourished. He became strong, healthy, vigorous, aware of the wider world, and hungry for knowledge. But the early experience remained lodged inside him. When he settled into his mature work, medicine became its central focus. He developed his revolutionary philosophy, with its grounding not in the Bible or ancient writers but in human reason, and became famous and infamous for it. But the heart of it, the deep reason for it, was his desire to solve the puzzle of the body, to cure disease, and to lengthen human life—including his own. At the end of the *Discourse on the Method*, his epoch-changing work of philosophy, he vowed to the reader not that in the future he would craft a revised metaphysics or a new approach to mathematics but that he would "devote what time I may still have to live to no other occupation than that of endeavoring to acquire some knowledge of Nature, which shall be of such a kind as to enable us therefrom to deduce rules in medicine of greater certainty than those in present use." Five years before he lay dying in Sweden he wrote to an English earl, "The preservation of health has *always* been the principal end of my studies."

The same goal was in the minds of many of his contemporaries. When we think of science and the spark of modernity, we tend to think of astronomy: Galileo crafting his telescopes and peering into the skies above central Italy; locating sunspots, moons around Jupiter, craters on the earth's moon, and other irregularities in a universe that the church had taught was perfect; amassing data that corroborated the theory that the earth revolves around the sun; encountering the systematic wrath of the Inquisition. In our perennial effort to understand who we are and what it means that we are "modern," we choose astronomy as a starting point in part because it provides a sturdy metaphoric peg for thinking of the massive change that humanity underwent in the seventeenth century, when we—seemingly—left our mythic, biblical selves behind and reoriented ourselves in the cosmos. In 1957—the year of Sputnik and the dawning of the space age, a time when people had a simpler, clearer sense of "modern" than they do today and felt ready to embrace what they thought the word meant—the best-selling book expressed this idea in its title: the change was "From the Closed World to the Infinite Universe."

But one could just as easily see modernity springing from the intense interest in the human body that arose in Europe at the same time. If our place in the universe is an elemental marker of who we think we are, our physical being is something more. The magnitude of human suffering down the centuries is somewhat quantifiable. The life expectancy of a child born in Descartes' France was twenty-eight; in England between 1540 and 1800 it was an estimated thirty-seven. Similar rates—the twenties and thirties—held for high-born citizens of ancient Rome, forager societies in Africa and South America, and people in rural India and China into the early twentieth century. More than half of all children born in London around the time of the American Revolution could be expected to die before age fifteen. And most deaths in early modern Europe were caused not by war or marauding brigands but by disease. Century upon century, hour after desperate hour, parents watched helplessly as their children succumbed to maladies whose very names—ague, apoplexy, flux, dropsy, commotion, consumption—spoke of the misty ignorance that was a definitive sentence.

The mists have lifted somewhat in three and a half centuries—we live longer and healthier lives—and still the body remains a touchstone of modernity. Zoloft, Lipitor, Viagra, Botox, ibuprofen, angioplasty, insulin, birth control pills, hormone replacement therapy, anabolic steroids—we don't merely allow science and technology into our physical beings but insist that they continually do more to better manipulate and aid the brute facts of our flesh and blood and bone selves. Embedded in this outlook is an idea of the body as a machine, so that illness is seen as a breakdown of the machine and healing involves repairing the broken parts, and a doctor is a kind of mechanic with medications as his or her tools. This simplistic view has been changing in the last twenty or thirty years. We have been hankering now to see mind and body as deeply connected, to appreciate the way thoughts and the environment influence our physical being. Yet the mechanical model has been very successful, and our medicine is still largely constructed around it. And it was this model that came into being in Descartes' generation.

This new way of viewing the human body was bewildering when it was first aired. Many people, in fact, equated it with atheism. It was frankly at odds with the overall approach to knowledge in the period against which modernity arose. Aristotelianism, or Scholasticism, was a blend of Christian theology and thinking derived from Aristotle and other ancient Greeks. These streams of thought had stewed together for centuries and resulted in a worldview that, often spiced with astrology and folklore, treated every subject under the sun, from the story of creation to the roles of men and women. It explained why a stone dropped from a window fell to the earth rather than floating upward (because objects want to move toward the center of the earth, which is the center of the universe); it told what happened when you died; it gave an account of the end of all things.

