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REVISIONING NATURAL LAW: FROM THE CLASSICIST PARADIGM TO EMERGENT PROBABILITY

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FOR SEVEN or eight semesters now I have taught an introduction to Roman Catholic ethics to undergraduates, a course in which we cover the sources from which ethical positions are derived, including natural law. I have discovered that it is impossible to teach about natural law without engaging in something of an apologia, or at least making an attempt to update it so that my students can relate to it. Richard Gula's text *Reason Informed by Faith* is very helpful here, but as an exercise in creative synthesis I have, with my students, grappled with an article by Sebastian Moore in 1989 in which he challenges the Roman Catholic teaching on contraception.[1] Moore's argument relies on an insight of Bernard Lonergan's that "the relationship between coition and conception is statistical."[2] Thus I have found myself giving lectures on the difference between the law of gravity, which is a classical law, and Cal Ripkin's batting averages, which are subject to statistical laws of probability, and, further, suggesting that conception is more like the latter than the former.[3]

A key insight here is that world process is governed by two types of "law." Classical laws explain one-to-one causality: the chemical and biological processes that occur once a sperm has fertilized an egg. Statistical laws explain the ideal frequencies that indicate when an event (such as fertilization) is likely to occur. If all of the created order were governed by classical laws (as presumed in the classicist worldview), natural moral law would involve determining how not to disrupt the

[1] Richard M. Gula, *Reason Informed By Faith* (New York: Paulist, 1989); Sebastian Moore, "The Crisis Over Contraception," *The Tablet* 243 (October, 1989) 1146–48.

[2] Ibid. 1147, where Moore cites a letter Lonergan wrote at the time of *Humane Vitae*, now published in *The Lonergan Studies Newsletter* 11 (1990) 7–8.

[3] This attempt to recognize the statistical aspects of conception has received further press recently, with an exchange in *America* on the occasion of the twenty-fifth anniversary of *Humanae Vitae;* see Richard A. McCormick, " 'Humanae Vitae' Twenty Five Years Later," *America* 169 (17 July 1993) 6–12; Kevin Flannery and Joseph Koterski, "Paul VI was Right," *America* 169 (25 Sept. 1993) 1–11; Richard A. McCormick, "A Response," *America* 169 (25 Sept. 1993) 11–14. Once again, Lonergan's claim that there is a statistical relationship between coition and conception entered the discussion, to the extent that an entire letter of Lonergan's (the same letter cited by Moore) was quoted by McCormick in his response. While I am neither qualified nor interested in entering into this debate over contraception, this exchange raises anew for me questions on the implications of Lonergan's notion of emergent probability for ethics.

given one-to-one causality. However, once one admits the probability factor into world process, the moral question shifts: How and under what conditions is it legitimate to affect the probabilities of various "natural" events (such as conception)?

A further distinction, emphasized by Gula, adds another dimension to the translation of natural law into our modern context. This is the fact that natural law incorporates two strains of tradition, that "according to nature" and that "according to reason." Here "nature" refers to the cycles of biology and animal sensitivity that humans have in common with other sentient species, and "reason" refers to the orders of will and intellect that are distinctive of the human species.[4] Most moral theologians are well aware of Ulpian's delineation of natural law as that which humans share with all animals. Many regret that Aquinas obeyed his sense of obligation to include this aspect of the tradition in his synthesis, since it perpetuated a reductionistic view of the human person.[5] Still, Lonergan's clue regarding the statistical aspects of the coition-conception relationship indicates that there is more involved in revisioning natural law than simply opting for reason over nature. Indeed, it seems that the rise of modern science and historical consciousness has meant that our cultural conceptions of both nature and reason have undergone a radical shift.[6]

[4] Semantics is problematic here, since "nature" has an equivocal meaning and "reason" often connotes a disembodied intellect. I have used these categories here in reference to Gula's use of them. However, in the sections that follow I try to speak of the "givens" in the whole of world process as "the created order" and use "nature" restrictively, to refer to the physical, chemical, botanical, and zoological aspects of both the human and the nonhuman world, in other words, to those aspects of the world studied by natural scientists. This includes what we would descriptively call "the body" and "the environment." Likewise, I understand "reason" or "intelligence" to refer holistically to the world as mediated by human meaning, not as something restricted to cognition or logic. I borrow this understanding from Lonergan's discussion of the distinction between history and natural science in *Method in Theology* (New York: Herder and Herder, 1972) 175–80. I am also indebted to Michael Shute, "Emergent Probability and the Ecofeminist Critique of Hierarchy," in *Lonergan and Feminism*, ed. C. Crysdale (Toronto: University of Toronto, 1994) 146–74; see especially 165 n. 3.

[5] See, e.g., Gula, *Reason* chaps. 15 and 16; and Charles E. Curran, *Directions in Fundamental Moral Theology* (Notre Dame: University of Notre Dame, 1985) chap. 5. Gula has an interesting analysis of recent Roman Catholic documents in terms of "reason" and "nature." He claims that most of the documents of this century that deal with sexuality use an "according to nature" argument while those that deal with social issues rely on an "according to reason" argument (see his chart in *Reason* 240). A recent article contradicts this thesis; see John Grabowski and Michael Naughton, "Catholic Social and Sexual Ethics: Inconsistent or Organic?" *The Thomist* 57 (1993) 555–78.

[6] Moore does not make these distinctions, but conflates an argument for a "personalist finality" to sexual intercourse with an argument about the statistical relationship between coition and conception. The two are not unrelated, as will become evident, but they are distinct. Gula does not conflate the two sets of distinctions but treats the shift in worldview only briefly and does not relate it to his more extensive discussion of the reason/nature dichotomy.

In other words, beside the distinction between the two strains of natural-law tradition, and cutting across it, is the historical shift from a classicist worldview to historical consciousness. In the latter worldview, both nature and reason are conceived as dynamic and developing, so that the derivation of moral principles from either must shift its argumentation. The earlier worldview, which we will call "classicist," incorporates a static view of both human meaning and its underlying animal sensitivities. Reason, that is, human meaning, while it certainly incorporates the changes involved in learning, is understood to have an ahistorical character to it. Likewise, the physical, chemical, biological, and zoological cycles of nature, while subject to certain changes such as growth and reproduction, are assumed to be explainable in terms of unchanging regularities.[7]

The revolution brought about by the rise of modern science involved a radical shift in our understanding of both the processes of nature and the evolution of human meaning. Modern science uncovered the processes of the created order by empirical observation rather than by logical deduction and in so doing revealed both nature and reason to be dynamic. That nature incorporates a flexibility that regularity cannot explain is exemplified by Darwin's theory of evolution. But even more revolutionary was the praxis of modern science, a praxis that revealed that human knowledge and meaning itself involve a dynamism that yields different truths at different times and places. This is what we now label "historical consciousness," and the implications of this new consciousness for theology are still being worked out.[8]

