

Douglas Sloan

This may at first seem like a strange title. After all, the curricular division between science and the humanities has long been the basic organizing principle for the main subjects in the whole of modern education. It is an organizing principle that reaches from the university level all the way down. Even if, as we shall see, regard for the distinction has often become in modern education little more than lip service, has not the science/humanities division been, nevertheless, extremely useful, and does it not, in spite of problems, remain so? In fact, is it not a given task of thoughtful educators to wrestle perpetually with the relationship between science and the humanities, and are not the problems thrown up by this wrestling and the need to grapple with them a part of the essential service rendered by the distinction itself? Moreover, is not the suggestion in the title of this essay more than a little overblown; namely, that the science/humanities division is not only an issue for education, but is deeply implicated in a major crisis in the whole of modern culture and consciousness?

This essay will attempt in brief form two main things: first, to explore how the educational division between science and the humanities has helped produce a profound split in modern consciousness—a split with far-reaching deleterious consequences; and, second, to point to some actual directions for overcoming and healing the split.

The development of the relationship between science and the humanities has a fascinating and venerable history. It lies far

beyond the scope of this essay to trace this history here in any detail. Suffice it to say that perhaps the first firm outlines of the modern form of the science/humanities classification, though this was not its first appearance, can be discerned in the rise of the medieval university in the eleventh and twelfth centuries with its division of the seven liberal arts between the trivium (grammar, rhetoric, and logic) and the quadrivium (arithmetic, geometry, music, and astronomy). Even then, lines between the subject areas were not hard and fast. Mathematics, for one example, was still looked upon as “the Queen of the Arts.” With the emergence of the scientific revolution at the end of the Middle Ages and the almost simultaneous development of Renaissance Humanism, boundaries began to grow sharper. Still, there was much overlap and movement back and forth.

The Renaissance Humanists inherited the seven liberal arts from the medieval university, and bringing these up to date, joined them with the newly recovered Greek and Latin authors, whose wisdom they regarded as essential to a fully developed human being. Central to the humanists’ educational ideal, beyond providing entrance to career advancement, was the conviction that knowledge and the development of

character should go hand in hand. The primary goal of education was, for them, to enable the forming of a strong sense of self, to equip that self with effective means of self-expression and communication, and to instill in the individual a solid ethic of service to church, state, and

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community. Scientific knowledge was still seen by the humanists as an important part of the educational ideal. The humanists helped foster a climate of eager inquiry in which scientific questioning could flourish; they encouraged the inclusion of natural science in the curriculum; and they themselves often engaged in actual natural science inquiry. Indeed, a leading historian of the humanities has shown that the Renaissance Humanists played an important role, directly and indirectly, “in the birth of modern science.”¹ He has pointed out, for instance, that Galileo credited his own humanistic studies, including Greek and Latin literature, with having given him the sense of self-confidence and effective modes of expression that enabled him to stand firm and independent in advancing his own scientific views against mainstream opposition. With Renaissance Humanism and the scientific revolution, a new consciousness began to emerge in the West, a consciousness full of promise for the human future and for the earth.

This positive potential of modern consciousness, including especially its connection with the emerging natural sciences, needs to be acknowledged and stressed. And yet, it is precisely these positive potentials that have been endangered by central conceptual presuppositions of modern science itself. In criticizing, as we shall, certain of these presuppositions, it is not to reject or disparage the positive potentials of modern science, but to explore how these might be maintained and developed further. The positive potentials of modern consciousness, as they made their appearance with Renaissance Humanism and the scientific revolution, can be variously described. They include: a new sense of wonder and respect for the material world; a clear and precise thinking that made possible new powers of control over the material world, and, accordingly, new possibilities for human freedom, as well as new demands on human responsibility; and, a new sense of separation

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from nature that went together with a newly heightened experience of individual selfhood and self-identity. The realization and fulfillment of these positive potentials required, however, that the quantitative and qualitative realms, at first shared alike by both the scientists and the humanists (who often overlapped in the same person), be held together—the quantitative realm, exemplified especially by the new powers of mathematics and technology, and the qualitative realm of meaning, value, and purpose.