The premodern medical establishment—which Descartes had dedicated himself to overthrowing—was built around the teachings of the ancient Greek physician Galen, whose work in turn was dependent on Aristotle's division of the physical world into the four elements of earth, air, fire, and water. Corresponding to these were the bodily "humors," or fluids: blood, phlegm, black bile, and yellow bile. Diseases and disorders were seen as the result of a humoral imbalance. This system—augmented by folk medicine, witchcraft, Christianity, and astrology—had the advantage of completeness. My body and its little world of concerns—toothaches and fevers, lovesickness and moodiness—was part of the wide world and the wider universe. This doesn't mean that the view was that the body was made of the same material as everything else in the universe or that physical forces controlled everything. The ineffable was a genuine and necessary part of reality. Jesus walked on water; miracles happened; the Devil stalked the land. The supernatural—magic—existed within the natural; it was woven into the fabric of the world and the stars, including the sinews of the human

body.

At the same time, the system was practical. As a physician in ancient Rome (with a list of clients that ran from Marcus Aurelius to gladiators), Galen himself had favored close observation of the patient—he was the first to recognize the pulse rate as an indicator of health—so that his approach had much to offer it, which explains why it endured for so long. One problem was that the underlying account of the physical world—Aristotle’s four elements, which combined in different ways to create all the stuff of reality, from mountains to lily pads to manatees to earwax—did not serve as an especially sturdy foundation. Diagnosis and treatment via the system of humors—a melancholic, “earthy,” illness called for an “airy” compound, and so on—were dodgy if not lethal, as patients well knew and as Molière, for whom the medical profession was a favorite target, suggested with the observation “most men die of their remedies and not of their diseases.”

And that was establishment medicine. There were many other options that were considered valid. A sufferer from fever or stomach pain or gout or nosebleed might get, by way of professional service, an astrological reading, an amulet to be tied around the neck with a ribbon, or a squinty examination of his or her urine (“uroscopy” was looked to as a general indicator of health, as when Shakespeare’s Falstaff asks a page, “What says the doctor to my water?”). The person administering the attention might be a physician, but astrologers and other sorts of healers were often seen as on a par, and some of the most esteemed medical men, including members of the College of Physicians in London, used astrology as part of their diagnostic tool kit.

Often, the caregiver was a clergyman. In any event, the procedure would have a religious cast. Illness and health were almost universally related to being in or out of God’s sight, and the language of healing was shot through with theology. It was commonly held that medicine would work only if prayer was offered to unlock its powers. Relying on physical remedies alone was often seen as downright ungodly: in England, Puritan minister John Sym advised “caution” that people “*dote not upon, nor trust, or ascribe too much to physical means; but that we carefully look and pray to God for a blessing by the warrantable use of them.*” To do otherwise—to rely on a physic or powder alone—would be to put the material above the spiritual. That was why a strictly mechanical approach to medicine was considered dangerously atheistic.

Now, it must be said that millions if not billions of people around the world today subscribe to beliefs similar to those of Sym: that the physical and the spiritual—pills and prayers, as it were—are both necessary components to health. They visit specialists and get diagnostic screenings, and at the same time they meditate and pray and ask God for a miracle cure. And these people don’t exactly inhabit the inner recesses of the rain forest; they live modern lives. They are us. What’s more, in the seventeenth century it wasn’t only the premodern Aristotelians who held such views; so, for the most part, did the first generation of modern philosopher-scientists who reacted against them. So, too, did Descartes, who seems to have been as devout a Catholic as anyone of his time and whose whole mechanical account of the universe depended on God to hold it in place. The main challenge following the story of Descartes’ bones would seem to be understanding exactly what “modern” is. It means a hard divide between the material and the spiritual, how do we account for the fact that both people of the seventeenth century who brought the modern sensibility into being and people today have managed to bridge this divide? We associate modern with a nonreligious, nonspiritual, purely rational and scientific outlook. Are we wrong to think that? If so, if it’s a false divide, how did it come into being?

