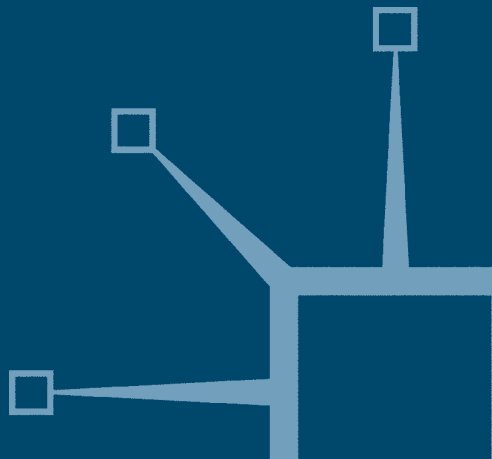


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# Metaphors for God's Time in Science and Religion

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Stephen Happel



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# Metaphors for God's Time in Science and Religion

Stephen Happel

*Dean, School of Religious Studies  
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'The time has come,' the Walrus said,  
'To talk of many things:  
Of shoes – of ships – and sealing wax  
Of cabbages and kings,'  
Lewis Carroll, *Through the Looking Glass*

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Stephen Happel, Dean  
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# Introduction: Can Transcendence be Found in Things?

Geometry came to a halt,  
struck with amazement at the glittering sky.  
Her hair was beautifully groomed, but  
her feet were covered with dust.

Martianus Capellus,  
*The Marriage of Philology and Mercury*, ca. 410–439

This book is about many questions: God, time, and the search by human beings for God in time and space. As Coleridge said of George Berkeley, the philosopher and bishop, because the topic reaches from ‘tar-water, ends with the Trinity, the *omne scibile* forming the inter-space,’<sup>1</sup> carrying a map or fixing upon a geophysical satellite might be useful as readers travel through the terrain. In the foreground I will examine the ways in which metaphors for time function in the natural sciences and theology or religious studies.<sup>2</sup> But I will aim for a view of God and divine action in our world that includes, rather than excludes, all of creation – from the formation of metals and planets to human beings. To complete these tasks will require some clarity about notions of metaphor, changing notions of temporality in the sciences, and Christian theology. If it has been chronically painful for theology since the nineteenth century to become privatized, relegated to personal experience or intimate interpersonal interactions, this book hopes to be some remedy.

To scientists, it will be obvious that I am not a mathematician or a specialist in any of the fields whose data and interpretations I oversee. My academic training is in philosophy, literary and cultural studies, and Christian theology. I will examine the images and texts of science as literature, a peculiar, and not always ‘artful,’ type of prose to be sure,

but a literature with metaphors nonetheless. Recognizing that scientists use language and symbols to communicate their findings has guided my investigations.<sup>3</sup> Implicitly, sometimes explicitly, rhetoric has a role within scientific discourse itself. Increasingly, the politics of grant-application and reception is understood as an exercise in public rhetoric. Scientists sometimes tell me that when they are engaging in science, they are not being rhetorical. However, part of my argument about the role of metaphors, images, and stories within the natural sciences is that science both *is* a rhetoric in its methodological operation and it *includes* rhetoric *inside* its borders.<sup>4</sup> This does not demean science; it helps locate its effectiveness.

Theology and religious studies also involve rhetoric.<sup>5</sup> In theology this is easier to observe since homiletic communication was not only the original, oral form of Christian religious discourse, but theories about such liturgical, narrative, and missionary communication have never ceased. Religious studies with its embedment within social scientific discourse has only recently begun to discuss its rhetorical dimensions, along with its dialogue partners in sociology, psychology, anthropology, and economics. To differentiate the importance of rhetoric within theology, even to give it priority, does not demote systematic theology or doctrines, it challenges religions to think about how they were effective in the past and how they might be persuasive in the cultures of post-Enlightenment, post-industrial societies. Recognizing that both science and religion have rhetorical dimensions may allow them to communicate more readily across the borders of mutual suspicion.

My understanding of both science and religion charts their relationships to artful language and images, the rhetoric they share as well as the styles that divorce them. Some may think this claim bizarre, since it interprets what is clear, precise, and accurate truth about the objectively real with what is muddled, fuzzy, emotional, and subjective. Religious people may estimate that I have turned the expressions of faith into novels and poetry. Indeed, both art and religion have been relegated to the same relativizing dustbin of post-Enlightenment refuse. How can we hope to shed light on the truthful pragmatic methodologies and results of the natural sciences with the subjectivity of aesthetics and religion?

The argument of the book must therefore proceed from two sides. The results of the philosophy of science teach us that the supposed precision of the sciences is just that – a carefully constructed clarity. With more attentive historical study, we also have begun to recover

the referential values in the presumed subjectivity of art and religion. The presumptions about their fields of data, their results, and their methods have changed significantly in the last 50 years – so much so that those thinkers in any field who tend to see science, religion, and art as completely disjunctive realms of discourse are the dinosaurs foraging in the meadow. In what follows, we will explore the ways in which artful expressions in images and language function in the natural sciences and in religion; we will also study the ways in which the arts function in both to inform us about the truths of our world. My attempt is *not* to collapse science and religion into aesthetic expression; this is not a new age version of religion or a deconstructed fragmentation of the sciences. I intend to show how the arts have been a rhetorical vehicle in both fields for inquiring into the nature of reality. Maintaining the methodological integrity of the sciences and various religions, while understanding their relationships to language, will produce far more fruitful dialogue than the collapse or reduction of one to the other.

The twentieth-century assumptions about the *objective* precision of the sciences and the *subjective* expressivism of art and religion are derived from a very particular notion of the human subject developed during the Enlightenment. The eighteenth century interpreted subjectivity as autonomy.<sup>6</sup> Autonomy understands freedom as determining oneself from within one's own resources without regard to any other; independent self-invention controls objects (and other subjects) in the world. 'The overarching ... principle is that the *modern* consists in a relation to the world according to which [humanity] posits itself as capable of providing the foundation for its own acts and representations, as well as for history, of truth, and the law.'<sup>7</sup> In effect, when James and others interpreted religion through individual and personal responses, they capitulated, often unknowingly, to the modernist subject.<sup>8</sup>

Thinkers also privatized art and made it the individualized expression of marginalized, genial makers. Even Durkheim's social understanding of religion participated in this modernist project. While focusing upon the rituals and the social fabric of religions, Durkheim's interpretation of the objects and artifacts used relegated them to the world of surplus, the same category as luxury. 'The unique task of expressing the real with the aid of appropriate symbols is not enough to occupy [religious adherents]. A surplus generally remains available which seeks to employ itself in supplementary and superfluous works of luxury, that is to say, in works of art.'<sup>9</sup>

Renaut argues in *The Era of the Individual* that the modernist notion of human autonomy has been linked too strongly with the subject as an individual. Individualism is only one form of the modern subject, derived from a specific reading of Leibniz and his ontological monads.<sup>10</sup> The consequent form of subjectivity quickly disintegrates into self-regard, a split between the public and private worlds, the complete valorization of human happiness, the desertion of any space as genuinely public or common, and the consumerist frenzy that substitutes for desire.<sup>11</sup> At the same time, it presumes that the goal of self-origination is possession and control over all other objects. In short, the subjectivization of human autonomy yields the narcissism and the lack of the common good that most would recognize as a characteristic of late capitalist economies and politics.<sup>12</sup>

Renaut, however, notes that individualism is only one way of reading modernist subjectivity.<sup>13</sup> The empirical subject is a prominent alternative that has shaped the natural sciences and the emerging social sciences. This subject is intrinsically connected to a field of subjects and objects transcending the individual. And although Renaut himself would emphatically *not* extend his analysis to religious identity, it would be useful to think about the ways in which religion emerges within the world of empirical subjects.<sup>14</sup> Is it possible to discuss transcendence, even divine Transcendence, within the forms of an empirically exercised immanence? I think the ways in which the natural sciences work can provide an answer to that question.

It is not just scientists who ask questions and inquire about the way things work. In everyday discourse, everyone asks questions of meaning; these questions are spontaneous. They emerge from the intersubjective world of our lives.<sup>15</sup> 'We' are a spontaneous event, occurring in our sense of bodily interaction, our feelings, and eventually our choices of one another. Within the intersubjective matrix of action and feeling, we also communicate meaning to one another through perceptual patterns like a frown or a smile, gesture and language, prose, poetry, music, and the visual arts. Even before we speak, we are communicating to one another, a word already spoken, waiting for a response from others.

In disciplines like physics, biology, and neuroscience, we thematize and explore systematically through experiment, mathematics, and technical controls whether the patterns that govern our lives in the ordinary world make sense. We presume certain regularities of our bodies, gravity, the planetary motion, and psychochemical balances; with the sciences, we investigate whether those patterns are operative

beyond our presumptions. We also sort out the anomalies in these patterns. Do they have rhythms of historical and mathematical probability? As empirical subjects within a world, we turn our questioning not only on the world, but on ourselves. The benefits of these second-level analysis are everywhere, not only in the technology that makes middle-class lives easier, but when resources are appropriately applied, in medicine, housing, clothing, and food for the poor.

Within these questions, whether in our ordinary lives or in the sciences, there is always more – the thirst to extend our understanding. When we ask questions about why there is meaning at all, whether what we mean is good or bad, whether the world develops or declines, we extend the range of our questions beyond our immediate contexts to ask about the meaning of the universe as a whole.<sup>16</sup> Asking questions about the meaning, value, unity, and worth of that universe is a *religious* investigation. Why is the universe mathematically compressible?<sup>17</sup> Why does it have just *this* intelligibility that our minds can make sense of it? Why are the judgments of fact and value we make a partial, though true, grasp of the world? ‘Has “worthwhile” any ultimate meaning? Is moral enterprise consonant with this world?’<sup>18</sup> The relevance and validity of such questions are not just to establish coherence or consistency with our subjective feelings, although the autonomous individualism of the Enlightenment subject often thinks so. Within the pursuit of meaning *inside* the most empirical disciplines, within the examined life of our perceptions and their mathematical analysis, lie questions about God.

The questions are not answers. Answers involve images, concepts, doctrines and beliefs, arguments and syllogisms, judgments and evaluations; these results involve weighing evidence and/or determining coherence, consistency, and practical effects. Yet if ‘transcendence-within-immanence’ is a way of describing the *empirical subject*, then asking, weighing, judging, evaluating, and deciding about *all* data transcend individually autonomous subjects, drawing and pulling us beyond any solipsism into the other. Just as it is possible for the empirical subject to weigh the evidence of the world about gravity, so too is it possible to ask whether the claims of religious people for an Ultimate transcendence have merit and validity.

Religions and the sciences have often offered answers to these questions. As a result, they sometimes compete for the relevance of their discourse within a public world of meanings and values. Religions claim to have many answers; most claim that those answers have emerged not solely from the psyches of adherents, but from the ‘other’

– from God. Answers are in the realm of images, beliefs, doctrines, and values. The sciences have offered an effective meaning-giving system in our world. Their highly practical applications from medicine and architecture to space travel give them a mythic quality of their own.<sup>19</sup> And in our pluralist world, science and religion compete with the arts, tribal loyalties, the accumulation of goods, national commitments, and social justice, etc. In addition, the explosive radicality of questions about universal meaning, combined with extreme want and desire, has resurrected earlier premodern mythic structures like astrology and developed non-traditional forms of spirituality. The comparative rhetorics of both theology and science find competition in the post-modern milieu, which when translated into the virtual reality of cyberspace, makes the referential value of both problematic.

To compare and contrast the linguistic expressions of sciences and theology is not an idle, apolitical exercise. It provokes many questions about the nature of society. In the past, Paul Ricoeur studied the ancient philosophical and religious myths of the origins of evil by a comparative rhetoric of their narratives.<sup>20</sup> He was trying to make a point about the nature of philosophy and religion and the primordial language of symbols upon which they were based and from which they were constantly nourished. In our world, it becomes critical to compare and contrast the ways in which the natural sciences provide basic meanings to our universe: their origins, development, goals (or lack thereof), and values. Among other elements, what religion and science share in this comparison is a use of language and notions of time. By mediating the competing mythic energies of the sciences and Christianity through their language and images, we can better understand the methods of both. The comparisons through language may also help to explain one discipline to the other.

To support the argument, however, it will be useful to discuss the ways in which images have developed as an integral part of the modern natural sciences and religion (chapter 1). I will focus upon images of time. In effect, this argues that religious metaphors have cognitive value and that the natural sciences mediate some of their investigative power through metaphors.

I then study the modes of empirical self-transcendence that are operative within the natural sciences. Successively, astrophysical cosmology (chapter 2), chaotic systems (chapter 3), macro-evolutionary biology (chapter 4), and neuroscience (chapter 5) are examined for the language and images they use and how that illuminates our understandings of time. Each in distinctive ways understands the ongoing

transcendence of nature as it develops questions of meaning and value. Each prompts questions about God and the nature of the divine. One could think of these chapters as a revisionist theology of nature in which the factual character of the universe is studied through its rhetoric for a possible transcendence toward God.

Finally, chapter 6 asks questions about what kind of God Christians claim is involved in nature in these manifold ways. How does God interact with time? What does the developing notion of temporality from the deep time of the universe to the ephemeral memory of human beings tell us about who God is or why there is a world at all? It is said that there is an infinite qualitative distinction between God and creation,<sup>21</sup> that anything other than this makes the Christian God a Platonic demiurge. Does this absolute difference between the divine and the human, between the God and nature genuinely reflect the Christian confession of an incarnate divinity? A Triune God?

From tar water to the Trinity – a lofty goal, not unlike the fragments of the *Opus Maximum* that Coleridge himself projected, but never finished. Although I do not pretend that the volume you hold is complete or finished since I do not know the origins of time nor can I know its ending, I do think it may serve to interpret God's journey with creation as both genuinely divine – and utterly human.





node in another network; networks group into further schemas; and entire systems of interpretation are born.

To study Gonzalo's speech in Shakespeare's *The Tempest* (II. i. 148) about the 'ideal' commonwealth as a democratic plantation leads not only to the ironies of his declaiming his speech to his King, but to the indentured service of other characters (Caliban, the mixed-breed servant; Ariel the sprite) and 'the cloud-capp'd towers, the gorgeous palaces / The solemn temples, the great globe itself', like an 'insubstantial pageant faded' (IV. i. 152). What was an overblown metaphor on politics slips into questions of reality and artifice, power and ultimate meaning.

What are metaphors? The term names an event or process in communication through which at least two elements modify each other so that both factors must define the situation. Metaphors invite hearers or viewers to participate in the world evoked by the juxtaposition, to reflect on the implied similarities and differences, to agree or disagree with the view of the world expressed, and to act if necessary to implement its values. Any ordinary 'dictionary' definitions of each element are insufficient as predicates for the event, since the elements interact to generate new meaning; they awaken a desire to be in that inchoate universe. They confront us with virtual worlds over which we do not have complete control. Metaphors provoke us into further thought.

Let us look at some examples. 'Richard the Lion' involves two terms, which evoke questions: how are my friend Richard and a lion the same and different? What sort of world is it where humans and animals are alike? How should I respond? The origin of our universe is a Big Bang. How is it possible to reflect upon the whole of the universe as an explosion? What are the similarities and differences? Does the metaphor imply anything about the way the world is – now or in the future? Does it mean that we should act in some new way? The book of Genesis<sup>1</sup> describes the beginning as a 'formless wasteland, and darkness covered the abyss, while a mighty wind swept over the waters.' With a commanding word, God established light. What world does this evoke? Does this image (a lighted, formless wasteland) work like a metaphor with similarities and differences? Can we be responsible for the world created by this language?

Few interpreters ignore the metaphors in Christian religious discourse (God as Father; Jesus as Lamb, Shepherd, Gate; Jerusalem as the Heavenly City);<sup>2</sup> however, some have viewed metaphors operative *within* science as an annoying outrage. Metaphors appear too unstable,

too emotional, or too diffuse in their references to play any significant role in the natural sciences. In many ways, the standard narrative about the development of modern science has maintained that it was the shift to precision through mathematics and experiment that banished images from scientific speech.<sup>3</sup> The old superstitions of natural philosophy, ancient medicine, magic, and religion ceded to securely obtained facts. But just as images cannot be exiled from Christian theology, so metaphors and images constantly inhabit the tents of the scientists.<sup>4</sup> Whether we use images of light as 'waves' or 'particles,' the 'cloud-chambers' of early quantum experiments, the 'Big Bang' or 'Heat Death' of astrophysical cosmology, the 'survival of the fittest' of biological evolution, or the 'theater' of the mind, there always appear to be initiating or summary images and metaphors in the sciences. What roles do these metaphors play in the drama of scientific discovery, the script for scientific methods, and the concluding results? Metaphors in science and religion operate as half of some reality; they are clues to what we hope to discover.

In what follows, I will outline a theory of cognition that understands images as a necessarily constitutive component of knowing. How do we learn using metaphors? What do they tell us? Then I will offer remarks about how images function to discover what is real and distinguish the ways in which science and religion characteristically go about using metaphors. To what do metaphors refer? How do they get us to reality? What is the relationship between images and words? The intimate link between metaphors and time will be discussed. Do metaphors include a time-laden status? Do they evade time altogether? Each of these topics could, of course, require books of commentary, but an overview of the topics and a particular resolution of those issues will establish a theoretic platform upon which the next chapters on the role of metaphors in specific natural sciences can be erected.

First, let us look at two examples of how metaphors have been operative in the developments of science. Among other contributions, they have generated new insights, framed scientific terminology, and developed not just research, but teaching.<sup>5</sup> I choose the first example from the history of mathematics precisely because the discipline seems so far in our minds from rhetoric and language. But 'in shifting what they have counted as constituting a valid argument, mathematicians have, in effect, shifted the rhetorical practices that they have agreed to accept as appropriate and convincing.'<sup>6</sup> The second example shows not only the multiplicity of metaphors that developed eighteenth-

century theories of light, but the way in which they guided research and brokered the politics of the academy.<sup>7</sup>

### 1.1.1 Mathematics: applied or pure?

After 1875, British mathematics underwent major revisions.<sup>8</sup> From a discipline that was primarily linked to physics and engineering, it consciously shifted toward pure, analytic mathematics – more clearly kin to that done on the continent. Oliver Heaviside sent to the Royal Society the third part of his long work ‘On Operators in Physical Mathematics,’ the first two parts of which had already been published in 1893. As a fellow of the Society, his work would in the normal course have been published without review; but the third part was rejected. He did manage to recover the manuscript and publish part of it in his book *Electromagnetic Theory* (1899). In the 1910s and 1920s, his work on mathematical operators attracted curiosity from electrical engineers, from mathematicians and physicists, especially in connection with Paul Dirac’s formulations on quantum mechanics. What was operative, as Hunt makes clear, was *not* the victimization of a lone genius by the establishment, but an excellent example of how rhetorical transitions in mathematics had snared a thinker while shifts in the genres of proof were occurring.

Fundamentally, Heaviside understood mathematics as a tool, a useful analytic method *after* the inductive data of experiment and experience had been gathered; his opponents saw mathematics as a pure, analytic discipline whose presentation was principled and deductive. ‘Mathematics is an experimental science, and definitions do not come first, but later on.’<sup>9</sup> When Heaviside developed his positions, the narrative by which he came to his conclusions was important, but not rigorously analytic. In this way, Heaviside continued the history of the interrelationship of mathematics and experimentation begun in the seventeenth century.<sup>10</sup> His belief in the interconnection of the two is fundamentally Newtonian. But, in addition to the historical development, the conflict in mathematics concretizes a philosophical and disciplinary difference between the *order of discovery* in a science and its *order of teaching*: the story of how one insight flowed from another and the logic of how they are internally coherent, connected, and linked in necessary deductions.<sup>11</sup> On the analytic side of the divide (the order of teaching), Heaviside appeared as a descriptive story-teller (the order of discovery); from Heaviside’s point of view, mathematical deduction tried to generate ‘self-contained theory’ – an impossible Platonizing ideal.<sup>12</sup> Heaviside’s reviewer found that he had not

followed the (newly) established rules for presenting his mathematical conclusions; hence, even if they were correct, they were fundamentally useless.

In other words, the *rhetorical genre* in which mathematics was to be *legitimately* expressed had shifted. Genres are loci for generating and confirming knowledge, not just an ornamental vehicle for transporting already established truths. The old rhetoric in which Heaviside had educated himself was based in the resolution of practical problems of engineering; the new rhetoric of mathematics understood itself as a pure foundational discipline, in principle the basis of *all* natural sciences. Gottlob Frege stated that mathematical knowledge had its importance not so much in *what* was understood, but *how* it was achieved.<sup>13</sup> Heaviside came to true conclusions, but presented his material in an unacceptable genre. Self-evidence and logical connections were more significant than whether the mathematical symbols produced 'more' knowledge.

This historical debate gives evidence for one of the main contentions of this chapter – that language operates *within* the sciences, even in mathematics.<sup>14</sup> Mathematics in this century has prided itself on its precise, deductive expressions. Yet that very claim itself is a rhetorical argument that evolved from the historical role of mathematics in the natural sciences. And even if it might be possible to describe a series of mathematical proofs within the literary form of a 'narrative,' it is essential to understand the modern justification for the way mathematics is accomplished. The particular, pure, analytic narrative structure to mathematics has produced new insights; but it replaced an older rhetorical form that (as it turns out) also produced new insights, some of them more significant for later theories (like Dirac's).

### 1.1.2 Light as wave or particle?<sup>15</sup>

Metaphors for light abounded in eighteenth-century theory: fluid theories, projectile optics, ballistics, and particulate images. Each had its proponents and its theological underpinnings. Cantor points out that it is sometimes difficult to determine whether the writer is using the image as a metaphor or as a proposition ('light is fluid'). What is visible, however, is that the images for light in the period functioned in an 'interactive' way to produce knowledge.<sup>16</sup> The subject (light) and its various predicates developed research programs, expressed conclusions, and raised further questions. The 'semantic impertinence' that occurs in the play among light, projectile, and their intellectual contexts generates new meanings.

Newton, in his *Opticks* (1706), asked whether light rays are 'very small bodies emitted from shining surfaces.'<sup>17</sup> Quickly, however, textbooks no longer traced the similarities and differences or the multiple meanings that would be operative in a metaphor, but they asserted propositional identity: light is made up of little particles. Sand provided a helpful image to scientists for conveying the position. Yet the earliest notion of light as an almost infinite number of sand particles (Nieuwentijdt, Eng. 1718–19) was a trope, a metaphor used rhetorically to evoke wonder at the excess produced by a burning candle. His use of calculations to show how much surplus there was for the purpose of giving light was not meant to be taken in a precise fashion; but rapidly it was. Light became empirical matter.

The metaphor of light as a fluid flows from the motion of water: streams, rivers, and floods. Those who held this image in high regard were more often than not committed to Christian revelation and emphasized the 'spiritual' dimensions of light. It would not be difficult to see that the metaphysics of light, emerging from the neo-Platonic tradition in Plotinus and Pseudo-Dionysius, embodied in Augustine, and utilized by the Aristotelian Aquinas had migrated to scientists, who wanted to correlate the book of nature with that of the Bible. One can hardly ignore the role of light in both the Hebrew and Christian Scriptures with the centrality of Jesus as the 'light of the world' (John 8.12). 'In two passages (Jeremiah 2:13, 17:13) God is referred to as the *fountain of living waters*. The spiritual light of life emanating from God is thus expressed by the flow of water ...'<sup>18</sup>

To discuss the impressive speed of light, thinkers used terms from ballistics; but if light was 'projected matter,' then it had to display momentum. The experiments that attempted to ascertain this were borrowed from mechanics; in effect, the 'crucial experiments' were 'realized metaphor.' But the experiments, while concretized metaphorical clues, were hardly conclusive. The delicacy of leverage and balance needed was crude; bright sunlight, largely unavailable in the lecture rooms. '[T]he move from asserting that light is composed of material particles to claiming that it has momentum is one of continuous metaphorical extension.'<sup>19</sup> It is not mathematically or experimentally precise. Here metaphors generated new insights, conveyed proper information, and established a program for further research.

## 1.2 Metaphors tell the truth

### 1.2.1 Metaphors and knowing

To understand how scientists use metaphor and how those metaphors affect their performance as scientists, I will outline some current theories about the metaphorizing process. Rather than a complete dialectic of historical positions, I shall outline a typology, using four schemes: (1.2.2) metaphor as ornament or emotional outlet; (1.2.3) Hesse's use of metaphor and analogy; (1.2.4) Ricoeur's notion of metaphor as confrontational paradox; and (1.2.5) my own interpretation of Ricoeur's and Lonergan's understanding of metaphor.

### 1.2.2 Metaphors as ornament

Scientists, no less nor more than philosophers, often dismiss metaphors as a primarily decorative value in discourse. Reichenbach, for example, maintained that images were a sure sign of 'emotional dissatisfaction.' Scientists 'make use of metaphors invented to appease the desire to escape the flow of time and to allay the fear of death. They cannot be brought into a logically consistent form.'<sup>20</sup> According to Shimony, metaphors more often lead us astray, since the quantized and/or mathematical world is fundamentally unimaginable.<sup>21</sup>

These views fit into an intellectual tradition that originates in theological suspicions about imagination dating at least from Augustine.<sup>22</sup> The rhetoric of images and even elaborate metaphors in preaching were suspect. Ambrose, eloquent as he was for Augustine, wanted nothing to do with 'dialectical disputation'; Tertullian desired only the 'plain, uncultivated, and simple' testimony of the soul.<sup>23</sup> In Christianity, constant justifications, like that of John Damascene for icons, were required to support something other than the sheer clarion call of the simple Word of God. Despite the daily use of metaphors and images in Christian worship and preaching, more positive notions toward metaphor and image only appeared in the Renaissance and in the early modern period with Ignatius of Loyola. More suspicious attitudes survived in the Augustinian strains of the Protestant Reformation and in continental philosophy with Kant.

'Richard the Lion.' The classicist view of any imaginative trope is that metaphors fundamentally produce no new knowledge; their function is decorative and emotional, pleasurable rather than instructive. Were one able to substitute the proper term for the metaphor, one would have plain speech, but true speech. 'Literal' speech is the ideal, human language; metaphors are deviant.<sup>24</sup> Before the fall, Adam used

true, cognitively efficient language in which things, words, and intentions completely coincided.<sup>25</sup> This language is a transparent, complete communication, a semiosis. 'Richard is fierce and aggressive.' 'Lion is a decorative device to designate the true predicate: aggression.' It is this view of imagination that placed art in a marginal position in western societies and made artists alternately messiahs and pariahs in an avant-garde.<sup>26</sup> As Soskice maintains, these attitudes emerged at the same moment that there developed the ideologies of scientific empiricism.<sup>27</sup> It is little wonder that the natural sciences hoped to excise imaginative devices from their discourse.