The purpose of this article is to examine emergent probability, as explicated by Lonergan, as a worldview that incorporates both the regularities explained by classical laws and the probabilities explained by statistical laws.[9] The objective is to delineate some of the implica-

[7] This is a caricature to a certain degree. Aristotle recognized contingency and change, but his focus was on the regularity of change and he tended to "explain away" chance as incidental to the greater regularity of form. See Lonergan's discussion of Aristotle in *Insight: A Study of Human Understanding* (Toronto: University of Toronto, 1992) 151–52; Patrick H. Byrne, "Insight and the Retrieval of Nature," in *Lonergan Workshop* 8, ed. Fred Lawrence (Atlanta: Scholars, 1990) 1–60; and Kenneth R. Melchin, *History, Ethics, and Emergent Probability* (Lanham, Md.: University Press of America, 1987) 98–101. See also Arthur R. Peacocke, *Creation and the World of Science* (Oxford: Clarendon, 1979).

[8] See Michael J. Himes, "The Human Person in Contemporary Theology: From Human Nature to Authentic Subjectivity," in *Introduction to Christian Ethics*, ed. Ronald P. Hamel and Kenneth R. Himes (New York: Paulist, 1989) 49–62.

[9] While there has been some work done on Lonergan and natural law, and on emergent probability and ethics, I am unaware of any works on emergent probability and natural law. See Frank P. Braio, "Lonergan's Recovery of the Notion of Natural Right: Introduction to a New Context for an Old Discussion," *Vera Lex* 10 (1990) 4–5, 10; John A. Gallagher, "Theological Categories in the Social Encyclicals," in *Rerum Novarum: One Hundred Years of Catholic Social Teaching*, ed. John Coleman and Gregory Baum

tions of this worldview for natural moral law.[10] How do we understand the relationship between moral norms and the given order of creation if this created order, which includes cycles of both nature and human meaning, is not given once and for all but is dynamically unfolding? Further, can emergent probability shed any light on the relationship between nature and reason as it relates to moral principles?

EMERGENT PROBABILITY: CLASSICAL AND STATISTICAL LAWS

Emergent probability is the term Lonergan gave to his account of world process, an account that seeks to explain both the regularities of systems and the probabilities arising from non-systematic aspects of the world. Our concern here is to understand the structure of classical laws, which explain regularities, and the structure of statistical laws, which explain probabilities, and the relationship of the two. This will lead us toward the goals of grasping world process as dynamic and of answering the question of how this dynamic process might contribute to natural law.

Let us begin, then, by observing that just as the mathematician designates the unknown to be "x," so the empirical inquirer seeks to understand the immanent intelligibility of some phenomena. Thus Galileo sought to grasp the immanent intelligibility of a free fall and began by observing similar properties of numerous objects dropped from various heights. By cataloguing and classifying properties common to the many instances of free fall, he was able to discover certain patterns, moving from the sensible similarity of things in relation to himself as observer to the similarity of things in relation to one another.[11] Eventually he was able to determine a differential equation whereby the relationship that held invariantly over all similar situations could be defined and explained. This invariance is what is presumed by science of the "classical" type, which seeks to explain the systematic "laws" of creation.[12]

(*Concilium* 1991/5) 36–46; idem, "The Relationship between the Natural Law and the Law of Grace in the Theology of Bernard Lonergan" (Ph.D. diss., University of Chicago Divinity School, 1983); Melchin, *History;* and idem, "Ethics in *Insight*," in *Lonergan Workshop* 8, ed. Fred Lawrence (Atlanta: Scholars, 1990).

[10] This article will not deal with other issues involved in natural law, which are often the subject of current debate, such as the relation between natural law and faith, or the nature/supernature distinction as it affects one's understanding of natural law; see S. Moore, "Ratzinger's 'Nature' Isn't Natural," *Commonweal* 117 (26 Jan. 1990) 49–52; and Thomas L. Schubeck, "The Reconstruction of Natural Law Reasoning: Liberation Theology as a Case Study," *Journal of Religious Ethics* 20 (1992) 149–207.

[11] On the move from description to explanation, see *Insight* 316–17, 320–21, 368–69. For Lonergan's discussion of Galileo, see ibid. 61–62; also Byrne, "*Insight* and Nature."

[12] Note that "classical" as used here is to be distinguished from "classicist." The "classicist worldview" refers to a premodern understanding of both human nature and the world, in contrast to the modern worldview that incorporates historical consciousness.

Note some of the characteristics of these kinds of laws. As already mentioned, they enjoy a certain invariance.[13] In other words, these laws of nature abstract from the particular places and times of the individual events that verify the law in question. A corollary of this is that the insights by which the immanent intelligibility ("the nature") of a certain phenomenon is grasped prescind from many otherwise coincidental aspects of a situation. Febrile seizures in children are explained by a failure of the brain's electrical signals due to the sudden onset of a high fever in a child genetically prone to such seizures. This explanation, and the concrete insight that yields a diagnosis in the hospital emergency room, has nothing to do with the color of the clothes the child is wearing, whether her hair is in a pony tail, or how tall she is.[14] Thus these classical laws, by their very nature, are abstract and leave unexplained many other aspects of a situation.

These "other aspects" are what constitute the data that is treated by statistical science. While much of what goes on in the world can be explained according to classical laws, not everything can be explained according to systematic process.[15] In addition to the regularity and invariance of the law of gravity or one's digestive system, there are other factors in the world that cannot be explained by a single insight into a multitude of data. These other factors form a coincidental aggregate of events that defy intelligible explanation.[16] The colors of the shirts worn in the hospital emergency room on the day I take my child in with a febrile seizure form such a coincidental aggregate. To seek an invariant pattern here, in which terms and relations are mutually

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While it can generally be said that the classicist worldview conceives of science predominantly as discovering classical laws, classical science continues within the purview of historical consciousness. What is new is the recognition of statistical as well as classical types of investigations.

[13] On the invariance of classical laws, see *Insight* 64.

[14] There are some factors that *are* relevant, such as the age of the child and the family history of such a disorder. It is important to determine which factors are systematically related to the phenomenon and which are merely coincidental. E.g., while racial origin or sexual activity may be merely coincidental elements in relation to the explanation of one disease, they may be significant factors in explaining another disease.