A partial answer is that when, in the early seventeenth century, the premodern worldview built around the received wisdom of the Bible and selected ancient writers began to come apart, and

dissatisfaction with it led to a conviction that the mind's latent strength could be brought to bear on radically new ways on the body's weakness, an inevitable result of the new approach was to give greater importance to the physical world and thus, however unintentionally, to devalue theological interpretations. Experimentation was not actually discovered by Francis Bacon in the early seventeenth century, but what Bacon promoted in his *No-vum Organum*, which was published in 1620, was a commitment to reasoning based on observation of the natural world.

The most far-reaching application of this approach came with William Harvey's study of the human heart. Following Galen, the accepted thinking prior to Harvey was that the lungs pumped blood; that there were two kinds of blood, one that was made by the heart and another by the liver; and that both were continually used up by the body. Harvey's dissections and calculations convinced him that the vast quantity of blood that was pumped out of the heart every minute couldn't possibly be consumed by the body. The bold theory he published in 1628—that the blood circulated continually throughout the body, that the heart was the central pump, and that the liver did not make blood—was not instantly adopted by one and all. Harvey anticipated hostility—"I tremble lest I have mankind at large for my enemies. . . . Doctrine once sown strikes deep its root, and respect for antiquity influences all men"—and indeed some medical men ridiculed the idea of grounding scientific work on observation, which given that the real world was rife with errors and exceptions, seemed patently foolish. Others stayed committed to the notion of two types of blood and thus of the value of bleeding a patient. Phlebotomy (bloodletting) was one of the roots of Galenist healing, and doctors and patients alike clung to it. It was tied both to the theory of humors and to the belief that purging the system was a key to healing, whether it was of the contents of the stomach, the bowels, or a portion of "impure" blood. Observation, however, showed that rather than restoring health, bleeding weakened a patient. To advocates of the new medical philosophy, bloodletting was symbolic of all that was wrong with the old ways—thus the reaction of Descartes, on his deathbed, to the suggestion of it.

Steadily, Harvey's system gained ground in the 1630s; people began to see it as the basis for a whole new approach to medicine, and exploring the recesses of the human body became a fad and an industry and a fascination matching the exploration of the heavens. In Holland, Reinier de Graaf delved into the mystery of birth: he applied his dissecting blade to pregnant rabbits and charted the route the fertilized ovum followed to the uterus. The Dane Nicolaus Steno, working in the hospital of the grand duke of Tuscany, took a step toward demystifying human emotion by laying bare the tear ducts and examining how they functioned. Medical professors created "domestic amphitheaters" at their homes to accommodate the rush of students signing up to observe dissections of human cadavers and vivisections of animals.

In Amsterdam, the physician Nicolaes Tulp gave public anatomy demonstrations, using the corpses of executed criminals. Far from being branded as an atheist, he was immortalized in a painting by Rembrandt in which, using forceps, he pulls aloft a muscle of the left arm of a cadaver. What's more, according to A. C. Masquelet, an orthopedic surgeon who has made a study of the painting, Tulp is holding his own left hand in such a way as to indicate how this particular arm muscle—the flexor digitorum superficialis—controls movement of the hand: the lesson isn't just on the fact of muscle but on the cause-and-effect relationships between parts of the body. The observers in the painting—neatly bearded men with white lace collars—lean in to watch, fascinated by the demonstration. *The Anatomy Lesson of Dr. Nicolaes Tulp* signals one of those telltale shifts in what is deemed socially acceptable—like women wearing pants or the end of segregation in the American South—which to some spell the downfall of civilization while others view the change as an expression of a new era with a new idea of progress. The recesses of the human body, long kept determinedly shrouded

respectful mystery, had become spectacle.