Following Mary Hesse, it seems appropriate to say that the distinction between metaphoric use of language and propositional or 'literal' use is a pragmatic distinction, not a semantic one.<sup>28</sup> Natural languages or ordinary discourse cannot be overcome;<sup>29</sup> they always remain as the field from which any formal language derives its 'literal' propositions. Ordinary language, therefore, simply enshrines the use that is most frequent in familiar contexts – 'the use that least disturbs the network' of common meanings. Any novel word-use, whether formal or metaphoric, must be returned to the common field to discern its pragmatic, historically evolving meaning. Metaphors are not ornamental to true and precise meanings; they are the *Gestalt* of ordinary meanings within which the more defined language of mathematics and the natural sciences is formed.

### 1.2.3 Hesse on metaphors, models, and analogy

Hesse initially distinguished analogies from metaphors in her writing, as did medieval philosophers;<sup>30</sup> and the bases for the distinction would appear to locate her in the first camp (ornament) mentioned above. To speak *metaphorically* of an angry sky is not to assume that there is any discernible identity between the human subject and the heavens; but when speaking of an angry dog, one can estimate *analogically* a definable similarity between canine and human anger that can become the basis of predictions for future activity on the part of both the human and the animal. In the biological sciences she argues that mathematical understandings of nature themselves are analogical.

Analogies have heuristic value, not reducible to modern logic's distinction between identity and difference. The internal similarity between an analogy and its object is that analogies can be made the basis of predictions. Such analogies guide by their 'surplus meaning.'<sup>31</sup> The model provides ways of looking at the consistency of the measured process and the possibility of extending the theory to other



data or situations.<sup>32</sup> And, if I understand her early thought correctly, this is possible because of a pre-predicative unity in difference (a 'direct, non-analogical relation') at the level of the world as it is. The observer and the observed share a common world prior to their differentiation.<sup>33</sup>

Hesse notes Black's interactive theory of metaphor<sup>34</sup> and connects it to her prior interpretation of the logic of analogy. Black argued that metaphors are *not* about the juxtaposition of unlike words, but a tensive sentence in which the two terms function as subject and predicate such that one interacts with the other.<sup>35</sup> If metaphors are not able to be reduced to a single, literal, proper meaning, if they gain their meaning from their interaction such that each term modifies the other, then metaphors and analogies are primary speech; and univocal formulae are a highly specialized language. Both sides of the metaphorical equation ('Richard' 'lion') are affected by the juxtaposition of terms; the meaning emerges in their interaction not as a substitution for some priorly determined concept or as a conclusion from antecedently held premises.<sup>36</sup> Richard is lionized; animals are humanized.

'What is disclosed' by this process is a 'redescription of the domain of the explanandum.'<sup>37</sup> 'The referent seems to be the primary system, which we choose to describe in metaphoric rather than literal terms.'<sup>38</sup> The domain of the explanandum is now described in terms of the analogue: as a result (although it is unclear how), the meanings of both are affected. The original observation language can be extended and shifted so that 'predictions in the strong sense will become possible.'<sup>39</sup>

The social, pragmatic construction of literal meanings and the primary nature of metaphor have become Hesse's current preoccupation.<sup>40</sup> Language acquisition itself prohibits any primacy given to literal language. Indeed, it is precisely the 'nonlogical' dimension of linguistic interaction that allows language to structure life and even logic.<sup>41</sup> The meanings of such linguistic impertinence are multiple – inviting constant reappraisal of situations, people, and stories. Without the context of natural or ordinary language, it becomes difficult, if not impossible, to determine the directions toward which the metaphors tend.

Does this mean, therefore, that metaphors have no truth or reference? By no means. For Hesse, 'redescription' of referents is what the metaphoric process accomplishes. Using Lakoff and Johnson,<sup>42</sup> she points out that it is significantly different to speak of argument as war,

logic, or negotiation. For Hesse, the 'extended metaphors are not ... true or false but are appropriate or inappropriate, more or less revealing, more or less useful, depending on the context of application and their coherence with evaluative judgments made about particular situations.'<sup>43</sup> In other words, the resolution of truth is pragmatic; it depends upon social and linguistic conditions.

Hesse's, Soskice's, and Gerhart and Russell's interpretations of metaphor argue that the surplus of meaning has a referential status in scientific (and other) discussions.<sup>44</sup> It tells us something about the world. If we use the notion of a 'Big Bang' or a 'gentle decompression' as metaphors for the origins of the universe, we are attempting, not to express our feelings about the universe, nor to communicate what we already know otherwise, but to indicate a state of affairs that we discover through the metaphor. To this truth-telling of metaphors, we will return.

#### 1.2.4 Metaphor as confrontational paradox

Ricoeur's hermeneutical phenomenology, although more welcoming to contemporary scientific explanation than either Heidegger's or Gadamer's, focuses upon allogical dimensions of discourse.<sup>45</sup> His work on images and their function in discourse began with the comparative study of symbols for evil.<sup>46</sup> Later, he distinguished symbols and metaphors and studied the structure, process, and referential claims of metaphors.<sup>47</sup> Part of the difference between symbols and metaphors is that symbols are not totally transparent to speech; they have their roots in the *bios*, the hurly-burly of the lifeworld of desire through which they gain their meaning. As liminal experiences, symbols negotiate between the biological force of desire and social and historical dimensions of culture. Symbols always contain, as a result, a knot of experience that is indecipherable – the dark striving of existence. Metaphors, on the other hand, are primarily semantic, a creation of *logos*, the 'free invention of discourse,' containing a 'surplus of meaning.'<sup>48</sup> On both sides of the interactive metaphoric equation, we receive multiple meanings to decipher.

Making use of Black's interactive theory of metaphor, Ricoeur argues that the juxtaposed terms of a metaphor produce the reference. They refer by indirection, not as scientific, univocal languages do. Ordinary referentiality is suspended, abolished, exploded; and a deeper paradoxical reference emerges.<sup>49</sup> To speak of an angry sky (or an angry dog for that matter) is a metaphor in which the two juxtaposed terms (the emotion of anger and the rainy, thundering sky) construct no logical,

coherent sentence. They make no *sense*. The metaphor attributes to an inanimate, material object dimensions of human feeling. For Ricoeur, the nonsensical absurdity of this interaction implodes and discloses some *deeper reference* that affects both human feelings and the nature of the skies. If it is a living metaphor, it will translate us (by our choice) into a world in which we know the inner human world as roiling as a thunderstorm and the outer atmosphere as churned, upset humanity. Metaphors are deliberate category mistakes, disclosing a *virtual, possible* world which the reader must appropriate to bring into reality.<sup>50</sup> Metaphors challenge the reader to activate the possibility. They invite existential witness.

Ricoeur's intellectual project for many years has been to establish the possibilities for human freedom in a finite, conditioned world. The surplus meaning that metaphors open is the space for human choice. One can choose to act 'as if' the skies were angry. Metaphoric language is the evidence for creativity and the way in which the desire for freedom exceeds its exercise.<sup>51</sup> The motive that readers must choose to transport themselves into the world redescribed by the living metaphor is 'feeling' (i.e., *le sentiment*).<sup>52</sup> The vehicle is driven or 'operated' by existential choice, the witness to what one experiences as possible through the metaphor. The ordinary 'logical and established frontiers of language' are obliterated so that readers are continually disoriented. The surplus meaning in metaphors (the excess of paradox) is the gap in which human freedom can operate.<sup>53</sup> Assuming responsibility for the path opened by metaphors, readers can become what they read. But note that readers are constantly challenged by the paradox of the metaphor; what makes the metaphor live is this confrontational mode. Constantly confronted by the uncanny usage (the universe, a Big Bang; Harold, the duck-billed platypus; God, the unjust judge), we must choose to live in a new world offered by the metaphors. Indeed, we will not know the world disclosed until and unless we choose to enter it.

I find no one of the previous approaches to the surplus of metaphor completely satisfactory with regard to reference. While Ricoeur's position has seemed to many the most elaborate and successful proposal, problems become particularly evident when his notions are applied to Christian language, since claims for religion include not just a *potential* way of being in the world but an *actualization* – at least in the case of the religious founder (e.g., Jesus of Nazareth).<sup>54</sup> Ricoeur waffles between a referentiality comprising the existential witness of the observer-participant who actualizes a potential, virtual world and the

avowal that this existential actualization can never quite take place. For Ricoeur, a living metaphor always overturns the state of affairs that the observer is trying to actualize. But a living metaphor asserts that 'this' is the way the world is, rather than this is the way it might be in a continually deferred future. As Soskice maintains: 'Christian theism has been undeniably realist about these models, whether it has a right to be or not.'<sup>55</sup> The problem is how to understand the kind of reference metaphors intend (whether they are used in physics or in religion).

### 1.2.5 Images, explanations, and reference

In this section we will extend the metaphoric realism of Hesse and Soskice by examining the metaphoric process and its referential capabilities based on Bernard Lonergan's understanding of cognitional judgment, critical realism, and art. For him, metaphors tell us the way the world is and the way it can be if certain conditions are fulfilled. I will argue that there is a judgment (s is p) implicit in all metaphors. The so-called 'shock of recognition' that is often mentioned in art criticism is not simply existential confrontation or emotional surprise. It is an agreement that this is the way the world is – under certain conditions. This investigation will specify these conditions as the 'constraints and criteria' of which Hesse speaks when she sorts out the 'success of social schemas'<sup>56</sup> and the 'historical and social contexts' that qualify her 'cognitive theory of revelation.'<sup>57</sup>

For example, we could examine an apocalyptic set of images (the film *Blade Runner*, the novel *A Canticle for Liebowitz*, Anselm Kiefer's paintings, Jerusalem the heavenly city). Under certain conditions, some of which may be realized, this is the way the world is and will be. The images extend the conditions of the present toward an as yet unrealized future. This is the case not simply for utopian or dystopian art, but also for so-called artistic realisms. Under certain conditions, this is the way the world is and will be. The fulfillment of the 'angry sky' of my prior example depends upon the conditions that surround the metaphor – personal or cosmic apocalypse.

Ricoeur is correct about artistic experience in that if human beings choose to live certain choices, the world will be the way the metaphor potentially describes the situation. Metaphors do not exist without speakers in communities. He is incorrect in that he sees no clear rational relation between the 'is' of the metaphoric interactions and the 'is not yet' of the future whose conditions have yet to be fulfilled. In reading Ricoeur, it seems that the reader or speaker of metaphors

simply leaps beyond the absurdity or paradox of the present toward the future without guidance, without direction or conditions. It is a philosophical version of fideism to preserve a form of human freedom. That is no doubt part of the reason that it is highly appealing to some theologians who emphasize the non-mediation between the divine and the human. For McFague, there can be no concrete conditions that 'constrain' divine freedom.<sup>58</sup>

The relationship therefore between the 'is' and the 'is not yet' of experiences and judgments of art requires a theoretic vocabulary that will articulate a relationship between present and future that accounts for the continuities as well as the discontinuities, the similarities and the differences. If the conditions in the present are fulfilled, then the sequential entailment follows. Temporal asymmetry ('is/is not yet') seems inscribed into the very nature of art as metaphoric. Let us now look at Lonergan's understanding of art.

Lonergan's philosophy and theology recognize the importance of images and symbols. Images function in his thought in many ways: 1) as part of the perceptual, sensitive flow of consciousness from which we can never be totally divorced; 2) as factors in discerning some known unknown (the heuristic power of models and analogies in science; and 3) as abstractly designated signals (as in symbolic logic) constructed to indicate the import of some particular experience or observation. As part of affective life, images function in human self-communication – in dreams, art, and love.<sup>59</sup> Images and metaphors operate in ordinary rhetorical language; only subsequently do they develop into heuristic tools or the precisions of semiotic abstraction.

It is in his study of art that Lonergan interprets the role of symbolic discourse, though he applies it to the role of models in science and to the construction and reconstruction of human societies. Symbols and art are more than a *virtual* discourse. In Lonergan's thought, the artwork draws observers into sharing its vision of the world, sometimes without the participants reflectively knowing what is occurring. Hence the 'dangerous' character of images; they 'trick' us into entering the world they disclose. We are in a common world they define before we 'know' it.

The referential world of metaphors is not univocity, nor is it the paradoxical proclamation of 'is/is not' that Ricoeur maintains. Metaphors tell us the way the world is and the way it can be if certain conditions are fulfilled. The shock of recognition that occurs in a work of art is the agreement by participants that the conditions for an aesthetic judgment have been fulfilled. This artwork tells the truth. In

an experiential, undifferentiated way, it contains a virtually unconditioned judgment in that the interpreter recognizes that unless further conditions appear, all the relevant existential, intellectual, and evaluative questions have been satisfied. The world will be the way the artwork depicts and that participants share while the artwork lasts. Every artwork is a drama, leading to tragedy or comedy; its viewers are the players. That is what makes *Blade Runner* frightening, *Pride and Prejudice* at once nostalgically comforting and disturbing, or the *Odalisque* (1814) of Jean-Auguste-Dominique Ingres mysteriously alluring.

Such aesthetic judgments are exploratory; they announce what the world might be like were appropriate conditions fulfilled. Yet some of those conditions have in fact been fulfilled. The teasing character of art is that it directs participants toward living within the conditions that are fulfilled and exploring whether others have or have not been completed. The metaphor leads participants through the foreground of a work by means of an intelligent, though often pre-conceptual, affect and sensibility into a horizon that may go beyond the artifact itself. In this sense, a work of art discloses a world that both is and is not yet. As Ernst Bloch has said: 'The self-identity of a work of art "is" not yet manifest.'<sup>60</sup> Indeed, part of the truth of any metaphor is its continuing ability to establish a world according to the conditions set forth in the work.<sup>61</sup> The temporal sense of metaphors is therefore asymmetrical; there is both an internal claim in the metaphors that this is the way the world is – but also that the present is not quite complete, unfinished, 'on its way' to another state. In effect, implicit in every metaphor is a narrative impulse – a telic structure that draws the interpreter into an other world. When metaphors no longer offer guidance under historically predictable consequences, they are discarded. In a postmodern world, they often compete in an economy of ornament and style.

The asymmetrical pattern of truth-telling in aesthetic judgment is operative in all knowing, except (perhaps) in some univocal forms of logic and mathematics where the conditions for judgment have been severely limited for the sake of precision.<sup>62</sup> The subject both is and is not yet identical with its predicate. Metaphors describe a real world which both is and will be under specific constraints. If the conditions are fulfilled (*one* of which may be the choosing subject), then the world as redescribed by the metaphor exists in a (seeming) identical relationship with its participants. Classic, living metaphors continue to reinvent the world, redescribing, and predicting new consequences.

The future can be different from the past, but on the basis of conditions in the present metaphors. Notice that by this standard a temporal asymmetry is built into the copula of all ordinary sentences.

Hesse, Soskice, and Lonergan, as moderate realists, see their use of metaphor and analogy as delivering not just an external observer's opinion, but a view, however partial, of the way the world is and will be. This view of the world can be judged, tested, reexamined, and overturned or confirmed. Analogies and metaphors have predictive capabilities; under certain conditions, such and such is or will be the case. As Hesse makes clear, there is a difference between the constraints upon scientific and artistic metaphors.<sup>63</sup> 'Religious systems do not make detailed testable predictions of an objectively recognizable kind ...' at least in their ordinary language usage; but they do describe, project, and establish the way the world is and will be – under conditions. Surely, much of the polarization among Christian theologians revolves around the 'conditions' under which the operative metaphors for church, service, and outreach should be implemented toward the future. *Literalists* of sacred texts believe that unless *all the social conditions* of the religious metaphors continue to be implemented, the continuing truth of the event will evanesce; *relativists* of the texts believe that metaphors include no particular conditions within them for a continuing statement about the way the world is. *Moderate realists* try to discern which social and personal conditions within the metaphors *must* continue to be embodied so that the references will continue.

### 1.3 Getting to the truth: metaphors and pleasure

From the beginning of this chapter, I have indicated that metaphors 'evoke' or 'invite' participation in what they refer to. They do not simply *declare* a state of affairs, even through cognitive juxtaposition of terms. The persuasive emotional power of images and words is one of the conditions through which metaphors work; such rhetoric does not simply include intellectual cogency.<sup>64</sup> Iconoclasm and periodic literary censorship, whether in science, religion, or culture, clearly witness to the sway that images have had over us.<sup>65</sup> Cognitive developments are conveyed by pleasure. In effect, we return to eighteenth-century discussions about judgments of taste, the possibility of art, and disinterested evaluation.<sup>66</sup> The postmodern discussion knows that no interpretation lacks interest or prejudice. If we are drawn into the foreground of a painting or seduced by the sensuousness of words,

should we automatically be suspicious? Can interpreters enter the worlds generated by metaphors and trust their truth? Can there be truth-disclosing images in repressive traditions? In this context, I would like to discuss two dimensions of metaphor and pleasure: one involves the ways in which metaphors engage us at the level of pleasure; the other is the gendered and political status of images and metaphors in our culture.

### 1.3.1 The pleasure of inquiry and participation

Metaphors in science, religion, and literature use enjoyment as one mode of transferring viewers, hearers, or readers from a state of disinterest and ignorance to interest and cognition. Scientists largely limit the role of pleasure in their disciplines to two qualities: the energetic joy of inquiry and an aesthetic sense of the coherence or elegance of their solutions.<sup>67</sup> Artists, while shaping the evoked world, tend to revel in the multiple responses to their works. Theologians (as distinct from religious individuals), on the other hand, have just as ambiguous a response to images and metaphors as scientists do, as we have noted above. Even if they are not obvious iconoclasts like Zwingli, even if they do not attribute sinfulness to the pleasures associated with images and linguistic metaphors, they often become uneasy when the 'truths' of revelation are embodied. And, indeed, stories in the Bible, such as that of Jephthah's sacrifice of his daughter to God,<sup>68</sup> should provoke considerable questioning, if not disgust.

We will look at one model for how metaphors draw us into their cognitive world by applying a paradigm of pleasurable reading to the process. Nell, a clinical psychologist, identifies reading for pleasure as 'an enormously complex cognitive act that draws on an array of skills and processes in many different domains.'<sup>69</sup> An evolving interest begins with *attention*, continues through modest *comprehension*, moves to *absorption*, and can conclude in *entrancement*.<sup>70</sup> He describes this movement as a consciousness-changing activity. His clinical experiments indicate that the passage from initial engagement to complete 'belonging' to a text is true for factual or fictive writing, for literary images as well as narratives. He speculates that the process is culturally universal. Through this developmental reading process, we can distinguish ways in which both scientific and religious images function as powerful heuristics in their respective disciplines.

There are some *preconditions* required if interpreters are to be 'ready' to enter the world of metaphors. Skillful readers know what *genre* they are approaching; in addition, they must *focus away from themselves*



toward the other.<sup>71</sup> An 'insatiable appetite' for stories and *narrative competence* seem to occupy much of our waking and sleeping life.<sup>72</sup> The very 'followability' of a sequentially connected set of images or incidents takes over from our own conscious assertiveness and determines the ways we inhabit the world.<sup>73</sup> For Nell, the anthropology that underlies these conditions is Freudian; our desire to have images and stories, to imagine and to tell stories, is due to our need to know that we are not alone. Hearing a story, being given a confirmatory image, especially in childhood, is 'deeply comforting.'<sup>74</sup> Within this desire to be comforted, Nell situates the 'magic' of metaphors to carry us off into other worlds.

A metaphor holds our *attention* and becomes effortless when the constraints that determine its followability are equal to, or stronger than, others.<sup>75</sup> When attention takes hold of us, we allow ourselves to be 'aroused,' and we resist other interests as distractions, as if our ability to concentrate were accomplished by the task at hand, the outside stimulus of the metaphor. Continuing attentiveness is an *active passivity*, in which viewers or readers choose to be swayed by something or someone other than themselves. The metaphor or image at hand becomes sovereign, governs the viewer, hearer or reader, such that the conditions for attention are determined by the metaphors themselves.<sup>76</sup>

The product of attention is *comprehension* or perhaps better, *initial appropriation*.<sup>77</sup> Through the schemas of memory, readers connect the metaphors with their prior experience, making metaphors their own – part of their previous worlds, connected to other language and images. Appropriation, placing the metaphor within the sequences of images and stories that preceded it, allows us to enjoy or disturb the meanings that define us. We begin to reconfigure the world we inhabit by introducing new elements. What was first attention, then appropriation, becomes *absorption*.<sup>78</sup> Appropriation permits us to be 'captured' by the metaphor, determined by the sovereignty of the image. Beyond absorption, however, is *entrancement*, an almost altered state of consciousness in which interpreters are completely overtaken by the artwork itself, an experience of total immersion in which 'the distinction between subject and object breaks down.'<sup>79</sup> Readers are enlarged in their 'capacity of self-projection by receiving a new mode of being from the text itself.'<sup>80</sup>

The pleasure in metaphors draws subjects out of their own immediate concerns into an other world. Through a progressive engagement with an image or a written text, we find ourselves mapping a new

territory in which we have a double role as both agent and observer. The new form of our personal agency awakens fear; but the observational doubling of the interpreter permits us the security of knowing that we can avert our eyes, put down the book, or cease listening to the story. Through these movements of consciousness, we can explore new paradigms for the ordinary worlds of language in which we live; we 'try on' new dramatic identities, establish new configurations of the world, and project alternative ideals. During the process of examining these events, we learn more about the conditions under which such changes could occur. We test those conditions in the world by living out the transformed conditions wrought by the metaphoric process.

### **1.3.2 Pleasure and politics: metaphors, images, and theory**

The pleasure of living in the worlds created by metaphors, however, is not unalloyed. Experiencing the multiplicity of meanings can be overwhelming; discerning which conditions might implement the world of the metaphor can be difficult; judging how to act in the face of an invitation can paralyze us. Philosophical, political, and religious traditions have constantly reminded us that pleasures are ambiguous. However, the pleasure that propels us into the worlds drawn by images, metaphors, symbols, and stories is not automatically fractured; it does not immediately require our suspicion. Both Nell and Ricoeur draw from Freud a deep inner connection between the symbol making in dreams and in artistic creation.<sup>81</sup> Each thinker argues that the passion invested in artworks and metaphors has its origins in a sublimation of the primal emotional world available in dreams. The 'wounded' Ego desires to overcome its original fears of absence and disconnection through symbolic behavior.<sup>82</sup> Symbols, metaphor, and art are born from the dark struggle to exist.

The ambiguity about the pleasure of the text in these interpretations tends to locate clarity on the side of concepts and theoretic explanation (the 'talking cure of psychoanalysis') and confusing multiplicity on the side of images and metaphors. In our cultures, scientific words have most often been associated with *logos*, with concepts, ideas, and theory; images are rooted in *bios*, the somatic, the material and the visual.<sup>83</sup> This relationship of words to images in our popular and philosophical cultures is problematic; rarely if ever are they equal partners in the business of interpretation.<sup>84</sup> Words are supposed to make clear the opacity of images. The more precise words are, the more sharply effective they can be in shaving the rough edges from

metaphors or the proverbs of ordinary speech. Though images have a powerful hold on the psyche and spirit, that energy can be 'controlled' by education into words.

In the course of our interpretation of metaphors in science and theology, therefore, we will need to pay attention to the politics of images and metaphors.<sup>85</sup> This Enlightenment unease with, even censorship of, both poetic words and artistic images has attempted to make ideological concepts or mathematical formulae primary, since unbridled artworks awaken a surplus of meanings, an uncontrollable excess of values. Ideological thinkers want images to be illustrations of previously formed ideas; but the arts resist. Despite the much-vaunted visual culture we inhabit, words still dominate images politically in our scientific culture.<sup>86</sup>

Words and images take part in the hegemony or supposed primacy of high over low cultures. In low, 'primitive' cultures, where images predominately communicate in an oral context, information is also communicated.<sup>87</sup> However, such knowledge tends to appear in the form of proverbs, aphorisms, the wisdom of the shaman, the gestures of the nurturer, the herbalist, dancer, musician, and the priest. When the visual arts become 'fine' arts, they are allied with poetry to dominate over 'folk' cultures. But are images or metaphors less precise, as writing-oriented cultures would assume?

#### 1.4 Summary and conclusions

This chapter has tried to show that theories of metaphor indicate that metaphors function within primary communication as a whole. As a result, metaphors cannot be excised from science any more than they can from religion. Both attempt to speak about reality through their respective genres of discourse. Christian theologians maintain a dependence upon the images, stories, and symbols from revealed texts and communal faith. But neither faith nor revelation is a univocal concept; they too are metaphoric, having multiple meanings.<sup>88</sup>

The external 'objective' conditions through which theologians assert truth-claims include community traditions of worship, oral preaching, and religious experiences; genres of written expression (gospels are not visions; nor are they letters or apocalypses); and institutional mediations (such as office or authorities) – among others. 'Subjective' conditions for the truth of religious metaphors include faith as a means of apprehending the meaning of these revelatory discourses. But faith itself has many levels – from a willing suspension

of disbelief to the highest levels of contemplative participation in the divine life.<sup>89</sup> Theology, therefore, is never a totally *independent* discipline.<sup>90</sup> Though theology has an inner logic and dialectic, it also operates from a rhetoric that precedes its inception and to which it returns.<sup>91</sup> Theology depends for its language upon prior discourse; but the natural sciences resemble contemporary theological discourse more than they have been willing to admit.

Contemporary scientists have a rhetoric. Their performance as scientists is not simply involved in mathematical deductions (i.e., dialectical thinking). It also involves a public community of discourse and the communication to non-scientists of their conclusions. Moreover, the metaphors of rhetoric endure *during* scientific activity, guiding investigations and expressing results. Again, there are both subjective and objective constraints upon scientific discourse; however, just as these conditions for truth have shifted since the early modern period (remember Heaviside), so too have scientists tried to make them more precise, more self-reflective. And although the pure inquiry of investigators hopes to prescind from all social constraints, they cannot – since they cannot completely absent themselves from ordinary discourse. The objective constraints have largely crystallized around mathematics or formulaic precision, repeatable experimentation, and a certain aesthetic coherence. But again, each of these conditions is embedded within natural languages. Even scientific formulae do their work by distortions of ordinary discourse.