[15] Were it possible to explain everything according to systematic processes, formulated in classical laws, world process would be a matter of mechanistic determinism, as some claimed in the 17th and 18th centuries. That worldview was discredited by the discovery of an empirical indeterminacy in the laws of evolution and physics, so that statistical science has come to the fore. Some earlier thinkers accounted for the supposed randomness of certain aspects of the world by insisting that it was merely a matter of ignorance, that, given enough time and research, everything could be explained by systematic patterns and relationships. Lonergan contradicts this view, as would many others today, insisting that coincidental aggregates of events are an integral aspect of world process rather than the fruit of mere ignorance (*Insight* 72–76).

[16] See Lonergan's definition of coincidental aggregates in *Insight* 73.

explanatory, is to waste one's time. The best that such an inquiry could yield is the insight that there is no intelligibility to be found.[17]

Thus, besides the insights that yield explanatory laws about the systematic and invariant aspects of the world, there are the inverse insights into the lack of intelligibility of coincidental manifolds, the various aspects of concrete situations from which classical laws abstract.[18] These inverse insights, nevertheless, can lead to a different type of inquiry, which grasps a different sort of intelligibility in the world. This is the domain of statistical science, and a few key features of it can be delineated.

First, whereas classical investigation heads toward explanation of laws that pertain invariantly, laws verified in but abstracted from concrete situations, statistical inquiry clings to the concrete situation. Classical laws are based on the proviso "all things being equal," but statistical investigation recognizes first and foremost that all things are not equal. Thus the latter concerns itself, not with the invariance of certain phenomena, but with the frequency of the occurrence of these phenomena. Classical laws explain the laws of motion by which coins tossed in the air move through the air, but statistical science deals with the likelihood of such a coin landing with heads up. Galileo explained the nature of a free fall, but his theory could not determine whether or how often objects fall off buildings.[19]

Second, statistical science thus deals with frequencies of events. It answers the question "how often?" and does so by counting events of a certain classification and calculating probabilities. There follows the distinction between *ideal* and *actual* frequencies. Actual frequencies are the actual occurrences of a certain type of event over a certain time period, e.g. the number of deaths from gunshot wounds in the city of Baltimore in 1992. Ideal frequencies are the numerical ratios that are the mean from which actual frequencies diverge non-systematically. These ideal frequencies are what constitute probabilities and what one relies on in predicting the likelihood of a certain event happening (e.g. the likelihood of dying from a gunshot wound if one lives in Baltimore).

Third, whereas classical investigations often reach a point at which a theory about a systematic relationship is confirmed beyond a reasonable doubt, statistical science is subject to ongoing changes in coincidental manifolds of events. So it is that, while the search for the cause of diabetes has come to a term with the discovery of insulin,

[17] On inverse insights, see ibid. 43–50; on inverse insights and the type of intelligibility discovered by statistical science, see ibid. 80–81. See also Melchin, *History* 66–68.

[18] On differing notions of abstraction, see *Insight* 11–12.

[19] Note that, though statistical science concerns itself with concrete aspects of situations from which classical science abstracts, there is also an abstraction involved in statistical investigation. That is, statistical science relies on concrete instances but precinds from these in order to determine an ideal frequency. In this way statistical science is able to make generalizations about the current "state" of the world, e.g. the state of the economy, or of marriage in the U.S.

determining the likelihood of dying due to a gunshot wound in Baltimore in 1999 will require ever more and recurrent gathering of information. "So, perhaps, it is that astronomers can publish the exact times of the eclipses of past and future centuries, but meteorologists need a constant supply of fresh and accurate information to tell us about tomorrow's weather."[20] Hence, while classical inquiry seeks to determine "the nature of" certain phenomena, statistical science sets out to determine "the state of" the nation's health, the weather, the economy, vehicle safety, and so on. As "the state of" the weather, for example, is constantly changing, so statistical science is ever seeking and re-seeking its object.[21]

The question then arises, What is the relationship between these two types of investigation and the sense they make of the universe? If events in the world can be addressed with two sets of questions—either "why?" "how?" and "what?" on the one hand, and "how often?" on the other—do these two sets of questions bear any relation to one another? Lonergan answers with an explanation of the complementarity of the two types of investigation:

> For classical formulations regard conjugates, which are verified only in events. And statistical formulations regard events, which are defined only by conjugates. . . . In other words, classical laws tell what would happen if conditions were fulfilled; statistical laws tell how often conditions are fulfilled; and so the phrase "other things being equal" amounts to a vague reference to the statistical residues, which are the province of the complementary statistical laws.[22]

To translate this into an example, let us consider the case of Cal Ripkin and home runs. The data about Ripkin's past success at hitting home runs answers the question "how often?" and gives us data from which we can calculate the probability of his hitting home runs this season. Thus statistical science tells us the likelihood of some of the conditions for a home run being fulfilled. However, classical science, in this case the laws of physics, can explain what happens if and when conditions are fulfilled. That is, classical science explains the laws of motion whereby the ball moves through the air in a certain arc. The laws of motion are the explanatory conjugates, which are verified in

[20] *Insight* 74.

[21] This is not to say that statistical investigations never come to a term. On any one topic, within a given set of defined parameters, one can determine the "state" of something. E.g., one can gather enough data from an adequately representative sample to determine with confidence that the majority of young people between the ages of 13 and 20 in the U.S. believe that they are not vulnerable to contracting AIDS. What keeps statistical investigators busy reworking their studies is not that they can never adequately deal with the data before them, nor that their investigations never come to a term, but that the "states" which they are studying are always changing. And though the state of the economy, e.g., may stabilize, one only knows through ongoing study that it has stabilized.

[22] *Insight* 131.

events (instances of a ball moving through the air), while the events which are counted in statistical investigations are delineated by explanatory conjugates.[23]

Thus, while classical science tells us what will happen if the conditions of motion are fulfilled so that a home run occurs, it cannot indicate whether and when such conditions are likely to be fulfilled. So it is that batting averages are calculated, and calculated under a variety of conditions: Cal Ripkin's home-run average while batting against this particular pitcher, his home-run average in a world series, and so forth.

To give another example, the classical laws of biology explain what occurs when a sperm fertilizes an egg and conception takes place. In doing so, they delineate the conjugates that define conception. Without these conjugates it is impossible to determine fertility rates. But the biological definition and explanation of conception cannot, in and of themselves, determine fertility rates. In order to determine these, one must count and calculate, considering a range of variables, such as age, education, health, and frequency of intercourse, among couples within a certain geographic location.