BUT FOR ALL THE interest generated by the great scientific explorers of the late sixteenth and early seventeenth centuries—Galileo, Bacon, Harvey, Kepler, Brahe, and others—their work was fragmented, so that the immediate effect of the endless experimenting, dissecting, peering, and analyzing was more confusion than clarity. Their results didn't fit within the framework of knowledge that had existed for four hundred years. It wasn't possible to use the ancient writers to explain them, and in fact the results threatened to undermine the pillars that had held up the edifice of meaning. It is difficult for us to appreciate what this meant at the time, largely because, as a direct consequence of these men's work, we live in a world with more than one meaning system. Of course, there are fundamentalisms now, too, but even fundamentalists today live with an awareness of relativism. They know there are other systems of belief, even if they are sure those are wrong. In the seventeenth century the challenge to what had been thought an absolute system of values and truths was so shocking and so disorienting that people of all walks of life, from popes to commoners with enough education to read pamphlets decrying the confusion, considered the situation a crisis. And no crisis is deeper than a crisis of belief.

Then, in 1637, a book appeared on the streets of Paris, Rome, Amsterdam, and London. On its title page was an engraved image of a bearded man, dressed in tunic and tights, digging in a garden—the seeker after philosophical truth in the guise of a humble laborer?—above which appeared the full title, written not in Latin but in French so that, its author asserted, it could be read by laypersons (French laypersons, anyway), including, somewhat scandalously, women:

DISCOURS
DE LA METHODE
Pour bien conduire sa raison, & chercher
la verité dans les sciences.
PLUS
LA DIOPTRIQUE.
LES METEORES.
ET
LA GEOMETRIE.
Qui sont des essais de cete METHODE.

Which is to say: *Discourse on the Method of Rightly Conducting the Reason and Seeking Truth in the Sciences. Plus the Dioptric, Meteors, and Geometry, Which Are Essays in This Method.*

The title page also listed the place of publication, the Dutch city of Leiden, and the name of the publisher, Jan Maire, who was at the time unknown but who would become famous because of this or that volume. It was printed in an edition of three thousand copies. It would become one of the most influential books of all time.

Conspicuously absent was the name of the writer, who had previously noted that he wished to stay “hidden behind the scene so as to listen to what was said.” But the authorship of the *Discourse on the Method*, or *Discourse on Method* as it became known, was identified almost at once.

While he was still at school, Descartes had taken the increasingly apparent faultiness of the foundations for knowledge as a personal crisis. As he writes about it in the *Discourse*, this questioning of values comes off something like the sort of psychological or intellectual crisis that is common to people in their late teens and early twenties: “As soon as I had finished the course of studies which usually admits one to the ranks of the learned . . . I found myself saddled with so many doubts and errors that I seemed to have gained nothing in trying to educate myself unless it was to discover more and more fully how ignorant I was. . . . Nevertheless I had been in one of the most celebrated schools in all of Europe, where I thought there should be wise men if wise men existed anywhere on earth.” He was cast about for moorings. He wasn’t going to be duped by “the promises of an alchemist, the predictions of an astrologer, the impostures of a magician.” Regarding the sciences as understood in the Aristotelian system, he judged that “nothing solid could have been built on so insecure a foundation.”

Then, like many a college graduate since, he determined to leave books behind and explore the wider world: “I resolved to seek no other knowledge than that which I might find within myself, or perhaps in the great book of nature.” He traveled—for nine years. “I did nothing but roam from one place to another, desirous of being a spectator rather than an actor in the plays exhibited on the theatre of the world.” Europe then being caught up in the massive tangle of conflicts known as the Thirty Years War and the Eighty Years War (they ran concurrently), the natural thing for a young man was to learn about the wider world via warfare. He spent time serving in two armies, that of Maurice of Nassau, stadtholder of the Dutch Republic, then that of Maximilian I, elector of Bavaria. He managed to avoid actual combat, however, and instead assisted with solving military engineering problems.

