Theology and the Integration of Knowledge

by Terence L. Nichols
Department of Theology

In his Apostolic Constitution on Catholic Universities, John Paul II argues that a Catholic university is committed to exploration of the whole truth about persons and the universe, and that the integration of knowledge is of critical importance. He writes as follows:

In a Catholic university, research necessarily includes (a) the search for an integration of knowledge, (b) a dialogue between faith and reason, (c) an ethical concern, and (4) a theological perspective … . It is necessary to work toward a higher synthesis of knowledge, in which alone lies the possibility of satisfying that thirst for truth which is profoundly inscribed on the heart of the human person. Aided by the specific contributions of philosophy and theology, university scholars will be engaged in a constant effort to determine the relative place and meaning of the various disciplines within the context of the human person and the world that is enlightened by the Gospel, and therefore by a faith in Christ, the Logos, as the center of creation and of human history.[1]

In this essay I will consider the implications of this statement for the curriculum of a Catholic university. In particular, I will suggest a possible model for the integration of knowledge and consider the role of theology in that integration.

Any such integration is especially difficult today when research and publication in most disciplines, including theology, requires greater and greater specialization, and hence leads to greater and greater fragmentation of knowledge, not only across disciplines but even within disciplines. This fragmentation makes any kind of integral vision of human persons and their place in the universe increasingly tenuous. But the lack of such an integral vision contributes to a society of atomized individuals each seeking his or her own personal good, with little knowledge of any unifying metaphysic or common good. We see this today at virtually all levels of society, from the highest levels to the lowest. Individualism is desirable, but can only flourish within a society held together by some unifying vision of a common reality and common good, without which society disintegrates into alienated self-seeking individuals and competing factions, and even relatively simple problems (e.g., balancing the budget) cannot be solved.[2]

Given its commitment to specialized research, the modern secular multiversity appears to be unable to provide an integrating vision for society; rather, it is part of the problem. Disciplines typically are isolated by their particular assumptions and methodologies and usually contribute to the problem of fragmentation. Let us consider some examples. Economics routinely eliminates variables that do not lend themselves to calculation; thus, modern economic projections of growth do not factor in the drawdown in resources (loss of topsoil, ground water, minerals, coal and oil, etc.) or environmental pollution and the cost of cleanup. These so-called "externals" are instead left to the discipline of ecology. The Valdez oil spill actually increased the GNP because of the expenses of cleanup.

Again, it routinely is taught in finance that the purpose of publicly held companies is to maximize shareholder wealth. If that means firing one-third of the workers, or polluting the environment, so be it; the unemployment problem can be dealt with by the discipline of social work, and the pollution problem by ecology. Chemists produce some 5,000 new synthetic compounds each year, many of which are employed in industry with no research on their impact on the environment. And so on.

It need hardly be said that this fragmentation of knowledge is confusing to students, who usually take over the views of their majors uncritically, so that their world-view is shaped by the assumptions and methods common in their field. If one is a molecular biologist, working daily with the model that biological processes are determined by genetic and molecular input, the temptation is great to assume that genes and molecules account for the whole of the human person.

Within this fragmentation, different types of integration of knowledge are possible. The simplest is reductionism, the belief that things can be explained by reducing them to their elementary components and explaining the laws of the components. Reductionism is an indispensable method of scientific research. But often that method becomes a metaphysic or total world-view, which claims that everything can be explained by reductionism. This might be called metaphysical or ontological reductionism: nothing exists but material particles and energy, to which all else can be reduced. Thus Harvard biologist Edward O. Wilson, one of the founders of sociobiology, argues that social behavior can be explained by biology, biology by chemistry, and chemistry by physics. Eventually all higher disciplines will be reduced to nothing but the laws of chemistry and physics.[3] Some years ago Wilson told the National Conference of Catholic Bishops that science would soon render religion otiose and put the bishops out of business. Similarly, Nobel Laureate Francis Crick has argued that the goal of the sciences is to reduce all knowledge to the laws of chemistry and physics.[4] In The Astonishing Hypothesis he claims that the human person is "nothing but a pack of neurons," i.e., a collection of neural networks and their associated molecules, without free will or any spiritual aspect; once these networks are explained, we will be able to explain all human behavior.[5]