In the chapters that follow, we will explore the ways in which metaphors have directed the notions of time operative in the natural sciences. Because metaphors themselves have an inherent temporal structure (is/is not yet, except under certain conditions), such a rhetorical scheme will affect the ways in which the disciplines understand themselves and their subject matter. In effect, they embody empirical subjects attempting to transcend themselves in two ways: first, by exercising their projective and controlling sensibilities toward the world; and second, by organizing the world in temporal schemes of development, progress, stasis, and/or decline. Empirical subjects are caught up in intersubjective communication about the world. They transcend any monadological autonomy in favor of others. Metaphors are a vehicle in the natural sciences by which interpreters understand the world as ‘surpassing itself,’ engaged in articulating an other with which/whom they must recognize at least a relative autonomy. With each successive chapter, I hope to outline cumulatively further dimensions of the temporality of empirical subjects in the world as they

investigate 'things' for the possibility of God. In a certain way, the chapters on transcendence, time, and the empirical world may be seen as a *preamble*. Are there conditions in the world of nature for the possibility of the Christian God? Finally, we will examine the ways in which understanding the world's transcendence affects the Christian interpretation of who God is and how God works in our world.

# 2

## The Story of the Universe: Metaphors for Time in Astrophysical Cosmology

*There is fire in everything,*

*shining and hidden –*

Or so the saint believed. And I believe the saint . . .

Edward Hirsch, 'Incandescence at Dusk'

### 2.1 Introduction

We human beings are aware of all sorts of time: the rising and setting of the sun, the regular phases of the moon, the seasons of the year and agricultural cycles, beating hearts, and flowing tides. Each marks the complexity of our ordinary day-to-day life. We are probably most conscious of the kinds of time that intimately affect us like our pulse, menstrual cycles, and sleeping patterns, but these rhythms are also traceable within, and often to, the larger cosmic cycles of recurrence. The succession of moments; patterns of repetition; and the accumulation, growth, and disintegration or death of people, objects, and institutions are built into the very structure of the world as we know it. 'As soon as man comes to life, he is at once old enough to die.'<sup>1</sup> Beginnings and endings, with intermediate flourishing and waning, structure non-human as well as human existence.

Since human beings inhabit a middle ground in time scales – between the microworld of quarks, electrons, and atoms and the macro-environment of the universe – our sense of time is limited in scope.<sup>2</sup> We are familiar with brief times, like our reaction time (about a tenth of a second) to a possible age (let us say) of a century (3,000 million seconds). Most of our life is developed within a few hours or a few days and weeks. Rarely do we think of times like a millennium, let alone the pre-human world four million years ago, when our

particular branch of evolution started. Reflecting upon the time of the earth (about 4,500 million years) or the time of the universe (15–18 billion years) seems incomprehensible to us. Can we even conceive of a story for that amount of time? Does the earth have a narrative structure before human beings emerged? Is there a succession of ‘events’ that marks the passage of the earth and the universe? Are the stories we tell meaningfully related to the data available to us?

Until relatively recently (by the standards of earth’s time), this question was answered only by the founding stories and rituals within cultures. These stories were always religious.<sup>3</sup> So Haida peoples of the Pacific Northwest describe the original human beings as having been created by a raven whose curiosity pried open a clamshell, releasing men and women onto the seashore. The book of Genesis proclaims ‘light overcoming chaos’ by the Word of the Lord; the Babylonians described the struggle of Marduk and Tiamat, one of whom dismembers the other to produce the heavens and the earth.

In an extraordinary fifteenth-century tapestry made in Flanders,<sup>4</sup> the cosmos is imagined as an astrolabe, the medieval astronomical instrument by which sailors measured the altitude of the stars, moon, and sun. The polar star is at the center, surrounded by the *rete* (net; in Arabic, spider) the moveable wheel, on which is projected the celestial sphere with the constellations of the northern sky. The extra-zodiacal constellations such as Orion, Andromeda, and Pegasus, are woven into the outer circle or *mater*. On the right of the cosmos is Lady Philosophy enthroned with Geometry and Arithmetic at her feet. By her left side Abraham and Virgil converse, while at her right shoulder Astrology points to the celestial spheres. Atlas supports the cosmic astrolabe on the left of the tapestry while a wind-driven angel adjusts the *rete* with a very large crank. God the prime mover radiates from a sunburst above the angelic steersman, directing planetary movements like an orchestra conductor by his hands – genuine action at a distance. The universe is organized around the stars and their configurations; it is comprehended through arithmetic, geometry, astrology, philosophy – and Abrahamic faith; it is run by the warmth of divine love working through the force of Atlas and the guidance of angelic servants. A Latin inscription states: ‘The poets say when the angel acts under the power of the prime mover, the world is made fit for this by its own agility; the sky revolves controlling its motion.’

At one of those nodes in human history during the initial age of European colonial exploration, philosophy of nature, theology, and art combined to produce a complete image of the known universe. At

the same time, the images gave the world its own semi-independent patterns of movement, begun by God, but working on their own, like a machine – a mechanism, however, that required angelic power and human manipulation to sort out the location of the stars and the planets. It was a practical instrument as well – one that sailors and incipient scientists needed to decide where they were on the planet and how to divide the geographic world unknown to them. Nonetheless, a loving divine attention focused the entire affair. All was right with the world; a coherent religious and philosophical story could be told.

The discovery since the Enlightenment of unimaginably long times for the Universe and unbelievably short times for the decay of subatomic particles has dismantled this triumphal tapestry. It has become very difficult to imagine the story of a universe governed in any coherent fashion as a vast spatiotemporal continuum. Nonetheless, scientists continue to tell their own stories about the universe. In this chapter, we will examine the images, metaphors, and stories that astrophysicists use to understand and develop their discipline. Does nature, even without human presence, have an internal sequence? Does the succession of moments indicate a narrative structure? What relationship does the story have to the metaphors of origin that astrophysical cosmologists use? What are some of the springs that trigger the understanding of temporality in astrophysics? Does it make a difference whether there is an open or a closed universe? Does Christianity require as a condition for understanding its God a temporally asymmetrical universe in which future transcends present and past? Must there be a direction (any particular positive or negative direction?) to time for Christian theology to make sense? When Christianity claims that redemption and resurrection are not ‘more of the same,’ are there conditions for this assertion in the physical universe as a whole? I do not believe there is any simple programmatic way in which Christian theology can predict cosmological consequences or that it has a blueprint for the future (any more than it has a readymade template for interpreting the past). I remain convinced nonetheless that theology, as a public discourse, must respond to the exigencies of reasonable conversation with the natural sciences.<sup>5</sup>

I am aware that I have asked many more questions that I can answer in this chapter. As we will see, we will be both extending and correcting Immanuel Kant’s interpretation of the sublime.<sup>6</sup> For Kant, we judge nature as *sublime* when there appears to be more than we can comprehend; we attribute to nature the possible evocation of both fear



and awe. Rational thought for Kant makes our practical sensibility 'look out into the infinite, which is for it an abyss.'<sup>7</sup> But for him, there is no basis in nature itself for such a judgment, except within the human subject. In this chapter, we will explore the possibility that the 'looking into the infinite,' the 'more' that keeps appearing in the scientists' understanding of the universe, has some basis within the universe itself. We will examine the way in which the metaphors of origin that astrophysicists use unwind into a temporal asymmetry that become stories. The universe, according to them, has a *telos* – what is it? Is some version of an 'ending' a cosmological condition for the meaning, meaningfulness, and reference of Christian discourse?

Much of the work presented here will be analytic, studying contemporary astrophysical cosmologies. As I have said in chapter 1, the hinge is metaphor, the language that these disciplines continue to use. First, we will examine the metaphors of origin in astrophysics. Then we will discuss the ways in which metaphors generate narratives for nature's temporal unfolding in the natural sciences. We can then ask some questions about what significance these cosmological metaphors might have for Christian understandings of religious narrative.<sup>8</sup>

## 2.2 Metaphors for time in astrophysics: the universe as story

It is now a commonly acknowledged fact that metaphors fill the standard model of the universe and that these metaphors structure themselves into a narrative form.<sup>9</sup> The natural sciences have chosen to tell a story about the universe using metaphors and the rhetoric of ordinary language. Stories have beginnings, middles, and ends. The middle evolves through a plot complication in the initial phases that functions as a narrative node – a trigger or switch, if you will, that generates the development of the tale. In a coherent story, the plot complication and the narrative evolution lead to an appropriate conclusion.<sup>10</sup>

Eighteenth-century metaphors for time focused upon the clock; nineteenth-century metaphors thought of the universe as an engine running down.<sup>11</sup> For thousands of years, the speed of a good horse carrying an excellent horseman was the ideal of swiftness. When James Watt in the eighteenth century experimented with a new kind of power, the medium of computing time and the goals of action and passion changed. The meter of the steam engine and the metronome transformed the human experience of time. Twentieth-century

metaphors take as the beginning of the standard model for the universe the furnace, explosive devices, or more recently decompression and ice. The issues inherent in current images are at first surplus, then imbalance, and ultimately open-ended directionality.

The notion of *surplus* denotes something over and above a simple sum of two or more items. To begin with, one could take the common-sense economic meaning in the dictionary: an excess of receipts over disbursements. It is the *extra* that remains or appears beyond what seems to be needed. Although mathematics may continue to determine precise meanings for this *surplus*, here it emerges within the metaphors for origins that we will interpret. What we will see, however, is that the possibility of a temporal orientation of the universe that appears in some current metaphors does not always cohere well with some contemporary views on time in mathematical physics.

Efforts have been made to think through the specifics of time asymmetry, though some would argue that it has 'never been a well-defined subject.'<sup>12</sup> Following Davies, we can say that physicists define *time asymmetry* as 'the basic fact of nature that the contents of the world possess a structural distinction between past and future facing orientations.' Note, however, that Davies distinguishes the 'material' *contents of the world*, the 'collective quality of complex systems' that have asymmetry from *time* itself. In his view, time does not have spatiality. For Davies, to think otherwise would be to turn an explanation of time into part of the data. Though it is common to distinguish among different dimensions of time, to recognize that human psychological temporality and cosmological time are not identical, the active character of human temporality is often projected upon the passive spacetime of physics.<sup>13</sup> This asymmetry of cosmic macrosystems is due to the fact that 'all systems left to themselves (isolated) tend to approach thermal equilibrium and not to leave it again.'<sup>14</sup> The *origin* of this entropic macroscopic asymmetry is problematic, perhaps due to the *mismatch* between 'the boundary conditions on the global dynamical motion as determined by gravity, and the microscopic particle motions of the cosmological material,' the 'large and small scale motions of the universe.'<sup>15</sup>

The asymmetry of the universe, that the material world is 'advancing,'<sup>16</sup> means that the universe is not a 'balanced' equation. There is a small dominance of matter over antimatter; if they were equal, the organized, structured universe would not exist. There would simply be radiation. The fact that the universe has been expanding since the

initial explosion raises questions about the ratio of matter to anti-matter in the universe. If the expansion velocity overcomes the gravitational attraction within matter, then the universe will keep expanding indefinitely; if the gravitational attraction of matter is stronger than the velocity of motion, then the universe will contract upon itself. What is known thus far leads physicists to think that the universe has a 'critical density' such that it expands ('advances') at precisely the velocity that will negotiate an open-ended dénouement. Another way of putting it says that the universe is an unbalanced equation into which one can keep putting numbers, but the solution will keep escaping. As we will see, the stories that parallel these 'equations' for the universe create a temporal unwinding of matter into the distant future. What is clear is that time (and coterminous with it, space) had a beginning; it likely will have an end.

Language by physicists about the universe as a whole is highly metaphoric. In fact, the possibility of speaking about the universe as an entire unit is itself problematic, even metaphoric, in physics.<sup>17</sup> Physical discussions of origins and conclusions give the cosmos a narrative structure with its own implicit plot, agents, complication, and dénouement. Physics and astrophysics, despite their explanatory mathematics, emerge from a rhetoric and use metaphor-driven models to communicate their insights to appropriate audiences.<sup>18</sup> The plot of the standard model about the universe begins in the Big Bang, complicates itself by what causes its expansion (e.g., the *mismatch*), and, depending upon the complication, concludes in greater order or in utterly random disorder – a Big Crunch or Heat Death. Not surprisingly, it has been easier to tell nature's story in its past from the standpoint of the present than to predict its future.<sup>19</sup> In what follows, I shall examine the rhetoric of cosmological physics to see where it leads.<sup>20</sup> The images for an originating and originated universe have developed into a narrative structure that in turn operates metaphorically.

The *inception* of the narrative is described as a fireball, blasting asunder any known connectives.<sup>21</sup> This 'searing violence'<sup>22</sup> bursts and swells into a constantly expanding, perhaps inflating, universe. The force of the violence impels galaxies to 'rush away' from one another.<sup>23</sup> There is a veritable 'swarm' of elements. The elemental bits have been 'thrown apart.' At the 'origins,' the language of paradox dominates discourse. In the beginning, ordinary mathematical formulae, according to many, do not cohere; they only appear or evolve as initial chaos gives way to the incipient regularities of spacetime.

Mathematics and the laws of nature evolve within history (perhaps even *make* history?). Under such 'unusual and improbable' conditions,<sup>24</sup> little can be described, let alone explained. At best, we might say that it was an 'undifferentiated soup.'<sup>25</sup>

A *complication in the plot* is required to explain the present – whether it is the predominance of matter over anti-matter or the possible presence of observers.<sup>26</sup> The 'excess' of matter,<sup>27</sup> the 'abundance' of helium,<sup>28</sup> the 'graininess' of the primordial soup,<sup>29</sup> and 'statistical' imbalances<sup>30</sup> invite scientists to investigate the critical density of matter and the critical rate of expansion.<sup>31</sup> The quality of the story changes, depending upon the complications. These complexities, which not only may explain the emergent 'clumping' of our universe but also its eventual conclusion, are of enormous importance, since they are the 'conditions' under which a plot evolves and through which it comes to a conclusion. One need only think of the difference in a play like Shakespeare's *Hamlet* if the writer had made the main character a decisive, aggressive warrior. The ending would be different, but in addition, the 'getting there' would have emerged in a utterly distinct fashion.

In the physical story, one condition is the unexplained 'gap'<sup>32</sup> in the primal chaos, the 'bubble' in the soup that generates distance and asymmetry between 'one' and an 'other.' A surplus establishes the causal network of before and after.<sup>33</sup> Thus the 'lopsidedness' of unbalanced matter residue<sup>34</sup> creates a 'dis-equilibrium'<sup>35</sup> which founds the temporal asymmetry of the cosmos, whether it is seen to be 'running down' due to entropy<sup>36</sup> or generating order.<sup>37</sup> Under any conditions that this event is explained, whether through fluctuations, wave disturbances, etc., it is the semantic overlap in the metaphors of surplus of 'getting more than you bargain for' in non-linear expansion<sup>38</sup> that establishes a cosmic sequence we call a story.

Recently, Prigogine and Stengers have told a somewhat different version of the story of surplus, using the same metaphors of excess to describe an irreversible power bringing order out of chaos at all levels.<sup>39</sup> Layzer has maintained that the disequilibrium that generates time asymmetry is more like a gentle decompression than an explosive fireball, a cosmos that emerges from 'critical-point opalescence' like a gas.<sup>40</sup> This occurs through gravitational clustering, a 'genuinely historical process.'<sup>41</sup> For Layzer, this explains the 'clumpiness' of the cosmic medium and the eventual emergence of the autonomous self-gravitating clusters we call galaxies.<sup>42</sup> This expansion of space is 'responsible for chemical and structural order.'<sup>43</sup> As can be expected, there is

considerable disagreement about the developments of space and time at the primordial moment.

The *final act* of the drama thus alternates, depending upon the conditions and the interpretation of *what is generated* by the excess, between an infinite dead equilibrium,<sup>44</sup> a contracting gravitational compression, or infinitely expansive order.<sup>45</sup>

The emphasis that I have placed upon the appearance of a totalizing narrative out of an originating singularity is not, however, the only interpretation of the excess. Other readings maintain random simultaneity or non-narrative sequences.<sup>46</sup> In the version I have stressed, the excess becomes the 'operator' that generates the sequence we call the universe. The cosmic 'arrow of time,' the temporality of the universe – that the cosmos has an asymmetry between past and future – appears in the metaphors of surplus. In one dénouement for the standard model, the surplus leads through entropy to heat death or cold soup; or in another conclusion, the universe develops into patterns of order the farther it moves away from equilibrium. In an alternate non-narrative interpretation, however, there is a focus upon randomness and the paradox of gaps that seems to preclude directionality altogether. Not only are there simultaneous worlds due to problems of observation,<sup>47</sup> but surplus can lead to multiple, unrelated universes.<sup>48</sup> We could have the development of cyclical world generation, based upon the expansion and contraction of spacetime or parent–offspring universes in which structures emerge from one another out of an inflating bubble of spacetime. Here, 'our' universe is only part of an infinite assemblage of universes, although it is self-contained now.<sup>49</sup> Another possibility is that the three spatial dimensions of our universe are simply those that observers in this world are able to experience.<sup>50</sup> The complexities of alternate interpretations to a narratively sequential universe focus upon sheer multiple possibilities.

## 2.3 Metaphors, time, and truth

### 2.3.1 The nature of metaphors, narratives, and time asymmetry

In the previous chapter, we have learned several things about metaphors: (1) metaphors generate a surplus of meanings, an excess of intelligibility; (2) the generation of meanings is telic, i.e. directional; (3) meaning in metaphors is directional for two reasons (a) there is an implicit time-laden nature to the trope (is/is not yet); and (b) there are

conditions, constraints implicit in the metaphors themselves under which the 'not yet' dimensions will take place; and (4) the temporal directions of metaphors disclose a world that is both actual and possible under those conditions.

In other words, there is an intimate connection, if not co-implication between the metaphoric process and narratives.<sup>51</sup> Internal to the structure of metaphors is a conditioned temporality that functions as a model for redescribing the world. Readers or hearers have proposed to them a way of understanding and living in the world that can be fulfilled – under certain conditions. Metaphors produce a story, an unwinding of the conditions through which they can be initiated and completed. The 'excess' of meanings that metaphors engender transgresses ordinary linguistic usage, but in cunning ways. Through the draw of pleasure or entertainment, they 'condition' the participant to the emergent world. Upon further reflection and explanation, interpreters can sort out the various conditions under whose influence they have been 'exercised', can evaluate whether they wish to continue participation in that world, and can judge whether to further that world with its conditioned infrastructure.

The surplus of meanings generates many stories; negotiating the many stories and their internal metaphoric processes becomes a social concern. The conversation creates communities of discourse and discriminates the validity of conditions for implementation. Stories become models of the world in which we dwell and which we hope to inhabit. But never do we surpass the productive power of metaphors or narratives; we keep returning to them because they create further meanings, more stories, a greater elaboration of conditions through which they might be implemented.

An intriguing element of the Standard Model of the Universe told by astrophysicists is that it is a story. It has a beginning in the Big Bang, a middle in the evolution of the universe, and an ending. The initial image is a metaphor that generates multiple meanings; in turn, this produces a narrative that functions as a model. The drama will take place, whether a self-conscious, intelligent being is here to see it or not.<sup>52</sup> The 'world of nature' becomes a history that in turn is metaphoric. Here we have several issues to explore: Can we examine the ways in which the genre of metaphor itself has 'generated' the story of the universe for astrophysics? Can we see how this standard story of the universe contrasts, not just obliquely but directly, with the philosophy of the sublime developed by Kant? How do the alternate endings emerge from the metaphors? What do the various resolutions

about this parabolic story mean to Christianity? Does one or the other story, or even narrative itself, make *any* difference to Christian theology? It is my contention that the sheer form of metaphor chosen by scientists to identify the cosmic origins generates the conditions that investigate the asymmetry of the temporal process.

### 2.3.2 Metaphors and reference: emergent probability and the deconstruction of time

The answers to the question: 'To what do metaphors refer?' are important for both science and religion, as I have indicated in the previous chapter. If metaphors are about paradox ('is/is not'), as Ricoeur indicates, then there is not only a disconnection between the concepts of science and theology and their (supposedly) prescientific discourse, between theory and ordinary language; then there are also no conditions through which metaphoric language can be enacted. This would be true for both religion and science: science would have no models; religion, no scriptures. The position I have taken above argues that the metaphoric process has an intrinsic temporal asymmetry ('is/is not yet'). This suggests a kind of reference that focuses upon narrative, whether the metaphors operate in science or theology. Is this temporal, asymmetric story an 'imposition' upon the universe? Or is the universe 'timed'?

The descriptive stories above make it clear that not all physicists and cosmologists see the *surplus* in the Big Bang generating temporality. I think that this is due less to physics or pure mathematics than to particular ways of understanding or 'holding metaphors' in language. Those scientists who use metaphoric surplus to generate atemporality or multiple worlds hypotheses are linked to a theory of metaphor that maintains their irrelevance or their paradoxical quality.<sup>53</sup> Those who claim that the cosmic Big Bang promotes a narrative to the universe are indebted to a theory of metaphor that supports a moderately realist historical ontology.<sup>54</sup> Here we will discuss the following dimensions of the problem: an historical issue that affects our understanding of metaphors – the connections between temporality and art in Kant and the alternate positions about metaphors and time that have emerged – narratives and temporal deconstruction.

Two major explanatory languages discuss the surplus to which metaphors refer. The first articulates a set of terms and relations that sort out the emergence of the future from the past under specified conditions. The second maintains that there is no direction, no emergence. There is only differentiating seriality without narrative – except

in so far as human beings impose order, necessarily oppressive hierarchies of before and after, prior and posterior, superior and inferior. Here the surplus of metaphors discloses not history, but the ambiguous interplay of traces. Lonergan's views on emergent probability coordinate his understanding of cosmic and human time. Deconstructionist attitudes toward time, especially in Jacques Derrida, carry the confrontational and paradoxical role of metaphor to its limit. Kant shows us how any intrinsic temporal directionality to nature was excised, making room for the positions of Ricoeur and Derrida (however different) on metaphor. Lonergan's notion of emergent probability offers a theoretic correction to these positions and shows how the asymmetrical temporality of metaphors parallels the structure of the universe.

### **2.3.3 Kant's *Critique of Judgment* and the time of metaphors**

Kant's correlation of art, purpose, and teleology shows how the philosophical tradition has already linked freedom, metaphor, and directionality in nature. Kant hoped to provide an overarching intellectual unity to theory and practice (*The Critique of Pure Reason* and *The Critique of Practical Reason*). This required integrating the conditions for the laws of nature (which demanded a theory of pure reason) and the conditions of particular empirical laws (which involved practical reason). The first conditions not only supported the necessary truths of Newtonian physics (if it is to reach any level of certainty), but provided the basis for all conceptual univocity and linguistic precision. Experience (and its basis in pure reason) and practice (practical reason) have different kinds of necessity. The 'as if' necessity of practical reason (one must act as if one is free, without absolute speculative justification) 'gives a law only to itself, and not to nature.'<sup>55</sup> In other words, one cannot postulate either intention or temporality to the processes of nature. But by studying the work of art as an instance, one can learn something about how purposefulness operates in a constructed object, and perhaps understand what it means to call nature beautiful.<sup>56</sup> Investigating the ways in which unity, necessity, and universality function in regard to the truth of the particular and practical, Kant turns to art as a primary instance of a particular object taken to have universal significance. Art opens up a world, but what world?

Subjective judgment attributes to nature a 'principle of purposiveness.'<sup>57</sup> The cosmos does not have a (speculatively) provable goal-directedness; hence, it becomes imperative to study human



making which does seem to have a purpose or goal. Since 'we cannot ascribe to natural products anything like . . . purposes,' we must study purposiveness as attributed to a constructed object – works of art. By prescribing to its own cognitional faculties a 'law for its reflection upon nature,' human knowing gains a certain pleasure in bringing order to the variety in things.<sup>58</sup> The aesthetic representation of this ordering brings disinterested, that is, non-possessive, pleasure to the observer. For Kant, it is the subjective agreement of sensibility, imagination, and understanding in a single moment that establishes the satisfaction of aesthetic judgment.

The purposiveness of judgment can appear as the harmony of the form of an object with the cognitive faculties or a formal congruence to the (ideal) possibility of the thing in itself.<sup>59</sup> But purpose itself is not directly attributable to nature (any more than to a work of art). Aesthetic judgment 'alone' provides a 'principle which the judgment places quite *a priori* at the basis of its reflection upon nature, *viz.*, the principle of a formal purposiveness of nature . . . without which the understanding could not find itself in nature.'<sup>60</sup> The critique of aesthetic judgment becomes a condition for examining the truth revealed in the laws of nature. Aesthetics provides the 'analogy with the causality of purpose, without any pretense' to explain nature in itself.<sup>61</sup>

Metaphors, therefore, play an important role in the discussion of nature's direction and temporality. Causal dependence between 'things', temporal succession, and the structure of nature itself involve reflection upon art. Kant sees the function of the attribution of purpose to nature as 'enlarging for the mind.'<sup>62</sup> By the elegance of explanation, cognition is 'strengthened.'<sup>63</sup> The possibility of a self-organizing purpose in nature is a regulative idea,<sup>64</sup> a heuristic ideal that guides human investigation (ultimately attributable only to reasoning humanity itself as the final purpose of nature). The emergence of this free space is precisely for Kant where human responsibility for the universe appears. Since the intrinsic purpose of nature cannot be determined except as a subjective ideal, it is the moral responsibility of human beings to supply 'that in which natural knowledge is deficient.'<sup>65</sup>

In the history of modern philosophy, therefore, the topics of temporality, metaphors, and human choice have already been interrelated. The referential character of art for Kant involves attributing to things a certain purposiveness, a subjective presumption about direction in art that is extended into nature. Where Kant finds in aesthetic and

teleological judgment the shock of recognition that awakens and broadens cognitive activity and Ricoeur focuses the reality of human freedom, Hesse, Lonergan, and Soskice maintain that a partial, conditioned, though truthful judgment about the world can be made. The conditioned realism of these latter figures indicates that reference is not merely directed to the free human subject nor to subjectively attributed purpose, but to a temporal (cosmic, historical) movement of which human beings are a part. For Lonergan the term to understand this temporal process is 'emergent probability.' It provides the basic terms and relations for understanding the temporal asymmetry of the universe.