Furthermore, statistical laws are operative if and when actual frequencies of events oscillate about a mean in a nonsystematic way. Thus, though the probability of rolling a six with a die is one in six, this does not mean that every sixth roll will yield a six. Rather, one might get a run of sixes or, alternatively, one might not get a six after twenty rolls.[24] It is this nonsystematic divergence that indicates that classical science has nothing to investigate here. It is when some systematic pattern of events begins to emerge that further investigation of the classical type is called for, e.g., are the dice loaded? To give another example, most couples under the age of forty who engage in non-contraceptive regular intercourse conceive a child within six months. For some couples it will take a year, for others ten days. These actual frequencies diverge nonsystematically from the average of six months. If a systematic pattern develops—if, for example, no conception takes place under these conditions over a period of years—some

[23] This example may be misleading because, of course, home runs are defined by convention, not by classical science. This leads to the distinction between experiential and explanatory conjugates. Experiential conjugates have to do with a description of an event (the ball flies through the air and passes over the fence at the far end of the field). Classical science moves beyond such description to explanation in terms, not of the observer, but of things in relation to one another (the moving object in relation to space and time). Baseball scores and statistics do not rely on a proper analysis of "home run" in terms of physical laws of motion. Thus the example given here relies on definitions based on experiential conjugates rather than explanatory conjugates. Nevertheless, the point still stands: statistics involves counting events, but unless an event is defined by a set of conjugates, there is no clear entity to be counted. On experiential and explanatory conjugates, see *Insight* 102–105.

[24] It is this randomness that makes gambling "fair." At the same time it is this randomness (i.e. the possibility of a run of sixes) that makes gambling so enticing.

explanation of the classical sort is sought after. This is what constitutes the diagnosis of reasons for infertility.

Thus we have treated both classical and statistical science and their respective heuristic structures. Both seek insights into the intelligibility of events in the world. Still, they seek different types of intelligibility and yield different yet complementary explanations of what goes on in the world. While one determines the invariant laws of the systematic processes of the world, all other things being equal, the other treats the nonsystematic aspects, calculating the likelihood that all other things will be equal.

EMERGENT PROBABILITY, WORLD PROCESS, AND HUMAN LIVING

How, then, does this explanation of two ways of making sense of the world result in an explanation of world process itself? Or, as Lonergan poses the question: "What world view is involved by our affirmation of both classical and statistical laws?"[25] Though Lonergan's answer to this question is somewhat complex, let us draw out some of the major points for our purposes here.[26]

The first point that is necessary to grasp is the notion of a scheme of recurrence. A scheme of recurrence occurs when the diverging series of conditions for an event coil around in a circle, so that event A fulfills the conditions for the occurrence of event B, which in turn fulfills conditions for C to occur, which then satisfies the conditions for A to recur. Thus a recurrent cycle emerges that has a certain stability to it. Further, defensive mechanisms can develop so that any intervening event that threatens the cycle is offset by a second cycle designed to eliminate the intruder. Examples of schemes of recurrence include the planetary system, the circulation of water over the face of the earth, the digestive system of mammals, the nitrogen cycle that keeps plants alive. Examples of defensive systems would be the body's immune system or the compensatory reactions of an environment when the ecological balance is disturbed.

Note that these schemes of recurrence are conditioned and not inevitable. Thus, though the scheme itself is a combination of classical laws that function with regularity, "schemes begin, continue, and cease to function in accord with statistical probabilities."[27] Further, not only are there single schemes, there are conditioned series of

[25] *Insight* 138.

[26] Lonergan presents a series of qualifiers before he launches into his answer to this question. An important proviso to be noted is that this explanation of world process involves articulating "the immanent design or order characteristic of a universe in which both classical and statistical laws obtain" (*Insight* 139). Lonergan thus precinds from addressing questions of the world's origins or its end. In addition, this account is not a specific account that appeals to the content of the empirical sciences; it is a general account of the structure within which empirical investigations go forward (ibid. 139–41).

[27] Ibid. 141.

schemes of recurrence. So it is that the circulation of water over the face of the earth is a scheme that itself is a condition for the possibility of the nitrogen cycle of plant life to occur. And the nitrogen cycle of plant life is a scheme that is itself a condition for the possibility of the digestive system of animal life to occur. So individual schemes themselves form a conditioned recurrent series of schemes.

At any stage of world process, then, there are probabilities for the emergence and survival of schemes of recurrence. The emergence of new schemes depends on a coincidental manifold of underlying events that produce the conditions for such an emergence. An example would be the random genetic mutations that yield a new species or subspecies. The survival of schemes of recurrence depends on the continued survival of the underlying conditioning schemes. Likewise, the demise of underlying schemes leads to the failure of higher integrations. Such is the ecosystem that, when changed, leads to the extinction of species.

Emergent probability is thus a generic explanation of world process that contradicts a determinism by which all of world process is considered intelligible according to classical laws. While classical laws explain the systematic aspects of the world, the emergence and survival of these systems depend on underlying conditions. And these underlying conditions occur according to schedules of probability. Thus Lonergan defines emergent probability as "the successive realization in accord with successive schedules of probability of a conditioned series of schemes of recurrence."[28] This worldview incorporates an indeterminacy that is not mere "chance" and which has its own intelligibility (that is, one can make some sense out of it) even though it is not the intelligibility of "automatic progress" or totally determined system.[29]

While the emergence or extinction of species serve as good examples of the probabilities inherent in world process, the examples used here have come almost exclusively from the natural sciences. What about human living and the schemes of recurrence that are not only intelligible but intelligent? How do human actions, the stuff of history, fit into this explanation of world process?

Just as in the arenas of physics, chemistry, biology, and zoology, so also human events and relationships manifest both classical and statistical laws. Emergent probability is operative in human living. There are schemes of recurrence and there are probabilities for their emergence and their survival:

> Children are born only to grow, mature, and beget children of their own. Inventions outlive their inventors and the memory of their origins. . . . The political machinery of agreement and decision is the permanent yet self-

[28] Ibid. 149.

[29] Chapter 4, section 3 of *Insight* deals with a "Clarification by Contrast" in which Lonergan discusses the Aristotelian, the Galilean, and the Darwinian worldviews, as well as that of Indeterminism (ibid. 151–61); see also, Melchin, *History* 115–17.

adapting source of an indefinite series of agreements and decisions. Clearly, schemes of recurrence exist and function. No less clearly, their functioning is not inevitable. . . . A vast technological expansion, robbed of its technicians, would become a monument more intricate but no more useful than the pyramids. An economy can falter, though resources and capital equipment abound, though skill cries for its opportunity and desire for skill's product, though labor asks for work and industry is eager to employ it; then one can prime the pumps and make X occur; but because the schemes are not functioning properly, X fails to recur.[30]

Nevertheless, human affairs fall under emergent probability in a distinctive way. Though human schemes emerge and reach a stability whereby they function automatically, as human life develops a significantly different scenario unfolds. Less and less importance is attached to mere circumstance, and more and more importance is attached to the operating of human intelligence and choice. The significant probabilities become, not those of emerging physical, chemical, biological, or zoological systems, but those of the occurrence of insight, communication, persuasion, consensus, and action.