Reductionism succeeds in integrating knowledge by arguing that all higher knowledge can be reduced to a knowledge of elementary physical particles and molecules. But this is not a Christian or Catholic view. Catholicism, like virtually every other religion, believes that reality, especially persons, is a complex interaction of both material and non-material (or spiritual) dimensions. Ontological reductionism ignores the spiritual dimension and so promotes a partial and oversimplified picture of reality and a dehumanized picture of the person. A holistic science of reality must wrestle with the problem of describing both the material and spiritual aspects of reality, their interaction, and in what sense they form a true whole. As John Paul writes: "A Catholic university is distinguished by its free search for whole truth about nature, man, and God."[6] In a Catholic view, therefore, it is critical to integrate knowledge of the physical world with knowledge of spiritual reality, lest our view of reality be too limited, too dehumanized, or too fragmented (e.g., we imagine that matter and spirit are dissociated and do not interact).

A natural way of organizing the disciplines that preserves their autonomy but also helps to integrate them is to organize them in a hierarchy of levels corresponding to the complexity of the systems they investigate; thus, at the simplest level, physics investigates atomic and subatomic particles and the laws that govern them. Above physics is chemistry, which presumes and incorporates the laws of physics, but investigates larger molecular systems and so develops its own unique concepts, theories, methods, and laws. Above chemistry, but incorporating it, is biology, which investigates yet more complex systems — living systems — based on cells, and so develops its own set of concepts, methods, and laws. Above biology are the sciences that describe the behavior of living organisms, such as ethology and psychology. Finally, there are the disciplines that study human culture — the most complex system of all — such as anthropology, sociology, economics, the humanities, and philosophy. In this model the disciplines are arranged like a series of maps of increasing scale. At the most elementary level, physics provides a map of immense detail and atomic and subatomic sized scale; at the most general level are maps of large scale, surveying human behavior and culture.

It is important to note that at each higher level of systemic complexity new properties and characteristics emerge; thus, wetness is not a property of a single water molecule, but is a property of many water molecules together. Reproduction is not a property of atoms or small molecules, but is a property of cells and living systems. Consciousness is not a property of atoms, molecules, or cells, but is a property of higher animals and humans. This is a major reason, apart from scale, that each discipline must construct its own concepts, theories, and methods, just as an engineer must construct different tools for different types of machines and tasks.

Again, many thinkers argue that at each higher level new kinds of wholes are formed, which in turn influence the parts of which the wholes are composed. For example, elementary particles, such as photons, can be obtained in twin pair sets, in which the spin of one is identical with the other. But the spin of either particle is not determined until that particle interacts with a measuring device (or another particle). Recent experiments have determined that the measurement of spin of one particle precipitates the spin of its twin apparently instantaneously;[7] thus, even if the two particles are separated by a light year, the measurement of the spin of one particle still will immediately precipitate a determinate spin in the other particle. The two particles, even though separated by a great distance, nevertheless behave as one system, a whole, which cannot be explained by reductionistic methods: some kind of holistic cause would seem to be operating. Again, considering properties in a more complex system, psychologist Roger Sperry argues that the mind, though an emergent property that cannot exist apart from the brain, nevertheless is a quasi-autonomous whole that influences the behavior of the individual neurons, thus allowing free choices;[8] the parts influence the whole but the whole also influences the parts. It is precisely this that reductionists deny: they say the parts influence, indeed determine, the whole, but the whole does not influence the parts; thus, the human person is nothing but a pack of neurons, and free will is an illusion.

The hierarchy of disciplines that I have been describing from a scientific view culminates in two different but related wholes. One whole is human culture, which is due to the

interaction of many human persons, the most complex physical systems known. The other whole is nature: the ecosystem of the earth and the universe, a whole that influences the parts of which it is composed.

One way to integrate the various disciplines, then, is to arrange them in a hierarchy of complexity corresponding to systems or wholes of increasing complexity. Many disciplines must combine to give us a complete description of nature. Many more must combine to give us a description of human persons and human culture. In this integration each discipline preserves its own autonomy — using its own concepts, theories, and methods; higher disciplines, because they describe higher level wholes, cannot be reduced to lower disciplines as reductionists like Wilson Aver. But in addition to being autonomous the disciplines are loosely united in that many of them build on, incorporate, or are interrelated to other disciplines (chemistry builds on physics, biology on chemistry, psychology on biology and chemistry, etc.) All are necessary to describe human persons, human culture, and humanity's place in the cosmos.