### **2.3.4 The intelligibility of time**

Emergent probability is the term Lonergan uses to discuss 'the combination of the conditioned series of schemes [of spatiotemporal recurrence] with their respective probabilities of emergence and survival.'<sup>66</sup> The world does not progress in the nineteenth-century Whiggish sense of the term, nor is there a necessary, antecedently determined scroll from which the universe unrolls. 'The intelligibility immanent in Space and in Time is identical with the intelligibility reached by physicists investigating objects as involved in spatial and temporal relations.'<sup>67</sup> It is simply the struggle for, and results of, intelligent inquiry about the universe. In so far as it is temporal, it is the 'ordered totality of concrete durations.'<sup>68</sup> It hopes to work out the statistical probabilities of emergence and survival for conditioned series to see if and how there is an intelligibility to our experience of the universe. 'To work out the answers pertains to the natural sciences.'<sup>69</sup> For human beings, the emergent probability in our human universe is a matter of cooperative intellectual activity, inquiring, imagining, understanding, judging, and deciding for values in the course of history. But here I am primarily interested in how this idea might help us understand time, the telic nature of the physical universe, and the power of metaphors in science.

To recite terms and relations in such a global investigation is incantation without explanation; but it may be helpful to outline the process of emergent probability. The general categories include the nature of events or occurrences: the spatiotemporal manifold of events; schemes of recurrence for events; the interlocking conditions under which schemes recur; probabilities, non-systematic divergence (chance), and actual frequencies. Though Lonergan assumes these categories are heuristic, to be filled by the data from the various

sciences, the enquiry operates under various hypotheses. (i) All world situations are not simultaneous; there is a succession and the world process is open, a succession of probable realizations of possibilities. (ii) Nonetheless, the world process becomes increasingly systematic since later schemes are conditioned by earlier ones. Sufficiently long periods of time and sufficiently high populations will assure the continuing emergence of certain schemes. (iii) The determination of the initial, basic world situation (boundary conditions) must contain elementary schemes in sufficient numbers to 'sustain the subsequent structure.' This process admits enormous differentiation, breakdowns in the probability of survival, and blind alleys. (iv) The intelligibility of the world process as emergent probability involves the complementary character of classical and statistical laws. (v) This intelligibility also leaves room for the appearance of human freedom as a condition for the emergence of later schemes of recurrence. For Lonergan, these five postulates are what must be investigated; they are not givens. Each would produce significant research programs for both science and religion.

In the interpretation of emergent probability as the explanatory term for temporality, Lonergan offers an ontological reference for the metaphors of the asymmetry of time. The interlocking levels of the microworld provide the initial patterns and conditions for the later appearance of multiple differentiations in the macroworld. The temporality appropriate to physics and chemistry provides the matrix from which biological and human time emerge. Time is neither a uniform clock imposed upon all objects, nor a sheer occasional contingency without connection. Rather the metaphoric surplus that produces an asymmetry in 'before' and 'after' refers to time as an emergent probability. There appears to be a 'nesting' of times, one appropriate to the causal successions in matter; another, although emergent and connected, for living matter; yet others for animals and the evolution of humans. How the 'before' and 'after' constitute each temporality intrinsically marks every element in the universe.

'Concrete extensions and concrete durations are the field or matter or potency in which emergent probability is the imminent form or intelligibility.'<sup>70</sup> Emergent probability, therefore, must be to some extent descriptive and predictive, since it involves the success of probable schemes of recurrence whose outcome one does not yet know. In other words, our understanding of time cannot be simply about symmetrical formulae or numbers; it must include descriptive categories, predictive models for the future.

To achieve those formulae, numbers, and models, we use measurement. Although measurement can move the inquirer from description (metaphors) to explanations (formulae, theories of terms and relations), enquiry itself participates in the process of emergence.<sup>71</sup> In other words, measurement (a macroscopic entropic process) affects the concrete succession of durations and extensions. Measurement is not temporally neutral. It assumes a determinate, unidirectional ability. Its intervention becomes part of the conditioned schemes of recurrence, including the microworld. The purposiveness of the universe is open, heuristic, dependent upon the concrete recurrence of some schemes of recurrence. To affirm finality is 'to deny that this universe is inert, static, finished, complete. It is to affirm movement, fluidity, tension, approximateness, incompleteness.'<sup>72</sup> To affirm this finality does not offer any opinion on the ultimate fate of the universe, but it does maintain that there is a directed dynamism in the universe's operation. This process is directed to 'whatever becomes determinate through the process itself in its effectively probable realization of its possibilities.'<sup>73</sup> Our interventions affect the conditions under which the probabilities emerge. Our metaphors and models involve our own engagement.

To the notions of probable schemes of recurrence, of emergence, and finality, Lonergan adds the notion of development: 'a flexible, linked sequence of dynamic and increasingly differentiated higher integrations that meet the tension of successively transformed underlying manifolds through successive applications of the principles of correspondence and emergence.'<sup>74</sup> By purposeful development in nature and history, Lonergan does *not* mean a determined or assured progress that justifies the present *status quo*. 'Purpose' and 'development' occur through the trial-and-error of evolutionary processes, discernible far more easily after the results than during the moments of change. He discusses the movement, differentiation, and integration from chemical compounds and molecules to the emergence of higher forms of organization we call 'life' that are self-organizing and self-replicating.<sup>75</sup> Evolutionary development moves from lower manifolds through differentiation to higher integrations and schemes of recurrence.<sup>76</sup> To understand development is to 'proceed from the correlations and regularities of one stage to those of the next.'<sup>77</sup> Yet once development reaches the level of self-organization and self-reflection, it can encounter human refusals to take responsibility for change. It must face the fact of evil. There appear in human history ignorance, bad will, and/or ineffectual self-control.<sup>78</sup>

For Lonergan, the possibility of overcoming the personal and social surd, where there is no intelligibility, is dependent upon many conditions. But a crucial one is a symbol he names *cosmopolis*.<sup>79</sup> The decline in human culture and history emerges from the various blindspots of human choice that can be overcome only by the non-violent rhetorical appeal of an interlocking set of critically appropriated *images* that appear in art and literature, theater, broadcasting, journalism and history, school and university. These appear in our common-sense world to correct the biases that skew development and make the emergent probability of the universe a dead end or a blind alley. Such metaphors drawing humanity into the future assist individuals and communities to take responsibility for the history of the universe.

Nature, individuals, and communities have histories. Lonergan thinks through the intelligibility of that history and, in effect, argues that without a history of the cosmos and the sufficiently wide and broad development and differentiation of plants and animals, there can be no human histories. The metaphor that guides the process as a teleologically open goal is *cosmopolis*. The higher schemes of recurrence depend upon and integrate lower manifolds at levels of statistical probability. Human self-organizing self-consciousness enters the story as (a very late) measurer and reflective agent of change. Lonergan explains the excess of human knowing (and loving) as the propelling power within the telos of human stories. It is this 'surpassing' (self-transcendence) that marks one's present from one's future; it is our particular form of 'surplus' or 'excess.' Moreover, this self-conscious intelligence makes judgments about things, events, people, and values that can be revised should new conditions emerge. For Lonergan, humans must take responsibility for the 'is not yet' of what is emerging.

In the last chapter, I argued that metaphors, whether in science or religion, establish the basis for a 'critically realist' view of the world; under certain conditions articulated in the metaphoric process; they tell us the truth about the world and predict outcomes. In this chapter, Lonergan has offered an explanatory language for the temporal indications of metaphor. The phases of 'is/is not yet' found in metaphor asks for and refers to a theoretic, historical ontology that can be named emergent probability. This name for the concrete extensions and durations of the physical world, enveloped by biological and human time, provides an abstract language for the temporal asymmetry of the universe. Time and narrative emerge from the surplus, the excess that is named in the metaphors about the universe. But this particular

theoretic language is not the sole interpreter of the referentiality of metaphor any more than 'asymmetry' is the 'only' version of the universe. There is another that claims to express theoretically the excess operative in metaphors. To that language we must now turn.

### **2.3.5 The deconstruction of time**

Deconstruction views the excess in metaphors as sheer bipolar play, without finality or purposiveness. As we shall see, the predilection for a present presence (any simultaneity) and an underlying being (ontology) is 'broken up' into temporal meaning that is at once always passing and always deferred into a becoming whose speech is intertextual and multiple. Deconstruction rejects any narrative as an imposition upon intrinsically chaotic data.

The figure who is most aligned with the positions of deconstruction, whether fairly or not, is Jacques Derrida. To locate his notions of time requires some contextualization, however briefly, through Freud's suspicion of the unity of the self, Heidegger's rejection of classical metaphysics in western thought, and Nietzsche's philosophical style.<sup>80</sup>

Freud describes the ways in which human subjects are never completely available to themselves. Not only is the subject 'broken up' in itself as an id, an ego, and superego; but the unconscious, following Lacan's reading of Freud, can never be objectified. Human beings are forever involved in an otherness over which they have no control. Psychoanalysis listens to this alien within. The signs that emerge from the unconscious can never be anything but suspect; they do not disclose themselves with transparency; they will never give up their meanings easily nor be deciphered completely. They split apart in fissures of radical ambiguity. All that human beings have are the signs that appear; there is no permanent personal background (a subject) present that generates the signs.

In keeping with this assertion of the subject's radical plurality, Heidegger de-structs western metaphysics. The age of ontology extending from Plato to (at least) Hegel was a tradition that believed that a fully constituted presence or positive ground supported phenomena. Being was the ultimate foundation of all that is, including that which is not. For Heidegger, Being is not a being among other beings, such as plants, trees, chairs, or even people. Being is both absence and presence, and thus should be written 'under erasure' (Being). To put the western ontological tradition under erasure makes the thinker concentrate upon the ways in which particular realities are present through Being which cannot be spoken.

Derrida points to the absence, the lack that is the condition of life and thinking. In classical terms, this absence is neither non-being nor nothing. One cannot ask 'absence of what'? There is no 'what' of which 'it' is a lack. Any theoretic attempt to understand resists our attempts to make action, thought, and things coincident. Derrida marks the present absence as a 'trace,' the way in which the other appears in the midst of human attempts to signify anything. Trace points to the ineradicable non-identity that conditions the motion of discourse. There can be no full presence or simultaneity.<sup>81</sup> Hence any attempt to control the meaning of things is impossible. No identities can be articulated in discourse; at best only similarities that are always slipping out of the conversation. One can never say 'I am *x*' or 'The world is *y*' without having to postulate paradoxically and immediately its opposite. The 'I' or the 'world' are, if they 'are' at all, *in the act* between the polarities. Yet even this positive statement falls automatically under erasure.

With Nietzsche, Derrida exercises a philosophical style. The perpetual creativity of the artist continually invents metaphors, tropes that ironically subvert the received pieties of philosophy. For Nietzsche, metaphors, not concepts, are the process of truth-telling. Indeed, concepts, jargon, even precise languages are simply disguised metaphors. The fragmentation of the philosopher's prose, the rapid reconfiguration of his texts from aphorisms to fables to lengthy conceptual commentary reveal the multifaceted play of the writing that is the creative force of the author. For just as authors are present and absent in the language they risk writing, so also the reader's access to the thinker is only through the pathways of prose. The subjects' freedom is the power to write, to undo a position by espousing another, in unending fashion.

'Remaining oneself,' therefore (an impossibility, of course) requires playing in between the differences, not attempting to master one metaphoric appearance by another. The movement has neither origin (and hence no 'original' sign) nor a specific ending (and hence no probable, preferable, or improbable dénouement). Eternally creative subjects, by noting the otherness within their own psyches, allow the signs to appear.<sup>82</sup>

*Différance* marks the reality of absent otherness in what is/is not; it is spelled with an 'a' to show its relationship in French to both differentiation and deferral of meaning. *Différance* appears in writing, both the usual marks on paper and a psychic space in which subjects are always distanced from themselves through words. Words are always

rifled by their own ambiguity, energizing simultaneous labyrinthine wormholes to other terms, not back to a primordial presence or to an absolute future. The subject knows itself only in the play of different signs, the marks that it traces. Hence any linear continuity of space-time is recognized as illusory nostalgia, abolished in a stream of differences. Deconstruction, therefore, as a skeptical critique, notes the sutures that try to sew the spaces together between works, the proposals of presence to hide the absences, the gaps in the psyche. It unravels any proposals of positive meaning.

History, therefore, whether of individuals, peoples, or nature is a construction. To suppose that there is a non-contingent relation or connection between one sign and another imposes upon the flow of disparate differences a unity from the outside. This is the 'logocentrism' of western thought. Since this presumption promotes archeology (the search for origins) or teleology (the search for a potential in the present that intends completeness), it is a fundamental mistake. Narratives are a 'reaction formation against the discovery of the "seriality" of existence.'<sup>83</sup>

Chronicles are the appropriate trope or style for events. These annals make no attempt to place a set of events ordered vertically as annual markers into a linear or horizontal process. No explanation is offered for interconnection and no central subject or voice is assumed to be speaking through history. Chronicles appear to extend both backward and forward without end. They are records without relation or motivation.

Narratives, on the other hand, seem to plot the connections between 'events.' They structure data so that they form a coherent pattern in which one moment follows another in progression. Scattered overlaps are taken for cause and effect; characters emerge from backgrounds; and intelligible wholes appear with privileged moments. The interplay of memory and anticipation marks the filled present for the agents in the story. The historian and the novelist have much in common; they both create plots, granting tensive relations and meaning to the dashes between the dates.<sup>84</sup>

The construction of history out of the chaos of metaphors attempts to master the uncontrollable resistance of time. Repression and domination of one moment by another, of the whole by a part, of the whole by one writer/speaker/narrator, of one gender by another – all these are the internal rhetoric of stories. Unwilling to face the 'irreducibility of absence and the inevitability of death,' tellers of tales colonize the unknown past and the intangible future. History itself, a narrative



whether for humanity, nature, or the universe, is a trope, a metaphor that deconstructs itself in the telling.<sup>85</sup> It subverts all attempts to point directions, tell tales, or name names.

Despite deconstruction's rejection of narratives, it claims that it does not replace history with nihilism or respond to experience with a sense of fatedness. That would simply replace presence with absence and transubstantiate it into a reversed presence. One would be entering the polarity of discourse from the opposing side, so to speak; and then nothing or the void would become a new foundationalism for thinking. For the deconstructionist who is suspended between, time moves in multiple simultaneities, overlapping and deferring identity, leaving traces. Humanity is polyhorizontal, a 'tissue of times.'<sup>86</sup> Critical skill is required to keep the moment open without assuming closure and the conviction of meaning. The stance of the subject in such a world has been described as a sojourner, an exile, the undomesticated drifter, the anonymous saunterer who is always transgressing boundaries.<sup>87</sup> Players within time have no purpose other than the game; play risks meaning nothing at all. The need to use others, to consume them for one's own benefit, is shed for the sake of frivolity. Humanity lives in the polysemy of carnival.

The opacity of deconstructionist prose is deliberate; it gives evidence for the very metaphoricality of discourse that it proposes. For scientists or systematic theologians, whose interest is in making words coherent or precise, the whole project must seem bizarre. But, aside from its continuing political influence in graduate programs in the United States, deconstructionist positions should be entertained seriously. By maintaining the utterly metaphorical character of all language, by arguing that the experience of metaphors is fundamentally paradoxical, and that metaphors are constantly subverting positive discourse, such interpretations push discourse toward thinking as an act and toward an overturning of any *status quo*. Yet at the same time, it maintains a quite distinct view on the nature of time and narrative, one which prohibits any attempt to create a coherent story out of nature or history.

### 2.3.6 Metaphors: stories or carnival?

The two attempts (Lonergan and Derrida) to provide a language for that to which metaphoric language of surplus refers are distinctly different. For the first, metaphors name a world of emergent probability; for the second, they label multiplicity without ongoing coherence. Under Lonergan's proposal, the universe has its own temporal movement;

and, as human beings evolve out of the manifolds below them, they can be responsible for time and in time for a future emerging as different from the blindspots of the present. This possibility for human freedom is based upon the emergent probabilities of other schemes of recurrence (cosmological, chemical, biological, etc.). One chooses and establishes the conditions under which the vital, social, personal, and transcendent goods might emerge. In the second interpretation (Derrida), one never exits metaphors and the slippage of their meanings. One could try to control them, but illegitimately. If one accepts them, then one lives in carnival and topological play. One values the passing, undefinable 'moment' without any assured sense that another trace will connect with it, unless one creatively allows it to occur.

## **2.4 Metaphors, excess, and time asymmetry**

In this chapter, I have argued that scientists use metaphors of excess or surplus and that with them they elaborate asymmetrical narratives for the universe, that this storywriting for the cosmos may be due to the nature of metaphors, and that current philosophies understand metaphoric reference in quite differing ways. One of the values of this characterization is that it shows how the hermeneutics of the natural sciences have begun to parallel those of the human sciences. More specifically, it indicates how the results of astrophysical cosmology correlate with the philosophical interpretations of metaphoric reference.

Nonetheless, carnival must seem a long journey from the mathematics of time and the quantum origination of the universe. However, my argument is that the metaphoric language of excess, surplus, and gaps invites physicists and philosophers into curious questions. Excess and surplus are experienced as a reality to be explained. Some make use of the surplus to investigate and analyze directional arrows of time, so that the surplus generates an asymmetry in which the future exceeds the present in the cosmos. Others hope to avoid origins and endings altogether. Direction is oppression. For one the intelligibility of the universe discloses a story; for the others, it is ahistorical, contingent playfulness.

In the first group (the narrativists), we might place Barrow, Davies, Morris, and Tipler and in a differing fashion, Layzer, Prigogine, and Stengers for whom the standard model is a story. Hesse and Lonergan provide explanatory intelligibility for this mode of discourse through their notions of metaphoric reference and an historical ontology called

emergent probability. In the second group (the non-narrativists), we should not be surprised to find Reichenbach, Price, Kaku, and Hawking with Derridean deconstruction and Ricoeurian notions of confrontational metaphor as philosophical companions.

In successive chapters, we will see how these rather starkly drawn alternatives have other features to display – both about metaphors and about science. In the final chapter, we will see how they affect any Christian understanding about God; here they can display a difference in religious attitudes toward the world. In chapters 3 and 4, we will explore how these issues are part of western philosophy's search for the intelligibility of identity and difference,<sup>88</sup> their mutual implication, and their temporality. The past and the future differ from the present, yet coinhere within it; they can be experienced as same or other, identical or different. Past and future can be threatening, dangerous, comfortable, or alien. For Derrideans, time should be described as a polyhorizontal dimensionality of traces in which recollection and anticipation are the vanishing excess. It is as though we lived in a universe with simultaneously evanescent multiple times, each relative to the other, none able to be 'marked' as a 'secure' frame of reference. We must simply accept the enjoyment of the slippage and commit ourselves without pretending to know the coherence of the past or the possibilities of the future. With Lonergan, time can be understood as a journey in which the overtones in the present are collecting the past and hinting the future in a melody that unwinds only in the linear playing out of action and passion.<sup>89</sup> The emerging linearity of time is dependent upon fulfilled conditions in lower manifolds, so without the asymmetrical motion of time in nature, there could not be the complex history of human beings. We learn remorse for the past and anticipate the future under legitimate conditions, which need to be discerned and negotiated. And, although meaningful frames of temporal reference are relative to one another, they can be integrated in a coherent, emerging set of probabilities.

For the narrativists, metaphors and scientific analyses truly (however critically) categorize what occurred and predict what could happen under specific conditions. The non-teleologists tend to assume that sameness is being imposed upon the different. The first group understands the differences to be moving into an identity (whether of disorder or order). For the latter group, linear time becomes a fantastic construction, ever a burdensome and domineering overdetermination of the sheer play of data.

Does it make a difference to Christian theology which of these

versions of time are the case about the world? The primary Judeo-Christian readings of the Scriptures are narrative in form: the stories of Genesis about creation, of Exodus about the delivery from Egypt and the Gift of Torah, of the Gospels about the death and resurrection of Jesus. Yet there are different strands of Christian discourse. The two divergent notions of time presented here parallel theological typologies of mystical communion and prophetic difference.<sup>90</sup> According to this typology, the mystic aims for an atemporal, 'timeless' identity with the divine; the prophet emphasizes the radical otherness of God.<sup>91</sup> Prophecy stresses ethical imperatives through narrative; mysticism lives the unspeakable no-thingness of an absencing Present with its sublations of memory and anticipation. Mystics detach themselves from unrolling temporality and sometimes claim extratemporal experiences of simultaneity with the Other. Prophets urge repentance (regret for the differences from identity) and command that the failures of the past be replaced by a new story for the future. Tracy has summarized these concrete patterns in Christianity's rhetoric as manifestation (sacramentality and mysticism) and proclamation (preaching and prophecy).<sup>92</sup>

Just as the mystical and prophetic dimensions of religious discourse find it necessary to account for each other, so too the scientific notions of the origins of the universe, whether narrative or non-narrative mediate each other. Scientists who account for the initial, originating excess or surplus by describing a linear narrative must include disruptions and dead ends in the evolution of the universe, just as the non-narrative theorists must enclose the polyhorizontal notions of time within destructive oppressive narratives. Each finds it necessary to account for the other's position, but in differing ways. Which facet mediates the other? Does sacramentality mediate prophecy? Does preaching mediate mysticism? Does temporal succession mediate the present or does a hyperspatial present mediate simultaneous times? The elements of identity and difference require continuing mediation.

Religious people find it necessary to discuss the iconoclastic dimensions of preaching within the sacramental presence or to mention the eruption of the sacred within their confrontational proclamations. Although we will explore these issues with regard to God's relationships to creation in our final chapter, it is important here to see (1) how the metaphors of excess prompt further discussion for scientists and theologians; and (2) what kinds of differences our metaphors for time make to religious attitudes.

What do these parallels of Christian experience and doctrinal

language introduce into our discussion of narrative, deconstruction, and cosmic history? At this point, they can encourage 'research programs' for an entire university of disciplines! First, they encourage *theologians* to investigate how the two paradigmatic interpretations of spacetime (narrative and non-narrative) might be related. Can they be mediated? Despite the fact that this essay has emphasized the temporal dimensions of metaphor, it would be important to continue to explore the atemporal paradoxes and disruptions that are claimed for the surplus awakened by metaphors. Second, it encourages *philosophers* to analyze how sameness and otherness, identity and difference cooriginate the experience of temporality as narrative and as transhistorical or non-teleological. Furthermore, the relationship of the seemingly symmetrical temporality of the microworld (in quantum mechanics) still needs to be correlated with the asymmetry of the macroworld. These reflections further encourage philosophers to discuss the genealogy that links metaphoric excess to narrative and non-narrative modes of expression. Thirdly, it encourages *mathematicians* and *astrophysical cosmologists* to develop experiments and formulae that might overcome the symmetrical-asymmetrical impasse (micro-macro world relationships).

*Theologians* must continue to examine the religious attitudes that are prompted by both narrative and nonnarrative interpretations of the universe. Does mystical awareness generate narrative temporality? Do those who tell stories awaken mystical identity? Second, if there is a cosmic narrative that includes elements of multiple temporal frames of reference, what does this tell us about who God is? What difference does this narrative make to the Jewish or Christian stories? Christian meaning seems to claim that the God who works in Jesus the Christ is not just Lord of human stories, but of the story of the Universe. This language may have been easier to defend in a preCopernican universe; but it remains as part of the Christian scriptures (Colossians 1.15–20). Do not cosmic narratives condition the claim to public discourse that Christianity continues to make? Third, if we rethink the relationship between prophetic narrative and mystical identity, must we not also reexamine the traditional relationship between action and contemplation? Fourth, what sort of ecclesial and world politics does the mediation of mysticism and prophecy require?

Finally, the specifically religious dimension for Christianity is its announcement that this experience of temporality (whether narrative or transhistorical) is a gift. We will examine this theological possibility in the final chapter.

# 3

## Does Chaos Tell a Story?

But in those days what did I know of the pleasures of loss,  
Of the edge of the abyss coming close with its hisses  
And storms, a great watery animal breaking itself on the rocks,  
Sending up stars of salt, loud clouds of spume.

Mark Strand, from XLIV, *Dark Harbor*

### 3.1 Introduction

Steven Weinberg, in *Dreams of a Final Theory*, asserts that ‘we’ are not likely to find an ‘interested God in the final laws of nature.’ The laws are more likely to lead inexorably toward a ‘chilling impersonality.’ It is better to avoid the cheap consolations of religion by courageously embracing the resistance of science.<sup>1</sup> Where the Christian theologian encounters the world as gift, others believe that the determinist laws of nature promote resignation to the reality principle. Within the impervious cycles of nature, creativity and the availability of a hopefully different future appear impossible. It is an ‘almost irresistible temptation to believe’ that there must be ‘something for us outside,’ beyond; ‘The honor of resisting this temptation is only a thin substitute for the consolations of religion, but it is not entirely without satisfactions of its own.’<sup>2</sup> To Weinberg’s credit, a humane stoicism may be the only *authentic* alternative to religious piety in our post-modern world.

But, as the universe would have it, facing the grand laws of nature with equanimity, even cheerfulness, means not only engaging a predictable, symmetrical, determined world. There are asymmetrical physical systems (some possibly at the level of quantum mechanics) that do not quite fit Newton’s laws.<sup>3</sup> Everything from dripping faucets

to the daily weather surpasses our ability to predict clear outcomes.<sup>4</sup> Human beings and their histories also operate under the same conditions. The systems described in this chapter are technically 'chaotic,' far from equilibrium processes where the conditions of their evolution do not seem to determine the resolution at the end. Chaos appears in the behavior of the weather, an airplane in flight, cars on an expressway, and cigarette smoke swirling away.<sup>5</sup> Some thinkers analyze these processes so that they can tell a large-scale story that integrates the symmetrical and asymmetrical temporality in the universe;<sup>6</sup> instead of the growing disorder of entropic time (the Heat Death or Big Crunch) in the universe, there emerges order.