So an infant's haphazard encounters with his world can lead to recurrent gross-motor or fine-motor skills. These in turn expand the range of his universe, and experimentation with sound making can lead to meaning making. Cognitive skills eventually develop and the physical autonomy of the two-year-old becomes the intellectual autonomy of the adolescent. The schemes of recurrence in the human person are what we call habits: recurrent operations that at first are haphazard, then are consciously practiced, and eventually become routine.[31] As basic routines are established autonomy grows, so that freedom and choice become ever more constitutive. In other words, the child grows to the "age of reason" whereby she herself chooses the conditions, sets the probabilities for the emergence of further schemes of recurrence. Rather than being merely "conditioned by" their environments, humans are "conditioners of" their environments and, hence, of themselves. This is what is meant by essential freedom, and its potential is given in the fact that humans are not only intelligible but also intelligent, that is, agents who grasp meaning and transform their worlds through action.[32]

Lest I seem to be granting too much power to the individual, note that human communities are no less subject to emergent probability, and that schemes of recurrence in a community set the conditions for individual development. Communal schemes of recurrence are the economy and polity mentioned in the quote from Lonergan above. No

[30] *Insight* 235.

[31] See Lonergan's discussion of Jean Piaget and the development of skills (*Method* 27–30), and also Melchin's discussion (*History* 125–28).

[32] On Lonergan's distinction between "essential" and "effective" freedom, see *Insight* 643–47; and Melchin, *History* 125.

less, they are the patterns of familial affection, of the discipline of children, of the school systems by which children are educated. These schemes themselves are subject to probabilities: climate sets limits on types of economic resources, economic resources affect the type of educational systems that can be developed, technology makes new social arrangements possible.[33] These in turn set the conditions for the development of individual habits: children in war-torn countries lack social stability, which in turn severely curtails the development of intellectual or emotional habits.

A further significant corollary follows. Once one enters into a discussion of emergent probability in human affairs one has necessarily entered into the arena of history. And history, under this interpretation, is neither automatic progress nor complete chaos. Rather, it is a series of increasingly complex, increasingly more systematized integrations of meaning and practice, which are, nevertheless, subject to probabilities of emergence and survival.[34] Furthermore, we have been catapulted, not only into a discussion of history, but into the realm of ethics. For greater system does not always mean the realization of the good, and among schemes of recurrence that emerge and continue to function one needs to distinguish the good from the bad, progress from decline. The development of racial hatred and the fine-tuning of terrorist skills in Palestinian children may be an instance of an emergent system, just as the systematic destruction of Jews in Nazi Germany represented an apex in human efficiency. However, neither the one nor the other would be considered the apex of human flourishing.

Thus human living and the history that emerges concretely from it are to be understood under the rubric of emergent probability: they are subject to both the classical laws that explain recurrent schemes and the statistical laws that explain the emergence and survival of these schemes. Furthermore, neither history nor human science can remain merely descriptive. Yet neither can become explanatory without elucidating norms.[35] So we come at last to the main subject of our inquiry.

[33] This was brought home to me when I visited Charleston, S.C. in the summer heat. The colonial buildings were all designed to minimize the discomfort of a southern climate. With the advent of air conditioning, such architectural and community design changed radically. In fact, much of contemporary sociocultural and economic life in the U.S. (most notably the pilgrimage of retirees to Florida each winter) is radically "conditioned" by the advent of air conditioning.

[34] These probabilities are mutually conditioning, so that a series of dialectical relationships emerges (dialectical here refers to a complementary interaction of two opposing principles). Within the individual there is the dialectic between the underlying physical and neural manifolds and the operation of intelligence. Within the community there is the dialectic between intersubjectivity and the social order; see *Insight* chaps. 6 and 7; also Robert Doran's development of these dialectics in *Theology and the Dialectics of History* (Toronto: University of Toronto, 1990).

[35] Lonergan makes the following statement about history: "The challenge of history is for man progressively to restrict the realm of chance or fate or destiny and progressively to enlarge the realm of conscious grasp and deliberate choice" (*Insight* 253). He insists

Are there any norms implicit in world order itself that can be highlighted, clarified, and expressed in such a way that they might guide human living? If world order, including human living, involves by its very make-up elements of probability, if world order and human living are not merely matters of systems not to be interfered with, can the order of reality contribute anything toward principles by which we ought to live?

EMERGENT PROBABILITY AND NATURAL LAW

A first task is to recognize and dispense with a tendency to grant the underlying manifolds of nature a fixed intentionality of their own. Though rarely defended in an unnuanced form, what I label the "no intervention argument" finds its way into much popular, if not scholarly, debate. The general character of the argument is that God has given a certain order to the world and we are not to intervene but to "let nature takes its course." At its worst, this argument can involve a kind of mystification of nature, so that nature seems to have a mind, to be intelligent and intentional rather than merely intelligible.[36]

It should be clear from our foregoing exposition that this approach involves a set of implicit, if not explicit, assumptions about the structure of world process, a set of assumptions that overlooks a flexibility and dynamism built into world process. The fact of the matter is that the created order, even including the most stable aspects of it such as the solar system, is subject to conditions which all have their probabilities of occurring and perduring. Furthermore, the fact that humans are agents of reason, and therefore have an autonomy that other portions of the created order do not have, means that humans have a unique role in affecting probabilities. Human persons can and do foresee possibilities and pursue them in an effort to create systems, to create conditions for the emergence of new orders or devise mechanisms to offset the demise of current orders.

A case study that illustrates this involves the forest fires in Yellow-

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that common sense, though it takes on this task, is not competent, in and of itself, to execute the task. It needs to be subject to the more explanatory grasp of human science, as well as the critical insights of normative history—that is, of ethics—and the transcendent perspective of religion. Of human science, Lonergan says that it "cannot be merely empirical; it has to be critical; to reach a critical standpoint, it has to be normative. This is a tall order for human science as it has hitherto existed. But people looking for easy tasks had best renounce any ambition to be scientists; and if mathematicians and physicists can surmount their surds, the human scientist can learn to master his" (*Insight* 261).