From a Christian and Catholic point of view, however, the most comprehensive whole is not just the human person, nor human culture, nor even the earth's ecosystem or the physical universe. For human persons are individually and collectively parts of a larger spiritual and physical whole. Different religions describe this whole differently. In Catholicism, it might be described as the whole creation, including living and dead persons, related to God through Christ and the Holy Spirit. It is God who forms the ultimate environment for nature and persons. A complete picture of human persons and their environment must therefore include the relationship of persons to God, as well as to the ambient creation. The same is true for nature; nature in Catholic thinking is neither self-sufficient nor self-creating; like persons, it comes forth from God and returns eventually to God, who creates it and holds it in being. The whole truth about nature, man, and God, to use John Paul's language, must therefore include the relation of persons and nature to God. This requires a theological perspective, for theology is that discipline whose task is to talk about God (Gk theos = God, logos = word, study, science), and God's relation with creation, i.e., with nature and humanity.

Now many people think that Catholic theology is like catechesis, that is, just a matter of repeating ancient dogmatic formulas. This is a misperception and typically is based on little acquaintance with theological practice. Theology begins with broad questions, such as what is the nature of ultimate reality?, How is that reality related to humanity and the universe?, etc. A Catholic theologian works with the faith assumption that ultimate reality, God, has been revealed through the Hebrew prophets and more fully in Jesus the Christ, and this revelation has been passed on through the church in doctrine and tradition (including a long tradition of theological reflection). If a Catholic theologian came to the conclusion that ultimate reality was not God, or that God had not been revealed in Christ, or that the Church had in fundamental ways falsified that revelation, he or she would probably, to be honest, have to leave the discipline.

A Catholic theologian, then, works within a paradigm. It is not that the theologian already has all the answers (a charge Bertrand Russell leveled against St. Thomas Aquinas), but

that she has a certain broad orientation to problems, within which further exploration can take place. But this is true of any discipline. Biologists, for example, have a commitment to evolution, and to mechanism (as opposed to vitalism); within this framework they continue to search for more knowledge. Any biologist who rejected this overarching framework, i.e., rejected evolution or was a vitalist, probably could only teach in sectarian colleges, and could not publish in refereed journals. But it is also true that theologians, like biologists and other scholars, are continually returning to, examining, and re-verifying the foundational assumptions of their discipline (indeed, "foundational theology" is a recognized subdiscipline of theology).

From a (Catholic) theological perspective, then, the complex whole on which all disciplines converge is the whole made up of God, humanity, and nature: it is creation existing in God, and God immanent in creation. Let us call it God/Creation. This is like other wholes in the hierarchy of being, in that the active principle of the whole, God, affects the constituent parts, perhaps in a way similar to the action of the mind on the body. And the investigation of this whole is the task of theology. But clearly, theology cannot by itself provide an adequate account of this whole. Only theology in cooperation with the natural sciences, social sciences, and the humanities can begin to give us an adequate representation of this complex whole. Each discipline by itself can provide only a facet of the whole picture. But all working together can provide a more complete, though never entirely complete, model. And this, I would argue, is the ultimate reason for the integration of knowledge. For an adequate understanding of God/Creation is the whole point of Christianity and Catholicism (and for that matter of Judaism, Islam, Bahai, Hinduism, and most Eastern religions, though they may not use the term God to describe ultimate reality); it is important to our wholeness, holiness, and fulfillment as persons; it is important for our relationship with God and our ultimate salvation.

Now to try to bring the disciplines together in such an integration — an integration that preserves the unique method and concepts of each discipline, but which also shows how the disciplines can be related to a larger whole — is a long-term task, which may require generations, not just years. It will certainly require a significant modification of the current orientation toward research and specialization. But, as the saying goes, "A journey of a thousand miles must begin with the first step." There are already signs of an emphasis on wholeness and integration emerging within the sciences, as the work of the Santa Fe Institute shows.10 Integration of knowledge is also an emphasis in the field of theology and science. A logical extension is to further this work in the setting of a Catholic university, whose mission, as John Paul insists, is to include a search for the whole truth about God, humanity, and creation.