If these two become separated and fall apart, the genuinely new, positive potentials of modern consciousness begin to be undermined. Controlling reason and technology, cut off from a larger matrix of meaning and purpose, begin to run amok and out of control. Individuality, severed from a larger and more encompassing context of meaning and purpose, becomes either rugged and rapacious individualism or leads to the lonely and alienated modern self. And apart from a larger reality of meaning and responsibility, freedom disappears into deterministic mechanism or meaningless caprice.

It was the scientific revolution itself that very early served to fix an increasingly sharp boundary between the sciences and the humanities, between the quantitative and the qualitative (and Galileo himself played a key role in this). Since the beginning of the scientific revolution in the sixteenth and seventeenth centuries in the West, three main assumptions about what we can know and how we know emerged very early and have since come to dominate modern thinking and consciousness. These assumptions have had momentous consequences for all of modern life.

The first assumption is what can be called the quantitative-mechanistic assumption about the ultimate nature of reality. It received its modern stamp very early in the scientific revolution in the writings of such scientists as

Galileo, Descartes, Newton, and Boyle, and the philosopher John Locke. A fundamental distinction was made in the emerging new “mechanical philosophy” between what were designated at the time as “primary qualities” and “secondary qualities.” The primary qualities included such phenomena as extension in space, mass, weight, motion, number, and so forth. In other words, the realm of the primary qualities was essentially that of the quantitative. The primary qualities—quantities—it was thought could be known with clarity and certainty through empirical observation and mathematics. The secondary qualities at first included such phenomena as color, taste, and sound, but were eventually extended to include what philosophers sometime designate as tertiary qualities—such qualitative domains as value, meaning, purpose, beauty, goodness, selves, and so forth. In this view, knowledge as such could be had only of the primary qualities, the quantitative. While the secondary and tertiary qualities might well be realities of experience, they could not, strictly speaking, be known in any proper sense of the term. The qualities—secondary and tertiary—could provide no real material for precise, objective knowledge as such because they depended on the observer and, therefore, were considered too tainted by subjective feelings, habits, predispositions, and so on. True knowledge was to be had only of the quantitative.

The quantities to be known were considered to be related to each other like the parts of a machine. Accordingly, the clock became famously the main metaphor for the universe and for all of nature within it. The world—the universe—was to be regarded as a “law-based system of matter in motion”—matter in motion, colliding and combining according to mechanical laws of physical cause and effect.

The second assumption is related and, in fact, really arises out of the first. This has been

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described as the “objectivistic assumption,” which points to a fundamental separation between the knower and the object to be known. This assumption holds that, if we want to know something properly, we must detach ourselves from it as completely as possible and describe it from the perspective of a mere, uninvolved onlooker. Appropriately, the assumption is also sometimes referred to as the assumption of the “onlooker consciousness.” The relation of this to the first assumption is seen in that it was thought important not to intrude personal qualities such as feelings and values into the knowing activity. To do so would distort and skew the pure knowledge of reality as objective and independent of the knower.

The third assumption that accompanied these first two has been called the “sensationist” or “sense-bound” assumption about knowable reality. This assumption, most forcibly expressed by the seventeenth-century philosopher John Locke, holds that we can know only that which is given through physical sense experience and abstractions from sense experience. This assumption further ensured the limitation of knowledge to the purely quantitative and mechanical. In this view, the non-sensory realms of value, meaning, purpose, qualities, spirit may exist, may even be experienced, but they cannot be known as such.

One result has been what can be described as a “two-realm theory of truth.” During the eighteenth and nineteenth centuries the distinction made earlier between primary and secondary qualities was further refined and institutionalized in modern education as the dominant classification in all education between natural science and the humanities. So we have two realms of truth: the truths of science, which are knowable; and the truths of the humanities which, strictly speaking, are not. Science deals with nature, which of course is taken to include the human body.

The humanities, as the name suggests, deal with the human realms of values, meaning, and qualities. Only the “truths of science,” dealing through empirical observation and mathematics, with nature conceived as matter in motion, are viewed as the results of objective knowledge.

The “truths of the humanities,” at most, arise from sources now regarded as subjective, such as faith, feelings, traditions, ethical action, social custom, mystical experience of some sort, and so forth.

