

## SCIENCE AND HUMANISM

*The fullness of humanistic thought against the poverty of scientific thought; the effectiveness of scientific thought against the impotence of humanistic thought*

“LET US BE DRIVEN, O Fathers, by those Socratic frenzies which lift us to such ecstasy that our intellects and our very selves are united to God.” So wrote the Renaissance humanist Giovanni Pico della Mirandola (1463–1494) in his *Oration on the Dignity of Man*, sometimes called the manifesto of the Renaissance.

By what means was humankind to achieve a knowledge so exalted that its intellects, its selves, would be “united to God”? By all means possible. Pico himself read Latin and Greek and studied Hebrew, Arabic, and Aramaic. He drew on Plato and Aristotle, on Islamic philosophers such as Averroes, and on the Talmud and kabbalistic texts, in an attempt to find, in the integration of his philosophical, religious, and mystical sources, the quintessence of knowledge. The *Oration* was intended as a preface to a great meeting of minds that Pico hoped to stage in Rome, in which 900 theses, drawn from ancient Greek, Christian, Jewish, and Moslem sources, would be debated. In the course of the dialogue, the wisdom each contained would be extracted, distilled, and then blended

to create an exhilarating concoction that would transport the human mind to the greatest heights of understanding.

We can put aside Pico's conception of the end of inquiry as a mystical union with God while finding in his project—as have his many modern readers and admirers—a portrayal and a celebration of a humanist ideal of knowing. This ideal upholds an integrating conception of knowledge, according to which the surest path to the most important truths brings together all sources of insight: philosophical, spiritual, poetic, mathematical, experimental, as well as everyday experience of the world. It is a route to enlightenment mapped out by many other Renaissance thinkers—such as the early sixteenth-century Swiss physician Paracelsus mentioned in Chapter 10, who combined a commitment to empirical experiment in medicine and chemistry with a devotion to the allegorical thought of alchemy, along with the idea of a grand symmetry governing the universe at both the astronomical and human scales.

A hundred years later, we encounter the same all-embracing ideal in Descartes. He took for his subject matter just about everything: the causes of motion, the structure of the universe, the emotions, the nature of thought, God, mathematics, the foundations of knowledge—philosophy, psychology, physics, theology, and more. Dashing back and forth, his reasoning interleaved and tightly wove these separate topics. His physical theory hinged on his philosophical argument that empty space is impossible. How could he be so confident? His philosophy of knowledge assured him that careful reasoning based on clear ideas could not go wrong, in part because God is responsible for planting those ideas in our heads. Why think that there is a God, and for that matter, why think that God wants us to be enlightened rather than merely ignorant and awed? Descartes gave two philosophical arguments for the existence of a benevolent God. His physics, then, is built on his philosophy of matter, which depends on his philosophy of

knowledge, which depends on his theology, which depends in turn on more philosophy.

In his religiously conventional French rationalism, Descartes was quite different from Renaissance figures like Paracelsus and Pico. Rigorous and systematic metaphysics rather than syncretic magical hermeticism was the form of his deepest thinking about the nature of the material world. But his answer to the question "By what means shall we know the world?" was the same as Pico's: *By all available means*. From metaphysics and mathematics, from introspection and observation, a single, coherent theory of the world should be drawn. That is the humanistic way.

The term *humanism* has been used to mean many things. Secular humanism, a modern idea, signifies a renunciation of all gods, all religious sources of meaning. That is not what I have in mind; for both Pico and Descartes, God and the spiritual plane are objects and foundations for knowledge. In another sense, humanism is a historical phenomenon confined to the Renaissance and concerned with the resurrection of classical learning. Although humanism in my sense is amply represented in Renaissance thought, it is far wider in scope. Aristotle, for example, is a paragon of my sort of humanism, mingling philosophical argumentation with observation, explanatory speculation, and a little theology.

If Aristotle, Pico, and Descartes are all fundamentally humanistic, what great thinker is not? The personification of science himself: Isaac Newton.