[36] This is a caricature of the commonsense view. More scholarly views do at times add nuances to recognize the autonomy of human reason. The problem with many of these arguments is not that they overlook the way in which human actions affect probabilities but that they appeal inconsistently to human freedom. On some issues persons are to use their consciences freely in conjunction with a discernment of God's will. On other issues this discernment seems to be merely a matter of conforming to an order written in nature.

stone National Park during the summer of 1988, when the park policy to allow natural fires to burn themselves out came under heavy criticism. Whereas the "let burn" policy had worked to increase biodiversity over the previous sixteen years, the drought conditions and the lack of intervention in the summer of 1988 led to unprecedented destruction of this country's "national treasure": over 989,000 of the park's 2.2 million acres were burned, causing a 40% decline in the elk population and a 25% decline in bison.[37] Debates over philosophical issues continued long after the fires were extinguished.

The "natural fire" or "natural regulation" policy involved distinguishing between fires started by humans and fires that had a natural cause such as lightning. Conventional wisdom held that such natural fires were an acceptable aspect of the rhythms of nature and that nature should be allowed to reestablish its own balance through such fires.[38] This natural-regulation policy had its roots in the environmental movement of the 1960s, a movement that assumed that all human intervention led to destruction of the wilderness. "As man was the source of all evil, expelling him became the way to restore and preserve wilderness."[39] Specifically, the natural-fire approach was derived from the Leopold Report of 1963 which advocated a "hands-off" policy in the National Park system, so that natural forces might create a "vignette of primitive America."[40]

What the Yellowstone fires of 1988 prove is that the idea of human nonintervention in wilderness is not only impractical, it is impossible. "Letting nature take its course," as if nature were somehow over against human action, with a will of its own, is not only a false moral ideal, it is an impossible proposal. The created order, it turns out, is a complex system of cycles of recurrence, some of which involve human action. And just as there are schedules of probability within natural cycles, which set the conditions for other natural occurrences, so natu-

[37] Richard Conniff, "Yellowstone's 'Rebirth' amid the Ashes Is Not Neat or Simple, but Is Real," *The Smithsonian* 20 (1989) 36–47. Other articles on the Yellowstone fires of 1988 include: David Jeffery, "Yellowstone: The Great Fires of 1988," *National Geographic* 175 (Feb. 1989) 255–73; Wilbur Wood, "Political Fires Still Smolder," *The Nation* 249 (7/14 Aug. 1989) 162–64; Micah Morrison, "While Yellowstone Burned," *The American Spectator* 21 (Nov. 1988) 18–22; idem., "The Yellowstone Scam," *The American Spectator* 22 (Aug. 1989) 17–20; "Yellowstone Lives!" *U.S. News and World Report* (15 May 1989) 24–26.

[38] One of the widely hailed facts among proponents of natural-fire philosophy involves the lodgepole pine. Apparently, one third of the lodgepole pines in Yellowstone have a special adaptation to fire, called serotiny. Their pinecones only open and release seeds when exposed to intense heat, thus endorsing the idea that "nature" has its own way of making use of what humans often consider a disaster (Conniff, "Yellowstone's 'Rebirth' " 42).

[39] Alston Chase, *Playing God in Yellowstone: The Destruction of America's First National Park* (New York: Harcourt, Brace, Jovanovich, 1986), as quoted in Morrison "While Yellowstone Burned" 19.

[40] See Conniff, "Yellowstone's 'Rebirth' " 39.

ral cycles set conditions for human choices, and human actions, or lack thereof, set conditions for the emergence of natural phenomena.

Indeed, even the ideal of preserving wilderness in the National Parks involves human "management" of ecosystems within the parks. The "let burn" policy was a *human* policy designed to facilitate certain ends that humans designated as valuable. And the statistical aspects of the created order become evident as policy is debated. Many critics of the "let burn" policy claim that the fires of 1988 should have been predicted, given the buildup of fuel during the years when all fires were suppressed and given the drought in the spring of 1988. Much of the debate over future wilderness policies involves determining probabilities, predicting the outcomes of certain human actions. Whether the issue is wildlife management ("Should bears be allowed to feed at garbage dumps in the park?"[41]) or fire management, recognizing and predicting probabilities of the emergence, survival, or demise of cycles of recurrence is necessarily a part of ethical analysis.[42]

To provide examples from another arena, medical treatment of any kind serves as an effort to affect probabilities. An ear infection may heal itself in good time, but the use of antibiotics will ensure its expeditious healing. To choose not to affect the probabilities is not a choice here: no treatment affects the probabilities just as much as treatment does. Similarly, the choices that occur at the end of life are only choices at the end of a continuum, and the moral questions are not whether to interrupt nature's course or not, but which actions are in accord with the meaning of human life and dignity and which contravene these and, in particular, how the value of physical survival fits into this nexus of values.

Likewise, medical ethics depends in large part on the calculation of probabilities. Thus, in the case of a pregnant woman dying of leukemia, questions about whether and when to deliver the fetus depend on many probabilities. What is the likelihood of the woman living through the term of the pregnancy? What kinds of treatments that may prolong the mother's life will harm the fetus? If the fetus is delivered at 26 weeks, say, what sorts of risks will it face?[43] In other words, if medical ethics involves the analysis of the relative benefits or burdens of a proposed treatment, the calculation of the likelihood of

[41] See Wilbur Wood, "What Is Wild and What Is Natural?" *The Nation* 243 (16/23 Aug., 1986) 1, 112–14.

[42] Conniff records an interesting debate between two researchers, Park service botanist Don Despain and Tom Bonnicksen from Texas A.&M. University, a specialist in restoration ecology. Most of their debate revolves around trying to recognize patterns in the occurrence of major forest fires and predicting probabilities for major forest fires in the future ("Yellowstone's 'Rebirth' " 44–46).

[43] See John F. Touhey, "Terminal Care and the Pregnant Woman: Ethical Reflections on *In Re: A.C.*," *Pediatrics* 88 (1991) 1268–73, in particular, his review of statistics on survival rates and various indicators of health for preterm infants, as a way of predicting what the chances are of quality life for an infant delivered at 26 weeks (ibid. 1270).

these benefits and burdens is a major aspect of ethical analysis. Not only is "not intervening" a nonoption, since lack of intervention merely shifts probabilities in one direction rather than another, but the recognition of probable outcomes for possible courses of action is necessarily part of the moral process.

What is at issue here is the recognition of statistical laws as *constitutive* of the order of the world. The conditional nature of all of existence is neither the fruit of ignorance ("once we understand things better we will explain away this conditional aspect of the world") nor an aberration to be overcome. To the degree that one ascribes the creation of this world to God's loving design, probabilities and the uncertainty that comes with them are given by God. Doing the right thing involves discerning, with an acceptance of the limitations of one's foresight, how God might want me/us to affect the future conditions of the world. God's will, rather than being a matter of conforming to an already established pattern in the world, involves creating patterns as part of a web of conditioning probabilities. The moral task involves not conforming to nature but transforming it.