How successful has been the two-realm theory of truth in keeping alive essential human qualities and concerns that the dominant view of knowledge cannot encompass? At their best, the humanities have helped cultivate a humanely critical spirit that has often stood as a bulwark against doctrinaire and even political infringements upon human freedom and human rights. Without the humanities many realities and experiences utterly central to a truly human existence would have long ago faded entirely. The affirmation of the two-realm theory of truth has also been the main response of religious thinkers who have been eager to reconcile their faith commitments with the materialism of modern science. It seems also to have been the main response of those many scientists who are serious about both their science and their personal faith and ethical concerns. It would be difficult to overestimate the influence for good this two-realm theory has had for modern, Western society and culture. And yet, at bottom, the theory has extremely serious problems, including a number that have become increasingly acute.

A major problem, seldom recognized or acknowledged, is that the science/humanities division expresses, and institutionalizes, from the start, a deep alienation of the human being from nature. Nature, handed over to modern science, is seen in its totality as dead matter in motion. Completely separated from this nature, and essentially standing over against it, are the humanities. This division at the heart

of our education system has, as expressed in our title, helped produce a profoundly split consciousness in Western civilization.

Some of the serious consequences of this split we will explore later, but first let us look at a second problem of the science/humanities dichotomy, namely, that, while in theory the relationship between the two sides is supposed to be symmetrical and balanced, in practice it turns out to be quite unequal. In this division, as in racial segregation, separate has not been equal. The quantitative side is nearly always regarded as the more important. It is often remarked that the arts and literature, not chemistry, physics, engineering, or computer science, are always the first to go in times of financial exigency. The desire to shape a self and a life, originally a central purpose of the humanities, has—in the last century especially—moved steadily down the list of priorities for higher education. The humanities continue to be placed on the defensive as business and political/social pressures step up their push for increased funding for technical and scientific subjects at the expense of the humanities. In the 1960s the Columbia University professor Lionel Trilling, one of the leading champions of the humanities and the liberal arts, expressed his concern that our society “will tend increasingly to alienate itself from the humanistic educational ideal.”² Since then, nothing has occurred to lessen his cause for concern.

Let us, for a moment, take a look at an event in the twentieth century which gives a clear example of both of these problems—the handing over of nature entirely to a mechanistic science and the uneven balance between the two realms. This example is provided by the work of some of the most creative religious thinkers of the twentieth century. The first half of that century witnessed the beginnings of what promised to be a major theological renaissance—a renewal of theological insight and practice. This movement involved leading thinkers from all three of the major Western

religious groups—Jewish, Protestant, and Catholic. Jewish thinkers such as Martin Buber, Abraham Heschel, Will Herberg; Catholic theologians such as Jacques Maritain, Etienne Gilson, and Gabriel Marcel; and Protestant theologians such as Karl Barth, Rudolf Bultmann, the Niebuhr brothers Reinhold and H. Richard, and Paul Tillich are just some of the names of those who led this theological renaissance.

This look at how leading religious thinkers of the twentieth century came to see the relationship between science and the humanities is especially illuminating for at least two reasons. In the first place, religion, we might say, is the canary in the mineshaft of the science/humanities division. It is the first among the humanities to feel the effects of the cognitive disparity between the two views of truth, and so provides a vivid example of what is involved. In the second place, the theologians at the beginning, from the 1920s through the 1940s, actually turned their critical attention to developing some penetrating critiques of the influence of an exclusively quantitative-mechanistic science on the wider culture. However, in the end they were unable to extend their critiques to question the sense-bound methodological assumptions of modern science and, consequently, fell back into a total acceptance of the two-realm theory of truth.

The whole movement was exemplified in this in the work of the theologian Paul Tillich. Tillich himself responded to nature not as a mechanist but with a romantic, even mystical, sense of awe and wonder. And he criticized the widespread, modern scientific-technological abuse and rampant exploitation of nature. But ultimately, Tillich, like the other theologians (and nearly all other humanists), was unable to draw the implications of his wonder and awe for a possible transformation of our dominant way of knowing itself. Instead he left the wall between science and religion (and with it all the humanities) standing and fully intact. This, Tillich came to feel, was a good thing

because he could then claim that there is no conflict between science and religion because they each deal with two completely different realities. “There is no religious statement,” he said, “that can contradict a scientific statement if religion is understood in its fundamental sense as ultimate concern [i.e., as the ultimate commitment of subjective consciousness] and science is understood as the inquiry into the finite facts and their relations.” Thus the dualism of the two-realm theory of truth remained for Tillich, and for the others finally, fully in place, as did the underlying alienation of the human from nature contained in that dualism.