Modern artists and architects explored new notions of space and time, anticipating and paralleling the new sciences. Of course, redesigning the temporal and spatial patterns of nature has marked all painting, sculpture, or constructed shelter since their beginnings. Such objects reorder our local sense of the world simply by occupying space and by beginning or decaying in time. Scientists and artists of the renaissance shared a vision of the role of perspective and schematic representation in their images.<sup>7</sup> But at the turn of the twentieth century, artists consciously differentiated themselves from the customary views by reshaping the traditional perspectives and realist figures developed since the Renaissance.<sup>8</sup> What had been accepted as standard artistic procedure in materials, medium, and message became problematic. Artists announced that new ways of viewing the world were at stake.<sup>9</sup>

Monet redescribed the 'same' haystacks through many canvases by giving them continuing, but distinct identities during different times of the day; he charged identity with temporal light. Cézanne changed the way we perceive space. In Cézanne, a single source of light no longer determined the shadows of time; by filling his paintings with colored planes, he indicated that 'space was not empty.'<sup>10</sup> 'For the world is a mass without gaps, a system of colors across which the receding perspective, the outlines, angles, and curves are inscribed like lines of force; the spatial structure vibrates as it is formed.'<sup>11</sup> Instead of one perspective in a still life, the viewer had many, each object requiring a new and distinct angle of vision. No longer did straight lines determine the objects, but objects within our visual horizon could obscure and bend lines and space. Colored planes built up the system of appearances by which objects defined themselves in space.<sup>12</sup> Manet curved the horizon lines in his paintings, reflecting the emerging sense that alternate curved geometries to Euclid's classical forms and dimensions were

the standard, rather than the exception in our universe. Interpreters and paintings interacted in explicit fashion; no longer did subjects manipulate the meanings of inert artworks. The artworks realigned typically anticipated perspectives and times, requiring observers to reimagine and rethink their relationships to the world.

In the second chapter, we have examined the way in which stories emerge from the almost unimaginably long temporal structures of the large-scale universe. In this chapter, we attend to temporal systems that are much closer to us: weather, water dripping, and chemical reactions. We will ask how time functions in these systems. But the attitudes toward time and space that were articulated in art at the turn of the century already had indicated that Newton's universe and its laws did not work so well at other than macro-levels. In 1905, the year before Cézanne died, Einstein published his special theory of relativity.<sup>13</sup> Artists, having anticipated the relativity of space and time, refused to insist on a favored perspective in their windows on the world. Color was no longer an inherent property of objects, but depended upon a host of other factors, including the relative speed of the observer. Later, Italian futurists would attempt to integrate motion on the canvases themselves.<sup>14</sup> The 'metaphysical' painting of Giorgio de Chirico and oneiric surrealists like Salvador Dali used optical tricks to express the relativity of the subject's perception of time.<sup>15</sup> Time and space became questions, not ready-made fabrications into which one placed stories and images.

What kinds of metaphors and images have scientists used about systems that change chaotically over time? Can we discern a temporality operative in these figures? Are the notions of time different from the stories that emerge in the Standard Model of the universe described in the previous chapter? Do they provide support for, or denial of, the large-scale asymmetry of the universe? When Prigogine includes time as a variable in his understanding of chaotic systems, he chooses sculpture as an image – a statue of the dancing Shiva, a 'junction between stillness and motion, time arrested and time passing.'<sup>16</sup> Can far-from-equilibrium systems tell us anything about the meanings of Christianity and our religious life? Do they parallel the sculptural form of time?

### **3.2 Where are we going with chaos?**

Time has entered the natural sciences in very intimate fashion, not just in the large-scale systems of the universe. 'Science is rediscovering



time.<sup>17</sup> Temporality is no longer simply a given, but a question, a factor within systems themselves. Prigogine states that 'time becomes an operator or agent within these systems.'<sup>18</sup> What does this mean? His position distinguishes him from the speculation that has emanated from St. Augustine, for whom human time (the 'distention of the soul' [*distentio animae*]) had to be dissociated from celestial motion and the time of the cosmos to ensure that humans remained free for God and God could continue sovereignly free over creation.<sup>19</sup> In the previous chapter, I have argued that the metaphors scientists use establish or deny a narrative structure to the universe, depending upon the way in which the tropes are 'held.' I have also maintained that these narratives emerge from the structure of the universe itself as we know it through science. But when we turn to smaller systems than the entire universe, must we say that these stories are impositions by a feckless intelligence, busy consumerizing and colonizing successive chaotic moments as a function of our need to survive?<sup>20</sup>

If we cannot answer these questions positively, if the universe and the chaotic systems through which it functions do not have some narrative form, what happens to the Christian story? If philosophy and science are simply *imposing* order upon disorder, if religion is simply *proposing* commands by fiat, pressing historical order and moral imperatives upon reversible physical processes, then the Transcendent can appear only as an intrusion, an intolerable burden upon nature and history, or as an illegitimate consolation.<sup>21</sup> Christianity asks whether there is a potential (indeed even more, an actualized potential) for its stories and their consequences in the cosmos. I will examine whether the languages of science and religion or theology share any common characteristics with regard to the notions of temporality in self-organizing systems. Can their use of metaphors and their references concerning time illuminate each other?

Initially, we have hypothesized that studying the language of scientists is a way to examine self-transcendence within empirical subjects, investigators working within sense data on the world and on themselves in that world.<sup>22</sup> Philosophers of science have examined the role of metaphors in inquiry and reference in the natural sciences; at the same time, theologians have tried to locate the status of symbols, stories, and metaphors in religious speech. Both discover an 'excess,' a surplus that generates further possibilities. The temporal asymmetry of the universe emerges from metaphors and stories functioning as models for the investigations reported and studied by astrophysical cosmologists. But the references the stories offer bifurcate into growing

order and disorder. In religious stories, the faithful claim that the surplus is a way of describing both the self-transcending freedom of believers *and* a possible reference to God's initiative. But up to this point, I have refrained from speaking about the reference of religious metaphors more explicitly.

With this chapter, we shift our sights somewhat by comparing the explanations scientists give for time in chaotic systems to theological interpretations of the time internal to finite realities. The explicit theological schema will add to our understanding of how metaphors refer to God *and* how they work as persuasive language. First, we will describe the way contemporary scientists use time and temporal sequence as a constitutive factor in their analyses of self-organizing (or chaotic) systems. Then, we will argue that Christian theology has an important resource for thinking about pre-human self-organizing systems in the medieval understanding of 'instrument' and the sacraments; and finally, we will end with questions about what our religious attitudes toward non-human self-organizing systems might be.

### **3.3 Self-organization, far-from-equilibrium systems, and time**

Physics has become interested in the kind of order present in dynamical systems, i.e., natural or artificial systems that change over time.<sup>23</sup> Temporal oscillations occur, both periodic and non-periodic, in mechanical vibrations, electronic circuits, chemical reactions, and ecological systems, among others. In far-from-equilibrium systems, instead of the eventual emergence of an entropic, static homogeneity ('cold death'), fluctuations are amplified, compelling the system to 'evolve toward a new regime that may be qualitatively quite different from the stationary states' expected.<sup>24</sup>

Turbulence is no longer associated simply with disorder; it may be the prelude to a new integration. In the Bénard instability, spontaneous self-organization occurs when the lower liquid surface of a vertical container is heated higher than the upper liquid layer. When the heated flow reaches a threshold value, the fluid's state of rest becomes unstable; but instead of producing greater disorder, 'millions of molecules move coherently, forming hexagonal convection cells of a characteristic size.'<sup>25</sup> The much studied Belousov-Zhabotinskii chemical reaction is a good example of an oscillatory movement in which successive instabilities, producing successive bifurcations in the system lead to 'a state of matter of increasing coherence.'<sup>26</sup>

What begins as an ordered dynamic motion can, at certain threshold points, reveal no underlying pattern.<sup>27</sup> The system moves to chaos in which no simpler algorithm than a repetition of the points explains the data. Such systems dissipate energy, but then yield, without clear prediction, ordered forms of behavior, far from thermodynamic equilibrium, exchanging mass and/or energy with their environment. They have a sensitivity to initial conditions such that the most minute change can drastically affect the later state of the system.<sup>28</sup> Here time itself becomes an *operator* or agent within these systems.<sup>29</sup> Prigogine argues for temporality as an internal function within certain systems.<sup>30</sup> In effect, time becomes a variable in the self-constitution of the systems.

An analogy might be drawn to musical forms. The slow progression of a Bach Sarabande or a Strauss waltz is quite distinct from the tempo of a Chopin Scherzo or a Beethoven Andante. Part of what makes dance movements to be what they are is the timing with its sequences and shifts. This sense of 'inner timing' seems true for inanimate systems as well as animate ones in far-from-equilibrium situations. In animate becoming, if the 'timing' changes, either the system disintegrates and dies or it evolves into something different. Within a certain range (its initial conditions), each system has a temporality appropriate to itself.

As Prigogine maintains, 'three aspects are always linked in dissipative structures: the *function*, as expressed by the chemical equations; the *space-time structure* which results from the instabilities; and the *fluctuations*, which trigger the instabilities.'<sup>31</sup> One can no longer always deduce or predict what the future of a system will be due to its initial state and a few simple multipliers as though temporal movement were insignificant. As Ford states, chaos is a 'visible proof of existence and uniqueness without predictability.'<sup>32</sup> Since it becomes possible to speak of a system being *attracted* to certain positions in phase space (even if the investigator cannot predict them), one can attribute to the system a certain internal *teleonomy* that is neither reversible nor always predictable.

*Teleomatic*, inanimate processes are those whose end states are the simple consequences of their internal, fixed laws – end-directed in a passive, automatic way. *Teleonomic* processes are goal-directed behaviors of living organisms – migration, feeding, reproducing, courtship. They owe their goal-directedness to an internal operator that regulates behavior. *Teleological* processes reflexively intend a goal by virtue of some activity.<sup>33</sup> These distinctions are significant, since they respond

to the way in which post-Kantian interpreters have made any form of internal, telic activity in nature a 'subjective' imposition. We can interpret matter as teleomatic, since some elements operate in a passive, automatic way; but we can also think of chaotic systems as *teleonomic*, i.e., as having some form of goal-directed behavior. They are 'aiming' for phase states that could not be predicted by the initial conditions of the system. Kant excludes non-human systems from having a *teleological* intentionality; a question remains whether far-from-equilibrium systems should also be excluded from *teleonomic* activity.

At certain points in chaotic behavior, a system undergoes a bifurcation sequence in which either/or possibilities are available. A system seems to *choose* a certain course of action. '[T]he bifurcation introduces *history* into physics and chemistry, an element that formerly seemed to be reserved to sciences dealing with biological, social, and cultural phenomena.'<sup>34</sup> Nicolis even speaks of self-organizing systems searching for new attractors when driven from equilibrium.<sup>35</sup> As Nicolis says:

Such ordinary systems as a layer of fluid or a mixture of chemical products can generate, under appropriate conditions, a multitude of *self-organization* phenomena *on a macroscopic scale – a scale orders of magnitude larger* than the range of fundamental interactions – in the form of spatial patterns or temporal rhythms.<sup>36</sup>

The temporal order of the whole (as a teleonomy) has a governing role in the determination of the integration of the parts.<sup>37</sup>

The end or whole is 'attracting' the system into particular kinds of order in the present. As a result, causation can operate in a different way than the usual axiomatic unidirectionality. Complex systems respond to the future emerging whole in biological evolution. 'When matter is appropriately organized, it becomes sensitive to causes arising from the future instead of just the past.'<sup>38</sup> Such hierarchical or top-down causality, a whole 'guiding' the parts teleonomically, needs to be explored by scientists in this context.<sup>39</sup>

### 3.4 What about living systems?

Self-organization is first of all a factor in physical and chemical processes, not an element in living systems.<sup>40</sup> But such temporal factors become particularly important in living systems, including

human beings. Some temporal systems internal to living things provide the regularities of a chemical clock. This is not just the rhythm of the pendulum, but a temporal stability that realigns itself internally when disturbed.<sup>41</sup> The heartbeat, circadian rhythms of nature, the cell division cycle – all belong to the same realm of temporal structures and dissipative systems. Without the integrated timing of the chemistry of the blood, the temporal cycles of rest and alertness, the autonomic beat of the heart and the breathing lungs, human beings would not have a time in which to examine possibilities or to determine self-made goals.

The role of time as an operator can be seen in recent theories of molecular biology. Utilizing current information theory, Bernd-Olaf Küppers argues persuasively that living and non-living matter are continuous. Moreover, he believes that the roots of natural selection can be explained by the physical properties of matter. Though this may sound 'reductionist' to those who hope for some ineluctable, but measurable, principle of life, it is not.<sup>42</sup>

Küppers distinguishes (with others) three phases of evolution: a chemical development in which prebiotic conditions establish nucleic acids and proteins; the self-organization of matter converging upon more complex coupling patterns; and biological evolution with its development of primitive, unicellular elements toward multicellular organisms.<sup>43</sup> In the final phase, the genetic information is optimized and diversified. The transition from nonliving to living matter takes place gradually during the second phase: self-organization. We should note that an emergent 'plot' with chemical 'characters' is being constructed about the origins of life.

After arguing against a chance hypothesis or a teleological approach for this evolution toward self-organization, Küppers maintains what he calls a 'molecular-Darwinistic' position: that 'biological proto-information arose by the selective self-organization and evolution of biological macromolecules.'<sup>44</sup> By pointing to information as 'that which produces information,' he believes that he has a criterion for determining when self-organization makes the transition. The ability to produce information is a 'dynamic criterion of value.'<sup>45</sup> In keeping with our previous chapter, we can think of this ability as the 'completion' in the plot of the emergence of self-organizing systems.

Note that value here involves some *normative* (or axiological) dimension to the process; randomness does not exclude teleonomy.<sup>46</sup> Efficiency is determined by internal and external criteria. When this information alters the recipient by making a structural change in it or

reorients the recipient's action, then novelty and confirmation can occur. Both identity and difference must occur for evolutionary self-organization to be confirmed. 'The optimum of production of information may be presumed to lie at the point where there is as much novelty as possible and no more confirmation than is necessary.'<sup>47</sup> This biological information 'has arisen by the selective self-organization and evolution of biological macromolecules.'<sup>48</sup> A *selection value* exists 'if the binary-coded mutant sequence corresponds to the reference sequence one "bit" better than does the master (i.e. parent) sequence[;] then it will be allowed to reproduce more rapidly than the master sequence by a certain factor, which we will term the *differential advantage*.'<sup>49</sup>

Temporal sequence is an *intrinsic* dimension of this process. Biological information must include both memory and anticipation of alternative futures. Information must be stored; bifurcating choice must be possible. By this process, 'qualitatively new properties emerge in the system that has undergone the transition.'<sup>50</sup> This process of temporal succession through which a new whole emerges from individual, but integrative, parts is not a special characteristic of living systems, but one which occurs (as we have seen) in all self-organizing systems.

The continuing success of this temporal sequencing is dependent upon 1) avoidance of equilibrium, i.e. a metabolism in which the production of entropy is compensated for by an infusion of energy; 2) self-reproduction, and 3) mutability, i.e., a mutagenicity where self-copying is not error-free.<sup>51</sup> A fundamental underlying characteristic of dissipative systems is their relationship to the environment with which they exchange matter, energy, and information. The temporality appropriate to a particular self-organizing system (i.e., a time pattern that keeps the system operating) negotiates internal teleonomic activity and the constraints of the context without exhausting either the resources of the environment or of the internal program.<sup>52</sup>

Even in biological (here molecular biological) language, there continues to emerge a *normative* dimension to the understanding of time. A system has a 'better' or 'worse' position for maintaining or developing itself. It is attracted to a whole that will appear in the future, one in which its reproduction of information is more effective. In the biological story told, therefore, there is not just 'more of the same'; there is an excess of information that promotes the continuance of the system. In addition, far-from-equilibrium systems do not operate in isolation. The success or failure of a system's ability to cooperate with

the environment is important,<sup>53</sup> but *metaphors* of competition or conflict with the environment (hence, with other systems) become a more prominent part of the rhetoric of biological explanation. 'Metaphorical directedness was, however, and continues to be, an important element in many systematic representations' in evolutionary theory.<sup>54</sup> In the next chapter, we will discuss the questions raised by these metaphors of cooperation or conflict, especially with regard to the macroevolutionary process.

### 3.5 Self-organizing systems as a question to religion

Self-organizing systems seem to have a different 'timing' than the universe as a whole. If the universe is a structural narrative that unrolls with a certain inexorable destiny due to entropic disintegration or (as some think) to further order, far-from-equilibrium systems introduce an element of choice. Different possibilities are exercised by the system itself on the basis of initial conditions, internal timing for replication, and the culmination of the whole. This gives the system a form of relative autonomy that permits self-direction within an environment.

The emergence of 'relative autonomy' within such systems returns us to one of the important questions raised in the introduction to this book. What we see here is that 'autonomy' appears within scientific discourse *prior to* discussions about the human subject. The weather is not a person; nor are certain chaotic chemical reactions. Nonetheless, these systems exhibit an autonomy that moves them not only irrespective of our personal interests, but on the basis of an internal teleonomy all their own.

Such material autonomy confronts the religious images on the Flemish tapestry of the cosmos I used at the beginning of chapter 2. The angelic winds cranked the universe – even if the prime mover was at some distance from creation. Supranatural intervention was an operator when the story of the cosmos was narrated.<sup>55</sup> Hence the stories from Genesis about the origins of the universe, about the deliverance from Egypt through the Red Sea, the sun stopping for Gideon the Judge – all these involved divine interpolation within created empirical causes. God was simply a more powerful empirical cause, working in place of other causes. If science establishes that the universe is a system of self-organizing temporal causes, moving forward on their own, then the old stories of origin and divine action prove problematic at best, intellectually inept at worst. In the tapestry, the two views of the cosmos exist simultaneously. The *image* discloses

that God the father is intervening through his angels and that philosophy, astronomy, and religion support this; the *text* indicates that the world, once initiated, operates on its own. 'The poets say when the angel acts under the power of the prime mover, the world is made fit for this by its own agility; the sky revolves controlling its motion.' Notice that it is the *poets* who proclaim that angels interact with the world's own power. *Stories* have begun to collide.

The conflict is about how the stories of the universe and its self-organization can or should be told. What I have stressed thus far is that astrophysical cosmologists tell a story with a plot that begins in the singularity known as the Big Bang, a complication through the 'clumpiness' of galaxies and stars with an inflationary velocity, and an ending. In this chapter, chemical reactions and molecular biology demonstrate some self-direction, a story that involves choice based upon initial conditions. The images and metaphors that the scientists use offer a story line that competes with religious stories. On the one hand, they tell a story about the origins that is agnostic about 'ultimate' origins: who started the Big Bang? Response: Unknown – or multiple universes. *Is there a storyteller for the entire narrative? And what are the criteria for discerning this?* On the other hand, once begun, the universe has its own temporality with self-directing systems. Can any actor *external* to the plot perform in the story? The scientific narratives *are* images and metaphors and share in the rhetorical dimensions of language used by their religious (and artistic) colleagues.<sup>56</sup> In what follows, we will examine how religious stories have been interpreted with supernatural actors. *Is there any similarity between the story of a self-organizing system or a narrated universe and the theological understanding about how the Christian God works within the stories found in the Bible?*

### 3.5.1 Supernatural: a critical theorem

Bernard Lonergan maintained that the supernatural did not add further divine actions to the world. The 'idea of the supernatural is a theorem ... it no more adds to the data of the problem than the Lorentz transformation puts a new constellation in the heavens.'<sup>57</sup> The development of a *genuinely theological theorem* of the supernatural in the writings of Albert the Great and Thomas Aquinas provided an explanatory perspective on the descriptive stories of the Bible. Just as emergent probability is Lonergan's interpretation of the intelligibility of time, so the supernatural sorts a whole series of definitions: divine transcendence, human power, instrumentality, and grace. To situate



Aquinas's theory of God's transcendence, it will be useful to outline the language about divine action in primordial societies. Such expressions contextualize the theory; they also show the rhetorical context in which Aquinas was thinking.

### 3.5.2 A supernatural god in a sacral universe

In a primordial, often preliterate, but not presymbolic world, religion appears in transformed people and actions. *What* changes things, people, and actions is not within sight or sound or touch, but the *what* exercises force or power and one should respect it.<sup>58</sup> To know why or how, through what mediations and conditions these unseen powers appear, is unnecessary.<sup>59</sup> According to Lévy-Bruhl, the realm of these unseen forces is often vague, including, in an undifferentiated fashion, the dead ancestors (both benign and threatening), the deities, and the spirits of nature.<sup>60</sup> To negotiate the power of these realities, one needs the rituals of one's ancestors, the traditions that protect and heal, and actions that will celebrate the joys without awakening the envy of the gods.<sup>61</sup> It is the shaman or the priest who helps the individual and the community across the thresholds between worlds and through the transitions or life.

The language used by anthropologists provides categorical reification for the experiences (what Lévy-Bruhl calls the 'affective categories')<sup>62</sup> that underlie them. The experiential base, in effect, includes simply the joys and misfortunes of day-to-day living.<sup>63</sup> The difference is that preliterate cultures assume, believe, trust that the pleasant and painful patterns of experience are produced by powers that are neither visible nor indifferent to human and cosmic affairs.<sup>64</sup> Because there is a 'blurring' of all invisible causes, because they are not distinguished, one hopes to have all these powers on one's own side (so to speak).<sup>65</sup> The task of religion (if differentiated from medicine or agriculture) is to protect people from what appears to be bad and to prolong what is good.

The extended security of the ordinary, the diurnal order, is critical; hence any intervention in the usual manner of things appears dangerous, even malign. 'Nature' is not differentiated from the supernatural powers; hence, even the most improbable transformations are within the course of things. It is only when their 'conception of the inevitable order of nature is *suddenly* disturbed and upset' that they are 'troubled.'<sup>66</sup> *Unusual appearances* are transgressions that require negotiation: avoidance (complete distance), prayer rituals (in effect, a distanced intimacy without flight), or submission (no distance and

absorption).<sup>67</sup> Powerful ancestors and the gods often intervene as unseen forces in experience. 'In these frequent occurrences, therefore, the primitive mind pays less attention to the happenings themselves than to the suprasensuous realities whose presence and influence they indicate.'<sup>68</sup> This interpretation does not necessarily contravene Lévi-Strauss's opinion that myths and rituals in primitive cultures provide a 'science of the concrete', a recollection of how to negotiate the day-to-day world.<sup>69</sup> Mythic stories can also be particularized universals.

Historical religions, such as Judaism or Christianity, though they have tended to differentiate the realm of the divinity and the causes of nature (at least by placing the divine *over* natural causes – in theories and in some practices), nonetheless use images, stories, and metaphoric symbols that describe the intervention or transgression of God within and among the ordinary course of things and events.<sup>70</sup> So in Joshua's battle with the sheiks at Gibeon, God hurls hailstones killing the enemy soldiers or makes the sun stand still at his prayer (Joshua 10.11–13). God provides an earthquake, rocking Paul's prison and releasing him from jail (Acts 17.25–8). The experiences are an unexpected transgression within the ordinary expectation of events, relayed in images and stories to indicate the activity of God.

The parallels between Jewish, Christian, and non-Christians stories are to be taken seriously, since this describes a form of divine transcendence that is often 'taken for granted' as a prime component in faith or in religious sensibility. But religious stories also evoke a *surplus* of meaning, an *excess* that has multiple referents. Does God work in the world 'alongside' other causes? Does God only operate in the 'surprises,' the extraordinary events that overturn or intrude in the ordinary necessities of nature? If we discard these forms of divine interaction with creation, then do we have only subjective, moral suasion on human subjects as the mode of divine action? The questions raised by the stories can be answered only if we understand how the rhetoric of religion functions in relationship to reflective theology and then relate these patterns to the language of the natural sciences. We have investigated the ways in which the pattern of excess operates in the metaphors and narratives of astrophysics. Can we see the same metaphoric structure and some qualified modes of reference to Ultimate transcendence in theology?

### 3.5.3 Aquinas's critique of his culture

Thomas Aquinas, using Aristotle's logic and metaphysics, differentiated primary (metaphoric) and secondary (analogical) languages in

faith as well as interpreted the medium through which God acted in our world. The need to distinguish 'what is divine' from 'what is human' within human experience encouraged theoretic discussions. Through Aquinas, Christians have had a theory of the supernatural to interpret the biblical stories and to account theologically for the specific character of divine action. It is important to reiterate that the supernatural is a *theory*, not an addition of data, 'something like the discovery of gravitation and not something like the discovery of America.'<sup>71</sup> It is the difference between *going faster* as an experience and *acceleration* as a theory. The latter accords the differing moments of time, distance, and velocity their relative relationship, providing analysis, generalization, and systematic correlation of factors. They apprehend the same data, but acceleration explains both going faster *and* going slower.

The theorem of the supernatural offers an overarching explanatory language for grace *and* sin, created action *and* divine initiative. The notion articulates the various factors at stake (human will, divine love, creation, redemption, evil, etc.) and correlates them much as one would do with distance, time, velocity, and mass. In effect, the middle ages always *knew* that the data of their experience were from God;<sup>72</sup> what the theorem of the supernatural offered was a way of *understanding* God's relationship to nature. 'Nature' itself was a conceptual abstraction; it was what was distinct from 'supernature.' Nature was not what was sensed or thought, our common experience; our common experience included divine resonances as well.<sup>73</sup> In this schema, it is not possible to say what is *solely* from human intention and execution. God was the ultimate intelligibility of what is the case about the world, not an object with multiple attributes (omniscience, omnipotence, etc.) to be explained.<sup>74</sup>

I will limit my treatment here to Aquinas's position on the nature of divine transcendence, the universal instrumentality of creation, and divine action as they will apply to self-organizing systems. Aquinas assumes that he has already provided warrants for God's existence and God's benign intention (providence) for creation; he stands within *fides* as one seeking *scientia*. Eventually, we will have to transpose these classical metaphysical categories into those of an historical ontology, the one we have elaborated in chapter 2 – emergent probability.

### 3.5.4 Divine transcendence

The meaning of *supernature* involves several terms: God's transcendence, creation's particular form of identity and self-organization, and

their interaction. What links them all is the experience and affirmation of transcendence. 'In a more general sense, transcendence means "going beyond".'<sup>75</sup> Insight and reflection do not simply reproduce images and sense data; they go beyond them; all data are theory-laden. Judgments go beyond interpretation in so far as they determine the truth or falsity of a subject and predicate linked under certain known conditions. Transcendence is proportionate to the kind of reality about which it is predicated. So we could say that human beings have a form of empirical transcendence in that our knowing goes beyond any purely immanent objects. We know people, things, processes 'outside' our brains, thus transcending solipsism. We do not simply fall in love with ourselves; we intend an other to whom we choose to be attached.