Still, the question arises, "Are there limits to transforming nature?" The answer is "Yes" and is grounded in the fact that human efforts to systematize some orders in the world will never ultimately do away with the nonsystematic aspects of world process. Many human choices seek to provide a systematic element to an otherwise randomly occurring set of events. Such is the effort to immunize children, the prescription of medicine, the use of contraceptive devices, and the fighting of forest fires. But no intervention that seeks to affect probabilities will ever ultimately shift the conditioned nature of existence.[44] So immunization may prevent one disease only to introduce other variables that threaten existence.[45] So it is that no contraceptive device is one-hundred-percent guaranteed, and every medicine is subject to failure. So it is that efforts to systematize agriculture can lead to reactions from the environment that yield a new situation with which one must deal.

This leads to the recognition that there are two potential flaws arising from the oversight of the probabilities that are constitutive of our world. On the one hand, the "no intervention" tendency presumes a determined order to the world that should be adhered to. On the other hand, there is the view that there are no limits to human intervention. This approach presumes that the autonomy of human reason, and therefore freedom, is absolute. The implicit hope here is that human action can so systematize nature that the uncertainty that comes with a conditioned universe can be overcome. This accounts for the untrammeled development of technology, the proliferation of legal-liability

[44] I am particularly indebted to Dr. Kenneth Melchin of St. Paul's University, Ottawa, for insight into this point.

[45] See, e.g., "Chicken Pox Conundrum," *Time* (19 July 1993) 53.

cases, the blame ascribed to the medical profession when treatments do not work, and some of the rage vented in 1988 towards the Yellowstone management team.[46]

Both approaches are ill founded and require correction. To admonish people to conform to a given created order, when their constitution is such as to orient them toward the transforming of themselves and their worlds, is to stifle human flourishing and overlook the role of human value and action in history. On the other hand, to promote unreflective intervention in the created world as if there were no conditions limiting such intervention is to sabotage, as we now realize, the very existence of the species itself.

Further nuances can be added to my argument if we return again to the "reason" versus "nature" concern in the development of natural law. The issue here involves the role of human meaning in history. It involves understanding the nature of the relationship between the underlying physical, chemical, biological, and zoological schemes of recurrence and human intelligence and choice, both *within* human persons and *between* human persons and the rest of the created order. Lonergan's explanation of conditioned series of schemes of recurrence can provide a helpful perspective here, one that avoids the dualism of spirit and matter that has been so destructive in the past.[47]

Recall that manifolds of coincidental aggregates, e.g. atoms bouncing about in a particular time and place, can provide the opportunity for a higher system to emerge. Thus, chemical compounds emerge that rely on but are distinct from coincidental aggregates of atoms. Likewise, these emergent units are merely juxtaposed to one another until some new and higher integration occurs, such as the organic processes of plant life that rely on, but integrate chemical processes into a distinctive system. So also, animal life is a combination of organic processes into a system by which animals are aware of and sensitive to their surroundings. Thus sensitive creatures are a higher integration of the organic, which in turn relies on chemical processes, which can only occur if physical material is there to be integrated.

Now human living involves a further integration, that of conscious intelligence in all of its various modes. Human consciousness goes beyond the merely sensitive to inquire spontaneously about the world. Whereas sensitive animals react to their environments, humans seek to understand and to create their environments. At the same time, inquiry depends on sensitive images as the matter into which it in-

[46] In theological language this constitutes the essence of sin: the presumption that one can be an agent without limits, a creator rather than a creature. Here I believe one can recognize the strengths of the Roman Catholic teachings on sexuality and the family. They express, with due reason, cautions about an unreflective and unrestrained transformation of nature, which would result in families being defined solely by legal or technological categories.

[47] See Shute, "Ecofeminist."

quires. So human living involves a higher integration of the lower orders of physical, chemical, organic, and sensitive processes.[48] Far from implying a dualism of mind and body, this view asserts an intricate interdependency among many layers of the created order.

From Lonergan's analysis of world process, then, we get a very complex view of the human person. On the one hand, the central form of the human person is constituted by the higher integration of lower manifolds of schemes of recurrence, namely, intelligent consciousness. Humans can and do create some of the conditions of their own existence. On the other hand, this higher integration is dependent upon schemes of recurrence beyond the reach of human agency. We are embodied beings; and without the proper functioning of physical, chemical, organic, and psychic processes, neither human schemes of intelligence nor human moral agency can exist.[49]

What are the implications of this view for deriving moral principles from the created order? The most reductionist of natural-law arguments will appeal to sensitive animal routines as a basis for moral principles.[50] This approach is enticing, since the routines of animal living are generally more predictable and more stable (all other things being equal) than those that involve human will. Still, this overlooks the fact that human consciousness, by virtue of the fact that it is an integration of lower manifolds, transforms those lower manifolds. So human sexuality is imbued with cultural meanings; so human death is dealt with by religious ritual; so food is served with grandeur and style. To determine how one should act with regard to any of these one must deal with the cultural meanings, the social and political schemes of recurrence, the autonomous acts, and the intelligent inquiry that

[48] See Lonergan's discussion of the "unity of man" (*Insight* 538–43).

[49] This raises, of course, the question of the possibility of immortality. If human intelligent consciousness is ultimately dependent upon underlying manifolds of physical, chemical, organic, and zoological schemes of recurrence, then when these cease to operate the human individual comes to an end. Lonergan responds that the central form of the human person is not constituted by these underlying schemes of recurrence but by the higher integration, an integration of "spirit." If this is the case, it is possible to envision the central form of an individual continuing to exist without the bodily underpinnings (ibid. 542–43).

[50] Note that these issues do not play themselves out only in theological circles. Indeed, in this century, one of the most interesting arenas in which reductionist tendencies have been evident is that of psychology. As the fruit of natural science, efforts were made to explain human behavior along the same lines as zoology explained animal behavior. The birth of human science as a distinct science, whose objects of study happened to be the same as the intelligent subjects who were the researchers, was long in coming. Now human science seems to have accepted the complexity of understanding human behavior, and the dominance of strict behaviorists such as B. F. Skinner is waning. The burning issue now is hermeneutical: how to interpret human behavior in a way that is scientific and objective at the same time that it deals with human meaning and value. See, e.g., Norma Haan, et al., eds., *Social Science as Moral Inquiry* (New York: Columbia University, 1983); Paul Rabinow and William Sullivan, eds., *Interpretive Social Science: A Reader* (Berkeley: University of California, 1979).

constitute human living. To the degree that human living is predicated upon the existence of underlying schemes of recurrence one must understand them correctly and respect their integrity. But these are exigencies that merely provide potential for and set limits upon human living; moral questions cannot be resolved by appeal to these lower levels in and of themselves.[51]