By the early 1970s the short-lived twentieth-century theological renaissance had essentially collapsed in its entirety. This was in spite of its thorough humanistic grounding in critical thinking, ethical concern, and aesthetic sensitivity (the arts were of great importance for the theological reformers). Despite its influence for a time in all the major religious traditions in the West, its existence is today hardly remembered. In its place has arisen a noisy, crude, and dogmatic religious fundamentalism, the reasons for which we will consider later.

The failure of the humanistic religious reformers contains a lesson that ought not to be lost on the other humanities. Now, it is the case that representatives of the other humanities—art, history, philosophy, and so on—are often glad and quick to distance themselves from religion. This is probably owing to a number of reasons, some of them understandable, others not entirely lofty. Some humanists have distanced themselves from religion in an effort to attach to themselves a portion of the same prestige as that enjoyed by science in modern culture. Others deny any compatibility between their subjects and religion because they have rejected specific religious views—say, those of religious fundamentalism—and understandably do not want themselves or their subjects associated

with these. Others reject religion because they assume that it is based on irrational, blind faith, which is more and more the case in the modern world because religion has largely lost all grounding in genuine knowledge. But the other humanities ought not to count themselves immune from the same fate that befell these most humanistic and rational theological reformers. All of the humanities share fully, with the humanistic, theological reformers, a dependence on the same non-sensory realm of values, meaning, purpose, and quality. It is just these in all subjects that have been denied an ultimate cognitive foundation by the two-realm theory of truth.³

Many of the consequences of the quantitative-mechanistic view of the world have been very destructive, and have shown themselves to be increasingly so. One consequence has been a constant pendulum-swing between, on the one side, a spreading nihilism about the meaning of life, and, on the other side, a harsh and dogmatic—even violent—fundamentalist reaction.⁴ A sense of deep meaninglessness and futility is entrenched even among some of our most renowned cultural leaders—the scientific elite. The great twentieth-century mathematician and philosopher, Alfred North Whitehead, did not share this nihilism, but he identified its origins in the picture of nature presented by the mechanistic-quantitative world view. In this view, Whitehead pointed out: “Nature is a dull affair, soundless, scentless, colorless; merely the hurrying of material, endlessly, meaninglessly.”⁵ Many prominent scientists today subscribe to this view. The eminent physicist, Steven Weinberg, has famously stated: “The more the universe seems comprehensible, the more it also seems pointless.”⁶ The biologist William Provine has written: “Our modern understanding of evolution implies that ultimate meaning in

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life is nonexistent.”⁷ The astronomer Sandra Faber has said: “The universe is completely pointless from a human perspective” (note here the first problem of the two-realm theory). And echoing the same thought, the Harvard astronomer Margaret Geller asks, “Why should the universe have a point? What point? It’s just a physical system, what point is there?”⁸ These scientists are among the most influential of public figures. Since science is the dominant modern faith and these scientists are its high priests, their view of a totally meaningless world seeps down into all strata of modern society, sometimes subtly, other times not so subtly.

In reaction to this modern nihilism, we witness the spread worldwide of an ever more violent and dogmatic fundamentalism. This rise of fundamentalism is not surprising. It is not surprising because the non-sensory realities of value, meaning, purpose, and qualities are of the essence of human life, and they keep coming back. If they can find no grounding in genuine knowledge, they will, nevertheless, continue to reassert themselves, if necessary in ways that are irrational and arbitrary—that is, in ways that are dogmatic and fundamentalistic.

Religious fundamentalism is today widespread. Nearly every religion in the modern world has its fundamentalist wing—Judaism, Christianity, and Islam, but also Hinduism, Buddhism, Sikhism, and most others. And this has given added ammunition to those modern enemies of anything religious. The modern critics of all things religious are, however, missing a critical thing of importance in the upsurge of fundamentalism: namely, that they themselves are not immune. The pervasive and all-encompassing modern view that values have no knowledge-grounding affects the political, scientific, and economic realms as well. All those in the modern world who would affirm and advance value commitments

that have no qualitative knowledge base (as is the case by fiat in the two-realm theory of truth) have to do so in ways that are ultimately dogmatic, drawing upon the givens, among other things, of tradition, ideological commitments, emotions, convention, and power interests. And so an alert observer will note that, alongside religious fundamentalism, we have the full complement today of political, scientific, and economic fundamentalisms on all sides. It would seem that no group in the modern world is spared the fundamentalist temptation.