Aquinas's understanding of the supernatural was, therefore, a relational, not a reified, term. It was emphatically *not* a term to cover the unusual transgressions of nature in the Scriptures. Both nature and supernature are abstractions, related to each other. The content of nature and supernature 'slides,' depending upon the stages of meaning that humans inhabit. In a stage of human development in which nature is the uncontrollable other, God can be embodied or named in theophanies such as the burning bush or Mt. Sinai.<sup>76</sup> That world has largely died in western countries since the rise of science, the Enlightenment, and industrialization. In our age in which the definitions of significant meaning have shifted again, divine transcendence might appear embodied as interpersonal suasion.

A theorem of divine transcendence permits the thinker to understand that God is always *Beyond*. To say that God is transcendent is to maintain that *whatever* creation does (whether human or non-human) is not to be absolutely identified with divinity.<sup>77</sup> Divine transcendence cannot be a property attributed to any creature. Every created cause falls within the order of necessity or contingency; but God 'produces not only reality,' but also their modes of contingent or necessary emergence.<sup>78</sup> God, by definition, exceeds and determines the modes of both contingency and necessity, both the laws of probability in history and the laws of nature that appear absolutely symmetrical. The analogy Aquinas uses in *De Substantiis Separatis*<sup>79</sup> is that of a geometer who not only makes triangles, but makes them isosceles or equilateral at the same time. Were God to produce a contingent effect *directly* in our world with irresistible efficacy, it would have to be God's own self.<sup>80</sup> What the geometer cannot do is to make equilateral triangles with only two sides equal.

What most people think of as divine intervention (the production of a surprising contingent effect with irresistible effectiveness), a *direct* manipulation of 'nature' (as an inert object 'out there'), a 'miracle,' is denied by Aquinas. For Aquinas, it is not that some astonishing moments might not appear in nature and history, but that they are not to be identified with divine activity in and of itself. An appropriate theoretic understanding of supernature will provide an explanation for both the usual and unusual course of things. It will also 'eliminate intervention's implication of violence.'<sup>81</sup>

What occurs in our world (orderly, chaotic, and random) offers a surplus in need of explanation. The supernatural transcendent is the name given to that realm of ultimate interpretation. Nature is the relatively autonomous pole of creation that operates by virtue of its own internal structures and processes, utilizing their own forms of transcendence and self-transcendence. Natural forms of transcendence, however, are dependent upon the supernatural for their relative independence. Nature does not operate on its own *without* divine initiative, support, or direction; theoretically, however, it is possible to distinguish and relate the relative poles of cooperation. Moreover, it becomes clear that the *two orders* (nature and supernature) constitute the expression of Grace, God's love poured out in the world.<sup>82</sup> Nature and supernature are dialogically related terms, each of which could contain different content, depending upon the style of the period to which they are applied. Here we will look at their relationship during the Middle Ages and determine whether the theory can be applied to our scientific understanding of the world.

### 3.6 Instrumental causality: the intermediary

The theoretical language that medieval and early modern Catholic theology used to discuss this interaction of the divine and nature was instrumental causality. The notion of instrument was applied to a wide variety of experiences: Christ's humanity, prophecy, the sacraments, but also the peculiar, invisible operations of nature, the influence of magical pictures, and (with Aristotle) the generation of animals.<sup>83</sup> Wherever it might appear that a more than finite agent (a 'surplus') was operative, the element itself could be construed as an *instrumentum*.<sup>84</sup> But in medieval life, that was true in all cases. God was never absent, even in death and sin.

Though I will focus upon the theoretical dimensions of the *instrumentum*, particularly as these applied to the Christian sacraments, I

must note that the role of magical images, moving statuary that healed, relics that cured diseases and protected in childbirth, the blessing of saints who oversaw a whole host of ordinary tasks from bread-baking and beer-brewing to journeys and coronations cannot be ignored in this context.<sup>85</sup> Anglo-Saxon rituals contained incantations in an amalgam of ancient and current languages to bring about fertile harvests, safe house-raising, and protection from elf-shots. The *Agnus Dei* was a small disk (earlier in wax, eventually in precious metals) that protected against the devil, thunder, lightning, fires, and drowning. All of these were interpreted as 'instruments' of the divine power. Anything could be the bearer of surplus meanings.

Although theologians such as Thomas Aquinas argued strenuously against magical interpretations of sacramental practice, the faithful, including theologians, commonly believed that eucharistic bread could turn into Jesus' physical flesh and blood. Popular stories related the way in which the host was used 'to put out fires, to cure swine fever, to fertilize the fields and to encourage bees to make honey.'<sup>86</sup> The relation of the high culture of the theologians and the knowledgeable churchmen and women to the low culture of popular devotion and magical practices is the matrix for the sixteenth-century reformations of Christianity. During the Middle Ages, new images of Mary or the saints could function as 'ready-made relics' in shrines or churches that lacked the required physical connection with a saint.<sup>87</sup> Nonetheless, in stories about the intervention of saints, the statue was not the agent, but the occasion for a heavenly actor to aid the supplicant.<sup>88</sup>

According to Le Goff, however, the marvelous, miraculous, and supernatural should be differentiated in the Middle Ages.<sup>89</sup> The marvelous, due to its origins in pre-Christian sources, is repressed from the fifth to the eleventh centuries; only in the twelfth and thirteenth centuries, precisely the period of theological critique, do marvels make their re-appearance in high culture.<sup>90</sup> The *mirabilis* corresponds to our notion of the marvelous; *magicus* could be a neutral term, either white or black magic; and finally the *miraculous* was genuinely the work of the supernatural. By the end of the thirteenth century, theologians such as Aquinas had separated miracles from unpredictable marvels and magic and relocated them under God's plan. Marvels continued, however, to play a role in popular life, whether as compensation for the quotidian grind, providing hope for a different world, or as resistance to the growing rationalization of religious life.<sup>91</sup> It is little wonder that the sciences of the sixteenth through the eighteenth

centuries saw *their* control over common meanings as more effective than the prior theologies and philosophies.

The general law in the theory we are exploring is that reality other than God is an instrument. *Instrumentum* could be defined as a lesser reality accomplishing the work properly attributed to some proportionately more powerful, effective reality.<sup>92</sup> In the universe, all realities are moved in relation to some cause higher than themselves. Only God is not an instrument; nor can God be used as an instrument.<sup>93</sup> Hammers do not move of their own accord, except in dreams and fantastic cartoons. To be able to operate beyond their own proportional ends, instruments must participate in a higher system. For that to take place, some participation is required in the higher cause's 'productive capacity.'<sup>94</sup> A theory of instrument explains how all empirical realities could be the *locus* for metaphoric excess. But because Aquinas applies this participation in different ways to differing natural systems, it becomes important to understand what he means in any given instance of instrumentality. It should not be assumed that the primary analogue for instrument is an inert, manipulable object, despite the fact that saws, hammers, and pipes are often his examples.

### 3.6.1 Human history as instrument

Divine providence (charity, infinite love for the other) in the mind of God is the primary cause of all; but this providence exists in the created universe as governance and fate.<sup>95</sup> Providence is the art in the mind of the divine artisan and fate is the operative instrumentality in history. Providence is the intention of love in divine life for all that is (including the divine self); governance is what takes place in the universe as a result of the natural realm's cooperation or conflict with that intention. Fate is not a cause in addition to God, but the 'order of secondary causes; it is their disposition, arrangement, seriation; it is not a quality and much less is it a substance; it is in the category of relation.'<sup>96</sup> Fate is the *de facto* pattern of what happens as the divine design unfolds in nature and history by virtue of cooperation or conflict with divine love. Fate is the interaction of divine primary cause and human instrumental causes.<sup>97</sup> There is always a mediated execution of divine providence which in itself is strictly supernatural, an unowed experience and knowledge of the gift of love. 'Extracting' (so to speak) the divine dimension from the human ones is not so simple as pointing to the ordinary and the extraordinary, the usual or the unusual, the orderly or the random. Hence the language of the

supernatural in theology functions as a critical upper blade on the stories, symbols, and metaphors within the primary languages of revelation.

### 3.6.2 The sacraments as instruments

Another example of Aquinas's strategy may be seen in his theology of the sacraments, the instruments of divine action *par excellence*. These signs of divine presence and action are invitations; they embody moments of cooperation. They have an instrumental power of their own that lays a permanent existential claim upon individuals and objects, but *not without their participation*. The *res et sacramentum* (an intermediate, symbolic effect of God's grace) of sacramental life is like fate in the *de facto* patterns of providence in the natural and historical world. It can mean minimal personal cooperation (*non ponitur obex* – 'no obstacle is imposed') or it can be the potential for holiness and communion with the divine. In any case, it is the interaction of objects, persons, and common ritual that makes the *instrumentum* a mediating reality for the transcendent act.<sup>98</sup>

For Aquinas, it was precisely *through* the internal organizing power of the natural elements themselves that the divine presence and agency was disclosed.<sup>99</sup> The physical signs of nature (sharing bread and drinking a cup) receive their historical (and divine) specification through the power of the words of Jesus whose memory is activated within the present ritual instruments.<sup>100</sup> Divine institution by Christ's words, specifying certain material objects for use, determines the meaning of the natural signs. This is the way *all* natural signs are specified in history; human beings make use of natural objects and give them historical contexts. But Christ's words are the evidence of *divine intentionality* for the believer – precisely because the believer has *faith* that in Jesus, God is speaking in human words. The Christological focus is important for Aquinas; it also demonstrates the layers of instrumentality that Aquinas discriminates.

In the Eucharist, the material and formal appearances remain, so that 'bread' is apprehended, but the 'being' or 'substance' is changed. This occurs by divine power, the power of the word of Christ, in which what is in common between the being of the natural reality and God is transformed into the being of the divine. It is as though God simply 'takes down' the barriers between the divine self and finite creation, so that created reality can be the vehicle for divine love.<sup>101</sup> Another way of viewing this, from the point of view of the 'objects' is to say that, unlike human beings, they have no barriers (no *obex*) other than



finitude, to divine presence.<sup>102</sup> Aquinas compares the operation of words, gestures, and material objects in the sacraments to the mystery of the Incarnation of the Word in which flesh (a *conjoint instrument*) perceived by the senses discloses the divine.<sup>103</sup> But it must still be noted that the humanity of Jesus is an *instrument*, **not** an unmediated intervention of divine action. Even the strictly miraculous (like the Incarnation) for Aquinas occurs within a natural medium.

Not all interpreters agreed with Aquinas.<sup>104</sup> Some (like Henry of Ghent, Ockham, Biel, Bonaventure, and Scotus) held for the instrument as an occasion, a condition in which God operates externally.<sup>105</sup> Aquinas held out for the difference of divine action, but not its extrinsic intervention. Others (Cano, Vasquez) argued that the instrument had a moral worth or value in itself that *moved* God to act. Aquinas denied this, since it seemed to make God dependent upon created conditions, using God for what we desire – even if the object of desire was salvation. Nonetheless, this position seemed to have great currency through the seventeenth and eighteenth centuries.

Later interpretations (Schmaus, Casel, Vonier) simply argued that there was a ‘mysterious’ power within the instrument that produced a more than human effect. Although Aquinas sometimes spoke of the power operative in a word that transmitted divine transformation, he denied an independent sacral vitalism functioning within created reality. The divine and the human remain distinct; the wonder was (and is) that God has chosen to act *through* nature’s own self-mediating capacities. There were theological arguments throughout the later Middle Ages and early modern period about whether it was the material of the instrument itself that was the ancillary cause to divine agency. Later thinkers, hoping to avoid any physicalist interpretation of the cooperative action in the sacraments, stressed that the instrument provided information to participants about God’s intention to make them holy. Or they could be understood as practical signs, like a juridical order or a title-deed, saying something, while simultaneously accomplishing it. Aquinas’s position is different than all of these.

### 3.6.3 Instrumentality and providence

Providence is God’s characteristic way of being; it is love for the other in and for the sake of the other (*caritas* or *agape*). For Aquinas, it is the prime analogue for all human knowing and loving. Everything outside of God is an instrument toward or away from that love. So he can quote Augustine approvingly: ‘God cooperates with good will to give it good performance; but alone [God] operates on bad will to make it

good, so that good will itself no less than good performance is to be attributed to the divine gift of grace.<sup>106</sup> But this deals specifically with the nature of human instruments, which are not our immediate concern in this chapter. Can the notion of providence and instrumental cooperation work with non-human instruments?

If I have interpreted Aquinas correctly on the sacraments, he is arguing that created reality operates at different levels, permitting each to cooperate with divine love at its own level. Non-human created realities, whether animate or inanimate, interact at their own level of reality precisely through their own internal operation to collaborate with divine providence. So, for example, the ability of bread to bear the historical presence of divinity is due to the fact that it can be transparent to divine love. In so far as each element operates at its own level and cooperates with higher schemes of recurrence, it will permit the universal transformation of all things into divine love. *To discover and know the proper instrumentality in a thing is to encounter the divine agent within it.* In other words, there is no separate connection between God and creation than the self-organization of the created entity itself.

The internal and external mediations are what non-human animate and inanimate realities are 'about.' It is precisely their self-organizing capabilities in relationship to the environment, with their law-governed structures and underdetermination (where that applies), that *is* the *locus* of divinely created interaction. Rocks cooperate as rocks, chemical reagents as chemicals, plants as plants, and dogs as dogs. One does not need to search for a further physical, vital, spiritual, or transcendental 'hook' into which God can insert direct divine operations. This immanence of God to all reality is the place where divine-creational interaction occurs. What the best science tells us about the way the world works *is* what God is telling us about the way divine action operates in our world. If one argues for any moderate realism in knowing, then one must say we *do know* something, however partial and mysterious, about the Ultimate Transcendence in the interaction. The excess, the surplus that we discover in things *is* the warrant for divine transcendence. The surplus is available not only because God has chosen to speak in the revelations of prophets and peoples, but because the created world itself, through its self-organizing systems, evinces a surplus, described and explained through the sciences themselves, that is not deceptive or malicious.

### 3.7 The surplus in self-organizing systems

Metaphors exhibit a surplus of meanings; when used in astrophysics and chaos theory, they prompt an excess that creates narratives and further inquiry; when used in religious language, they indicate an abundance that religious people claim is a transcendent world with a transcendent operator. But let us try to go beyond the classical metaphysical categories of Aquinas. His use of the theorem of the supernatural was a critique of a culture that has largely passed. We can do so by using the language of self-organization and far-from-equilibrium systems. We do so not simply by seizing upon the instabilities or indeterminacies in such systems, but by noting their fundamental inner temporality. Just as Aquinas used what he believed to be the best available scientific explanations concerning how instruments work, we can integrate such scientific language into an overarching scheme that articulates divine transcendence and leaves animate and inanimate nature open to the presence of God.

We, of course, are mostly interested in our own interaction with God. However, a theory of self-organizing systems provides a way of speaking about non-human agents *in their own right*. Indeed, theories of self-organization can specify the internal dynamics of non-human, self-directing realities and specify the *relative independence* of non-human instruments. By developing a hierarchy of such relative independence from chemical reactions to human teleonomies, it becomes possible to specify the characteristic instrumentality of each, their ability and level of interaction with divine love. For Aquinas, God not only *respects* the proper temporality of creatures; God *originates*, supports, and encourages them to come to their appropriate completions. For reasons known only to love, God has chosen to mediate divine temporality through the structures of created self-organizing systems.<sup>107</sup> As we will see in chapter 6, this is the way God has chosen to interact with our universe at all levels.

### 3.8 Summary and conclusions

Self-organization theory provides an analysis of how certain kinds of systems work from inanimate through animate to self-conscious life. The internal clocks of things operate as a self-constituting process by which a reality is what it is and does. We could even quote the poet Gerard Manley Hopkins:

Each mortal thing does one thing and the same:  
Deals out that being indoors each one dwells;  
Selves – goes its self; *myself* it speaks and spells,  
Crying *What I do is me; for that I came.*<sup>108</sup>

In the particular kinds of systems described above, there is the development of a future different from the past, often dependent upon a choice in a bifurcation process. Such unpredictability creates conditions for the emergence of something new – including the decisions in human freedom (at a much higher level of organization).

The ‘whole’ in such a system is relative, a moving viewpoint; it is dependent upon its own evolution, drawn by the future coherence of the system. One could speak about it synchronically as well as diachronically. The reality emerges as its future state attracts it toward that whole. History in an organism makes a difference to what it is.

The ‘timing’ of self-organizing systems articulates a relative independence that is self-directing. This *teleonomy* is not totally separated from its environment, but its ability to organize itself can be recognized as encoded within the system itself. Its success is dependent upon its ability to avoid stasis (i.e., to grow and change) and to replicate itself. To be able to do that, there must be some mutability, i.e., non-necessity in its replication.<sup>109</sup>

In this chapter I have argued that Christian theology, in the thought of Thomas Aquinas, has had a coherent understanding of created reality and the supernatural. By developing a clear theorem of transcendence and of universal instrumentality, Aquinas was able to articulate the basic ways in which inanimate, animate, and human secondary causes could operate on their own autonomy within the condition of divine love. I have transposed the terms into an historical ontology defined by self-organizing systems with their own forms of internal temporality.

The science of chaos theory, with its analysis of self-organizing systems, provides an understanding of the regularities and contingencies of inanimate and animate created realities from autocatalytic chemical processes to the emergence of life. Their language of ‘excess’ permits us to understand how an open, flexible (lower-level) universe can provide the conditions for establishing not only the appearance of genuinely ‘new’ realities, but the possibility of Ultimate Transcendence. In addition, these systems with their relative autonomy must command some respectful independence from observers and investigators. Discovering that the chaotic systems of the

universe, even autocatalytic chemical processes, have an autonomy in relationship to human beings means facing the other with appropriately responsible attitudes. We are no longer manipulating objects with no value other than to our use. An intelligent ecological consciousness should be born of recognizing such relative autonomy.

There is an optimism inherent in this analysis; it is born of a religious conviction that though the cosmos (whether human or non-human) is flawed and finite, its internal logic is not vitiated, malicious, or deceptive. The results of the natural sciences can be trusted. Metaphors and images are no more (and no less) prone to sin than reason. Within the temporal being of 'nature,' self-organizing, living, self-conscious beings can engage with their environment in a cooperative way. Ultimately, it argues that self-conscious creatures, like ourselves, may learn that cooperating with the ultimate environment, an unfathomable Other will not do violence to our own complex teleonomies.

The Christian claim, however, goes further. Christians claim that they are not merely projecting themselves abstractly into an alien environment to present themselves, but that the Other has chosen out of love to mediate the divine subjectivity in and through natural self-organization. The story of the Christ could have been quite different than it was. Jesus could have mediated himself in some other fashion; but he did not. He chose to offer his life for others in self-sacrificing generosity. In this action, he operated as though neither the natural nor human environment nor God were an enemy. In loving creation, entrusting his own life to others – even in death, faith claims that there is here a divine love. We are present *to* the divine who in that same movement is present *to* us.<sup>110</sup> What we discover in this fragile and stumbling process of mediating ourselves and our world is an antecedent lover and friend.

# 4

## The Politics of Evolution: Metaphors for Competition

The lone ping into being of the first hydrogen atom *ex nihilo* was so unthinkable, violently radical, that surely it ought to have been enough, more than enough. But look what happens. You open the door and all heaven and hell break loose.

Evolution, of course, is the vehicle of intricacy.

Annie Dillard, *Pilgrim at Tinker's Creek*

### 4.1 Introduction

John McPhee, in trying to fathom the extraordinary age of the earth, speaks of *deep time*.<sup>1</sup> The metaphor of depth describes a temporality so distant from the present that its very presence among us in rocks and fossils seems quite alien. By examining layered geological formations, analysts can interpret a past that is nonetheless present with us. 'You begin tuning your mind to a time scale that is the planet's time scale.'<sup>2</sup> As we have seen in chapter 2, the narrative that astrophysical cosmology has told about the universe as a whole is similar. By looking into the night sky, astronomers begin at such a temporal distance that the presence of background radiation noise as a 'present' phenomenon, however measurable, seems thin. Nonetheless, *deep time* appears to us, narrowly discernible, as a past yet contemporary light.

By way of contrast, we may use another image, *shallow time*, to indicate the recent history of living entities.<sup>3</sup> One might think of this metaphor as the entry into an almost fathomless ocean, the shallows of which are the most accessible to us, the deep currents the farthest from our touch. However, both deep time and shallow time are present, embedded in the temporality of things as they are. Whether

we look deep into the earth's core or outward into the distant stars, we see the past history of the natural world that surrounds us.

The relationship of deep time to shallow time, of the most ancient light to the most recent, is not simple simultaneity, but a story. Contemporary scientists to use the linguistic rhetoric of the Big Bang in their analyses as we have seen in chapter 2. Metaphorical language about the origins speaks of an *excess* or a *surplus* that generates the temporal asymmetry of the universe, the graduated reality of a 'before' and an 'after.' The origin of this macroscopic asymmetry is problematic, perhaps due to the *mismatch* between 'the boundary conditions of the global dynamical motion as determined by gravity, and the microscopic particle motions of the cosmological material,' 'the large and small scale motions of the universe.'<sup>4</sup> The originating singularity occurs in the deepest of deep time, infinitesimal moments in which the relationship of before and after would barely be recognizable if at all. Indeed, at this 'time,' unidentifiably indifferent particles 'exist' in reversible symmetry, an incipient sea of movement.

As the universe expands from this singularity, with the formation of stars and galaxies, asymmetric temporality would become more recognizable to observers (if such could have existed). It is recognizable as the use of energy, moving toward equilibrium.<sup>5</sup> As space expands, so time evolves; and it can even be argued that the laws of nature develop and change. But at the origins, narrative time and simultaneity seem to coincide.

In chapter 3, we have seen that when animate matter develops, grows more complex, and even becomes self-conscious in humans, time makes a clear shift from (what seems to be) more of the same to new temporal frequencies guiding different schemes of recurrence. Self-organizing, self-replicating systems offer bifurcating processes that, in far-from-equilibrium situations, become developmentally unpredictable until the system makes a choice that 'settles it' into a new pattern. We may think of these systems as part of the patterning of shallow time. Scientific cosmology may use narrative metaphors; but what sort of metaphors do the biological sciences employ? And of what importance are traditional religious metaphors and stories to these important scientific myths?

This chapter continues our examination of the meaning of metaphors for time in theology and science. What we have thus far discovered is that metaphors function in surprisingly similar ways in the natural sciences and religion. They are models for the way we think of reality; they interrogate 'what is' and provide us with

structured solutions that work under specific conditions. In science, the conditions for fulfillment are largely limited, on the researcher's side, to a skeptical attention to detail and on the side of the studied field, to experiments that publicly verify repeatable data and conclusions. Nonetheless, metaphors remain – whether in the narratives of astrophysics or the self-organizing temporality of far-from-equilibrium systems.

In religion, images and metaphors also function, but they include, not fewer, but even more extensive subjective and objective validating conditions. Traditionally, the subjective conditions involve faith in every stage from Coleridge's 'willing suspension of disbelief' through commitments to stories, symbols, doctrines, creeds, and institutional order, sometimes even to particular theological interpretations of the primary languages. Different Christian traditions stress distinct dimensions of this spectrum. But what of the objective conditions for these metaphors? As I have indicated in chapter 1, metaphors make claims or judgments about reality within specific conditions. During the past one hundred years, there has been a growing series of shifts concerning the objects studied under theology. Aquinas, and medieval theology in general, argued that theology studies God and things in relation to God; contemporary theology has often focused upon religious experience or the personal and communal states of religious claims. In this context, I have stressed that theology's projected research is about God, the Ultimate Transcendence. But with each successive chapter, as they unfold the further dimensions of metaphor in the natural sciences, we find additional inclusive conditions. The public nature of the metaphors in religion and theology is not simply about person and interpersonal (i.e., social scientific) conditions for their validity; it involves the physical nature of the universe, the inner structure of nature's processes, and the temporal structure of the human brain. The concluding chapter will study the Christian understanding of God's relationship to everything from the formation of the universe to human interaction with the divine.

But if chapter 2 examined some of the narrative dimensions of metaphors and chapter 3 studied the ways in which metaphors instrumentally guide us toward Ultimate Transcendence, then this chapter will examine the metaphors of biology for what they tell us about the political dimensions of images and metaphors within science and religion. By reminding ourselves of the metaphors operative in cosmological physics and microbiology (with its study of genetic evolution), we can discover important underlying attitudes toward



cooperation and conflict. When we uncover those themes, we will also disclose a further layer of investigation – into the relationships between images and words in contemporary hermeneutics. Indeed, I will finally argue that the some of the dialogue between science and religion is actually ‘about’ the political relationships between images and concepts in our postmodern cultural matrix. By politics in this context, I mean the relationships that exist between two elements that are public (the *polis*) and that claim power or authority in a system. In the politics of science and in religion, ‘lines of force,’ competence, authority, and power are always operative. By studying metaphors as I have in the first three chapters, I have not ignored these issues, but delayed them. Metaphors in science and religion have multiple layers of interpretation; in chapter 1 we studied their power to refer to ‘what is.’ In chapter 2, we examined their ability to generate narratives and establish the history of the universe. In chapter 3, we noted how temporal narratives gained an ‘internal’ teleonomy by which self-generating agency begins to appear in theories of chaos and complexity. But we noted that language in science and theology surfaces conflictual vocabulary or competitive images. This political grammar and syntax needs to be explored.

In effect, there are always *four* variables in the conversation between science and theology: (1) scientific stories and metaphors; (2) religious symbols, metaphors, and stories; (3) scientific experiments, methods, and conclusions; and (4) theological critiques and systems. Within science, there is an operative politics about the relationship between concepts and metaphors; and within theology, there is a political interaction as well. In addition, in the marketplace of contemporary cultures, religious stories and symbols are competing for attention with *all* relevant stories of the whole, or with local narratives that define an operable livable region. Religious stories cannot ignore the dominance of scientific stories, since the politics of current western cultures gives precedence to the latter over the former. Science, on the other hand, ought not ignore theology because methodologically, it has had a much longer sophisticated history of interacting hermeneutically with metaphors and stories.

In what follows, therefore, we will look again at the narrative images that emerge in the astrophysics of the universe to stress their preoccupation with conflict and violence. Second, we will remind ourselves of the competitive and cooperative character of self-organizing systems in their evolution; in addition, we will link this to the images of competition as they appear in the macroevolutionary scale. This recognizes

that these metaphors 'refer' to a cooperative or competitive understanding of temporality and the relation of agents to their environments. We will then need to turn to the hermeneutics of science and religion in which concepts and metaphors are related in a competitive or cooperative fashion, often in a gendered way so that ideas are masculine and images feminine. And finally, we may ask what questions this recognition raises for the hermeneutics of religious meanings.