According to Cartesian legend, while he was garrisoned in the Dutch city of Breda he was attracted one autumn day, by a mathematical puzzle posted on a public notice board. (In an era before newspapers, with their games and diversions, such puzzles were commonly posted in public places.) He was in Dutch, so he asked the young man next to him if he could translate. A fast friendship formed. It happened that Isaac Beeckman had also been distraught over the shaky state of the foundations of the intellectual world in which they had grown up. Both, it seems, had hit on the same new strategy for obtaining genuine knowledge of the natural world: by applying mathematics to physics. Their friendship became a kind of competition in which, as Descartes continued to travel with the army, they sent each other problems and investigations, and their correspondence built to a fever of helter-skelter discovery across a dizzying range of topics: music theory, the acceleration of falling bodies, the pressure that fluid exerts on its container, geometry. At the start Beeckman, who was seven years older, was in the role of teacher, but Descartes quickly shot past him, outlining in one letter his discovery of analytic geometry—the use of algebra to analyze geometrical shapes and problems which in turn would become the basis for calculus—and crowing that once he had worked out the details “there will remain almost nothing else to discover in Geometry. The task is infinite and cannot be accomplished by one person. It is as incredible as it is ambitious. But I have seen a certain light in the dark chaos of this science.” Modesty was not a condition from which Descartes suffered.

Shortly after, while stationed in Germany, his head teeming with ideas and his whole being straining to comprehend their totality, he spent a November night in a “stove”—a tiny room intensely heated by a ceramic furnace—and had a series of three momentous, hallucinogenic dreams. On waking, he felt that the dreams constituted a kind of vision: they were the distillation of all the lines of thinking he had been pursuing. The vision was of the natural world as a single system, with mathematics as its key. Pursuing this vision—a new way of seeing the universe and man’s relation to it—would be his life’s work. Descartes’ night of heated dreams has gone down in anecdotal history as

one of the fulcrums on which the Western world has turned.

The *Discourse on the Method*, which appeared seventeen years later and summarized the work I had done in that time, was his first published book. To be precise, it was four short books packaged together. The last three were essays devoted to light and optics, geometry and geological and weather phenomena. They included the first or among the first credible accounts of the law of refraction, near and farsightedness, the nature of wind, cloud formation, and rainbows, as well as the elaboration of analytic geometry.

But it was the introductory essay, the “Discourse on the Method” itself, a mere seventy-eight pages that gave this small, vain, vindictive, peripatetic, ambitious Frenchman a status among his contemporaries and those who followed unequalled since Aristotle. He was not the greatest mathematician of the seventeenth century (Isaac Newton, a generation older, would surely win that title), or the most influential scientist (here there might be a tie between Newton and Galileo), and one could argue that both Spinoza and Leibniz were more refined philosophers. But Descartes could not be considered, as one current philosopher puts it, “the father not just of modern philosophy but, in important respects, of modern culture—of modern Western culture and later, through export of his ideas, of much of modern world culture,” and the *Discourse on the Method* is the first reason why. This little essay has been called “the dividing line in the history of thought. Everything that came before it is old; everything that came after it is new.”



AS FAR BACK AS his school days Descartes had concluded that the place where the traditional approach to knowledge was flawed was at the base: its method of going about the business of understanding. There was no end of brilliance and subtlety in the ancient writers, but if they were starting from a swampy foundation their edifices weren't supportable. Take Aristotle's elemental building blocks of nature: why earth, air, water, and fire? What is the rationale for supposing that what is simply most evident to the senses is necessarily the base of reality? Or consider Thomas Aquinas, the finest of the Scholastic thinkers, who devoted his razor intellect to such things as an elaborate “proof” of the existence of angels, which included an analysis of their numbers, varieties, substance, intelligence, and origin and resolved such questions as whether, in moving from one place to another, an angel passes through intermediate space. How could one of the greatest minds in history get itself into such convoluted alleys of reasoning? Or Plato, with his theory of forms, according to which the tree out the window is not itself real but merely a reflection of the eternal form “tree” and the keyboard on which I type is actually an imperfect approximation of a perfect nonmaterial form—call it “keyboardness”—that was created by God and exists in eternity.