Of course, between the poles of nihilism and fundamentalism lies a middle ground in which thinkers of various stripes have attempted to avoid either extreme. But this middle ground is unstable, constantly shifting and fading away, as one attempt after another is made to hold the middle. Some of the efforts to maintain this middle ground achieve a degree of success and the effort itself warrants being encouraged, if for no other reason than that it helps keep alive the issues. So far, however, none of these middle ground efforts—philosophical, artistic, or spiritual—has been able to overcome the two-realm split, nor to do more than slow the pendulum swing.

Especially serious is the tendency for the mechanistic side to encroach constantly upon the humanities, such that all semblance of a symmetrical, equal relationship disappears. The claim is increasingly made that human beings and all that makes them uniquely human—values, meaning, ideals, love, selfhood—can be understood like everything else in terms of matter in motion. The mechanistic view not only attempts to explain nature, but also to explain away the human. This tendency has become especially strong in contemporary Western culture, with profoundly negative consequences.

If these two become separated, controlling reason and technology, cut off from a larger matrix of meaning and purpose, begin to run amok and out of control.

Consider two of these consequences: the degradation of the human being and the actual and unremitting exploitation and destruction of the earth. Truncated and mechanistic models and images of the human being and of nature alike predominate in our thinking, guiding our research and practice and our education at every turn. Some of the models are reductionist in the extreme. Even those scientists who, in their own thinking, would not subscribe to full-scale reductionism—on the order of, e.g., that expressed by Francis Crick: All human joys and sorrows, memories, ambitions, and personal identity itself are, as he puts it, “no more than the behavior of a vast assembly of nerve cells and their associated molecules”⁹—

are almost all bound in their actual research entirely to mechanist models of reality. In medicine, agriculture, biology, cognitive science—in nearly every field—mechanistic models of inquiry and application prevail and guide research, teaching, and technological development. Among the results are wrenching ethical, medical, ecological, and cultural dilemmas, as the fullness of the human being is forced to conform to the less-than-human “realities” that are generated in the laboratory and then released upon a hapless public. All the while, qualitative nature—the nature around and in us, the nature of beauty and life—continues, relentlessly, to be taken apart. As long as nature is regarded as having no qualities—no inner life, no meaning, no living wholeness—dismantling it for our own pleasure and economic advantage is obviously that much easier to justify.

A major example, often disregarded, but a blot on the human heart, is the treatment of animals in modern factory farming. Daily our culture inflicts intense and unrelieved suffering on millions of animals—particularly pigs, cows, and poultry—all feeling, sentient

creatures. The animals, defined as “units of production,” are treated like the rest of nature as useful pieces of machinery without feelings—things to be exploited and tortured without compunction in order to satisfy our gastronomic cravings.

The costs of this mechanistic justification for the exploitation of the earth are evident on all sides. *The Living Planet Report* for the World Wildlife Fund has recently concluded: “People are plundering the world’s resources at a pace that outstrips the planet’s capacity to sustain life.”¹⁰

All of this is not to say that each of the three assumptions of the mechanical philosophy with which we began have not been subjected to penetrating criticisms. The criticisms have come from many quarters. The first assumption, that of the onlooker stance of the detached knower, has, perhaps, been the most thoroughly undercut by critics. Serious challenges to the notion of the objectivistic, detached knower come from ecological studies, from literary interpretation, from women’s studies, and especially from quantum physics—all of which stress the centrality of an interactive, participatory, and mutually transformative relationship between the knower and the known. An important challenge to the second, exclusively quantitative, mechanistic assumption has come from some philosophers and ecologists who maintain that the most adequate metaphor to guide our thinking about the earth is not the machine but the living organism. And this challenge to mechanistic exclusivity has even come from some quantum physicists—not yet all by any means—such as David Bohm, who has argued that the living whole, not the

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separate parts, must be the ultimate basis for understanding nature, as well as the human being. The third assumption, the sense-bound or sensationist assumption about all knowing, has been challenged by some philosophers who point out that we must presuppose a certain intuitive apprehension of non-

sensory realities, such as ideas, moral norms, meaning, cognitive rules of logic, and others, even for the possibility of all our ordinary sense-based knowing, including our practice of science.¹¹

All of these criticisms suggest the need for the development of new ways of qualitative knowing on both sides of the science/humanities divide: ways of knowing that would ground in knowable reality the values, meaning, and qualities central to the humanities, ways of knowing that would enable us to deal not only with the material and mechanical dimensions of nature but also with the qualities in nature of life, beauty, and organic growth and development.