If we think of the whole to be known as God/Creation, then this sheds some light on how particular disciplines might be taught within the setting of a Catholic university. Let us consider some examples. Most of any physics course will be devoted to teaching the rather formidable content of physics. But in any course questions could be raised concerning how physics relates to the larger whole of God/Creation; indeed, such broad questions naturally emerge from within physics. What caused the Big Bang to occur? Why are physical laws and constants so precisely balanced that life can occur in the

universe? And so on. A major in physics might end with a course on how physics could be integrated with other disciplines, including philosophy and theology, and so bring its unique perspective to the ultimate mystery of God and God's relation with creation. Similar questions arise in other natural sciences, such as chemistry, biology, and geology. Within the psychological and social sciences, questions naturally emerge concerning the ultimate environment of the human person: can the person be fully understood as the product of natural forces alone (as reductionism claims), or is the person open to transcendent spiritual influences as well, which might be factors in shaping human psychology, history, and society?

In fact I would maintain that the mystery of God and God's relation to nature and humanity can be touched on by almost any discipline, and that each discipline can bring a unique perspective to this mystery; indeed, much of the best theology of nature right now is coming not from theologians, but from natural scientists, who are better positioned to appreciate the wonderful design found in nature than are theologians.

In the same way, ethical questions arise within each discipline, questions that query what the relation is between the contents and methods of the discipline and the ultimate good of human persons and society. Such questions would involve both philosophy and theology, insofar as the ultimate good of persons involves fellowship with God.

Thus it seems to me that within any discipline, both theological and ethical questions arise. Essentially these questions concern how that discipline, with its assumptions, contents, and methods, relates to the larger whole, God, humanity, nature. And I think that each discipline is in a position to offer a theological and ethical perspective that is unique and important to all those who are concerned with theology and ethics.

I agree, then, with John Paul, that research (and I would add teaching) in a Catholic university should include a quest for the integration of knowledge, an effort to relate faith and reason, a consideration of ethics and a theological perspective. These are all interrelated; for considering the ethical or theological perspective implicit in one's discipline is one way to relate it to the larger whole that is the aim of all knowledge, and so to integrate it with other disciplines.

I must admit, however, that the question of how individual disciplines fit within the larger whole discerned by a Catholic vision of reality has not been a concern of most scholars and teachers, even in Catholic colleges. The overriding emphasis has been on research and publication within one's specialty, on learning more and more about less and less, on methods and assumptions that serve to define one's discipline in contradistinction to others, rather than on methods and assumptions which would serve to show how that discipline is related to a larger whole.

I am not optimistic that this will change in the near future. The pressures for hyper-specialization and reductionism are too strong. But I do think that a shift is occurring in the sciences and elsewhere, and the necessity of the integration is coming to be recognized. I am convinced that the quest for integration of knowledge ought to be a part

of the Catholic curriculum, and probably can only survive at a religiously based institution. One way that administrators could foster this quest would be to rate interdisciplinary work on a par with specialized research and publication when evaluating faculty performance, promotion, and tenure. This could help shift the balance toward integration and away from ongoing fragmentation.

Notes

1. Ex Corde Ecclesiae, pp. 14-15, emphasis in original.

2. See Arthur M. Schlesinger Jr., The Disuniting of America. N.Y.: W.W. Norton, 1992.

3. Edward O. Wilson, Sociobiology: the New Synthesis. Cambridge, Mass.: Harvard Univ. Press, 1975.

4. "The ultimate aim of the modern movement in biology is in fact to explain all biology in terms of physics and chemistry." Francis Crick, Of Molecules and Men (Seattle: University of Washington Press, 1966), pg. 10.

5. The Astonishing Hypothesis (New York: Charles Scribner's Sons, 1994), pg. 3.

6. Ex Corde Ecclesiae, pg. 9.

7. On these experiments see Paul Davies, God and the New Physics (New York: Simon & Schuster, 1983), chap. 8; and P.C.W. Davies & J.R. Brown, The Ghost in the Atom. Cambridge, Cambridge Univ. Press, 1986.

8. Roger Sperry, "The New Mentalist Paradigm and Ultimate Concern," in Perspectives in Biology and Medicine, 29, 3, Part I, Spring, 1986, pp. 416-417.

9. The approach pioneered by scientists at the Santa Fe Institute is the exact opposite of reductionism; it seeks to explore the behavior and emergent properties of whole systems as wholes. These scientists, who include many Nobel prize winners, such as Murray Gell-Mann, "believe they are forging the first rigorous alternative to the kind of linear, reductionist thinking that has dominated science since the time of Newton." See M. Mitchell Waldrop, Complexity (N.Y.: Simon & Schuster, 1992), pg. 13 and ff.