Likewise, the fact of human consciousness sets the human species apart from other animate and inanimate species. So settling questions of environmental ethics involves the imperative to "be attentive" to the biological and zoological schemes of recurrence involved in the nonhuman world. And while these schemes do have an order and purpose of their own, to ascribe consciousness or intentionality to them is problematic.[52] As Holmes Rolston puts it in his discussion of animal rights, "The concept breaks down because nature is not culture."[53] This is not to say that underlying schemes are merely instruments for use toward human ends; indeed, the instrumental view of nature is in dire need of correction. But a critique of "man" as dominating nature, and a recovery of an ecological consciousness, requires a change in *human* values. It does not necessarily require reducing humanity to a lower level of functioning or, alternately, ascribing consciousness and intentionality to nonhuman cycles of nature.[54] To recognize the distinctness of human meaning and value making is not to negate the intrinsic value of the manifolds of schemes of recurrence that coexist with the unfolding of human history. Neither is it to set up a polarity of "man" over against nature, since the two are involved in an intricate web of conditioning probabilities.

The point here is twofold. First, the underlying manifolds of nature cannot be directly translated into moral norms. Moral questions arise only with the advent of intelligent consciousness. Moral questions can be answered adequately only through being attentive, intelligent, rea-

[51] See Mary Frohlich, "From Mystification to Mystery: Lonergan and the Theological Significance of Sexuality," in Crysdale, ed., *Lonergan and Feminism* 175–98.

[52] In saying that natural schemes have an order and purpose of their own, I am thinking of Lonergan's discussion of horizontal finality. Lonergan speaks of horizontal and vertical finality, meaning that every scheme of recurrence is ordered both to its own continuance and toward its transformation into a higher degree of systematization. Though I am unable to do it here, a fruitful path to explore in further developing the implications of emergent probability for natural law would involve an examination of these two notions in Lonergan. He discusses them at length in his early essay, "Finality, Love, and Marriage," in *Collection,* ed. Frederick E. Crowe and Robert M. Doran (Toronto: University of Toronto, 1988) 17–52.

[53] Holmes Rolston, III, *Environmental Ethics* (Philadelphia: Temple University, 1988) 51.

[54] I realize that saying this does not solve the complicated moral problems that arise when the interests of various species conflict. Indeed, one of the important aspects of recent ecological consciousness involves recognizing that human interests, in terms of productivity, efficiency, and profit, should not be hegemonic in determining the future of the environment. Nevertheless, sorting out conflicting interests involves calculating the probable outcomes of certain actions and weighing these in light of human values.

sonable, and responsible. Principles of natural law must therefore be grounded in the structure of human consciousness ("reason") rather than derived directly from the routines of animal sensitivity or biological processes ("nature").[55] Second, human intelligence and moral agency are only relatively free. Some of the conditions of the possibility of knowing are physiological. Many of the conditions of human existence are ecological. So one aspect of "being attentive" is attending to the complex interrelations among nonintelligent schemes of recurrence. And the imperative "be responsible" involves as corollaries the imperatives "get your facts straight" and "calculate as accurately as possible the probable consequences of your actions." Thus principles of natural law, while they cannot be directly derived from knowledge of natural, nonintelligent processes, must take such knowledge into account or risk violating the very premise of natural law itself—that of attending to the created order.

CONCLUSION

Where does this leave us in terms of the implications of emergent probability for natural law? First, our understanding of the order of creation must incorporate the fact that the world is constituted by both classical and statistical laws. This means that not all phenomena can be explained by simple one-to-one causalities, but that each set of causal relationships is subject to a set of probabilities. Human choices and human norms involve choosing how to affect probabilities, not merely choosing not to intervene in natural processes. At the same time, probabilities set limits on the transformation of the created order, and one can never systematize this order in such a way that the conditional constitution of the world is overcome.

Secondly, humans are unified combinations of both animal sensitivity and intelligent consciousness. The essence of what it means to be human lies not in the underlying chemical, biological, and sensitive manifolds but in the intelligence and deliberation that define the human species. The foundation of natural moral law thus lies in the normative constitution of human consciousness and not simply in the underlying processes that show some similarity to the routines of other

[55] In response to a question about the "absolute in ethics" Lonergan replied, "The natural law is Be Attentive, Be Intelligent, Be Reasonable, Be Responsible, and any precept you arrive at you arrive at from observing these precepts" (1974 Lonergan Workshop at Boston College, Question Session 5 [21 June 1974], from the typescript at the Lonergan Research Institute, Toronto, p. 17). Lonergan makes essentially the same point in a less direct way in the following published works: *Method* 20, 53, 55, 231, 302; *Doctrinal Pluralism* (Milwaukee: Marquette University 1971) 8; *Collection* 230; *Second Collection,* ed. William F. J. Ryan and Bernard J. Tyrrell (London: Darton, Longman, and Todd, 1974) 3–6, 169–79; *Third Collection,* ed. F. E. Crowe (New York: Paulist, 1985) 7–8, 144, 172–73; and "Questionnaire on Philosophy," in *Method: Journal of Lonergan Studies* 2 (1984) 27. These references were collected by Michael Vertin and Frederick Crowe.

animals or species. At the same time, however, the conditioned nature of human existence and intelligence cannot be overlooked. To the degree that natural law demands that one be attentive to the created order, the moral theologian must take stock of the manifolds of nonintelligent schemes of recurrence that condition human being. Thus knowledge of the natural world—reproductive processes, ecological systems, medical diagnoses—is an imperative for responsible ethics.

In conclusion, a revised natural law is both possible and imperative. It will recognize the conditioned nature of all of existence, and in particular the statistical laws that contribute to world process. It must further locate itself in an analysis of history that is critical and normative, but that grounds its critical stance in the norms constitutive of human intelligence. It will attend to chemical, biological, and zoological schemes of recurrence as conditioning factors in human existence, both within the human subject and between that subject and her environment, without seeking to derive moral norms directly from these natural processes. It will take as an important task, not defining ways in which persons should conform to nature, but clarifying the values implicit in interventions in nature, and stipulating which transformations are ultimately conducive to human flourishing and which are not.[56]

[56] This comment on "human flourishing" may sound very anthropocentric. However, an appeal to human flourishing does not necessarily involve an instrumental view of nonhuman aspects of the universe, nor does it necessarily imply domination of nature. Indeed, I would insist that human flourishing, as a fulfillment of the transcendental imperatives mentioned above, includes recognizing the intrinsic value of all of creation and working toward a cooperative relationship with nonhuman species and processes.