Why have the criticisms, and they are many, of the inadequacies of an exclusively mechanistic science not led to actual qualitative ways of knowing? The reason seems to be that recognition of the inadequacies and destructive consequences of the two-realm theory of truth is not enough. The basic essential for qualitative knowledge is not merely to establish the need for it, but to develop capacities for it. What might this entail?

Showing that such a transformation of knowing is both necessary and possible was a guiding concern of Rudolf Steiner’s throughout his life’s work. Connecting with the qualitative science of Goethe,

especially, as an actual example in Western culture of the beginning possibility of such qualitative ways of knowing, Steiner provided insights, examples, and exercises whereby the beginnings of the Goethean impulse could be carried further—and in all fields, in both science and the humanities. Without in any way attempting here an account of the riches Steiner has to offer, let us conclude by focusing briefly on one essential aspect of the qualitative way of knowing that he was able to demonstrate in his own person, and that he was concerned to show is a possibility for all. This is the realization that a qualitative transformation of knowing requires a qualitative transformation of the self, the knower.

This means that, in the work of knowing, the whole person is involved—the thinking, feeling, willing, and moral character of the knower. A starting point can be the realization that, as we have already pointed out, even in our sense-based knowing a certain minimum grasp of non-sensory realities is necessary. As the historian and philosopher John Lukacs has said: “[A]ll of our perceptions are, at least to some extent, extrasensory.”¹² And the philosopher and theologian David Ray Griffin has written: “Sensory perception is a very high-level, specialized type of perception which may or may not occur and which presupposes the existence of non-sensory perception.”¹³ A beginning task, then, becomes one of developing these incipient, and usually unconscious, non-sensory capacities into full-fledged, conscious capacities for qualitative perception and understanding. Steiner, for example, provides many meditative and observational exercises and considerations to enable us in this task. And the education of the whole person in Waldorf education, when rightly grasped and practiced, can provide in the earliest years a firm foundation for these capacities.

Also essential to the qualitative transformation of knowing is that knowledge

of qualities must be participatory. This is to say, I can only come to know qualities in the world—the world of nature, the world of others, the world of the spiritual—to the extent that I can bring those qualities to birth in myself. For example, the non-sensory qualities of love, joy, peace, patience, and many others, can be truly known by me as realities in the world only if I can come to experience them as realities in myself. And, it also works in the other direction: Opening myself to the qualities in the world can nurture and enable them to take root within myself.

What is possible to us, and much needed in our time, is a deep healing of the split between “the two realms of truth” such that we can speak equally of genuine knowledge in both realms, qualitative knowledge that can enliven both science and the humanities. And in this, there would always be an honored place for quantity, for, to the extent that it has meaning, quantity is a subset of quality.

Endnotes

- 1 John Paul Russo, *The Future without a Past: The Humanities in a Technological Society* (University of Missouri Press, Columbia, MO, 2005), pp.86–87.
- 2 Quoted in *Ibid.*, p. 115.
- 3 Paul Tillich, *The Spiritual Situation in Our Technical Society* (Mercer University Press, 1988), p.165.
- 4 The late Stephen Jay Gould, the renowned Yale biologist, wrote an entire book not long before his death setting forth a view of the two realms of truth that is almost exactly the same as that presented by Tillich and the theological reformers. Like the theologians, Gould’s concern is to argue that science and religion represent two entirely different domains of experience. Borrowing a rather clumsy term from Roman Catholic theology—*magisteria*, referring to the sphere of authority in teaching—Gould argues that science and religion represent two “Non-Overlapping Magisteria.” “The net, or magisterium, of science covers the empirical realm: what is the universe made of (fact) and why does it work this way (theory). The magisterium of religion extends