Newton was in one sense a supreme Renaissance man, his interests quite as broad as Descartes's. He was not only an empirical scientist but a mathematician, an alchemist, an interpreter of scripture, and, like Descartes, a metaphysician using philosophical argument to understand the nature of space and matter. Unlike Descartes, he quite deliberately failed to integrate these investigations. Each went forward under the power

of its proprietary techniques, without assistance from the others. In his compartmentalization of inquiry, he practiced—indeed, he pioneered—an approach that is a stark negation of humanism's synthesizing ethos.

Were Descartes a university, it would be a rambunctious and vibrant place, spilling into the hallways and the stairwells. Every member of the faculty would read, discuss, and argue about the work of every other. The physicists and the philosophers, the theologians and the psychologists, would participate equally in a shared discourse on the principles that rule the world.

Were Newton a university, you would not hear a sound; the common room would be thick with dust. Each faculty member would be found at all times shut up in their office or lab, pursuing their own researches by their own means, reading just those books that speak directly to their own subject matter, writing only books answering to the same specification. They would meet once a year to discuss parking and the budget for coffee.

And which would be the greater institution? The principles of rationality and the humanistic spirit give the same answer: the Cartesian university, the very incarnation of the most human qualities in its vibrant sociality and open-mindedness. Experience says otherwise. It is the Newtonian university's taciturn specialization that is the better route to knowledge. Whatever is lost through detachment and disregard for the grand view of life is more than recompensed by the narrow, tightly focused beam that searches out the diminutive but telling fact.

The bitter fate of humanist thought has been to see its glorification of the full, unifying intellectual potential of the human mind eclipsed by the immensely greater contribution to our knowledge of the natural world made by the lean scientific spirit—to comprehend the meagerness of what is found beyond the golden gate of the imagination when measured against the riches brought back through the low and shameful gate of experience.

THE NEWTONIAN UNIVERSITY is an allegory of Newton's mind, not a genuine institute of research and higher learning. It has something in common, nevertheless, with the enterprise of contemporary science.

This is due in part to the iron rule's governing the way that science talks to the world. Leaf through an assortment of scientific journals and you will find a tidy array of self-contained compartments, aloof and insular, an embodiment of the narrow empiricist code.

At the same time, the iron rule—I'll say it again—leaves scientists quite free, in their private lives and interior deliberations, to range over whatever theological or philosophical or aesthetic territory they wish to explore. Even if a certain Newtonian quietude prevails in the great public spaces of science, the back rooms and connecting passages are wide open to untrammelled Cartesian hubbub. Indeed, scientific discovery relies to a not inconsiderable extent on this furtive openness, which has allowed thinkers such as Murray Gell-Mann, D'Arcy Thompson, and Albert Einstein to use their aesthetic and philosophical senses in the search for extraordinary theories.

These great scientists were exceptional in more than one way. Not only were they brilliant and imaginative; they also succeeded in evading the deadening effects of contemporary science's preferred method for imposing the iron rule, a method that starves scientific novices of non-empirical knowledge and undercuts nonempirical habits of mind.

The standard product of this system is an empiricist all the way down, an individual who not only in their public writings but also in their private thinking takes a "scientific attitude" that is directly opposed to the humanistic attitude. The scientific attitude demands tangible evidence. It scoffs at philosophy and is uneasy with a sense of beauty or meaning that cannot be put into words. It finds fulfillment in direct, unemotional, indeed colorless expression of ideas and arguments. It transmutes the iron law of explanation into a leaden law of scientific thought.

ASIDE FROM THE OCCASIONAL outbreak of plague, life as a university student in medieval times seems to have been much like it is today: a steady rotation of classrooms, taverns, and last-minute study sessions. The books, however, were rather different. There was, in the twelfth century, no *Norton Anthology of English Literature*. But there was Martianus Capella's *On the Marriage of Philology and Mercury*, "the standard schoolbook of the Middle Ages."