#### **4.2 The politics of deep time: astrophysical cosmology**

As we noted in chapter 2, it is not uncommon for astrophysicists to discuss the universe as a unity that has a narrative structure. Briefly, we will remind ourselves of the kinds of stories that scientific cosmologists tell. The cosmos has a narrative pattern with a beginning to time and space with their laws, agents of motion and change, complications due to plot developments, and either a cold or a hot ending. In this chapter, however, we want to note how the narratives emergent from the metaphors tend toward conflictual images.

The universe's standard plot begins in the Big Bang, complicates itself by what causes its expansion, and, depending upon the kind of complication, ends in greater order or in random disorder – a Big Crunch or a Heat Death.<sup>6</sup> Let us notice the strong language of the metaphors. The beginning occurs as a fireball, blasting asunder any known connectives.<sup>7</sup> This 'searing violence'<sup>8</sup> bursts and swells into a constantly expanding, perhaps inflating, universe. Early images by the Belgian Lemaître (1927) described a 'primeval atom' that expanded, 'fragmenting' and 'scattering' the star, planets, and galaxies, which in its updated version became a 'hot broth' of nuclear and elementary particles.<sup>9</sup> The force of the violence impelled galaxies to 'rush away' from one another.<sup>10</sup> The primal elements 'swarmed' like angry bees. The elemental bits have been 'thrown apart.' At the origins, the language of paradox dominates discourse. In the beginning, ordinary mathematical formulae, according to many, do not cohere; they only appear or evolve as initial chaos gives way to the incipient regularities of spacetime. Mathematics and the laws of nature evolve within history. Under such 'unusual and improbable' conditions,<sup>11</sup> little can be described, let alone explained. At best, we might say that it was an 'undifferentiated soup.'<sup>12</sup>

The unexplained 'gap'<sup>13</sup> in the primal chaos, the 'bubble' in the soup, generates distance and asymmetry between 'one' and an 'other.'

A 'surplus' establishes the causal network of 'before' and 'after.'<sup>14</sup> Thus the 'lopsidedness' of unbalanced matter residue<sup>15</sup> creates a 'dis-equilibrium'<sup>16</sup> which establishes the temporal asymmetry of the cosmos, whether it is seen to be 'running down' due to entropy<sup>17</sup> or generating order.<sup>18</sup> The 'flawed opus,' as Frank Close calls it, is the basis for life.<sup>19</sup> In whatever way this 'event' is explained, whether through fluctuations, wave disturbances, etc., it is the semantic overlap in the metaphors of surplus of 'getting more than you bargain for' in non-linear expansion<sup>20</sup> that establishes a cosmic sequence we call a story. We do not simply have isolated items placed in causal sequence by an observer (should one appear); we have a 'one' and an 'other' that become a 'before' and 'after' – a timed series whose elements are causally related such that one could not 'reverse' the pattern. Eggs that fall off a wall do not return to the ledge reassembling themselves. The story begins and evolves; it ends and it does not return to the beginning.

The final act of the drama alternates, depending upon the interpretation of *what is generated* by the excess, between an infinite dead equilibrium,<sup>21</sup> a contracting gravitational compression, or infinitely expanding order.<sup>22</sup> It is not necessary that the universe have a *particular* ending, but that it have *an* end to the story.

Even highly speculative theories about the origins of the universe create narratives. Our universe, according to Kaku, is the product of an unstable ten-dimensional world that 'cracked' in two.<sup>23</sup> We exist in four dimensions, but the other six remain available. The rapid expansion of our universe is simply a 'minor aftershock' of this 'cataclysm.' Indeed, Kaku is quite satisfied to replace the biblical language of creation with the Big Bang, and sees the problem of 'who did it?' or 'what preceded it?' as of continuing significance, but only in the sense that research about origins displays the possibilities of a reassembled ten-dimensional universe.<sup>24</sup> As we have pointed out, the ordinary laws of physics do not apply in such a singularity.

In effect, what scientific cosmologists have created in this instance (but not in every instance)<sup>25</sup> is a general metaphor or mythic structure about the world.<sup>26</sup> The abundance or excess in the nature of metaphor itself provokes the unrolling of time as a history for the universe. In effect, astrophysical cosmology is making use of the very nature of language as metaphor to produce not only a narrative structure, but a model for an empirical research program. 'It is not order or disorder that cosmic creation produced out of chaos but conflict, and the possibility of evolutionary development of complexifying modes of

conflict.<sup>27</sup> We have *deep time* as the all-encompassing story of conflictual violence leading to a passive soup which, in turn, enfolds the *shallow time* of animate life. What is the metaphorical relationship between 'before' and 'after' in shallow time?

### 4.3 The politics of shallow time

In the early 1970s, I was introduced to the issue of intrinsically generated periodicities within certain kinds of physical systems by a biologist working at the University of Leuven, Belgium. Jozef Heuts was convinced that *temporal complexity* governed investigation of everything from crystals to humanity – and God.<sup>28</sup> He was particularly interested in the internal clocks of living systems and the role of temporal frequencies occurring between generations of living systems. He lectured on time as an *operator* and claimed that he could connect this discussion both in terms of method and content to theological claims about God and the world. As Prigogine maintains, 'Time is now intrinsic to objects; it is no more a container for static, passive matter.'<sup>29</sup> Prigogine finds the closest parallels among two poets: Paul Valéry and T.S. Eliot. He quotes Eliot at the beginning of the *Four Quartets*:

Time present and time past  
Are both perhaps present in our future,  
And time future contained in time past.<sup>30</sup>

Time is the key to understanding our internal nature and how human beings are embedded in the universe.

But as we have seen in the previous chapter, a time internal to things begins before the neuronal bases for human psychological time. Physics has made it clear that dynamic natural and artificial systems have a temporal order. These far-from-equilibrium systems, from dripping faucets through autocatalytic crystalline forms to human beings occupy a niche in the universe that has its own internal time with constitutive choices. From dissipated energy emerges often unpredictable ordered behavior at a new level of organization. These systems have a future different from their past and dependent upon their history. 'Before' does not always decree necessarily what will occur 'after.'

So *shallow time*, at least by the universe's geological standards, has its own self-organizing time structures. The 'behavior of all organisms

involve the collective, orchestrated temporal programs of all these processes together.<sup>31</sup> In molecular biology as we have seen, there appears to be a principle of selection for future organisms that is directly related to time. They have their own internal history dependent upon initial conditions of environment and genetic heritage, but also conditioned by their 'choices' made out of 'differential advantage.'<sup>32</sup> 'Before' and 'after' have gained certain values. But for Küppers, as we have seen, this 'advantage' is due in biological systems to its ability to compete for resources and to generate maximal functional information. Thus, *before* and *after* are now related in a particular way – through a selection value that determines development or decline.

To speak of development and decline in the historical process of biological systems presumes not only a description of change, but also an evaluative or *axiological* conviction about time.<sup>33</sup> We can define progress in evolution as 'systematic change in a feature belonging to all the members of a sequence in such a way that posterior members of the sequence exhibit an improvement of that feature.'<sup>34</sup> But Francisco Ayala, from whom I have taken this definition, does not think it is possible to define progress or decline as a purely biological concept. Finally, however, he sees the criterion for progress as the advancing ability of organisms to 'obtain and process information about the state of the environment.'<sup>35</sup> In effect, progress in evolutionary development is not simply about conflictual *competition* for resources but also about *cooperation* with the environment. 'Some selective interaction with the environment occurs in all organisms.'<sup>36</sup> The temporal sequence of particular biological systems is integrally connected with the time of the universe.

More often, however, the Darwinian and neo-Darwinian description of the scale of value for success in this process speaks of *competition*.<sup>37</sup> Although it is recognized that Darwin himself borrowed this image from Adam Smith's economics,<sup>38</sup> who in turn used Hobbes,<sup>39</sup> the fact that *success in competition* underlies the scale of value is rarely noticed. In Ayala, as in Küppers, there is a correlative dimension of *cooperation* that is also functional.<sup>40</sup> A fundamental underlying characteristic of dissipative systems is their relationship to the environment with which they exchange matter, energy, and information. The temporality appropriate for optimal efficiency to a particular self-organizing system (i.e., a time pattern that keeps the system operating) negotiates internal teleonomic activity and the constraints of the context without exhausting either the resources of the environment or of the internal program.<sup>41</sup>

Küppers distinguishes functional from structural organization: the former measures the 'degree of adaptation of an organism to the conditions of its environment'; the latter, 'the amount of interdependence of [a system's] subsystems.'<sup>42</sup> Küppers sees the phenomenon of evolution primarily in terms of functional ordering, not structural ordering, primarily because there is an 'absence of any unambiguous mathematical connection.'

Notice, however, that the success of a far-from-equilibrium, self-organizing system requires *cooperation* with its environment to maintain itself. Pure *consumption* of the medium will eventually destroy the system; as would pure *confrontation* with, or *refusal* of, the environment. Internal and sequential temporality as an operator in self-organizing systems is not a neutral factor. 'Genetic information, too, possesses no absolute semantic value, but only a relative one, referred to the specific environmental conditions to which the organism in question has become adapted.'<sup>43</sup>

There is, therefore, an optimal temporality (a scale of value) for any given system (Küppers tends to identify this with rapidity of reproduction).<sup>44</sup> In addition, systems (especially biological ones) change over time, depending upon their ability to interact with the environment. On the one hand, there is a shifting shape to the environment *and* a mobility to the interior temporal sequencing of the system. The interior optimum is marked by that temporality toward which the system is attracted. On the other hand, the system itself interacting with the environment may be involved in 'differential shifts' that affect the direction of the evolution. The self-determining dimensions of the inner temporal dialectics affect the path through the environment.<sup>45</sup>

It is important to mark the fact that there continues to emerge a *normative* dimension to the experience of time in biological language. A system has its 'better' or 'worse' position for maintaining or developing itself. It is not that the success or failure of other systems to cooperate with the environment is unimportant,<sup>46</sup> but that the *military and ballistic metaphors* of competition and explosion have tended to dominate the rhetoric of biological explanation. We will turn to work of Stephen Jay Gould whose popularization of explanations in biology is a useful example in this context. Although Gould's observations about evolution have developed, he has provided a critical commentary on the rhetoric of both science and religion. At the same time, he offers a rhetoric of his own to negotiate the differences. In addition, he is able to articulate the ways in which the images of

competition and cooperation have emerged in the scientific tradition since Darwin.

#### 4.4 Darwin and natural selection: metaphors in Stephen Jay Gould

Gould was Alexander Agassiz Professor of zoology and professor of geology at Harvard University. During the past 25 years, until his death, he wrote almost weekly columns on natural science for *Natural History Magazine*; he informed his readers about current biological sciences, contravened false information and methods, outlined historical precedents, hectored colleagues, and advanced political positions. He has done so with wit, clear prose, intelligence, and occasional grace, while supporting his arguments from his own research in geology and evolutionary biology. As a result, he has gained a public following for the essays that belies what he once thought of their ephemeral nature.<sup>47</sup> Although neither he (nor I) would claim that the essays reflect a complete biological science, they illustrate in this context both a scientist's *methodological* interest in communicating his findings to a wider audience (the rhetoric of science) and some *substantive* scientific positions on macroevolutionary biology. They parallel in a self-reflective fashion the microevolutionary arguments of Küppers.

Some of the concerns for metaphor, narrative, and method that have animated this volume also occupy Gould's essays. Although he believed that the supposed nineteenth-century war between science and religion is a myth,<sup>48</sup> he opposed any intervention of religious sensibilities in the natural sciences, treating religion as a primarily private, moral enterprise. 'But no battle exists between science and religion – the two most separate spheres of human need.'<sup>49</sup> He most notably opposed any intervention of religion in science by testifying against what has been called 'scientific creationism' and its attempts to be included in textbooks as a theoretic equivalent to evolution.<sup>50</sup> However, it seems that were the role of metaphors better treated in both science and religion, matters would be clarified sufficiently such that, even for him, a genuine dialogue could occur. So Gould was willing to venture that the creation myth in the first books of Genesis is not about *linear addition* as a metaphor for creation, but about *differentiation*, a genuinely scientific and evolutionary concept.<sup>51</sup> Such a metaphor could coincide with, or at least not oppose, contemporary evolutionary theories. The 'public' character of his nature writing, his

self-differentiation from religion, and his own strenuous biological research program make him an apt exemplar for our analysis.

Gould claims his scientific lineage from Darwin, defending the writer's methods, theory, and most of his results. He views his own theoretic position on evolution (punctuated equilibrium) as well within the realm of Darwin's analysis.<sup>52</sup> However, whether it is Darwin and his contemporaries or Gould and his own coworkers, he always maintains that the scientific method he pursues includes both metaphors and narratives. For Gould, metaphors are endemic to scientific method; they structure discovery, provide models for analysis, and consistently prove useful for 'creative global thinking.'<sup>53</sup> 'We think of ourselves as logical, as able to move in deductive order through a set of arguments from beginning to ineluctable conclusion ... [but] we need carriers, or metaphors, to make these imaginative jumps.'<sup>54</sup> They enshrine the 'eureka' experience of the investigator even when the insight proves to be partially invalid.<sup>55</sup>

But metaphors used in science (or in any other realm) can also go awry. Gould indicates the scientist's ambivalence to images:

Metaphor is a dangerous, if ineluctable, device ... We use images and analogies to foster understanding of complex and unfamiliar subjects, but we run the risk of falsely infusing nature with the baggage of our parochial prejudices or idiosyncratic social arrangements. The situation can become truly insidious ...<sup>56</sup>

The search for 'origins' can be peculiarly seductive according to Gould. The myth of origins invents 'primal' creatures, heroes, and sacred places, 'while evolutionary stories provide no palpable, particular object as a symbol for reverence, worship, or patriotism.'<sup>57</sup> The search for origins is usually linked to a belief that the current function of a biological system was 'initiated' necessarily through some evolutionary step at the beginning. Gould stresses the contingency of evolutionary development; anything else is an imported theology that argues necessary links between current utility and historical origin. 'Metaphor is a dangerous, if ineluctable, device.'

For Gould, the issue is to find the analytic and predictive capabilities of metaphors for modeling nature. The predictive dimensions are focused through experiments and particular evidence. No metaphor or theory can be useful in science (or otherwise) if it does not illuminate the particulars with which it is concerned. 'The details are the story itself; the underlying predictability, if discernible at all,



is too nebulous ...<sup>58</sup> If metaphors provide a strong analogical framework or structure (as artificial breeding or selection did for Darwin's 'natural selection'), then it will prove useful in a research program. Further details will emerge.

Narratives are of equal necessity to science, not only because humans are inveterate storytellers,<sup>59</sup> but because facts are not 'passive' to the observer.<sup>60</sup> Data are never simply 'there'; researchers ask questions, construct theories, and data exist within those constructions. Science is never fully rational and theories always constrain the search for, and interpretation of, data.<sup>61</sup> To think 'historically' is the essence of evolutionary biology;<sup>62</sup> knowing the criteria for telling the appropriate story, for reconstructing the history of nature, marks the difference between effective science and misguided enthusiasm.<sup>63</sup> But more importantly, 'being scientific' about past history – unrepeatable events and 'objects' – requires a form of 'historical reasoning' that cannot avoid stories.<sup>64</sup> The natural sciences are intrinsically historical and the patterns of history require sequential cause and effect, even if those causes are limited to only one of Aristotle's four causes. 'Narrative remains an art and science of the highest order, but of different form.'<sup>65</sup>

Telling the history of nature, especially natural processes and life-forms prior to humanity, does not mean a regressive imposition from an anthropocentric point of view. He is particularly opposed to the 'anthropic principle' in cosmological speculation. The intricate 'fine-tuning' of the universe does not allow us to draw the 'wildly invalid inference that human evolution is therefore prefigured in the ancient design of the cosmos.'<sup>66</sup> One can only tell the story from the present in the sense that comparisons with the current utility of evolutionary adaptations can disclose possible analogies with past functions. On the other hand, 'speculative storytelling' without sufficient data can create serious social problems. 'Speculative storytelling in the adaptationist mode has been the primary weapon from evolutionary theory used by sexists to keep women in a subservient place.'<sup>67</sup>

Scientists who study history, particularly an ancient and unobservable history not recorded in human or geological chronicles, must use inferential rather than experimental methods. They must examine *modern results* of historical processes and try to reconstruct the path leading from ancestral to contemporary words, organisms, or landforms.<sup>68</sup>

Organisms have a history and leave remnants behind.

Using 'ratchet' and 'slope' as metaphoric models for evolutionary history, Gould displays their values, their problems, the data that support each, and the research questions each might evoke.<sup>69</sup> By the time he has concluded his comparisons for life's history, he has rejected the metaphor of the ratchet for that of the 'very broad, low and uniform slope.' For Gould, the underlying problem with any metaphors or theories is their claim that evolutionary history was an inevitable declension from certain initial conditions. Any metaphor for the history of nature must acknowledge the absolutely radical contingency of evolution. There are always 'complex and curious pathways.'<sup>70</sup> To presume that past adaptations progress inevitably toward the present 'badly misrepresents the richness of evolutionary history.'<sup>71</sup> Harmful structures may be eliminated by natural selection; but helpful structures are not *necessarily* built into evolution.

For Gould, the issue is 'progress' imagined as the necessary operator in the narrative. On what basis could one say that evolution progresses? This would require a norm. 'Progress is a noxious, culturally embedded, untestable, nonoperational, intractable idea that must be replaced if we wish to understand the patterns of history.'<sup>72</sup> Simple documentation of trends and replacement of one form by another presumed more competitive does not constitute 'progress.' What natural history requires for history is that its events have a 'temporal signature' and that distinct events unwind 'in some particular, if complicated, direction.'<sup>73</sup> Gould and his coworkers looked for temporal asymmetry in the 'standard paleontological representation of life's temporal structure.' Both for marine invertebrates and the Tertiary history of mammalian genera, there appears to be 'possible generality, or true arrow of evolutionary time.'<sup>74</sup> In other words, in terms we have used before, there is an internal teleonomy to evolution that can best be articulated through a narrative structure.

What Gould rejects is an external moral *telos* to natural processes. Evolution is a bush in which the evolution of humans need not have happened; it is not a ladder, a continuous sequence of ancestors and descendants.<sup>75</sup> 'Ladders are false abstractions, made by running a steamroller over a labyrinthine pathway that hops from branch to branch through a phylogenetic bush.'<sup>76</sup> Adaptive traits can change at different times and different rates; contemporary humans may have three coexisting lineages,<sup>77</sup> but humans now share with horses 'the sorry state of reduction from a formerly luxuriant bush to a single surviving twig.'<sup>78</sup> Repeated episodes of speciation, the splitting of one

lineage from a parental stock, produce a bush. The internal teleonomy of a set of lineages develops by virtue of 'natural selection.'

Natural selection, however, is a metaphor. Darwin argues that 'natural selection works upon *individuals* engaged in a struggle (metaphorical and without conscious intent, to be sure) for reproductive success.'<sup>79</sup> These organisms are working in a local situation; they are not struggling for some universal superiority of the species. The calculus, as Küppers has indicated, is that the winners pass on more copies of themselves into the future. They have three tasks: competition for resources, avoidance of predation, and adaptation to the environment. Gould argues that this occurs not through a self-interested gene, since organisms inhabit an environment; nor is natural selection the operation of a species protecting itself. The creativity of natural selection is always local.<sup>80</sup>

Natural selection is an 'operator' by an 'extended analogy' to the work of artificial breeders and to the 'economics of Adam Smith.'<sup>81</sup> The problem with the first analogy is that, unlike animal breeders, nature has no 'preordained purpose'; the problem with the second is that there is no 'independent criterion of fitness.'<sup>82</sup> Apparent order, appropriate adaptation to local environments, discloses itself after the struggle for resources takes place. Gaining a differential advantage in the environment guarantees survival of one's offspring and demonstrates the creative power of natural selection.<sup>83</sup>

But for Darwin, natural selection was not necessarily the *sole* operator.<sup>84</sup> Indeed there may be an internal molecular clock that establishes some mutations.<sup>85</sup> Further, the organism's life strategy changes to fit different types of environments; these changes may include altering size and shape, adjusting their internal temporal rhythms, and the 'energy invested in different activities (feeding, growth, and reproduction, for example).'<sup>86</sup> The process of natural selection, however, requires some stability of environment so that the organisms can tune their rhythms to the resources. 'I have long felt that images of balance and optimizing competition have been greatly oversold [in Darwinian theory], that important and effectively random forces buffet the history of life.'<sup>87</sup> Internal clocks, random instability, competition for resources, cooperation with the environment (including other species) become a complex set of variables in the evolutionary process and in the strategies for the life history of organisms. To presume that *competition* is the only 'operator' in natural selection can lead to an understanding of *homo sapiens* as combative or aggressive by nature and to mistaken interpretations of the evolutionary relationships

between men and women in culture.<sup>88</sup> Natural selection, as an extended analogy, in other words, covers multiple processes that can be sorted out only through careful experimentation, field research, and further data.

Gould's general position on evolution is not reductionist in the sense that culture continues to be hierarchically developed above biology.<sup>89</sup> Culture has laws of its own due to the 'nongenetic transmission of information across generations,' even though culture has a biological base. Hence, Gould argues for a 'structural biology, that views evolution as an interaction of outside and inside, of environment and the structural rules for genetic and developmental architecture – rules set by the contingencies of history and physiochemical laws ...'<sup>90</sup> For him, this requires the integration of the distinctive narrative style of natural history and Aristotelian experimentation searching for evidence.<sup>91</sup> A unified science of life will study how the interior temporal mechanisms of organisms integrated molecular genetics with natural history.<sup>92</sup> As Gould quotes Darwin: 'I use the term *Struggle for Existence* in a large and metaphorical sense, including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving progeny.'<sup>93</sup> Differential advantage may mean competition and domination; it may also mean 'cooperation for mutual benefit.'

More recently, Gould has developed 'cooperation' as a factor in natural selection. He believes that William Jennings Bryan misunderstood Darwin's theory as a claim to the 'moral virtuousness' of a 'martial theory of survival by battle and destruction of enemies.'<sup>94</sup> He thinks that Kropotkin's critique of Darwin is not inaccurate. 'Darwin did present an encompassing, metaphorical definition of struggle, but his actual examples certainly favored bloody battle ...'<sup>95</sup> Thomas Henry Huxley, one of Darwin's major interpreters at the end of the nineteenth century, went further, arguing that the brutal social world of 'war of all against all' required social laws and culture to moderate our intrinsic bellicose instincts.

Kropotkin argued in 1902 against Huxley that the struggle for existence leads not to combat, but to mutual aid.<sup>96</sup> As part of the Russian school of Darwin's critics, he rejected the Malthusian (and therefore, Hobbesian) presumptions of Darwin's metaphors and maintained that the struggle for existence places humans 'against the harshness of surrounding physical environments,' not against one another. Gould believes that Darwin recognized both competition for limited resources and cooperation in the face of the environment, but that he

emphasized competition due to his commitments to Malthus. 'Sociability is as much a law of nature as mutual struggle.'<sup>97</sup> Gould is impressed that Kropotkin's observations were not due only to his commitments to his revolutionary ideology, but to his scientific work in Siberia. And although Gould sees no need to postulate 'kindness, mutuality, synergism, harmony' or any other moral value in evolutionary history, he is willing to see the metaphors for competition and cooperation as 'liberating and enlightening' when they yield new scientific theories with new data for examination. The combination of both dimensions of the metaphors for struggle can provide the biological, evolutionary basis for cultural developments.

For Gould, his scientific attitude toward the data, the 'facts' – however theory-laden – is not wonder or awe, but the acceptance that 'we live on a peripheral hunk of rock on the edge of one galaxy among gezillions ...'<sup>98</sup> Humans are a 'fortuitous cosmic afterthought, a tiny little twig on the enormously aborescent bush of life.'<sup>99</sup> 'If *Pikaia*, the only chordate of the Burgess Shale, had not survived the great sorting out of body plans after the Cambrian explosion, mammals might not exist at all.'<sup>100</sup> This contingency of the planet and of human life upon it should be seen as a task, a responsibility.

If evolution has no direction – or only the internal teleonomy available to our research afterward – then human beings must define the purpose in nature.<sup>101</sup> Here the underlying origins of Gould's theory in Kant's philosophical program (outlined in chapter 2) become clear. The natural sciences born of Kant's *Critique of Pure Reason* have no right to speculate about the purpose of the universe, God, or the human psyche; these regulative ideas, however, must be assumed through practical reason in our day to day operations. Gould offers a Kantian duty for the day-to-day dealing with contingencies, even on the large scale of human evolution. The Freudian deflation of the autonomous ego, which he is fond of citing, leaves human beings with a stoic resignation to 'what is' without being able to generate the responsibilities of existence from the structures of the universe. In addition, such resignation is distinctly different from the metaphors of religious understanding which claim that contingency, however confused or partial, is a *gift* to be cherished.<sup>102</sup> For the major religions, contingency is not the competition or domination of 'before' and 'after', of one and the other, but a grace, the gift of one to the other.

Gould's science offers important services to our enterprise: 1) it argues that metaphors and narratives are always operative in the natural sciences; 2) history is an intrinsic dimension of nature; stories

about nature, buttressed by field research, are the outcome of this conviction; 3) temporality may be operative in the internal molecular time clocks of organisms through evolution; 4) the metaphor of natural selection includes a range of strategies: internal timing, struggle for resources, randomness or mutagenicity, cooperation with the environment, even dependence upon other species; and 5) a stoic resignation to the data as an underlying philosophical attitude. Now we will explore the origins of the very notion of competition within the language about metaphors themselves.

#### 4.5 Cooperation and/or competition: the metaphors of time

The tour through the metaphors used in the standard story about the origins of the universe and about the origins and development of life both at the genetic level and that of natural history is necessary if we are to show how reality is constituted for contemporary science. If we were to summarize the qualities of 'what is' in *deep time* as well as in *shallow time*, we would find no longer a static universe, but a dynamic one. Not only is temporal sequence important to the material universe's evolution, but it is a variable that constitutes it normatively. This normative temporal flow also operates at the most primal level of biological development. The 'before' and 'after' of the temporal flow are related integrally so that there is an optimal state of affairs. Without the appropriate 'excess' of certain elements, there would be no temporal flow; there would exist no expansion of the universe, no further mutagenicity. Life would not continue.