Layers of tradition had built up around such categories for understanding reality. Centuries of robed scholars and scribes had bent in tallow-tapered light over parchment sheets and leather-bound manuscripts, mouthing words, quill-scratching, rubricating, memorizing, parsing and analyzing and adding levels to the hoary infrastructure that had these categories as elements and that was applied as an increasingly unwieldy tool to explain natural phenomena, human behavior, history, the universe. But on what ground did they stand, these classifications? How could one trust them? How do we know they aren't nonsense? Or, if they were true, couldn't we expect that great things would have arisen from knowledge built upon such bases? As Descartes put it, devastatingly, “The best way of proving the falsity of Aristotle's principles is to point out that they have not enabled any progress to be made in all the many centuries in which they have been followed.”

What kind of method, then, would yield progress? Descartes was clear as to his ultimate aim. Unlike philosophers of later eras, who would devote themselves to questions of the order of “Why there something rather than nothing?” he was full-blooded in his inquiry: he was after the kind of philosophy that would take the world by the throat, that would make people “the lords and masters of nature.”

At first glance, his way of proceeding doesn't seem to make sense. For a universal measure of truth might reasonably look outward, like a navigator with a sextant: to the stars, to the distant horizon. Instead, his break from tradition is signaled, first, stylistically: the *Discourse on the Method* is written in the first person. A byproduct is that one of the world's great works of philosophy is also one of the most readable. And it serves as an appropriate launching point for a new era in which the focus is on the individual. The *Discourse* begins not with mathematical formulas or scientific propositions, nor with the lining up of outside authorities, but with a living human being—Descartes himself—sitting alone, thinking. There is atmosphere in the text, snugness: you can almost hear the crackling of the fire in the background. The realm we're in is familiar: it's that of the novel, the narrative, the play, and the film. It's human and, yes, modern.

All of these modern art forms involve, in addition to a personal focus, a central crisis on which the story turns, and so does this first work of modern philosophy. The crisis is a loss of meaning, and the quest is a search for truth, for something to believe in. Descartes' strategy was to assume that Aristotle's entire approach to nature, to reality, is wrong and then to assume the same for Aquinas, Plato, Duns Scotus, William of Occam, and all the revered writers. He ceremonially placed the Bible—from Adam and Eve to the Hebrew prophets to the resurrection of Jesus Christ—in the same dustbin. He continued slashing every such thought and idea until he came to a proposition that was impossible to deny. It was both a philosophical and a psychological undertaking, and to it he appended a “don't try this at home” caution: “The single design to strip one's self of all past beliefs is one that ought not to be taken by every one.”

Maybe grand abstract writings needed to be dismissed in this way, but what about the things that are right in front of me? What about, as Descartes put it in *Meditations on the First Philosophy*, the simple fact “that I am in this place, seated by the fire, clothed in a winter dressing-gown, that I hold in my hands this piece of paper”? Even these things fell by the wayside. The senses can't be trusted, either. The senses deceive. I might be dreaming, or drugged, or deceived by a malicious deity. If we are being serious about this project, then sights and smells and tastes, no matter how self-evident, must also be doubted. Strictly speaking, I can't even be sure of the reality of my own body.

Which leaves what? At the end of this remorseless reduction there is only one thing that remains: one proposition that can't be denied, one sound, as it were, in the universe, like the lonely ticking of a clock. It is the sound of the thinker's own thoughts. For can I doubt that thoughts are occurring right now, including this one? No: it's not logically possible. So, humble though it is, we can call this ground: bedrock.

In this way, Descartes became one of those rare figures in history who have given the world a sentence that is a touchstone. “I am the way, the truth, and the life” was such an utterance, standing on one side of Descartes and his era. On the other side we have “ $E=mc^2$.” As philosophers since have pointed out, “I think, therefore I am,” or “Je pense, donc je suis,” or “Cogito, ergo sum,” does not fully encompass what Descartes intended. Once the acid of his methodological doubt had eaten its way through everything else, what he was left with was not, technically, even an “I” but merely the realization that there was thinking going on. More correct than “I think, therefore I am” would be “Thinking is taking place, therefore there must be that which thinks.” But that hardly has the snap

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