Written as the ancient Roman Empire's power in the Mediterranean crumbled—most likely sometime between the Visigoth Alaric's sack of Rome in 410 CE and the invasion of Martianus's native city of Carthage by the Vandals in 429—*On the Marriage* describes a celestial union conducted in the palace of the gods Jupiter and Juno, floating beyond the outermost planets. The bridegroom Mercury stands for eloquence and the art of persuasion, embodied in the study of grammar, logic, and rhetoric, while the bride Philology stands for the love of learning and inquiry into the workings of the world, embodied in the study of arithmetic, geometry, music, and astronomy. The wedding is therefore a synthesis of three "humanities" and four "sciences," making up the seven liberal arts—who serve as bridesmaids of a sort and who occupy the greater part of the book with learned presentations of their domains of knowledge, jointly portraying an ideal of the educated mind as fluent in modes of thought that span the sciences and the humanities.

Numerous writers have lamented what appears to be, in the era of contemporary science, a de facto divorce. The English chemist and novelist C. P. Snow famously declared in 1959 that science and the humanities had diverged to the point that they formed two distinct cultures, each largely unconscious of the other's subject matter and methods. Snow deplored the situation; his ideal was a thinker conversant with, if not expert in, all branches of human knowledge and invention. The same sentiment is expressed in Stephen Jay Gould's book on science

and the humanities (*The Hedgehog, the Fox, and the Magister's Fox*); and Gould might have been surprised to come upon, had he lived to read it, a similar outlook in the culminating sentence of his sparring partner E. O. Wilson's *Meaning of Human Existence*:

If the heuristic and analytic power of science can be joined with the introspective creativity of the humanities, human existence will rise to an infinitely more productive and interesting meaning.

Who could fail to be moved by this vision? It is, I regret to inform you, too lovely to be true.

There are two missteps in Snow's famous lecture. The first is to talk of the modern science we have built, our contemporary knowledge machine, as a culture. It is not even a subculture. It is a social practice, and one that is carefully cultivated in the gardener's sense, but it bears little resemblance to what an anthropologist would call a culture. It has norms—a moral code, if you like—but the central tenet of that code enjoins scientists, in their professional lives, to shun all entanglement with broader intellectual or spiritual matters. It is socially embedded, and like any social unit it has its traditions and its quirks. Otherwise, it is more like a rule book, a corporate headquarters, or a military unit than a form of life. Its function is not to enable a certain way of being in the world, but to suppress the impact of our being in the world on our knowing of the world.

Snow's second misstep—and Wilson's too—lies in suggesting that science would flourish if scientists knew and cared more about the rest of existence. Quite the contrary: their obliviousness is the greatest guarantee that they will follow without deviation the empirical path laid out by the iron rule. All the power to improve the world that Snow and Wilson hoped for lies along that path.

According to a story in Genesis, the creation of humanity was an act of inspiration:

And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul. (Genesis 2:7)

The creation of the knowledge machine was just the reverse. Its engineers brought it into being by sucking the air out of the chambers of the mind—the philosophical air, the theological air, the air of beauty, the humanistic spirit. It was this act of deprivation that manufactured the void in which empirical inquiry can most effectively divine the facts.

In Joseph Wright of Derby's most famous painting, *An Experiment on a Bird in the Air Pump*, a group of onlookers—both rapt and



Figure 13.1. William Blake, *Elohim Creating Adam* (detail), 1795.



Figure 13.2. Joseph Wright of Derby, *An Experiment on a Bird in the Air Pump*, 1768.

appalled—watch a bird die slowly as the oxygen is extracted from the bubble of glass in which the bird is imprisoned. Scientific instruments are spread across the table like tools of torture. The room's only source of light is obscured by a goblet in which floats some nameless horror. Through the window faintly shines a wan, gothic moon. The experimenter, with his long and gray Newtonian locks, shows no mercy.

The bird in the painting is doomed. But science is a different kind of creature. It loves the bubble; it thrives in the vacuum. What would kill it is to let in the scents, the commotion, the delights of the outside world.