Not only is the *content* of contemporary scientific cosmology and microbiology temporal, but the *form* is metaphoric. Metaphors have a 'timing' of their own (is/is not yet); and the time of planets, rocks, plants, and animals appears in metaphors. Indeed, as I have said, it is quite conceivable that the metaphoric form has given rise to the narrative shape of the content. But the form in these metaphors for the origins of 'nature' is often competitive: military, ballistic, explosive, expansive, and assertive. In the metaphors as they are used by scientists, the before and after moments are distinguished not by their identity, but by their difference. And the difference is conflictual, not cooperative.

Occasionally, in the case of some current thought, the metaphors of origin shift to holistic, developing cooperation. Prigogine and Stengers have told a different version of the story, using the same metaphors of

excess to describe an irreversible power bringing order out of chaos at all levels.<sup>103</sup> Layzer has maintained that the disequilibrium that generates time asymmetry is more like a gentle decompression than an explosive fireball.<sup>104</sup> This occurs through gravitational clustering, a 'genuinely historical process.'<sup>105</sup> For Layzer, this explains the 'clumpiness' of the cosmic medium and the eventual emergence of autonomous self-gravitating clusters.<sup>106</sup> This expansion of space is 'responsible for chemical and structural order.'<sup>107</sup>

But the competitive edge in the use of metaphors is more pronounced in the genetic theory we have examined, due primarily to Darwinian proposals for natural selection as the operator in evolution. The genetic evolution of far-from-equilibrium systems requires competition for available energy resources to continue efficient temporal sequences. Thus the *differential advantage* is due to the system's ability to 'win' in the competition for nutrients within the environment.<sup>108</sup> Or this process can be described as cooperation with the environment. The two alternatives strikingly indicate the multivalent operation of metaphor within science itself – alternate research programs as well as alternative attitudes toward the systems' integration into their contexts. So Gould argues that in evolutionary history, there are both competition for resources **and** cooperation or mutual aid in the face of environmental challenges. Both cooperative and competitive options seem to be awakened in the interpretive procedures of scientists as they examine the surplus that emerges in their metaphors – whether in the universe of deep time or in the evolution of shallow time. And yet at the same time, scientists regularly argue that they are not using images in their analyses.

Why is it that, with the evident use of metaphoric language in the hard sciences, the practitioners of science feel compelled to reject their own use of images? It is to this dialectic of images and concepts that we must attend.

#### 4.6 Words and images: cooperation or competition?

In the remainder of this chapter, I would like to explore the political dimensions of metaphor, especially the ways in which metaphors and concepts, images and words or mathematics, interact in the sciences and theology. It is my contention that the conflict between metaphors and mathematics/concepts in science is primarily a hermeneutical issue, replicated in the analysis of temporality in the sciences themselves. The epistemological and/or methodological refusal to

acknowledge the role of images *within* the sciences as a cooperator with the other analytic dimensions of science produces a curious view of deep time and shallow time. Both end up defined by conflict rather than cooperation, competitive difference rather than cooperative or empathetic identity.<sup>109</sup> It is no doubt true that dimensions of identity and difference operate within the data that scientists research; but the drift toward *competition* as the dominant strategy for understanding the relationship between *different*s seems to be due to factors other than those intrinsic to the data. The data produce patterns of cooperation as well as competition; the theories about the data and the stories that provoke the theories and enshrine them focus upon conflict.

The hermeneutical issue is located in the dialectic interaction of words (especially conceptual, analytic ideas) and images (especially poetic or metaphoric ones). The inability to mediate the relationship between the differentiations of language has promoted the conflictual view of evolution and time itself to its level of dominance.

In our (particularly western, industrialized) cultures, words are most often associated with *logos*, with concepts, ideas, and theory; images are rooted in *bios*, the somatic, the material and the visual.<sup>110</sup> This relationship of words to images in our popular and philosophical cultures is problematic; rarely if ever are they equal partners in the business of interpretation.<sup>111</sup> Words are supposed to make clear the opacity of images. The more precise words are, the more sharply effective they can be in shaving the rough edges from metaphors or the proverbs of ordinary speech. Though images have a powerful hold on the psyche and spirit, that energy can be 'controlled' by education into words. But icons continue to show inordinate power; otherwise iconoclasm would rarely be inviting and would have little meaning.<sup>112</sup> Words must become poetry or political rhetoric to have the same sway; but then, in common parlance and in philosophy, they appear no longer altogether trustworthy! The poets lie; politicians are shifty sophists. This Enlightenment unease with, even censorship of, both words and images has attempted to make ideological concepts or mathematical formulae primary, since unbridled images or words awaken a surplus of meanings, an uncontrollable excess of values.<sup>113</sup> Ideological thinkers want images to be illustrations of previously formed ideas; but the arts resist. There is a clear politically dominative relationship of words over images.<sup>114</sup>

Words and images take part in the hegemony or supposed primacy of high over low cultures. In low, 'primitive' cultures, where images



predominately communicate in an oral context, information is also communicated.<sup>115</sup> However, such knowledge tends to appear in the form of proverbs, aphorisms, the wisdom of shamans, the gestures of the nurturer, herbalists, dancers, musicians, and priests. When the visual arts became 'fine' arts, they allied with poetry to dominate over 'folk' cultures.<sup>116</sup> But are images that have not been 'informed' by words less precise, as speech/writing-oriented cultures tend to assume? Or do images communicate information (not simply 'inner,' 'emotive' knowledge) unavailable in the semi-precise rhetoric of ordinary speech?

The conflictual relationship between words and images plays a role within science.<sup>117</sup> The insistence that images are external, even extrinsic, to scientific analysis is an Enlightenment prejudice.<sup>118</sup> In its attempts to extricate analysis from the 'superstition' of doctrines and occult causes, early modern science contrasted the management of data through mathematics and geometry with the discardable role of religious images. Even with Galileo's care to assert his Catholic orthodoxy,<sup>119</sup> he focuses upon mathematical proofs that will explain what his eyes see, not what he has heard or has had transmitted to him by tradition. Modern science and the philosophy created to justify its efficacy reconceived curiosity itself, arguing that its fundamental operation is to be found, not in the wonder of images, but in rational analysis.<sup>120</sup>

In early modernity, the philosophers Lessing and Burke made the distinction between images and words a metaphysical and political necessity. Lessing's distinctions between the spatial and temporal arts, while mimicking the emergent natural sciences, also mirrored political economy.<sup>121</sup> For him, the visual arts required more control since there is an unconscious power to images. Gender roles play a part in this distinction, since the mixing of genres, the transgression of communication between words and images, creates a monstrous display that must be excised. Burke provides further support for this political position in western philosophy. The intrinsic differences between words and images in Burke permit their enlistment in ideological causes and crusades. Sublimity is the masculine mode with its evocation of transcendence through pain, terror, vigorous exercise and power; beauty, on the other hand, is little, smooth and delicate – in a word, feminine.<sup>122</sup> Ultimately, the verbal sublime has nothing to do with images.<sup>123</sup>

Recent hermeneutics, however, contests these assumptions. We may take the position of Paul Ricoeur as representative. He argues forcefully

that symbols, metaphors, and narratives are those languages upon which philosophy reflects, indeed must reflect.<sup>124</sup> Philosophy is not self-justifying, self-initiating conceptual speech. It is dependent upon ordinary speech, even poetic speech for its content, if not its form.<sup>125</sup> For Ricoeur, living metaphors continue to disclose a new way of being in the world, should one choose to live within it, as we have seen. They awaken reflection, but cannot be exhausted by it. The dependence of the thinking subject upon symbols and narratives constantly calls attention to the fact that thought is never self-originated, but interdependent with other languages.<sup>126</sup> W.J.T. Mitchell asserts that the visual arts must be treated no more nor less dialectically than the verbal arts. From the semantic point of view, 'from the standpoint of referring, expressing intentions and producing effects on a viewer/listener, there is no essential difference between texts and images.'<sup>127</sup>

Scientific belief that it can remove itself from the rhetoric of images (whether prior to mathematics or after it) is, from Ricoeur's point of view, a hermeneutical arrogance. It presumes to constitute the self as an autonomous subject (precisely the Enlightenment ideal) without any contexts, except as enemy. In this sense, it is not surprising that images or symbols would appear disposable to scientists. At best, such preanalytic artifacts must be controlled.

#### 4.7 Religious images and theory: the claim for cooperation

Had science not been so ready to reject its nurturing religious matrix, it might have found a different method for articulating its relationships to the rhetoric of ordinary speech, although *de facto*, some of those iconoclastic attitudes were also fostered within certain early modern religious traditions. Nonetheless, Enlightenment attitudes to science (and thereby metaphoric speech) differed radically from the self-understanding of medieval science and technological development. The Platonist philosophers at Chartres in the twelfth century recovered the ancient term *universitas* to describe the cosmos as a whole entity and, through reflection upon the book of Genesis and the *Timaeus*, speculated about the order within nature. William of Conches disdained those who wanted thinkers to 'believe like peasants' and leave reasons aside (*ut rusticos nos credere nec rationem quaerere*).<sup>128</sup> As Thomas Aquinas would quote him later: 'To slight the perfection of created things is to slight the perfection of divine power.' Andrew of St. Victor 'accepts the slow appearance of natural species from primitive chaos; against the ancient tradition of simultaneous

creation, he espouses the idea that the cosmos developed in successive stages through time.<sup>129</sup>

Even the rise of technology in the Middle Ages is not unrelated to the narratives and images within the Scriptures. Whether it was agriculture, mining, papermaking, or the key invention of the mechanical clock, western spiritual life nourished the development of machines.<sup>130</sup> The two proposed thirteenth-century makers of the mechanical clock (Richard of Wallingford and Giovanni di Dondi) were students not only of mechanics, but of philosophy, theology, scientific subjects, and medicine. Such 'clocks' were not mere time-pieces, but astronomical maps that articulated the patterns of the sun and planets.<sup>131</sup> The western Roman church's willingness to compromise with the new mechanics was markedly different from the Orthodox churches of the eastern empire, who refused until the twentieth century to permit clocks in church architecture. For the latter, to install a clock was a blasphemy against the eternity of God.<sup>132</sup> But Gilbert de la Porrée could ask and answer the question: 'Can one consider things manufactured by man – footgear, cheese, and like products – as works of God?'<sup>133</sup> He responded affirmatively. Such mechanical devices were part of human cooperation with divine action in the world. Because there was an antecedent willingness to learn from the metaphors and stories of the biblical text and a conviction that human beings could be co-creators with the divine, a conviction that a reasonable God governed both conceptual thought and poetic words or images, it became possible to integrate both.<sup>134</sup> For Aquinas, theology was a 'subalternate' discipline,<sup>135</sup> one that depended upon the disclosive speech of the scriptures and tradition. As a science, it continued to ask for reasons, but it did so within a wider matrix, trusting a language outside itself.

But a more negative dialectic of words and images has also functioned within Christianity. The religious iconoclasm of the eastern empire in the seventh and eighth centuries, of the Lollards in England in the fourteenth century, of the Reformers and Puritans in western Protestantism among others, witnessed an inherent tension in Christianity between an *incarnational impulse* that emphasizes the concrete, divine Christological and pneumatological presence in the sacraments (especially the Eucharist), the church and icons, and an *aniconic emphasis* in which God can never be imaged.<sup>136</sup> The radical distinction between God and all created reality should leave human beings without images or words. As Zwingli said, 'There is no vehicle necessary for the Spirit.'<sup>137</sup>

Images and stories within post-Enlightenment Christianity have been idolized (as miraculous or preternatural causal intervention), discarded (as superstitious, unnecessary explanation), or transcended (as primitive, first-level approximations). Rarely have they been given a primary, indeed unsurpassable role in religious discourse.<sup>138</sup> As Miles says: 'the use of images in worship modifies the tendency of words to exclude people who cannot subscribe to a precisely defined concept. Images also challenge the tendency to confine ourselves religiously to intellectualizing activity.'<sup>139</sup> Theologians and philosophers (mostly male) prefer the clear and distinct, the theoretical and/or mathematical. Rather than discuss or entertain the dialectical interaction (i.e., mutual mediation) of the two forms of discourse, thinkers stratify their relationship, making clear words dominant over opaque visual images.<sup>140</sup> Where Aquinas might have studied the specific power operative in each form of discourse and related them,<sup>141</sup> scientists and theologians have granted effectiveness to words and limited images to a social realm (of women and children, or women as children) in which it is difficult for them to have a *public* role.<sup>142</sup> Clear words and mathematics are public languages; images and stories reflect private opinion or personal emotions – the domestic scale of women and the nursery.

#### 4.8 Words and images: competition or cooperation?

Mieke Bal's *Reading 'Rembrandt'* is a sustained attempt by a literary critic and philosopher to understand, explicate, and mend the relationships between words and images. She focuses upon the way in which they mutually imply each other, although often while they maintained the effective domination of words over images. Her work in this case is both a critique of literary theory and art criticism, as well as an attempt to see the underlying linguistic and philosophical dimensions that operate culturally. But her diagnosis also applies to the way that images and words have functioned in theology and science. Our cultural bias is toward the verbal; so Bal focuses upon the ways in which images originate their own structures and meanings.<sup>143</sup>

Images function (as writing does) as an interpretation of subject matter; images are 'writings,' new 'texts' to make a point. But the nonverbal movement of a painting, including the mobility of figures, gestures, tones, contrasts, and affect, establishes a 'visual poetics' in which theater and drama are the central mode of operation and analysis.<sup>144</sup> Theater, with its characters and narrative, provides visual

poetics with an appropriate overarching framework precisely because in theater word and image function in 'one, composite sign.'<sup>145</sup> Theater is accomplished for an audience; therefore, one can see in a rhetorical reading of images the implication of the viewer, always a participant.<sup>146</sup> In an analysis of images and stories of rape, Bal points out the ways in which visual images and verbal discourse are mutually implied. The unremembered and/or repressed scene of violence done to the self is recovered by telling the story. In certain images, Bal discerns the ways in which the viewer becomes not only voyeur, but complicit with the oppressor, the one who is violating the text of the body.<sup>147</sup>

Though Bal argues for a relatively independent mode of visual discourse, having its own structures, logic, and meanings, an underlying question remains about whether images and words *must* conflict and enter into a political hierarchy in which words dominate images. Can words and images *cooperate*, i.e., mutually interact toward a common meaning?

Bernard Lonergan offers a few terms and relations that may be helpful. By applying central concerns on another topic, we can understand words and images as mutually mediated.<sup>148</sup> The notion of *mediation* is a common one in logic, of course, since it is the term that intervenes between subject and predicate or between the first principle and a conclusion that follows. 'All humans are mortal.' Why is this the case? Because anything that is made up of parts can come apart. Humans are composite; their coming apart is mortality, death. So the middle term, the necessary condition under which the statement 'all humans are mortal' is accurate, is 'composition.' It explains why the predicate (mortality) is to be necessarily found in the subject (human beings). Human beings are composed of parts; they disintegrate.

Most human knowledge is mediated, although Aristotle believed that first principles were necessary and immediate, self-evidently true. Lonergan uses the notion of mediation very generally, even more vaguely than the notion of cause. It defines relationships between two elements. Any factor, quality, or feature that has a source, an origin or a basis can be distinguished from factors that are consequences, derivatives, or outcomes; the element is *immediate* in the basis or ground and *mediated* in the consequences. In this chapter, I will make use of his notions of *mediation* and *mutual mediation*.

Using the term *mediation* does not include any particular content; it distinguishes between relative origination and what results from the element in question. I have outlined a logical example of mediation in

which the truth of the statement (humans are mortal) is mediated by the notion of composition. Organically, oxygen is immediate in the lungs, but mediated to the rest of the body; blood is immediate in the heart, but mediated through the arteries and veins.

In *mutual mediation*, however, the system operates as a functional whole. The principle of movement from an origin and the principle of control in a system are combined. There are differing centers of immediacy and their mediations overlap; the result is a functional whole. Even the mechanism of a watch is a form of mutual mediation. The balance wheel controls itself and other moving parts; but the main-spring moves itself and all other parts, including the balance wheel. To have a watch, one must combine both a principle of control and a principle of movement. Without a principle of movement (the main-spring) there is no motion forward; without a principle of control (the balance wheel), it does not keep measured time. The combination of the two centers of immediacy and mediation creates a functional whole, one that closes in upon itself to make a unity. A watch, in other words, is not simply a material object, the case and its stuffing; it functions as a whole. The two immediate functions mediate each other.

The body is also a mutually mediated organism. The respiratory system, the digestive system, the nervous system and musculature move not only their respective coordinates, but they mediate the entire body. Each system is an immediate center of movement, but mediated in and through each other to constitute an organic whole. So blood in the heart, oxygen in the lungs are better seen as mutually mediating systems; each has its own integrity as a mediating system, but both contribute to an organic whole. Psychologically, one can see that one's love for someone is mediated in one's body posture, tone of voice and flushed face; but also vice versa, one's own body posture or tone of voice can awaken the love itself. There is a feedback system that constantly renegotiates the human subject's temporal sense in space. The body and its attitude mutually mediate each other.<sup>149</sup>

We can even see this form of mutual mediation in scientific method. Empirical science is empirical through its attention to data and experiments; but it also operates through questions, hypotheses, deductions, classifications, and validating processes in the scientist. There are mutually mediated centers of activity in the attending subject and the intended data of the objects investigated. Science does not 'deduce' external data from internal first principles; on the other hand, scientists are not purely passive to inflowing objects. The interaction makes a mutually mediated functional whole called science.

Words and images, therefore, should be seen as two distinct centers of immediacy, governed by a variety of sensorimotor skills and data-gathering systems. In ordinary human knowing, they mutually mediate each other, not with complete overlap, but by their ability to move and control each other. Images control words; words inform images; each is only relatively more significant at any given cognitive moment. To say that they mutually mediate each other does not *define* in a universal, necessary way the precise interaction; it argues that they *cooperate* rather than *compete* for conscious attention in ordinary perception and interpretation. In any given cognitive moment, images might offer primary data and words might follow; in another, the reverse could be operative. The complex mutually mediating networks of the auditory, visual, and linguistic neural pathways make it clear that each modifies the other in our apprehension of the world.<sup>150</sup> The mutual interaction of visual imagery, words, and motor activation has only begun to gain scientific precision.<sup>151</sup>

For Lonergan, words and images are located within emerging *self-mediation*. Machines are made; organisms grow. Organisms give rise to physical parts within themselves, originating in processes of division and differentiation. In self-mediation, there are differing centers of immediacy, each giving the whole all the properties of the relative center of operation. As I have indicated in chapter 3, such self-mediation appears prior to humans. Systems organize themselves *teleonomically*, with an internal sense of ordering and controlling for the sake of an emergent whole. In doing so, the whole takes on properties unavailable at lower levels in its emergence. Change in the history of a system is not simply a replication of identities, but a genuine integration that produces higher level functions through the operation of its parts. This follows the pattern of self-organizing systems at the level of human experience. We too are 'far-from-equilibrium' systems that dissipate energy, while at the same time generating order (and further disorder) through choices made. Words and images function as distinct cooperative centers of data and interpretation within *self-conscious mediation*.

In self-mediation, mutual parts cohere to make an emergent whole; and the whole becomes something different through its consequences or outcomes. In *self-conscious mediation*, acts of intending; hearing, smelling, seeing touching, tasting, moving become integrated with memory, anticipation, and affect. Self-conscious intending is another step. Lonergan sees a final notion of self-mediation *inward* through which *self-conscious mediation* occurs. Self-consciousness

implies a prereflexive presence to self that is the condition for all human mediations.

[F]or you to be present to me, I have to be present to myself. This presence of the subject to [the self] is not the result of some act of introspection or reflection . . . . Consciousness is a presence of the subject to [the self] that is distinct from, but concomitant with, the presence of objects to the subject.<sup>152</sup>

For Lonergan, the mutually mediating characteristics of images and words occur within the process of self-conscious mediation. They *are* the ways by which self-conscious intentionality appears, knows, and is known. Their characteristic temporality, therefore, is that of the human subject, who when artistic is consciously performing in a transformed world.<sup>153</sup> The artist and the appreciator of art are transported into the space and time that are spoken and seen. In a differentiated self-consciousness, symbols, narratives, images (and concepts and mathematics, I might add) do not conflict, but cooperate toward the mutual self-mediation of the subject.<sup>154</sup> In the chapter that follows, we will examine the characteristic temporality that functions in human subjects and discuss whether cooperation or competition is the appropriate image to speak about human time.

#### **4.9 Conclusion**

In this chapter, we have investigated the metaphors that have been used in contemporary sciences with an eye toward their lines of power. The hermeneutics of metaphor require attention to political contexts and political effects. The images chosen by astrophysical cosmology, genetics, and macroevolutionary theory have tended toward conflict, military ballistics, and competition. The metaphors for time drift toward a dynamics of force that insist that one element is at war with another; 'before' and 'after' relate through domination, replacement, or rejection. In effect, independent, autonomous elements struggle to win over each other.

The pattern is replicated or rooted in the relationship between images and concepts in science. Scientists have tended to reject images as valid modes of discourse in favor of critical concepts and mathematical formulae. Their attitude toward religion has often been governed by this commitment to precision. Science has overturned and replaced the primitive images of the world used in premodern



religious sensibilities. Images and concepts are often at war; the dynamics of political force locate power in concepts, mathematics, and formulae and submission in images. In the classical modernist paradigm, images can function in science only as illustrations of clear and distinct ideas that have been derived from precise experiments. 'In the new iconoclasm characterizing the second half of the eighteenth century, optic-based media were reduced to being didactic tools of discourse or thoughtlessly replicating toys.'<sup>155</sup>

The paradigm becomes particularly clear in analyses of evolution. Whether scientists examine the emergence of the universe in astrophysical cosmology, the genetic interrelationships of species, or the appearance of sequences of species in the bush of evolution, competitive metaphors tend to dominate. Recent thinking has turned to alternate modes of discourse, recognizing that a focus upon competition may skew prospective research programs. Current philosophy of science now studies the role of visual images in the development of scientific models, the establishment of evidence, and the nature of scientific validation. The knowledge of gendered emphases has begun to affect significantly the ways in which research programs develop and how funding occurs.

Most theologians, on the other hand, have required the primordial language of images, metaphors, and stories because it was the language of revelation. Theological concepts, doctrines, and systems were a derived language, dependent upon the ordinary religious rhetoric of believers in their worship, scriptures, and ethical commitments. Although the politics of words and images differ within and between Christian denominations, each in its own way felt compelled to negotiate, whether wholeheartedly or ambiguously, a mode of discourse in which both were operative. In the notions of *mutual mediation* and *self-mediation*, I have offered a hermeneutical vocabulary for understanding a nonconflictual, cooperative relation between images and words. The self-organizing temporality of wordmakers and image-makers can exist as a teleonomic unity, an emergent political whole. For religion certainly, but also for science, this commitment could produce a variety of hypotheses that can be analyzed and tested.

There is an optimism inherent in this analysis; it originates in a basic trust, a religious conviction that though the cosmos (whether human or nonhuman) is flawed and finite, its workings are not vitiated. Cooperation is the ultimate source of power in the universe.<sup>156</sup> Images, the body and the nonverbal are no more (and no less) sinful than reason. It is a belief that 'the integrity of the dialectic of the

subject is grounded in the gift of universal willingness or charity.<sup>157</sup> The benign, if ambiguous, temporality of 'nature' is a condition within which self-organizing systems such as human beings may learn that cooperating with the ultimate environment, an unfathomable Other, will not do violence to their own complex teleonomies.

Scientists' penchant for neglecting their own metaphoric rhetoric could indeed be overcome, not only by examining the performance of scientists, but also by science's willingness to listen to the performance of theology. This hermeneutical interaction would significantly overcome a cultural impasse that not only destroys civil discourse, but is rapidly erasing a hospitable environment. The process would also heal the historical origins of the anti-ocular attitude in anti-religious politics. Just as concepts, stories and images cooperate in theology, so in science, metaphors and mathematics can find new collaboration. But the efficacy of such a strategy will require some element of self-gift on the part of scientists and theologians. Rather than anticipating the death of their discipline if it is invaded by the other, they must welcome each other as partners.

As Levinas says:

In my religious being I am *in truth*. Will the violence death introduces into this being make truth impossible? Does not the violence of death reduce to silence the subjectivity without which truth could neither be said nor be – or . . . without which truth could not be *produced*? Unless, revolted by the violence of reason that reduces the apology to silence, the subjectivity could not only accept to be silent, but could renounce itself by itself, renounce itself without violence, cease the apology for itself. This would not be a suicide nor a resignation, but would be love.<sup>158</sup>

The possibility that not competition, but love, is the structure of the universe is a claim that Judaism and Christianity have made since their beginnings. But it is also a claim whose evidence depends upon the continuing willingness of human beings to reenact the kenotic gift of divine love. Whether this dimension of life will occur is a choice left to the participants. Without it, both *deep time* and *shallow time* may disappear.

In *shallow time*, theologians are concerned with divine activity in and upon nature and history. They argue about the role of the finite agents in that time, their ability to cooperate or conflict with providence (kenotic love), thereby engendering the governance (*de facto*

history of good and evil) in our world. In *deep time*, mystics (whether philosophical or religious) contact contemplatively a deep silence that envelops all discourse, whether visual or verbal.<sup>159</sup> Whether those of us who live in shallow time as well as in deep time will take responsibility for both is the contemporary challenge for both science and religion. Failure to accept the challenge, even at the cost of our present selves, may ensure that there will be no future time in which anyone may dwell. That may be the ultimate politics of temporal metaphors and their importance in science and religion.

# 5

## Neural Networks, Human Time, and the Soul

The human soul understands itself by its own understanding, which is its proper act, perfectly showing its power and nature.<sup>1</sup>

Thomas Aquinas

### 5.1 Introduction

The study of time is seductive, and like most seductions, confusing. Despite the fact that we cannot ‘cut time’ into pieces, we establish and fix units like seconds, minutes, and hours or years. We measure time; we lose time; we kill time; we waste and fill time up as though it were quantifiable, able to be contained or a container able to be filled. As Augustine said: ‘It is not [the past, present, and future], which now are not, that I measure, but something in my memory, which there remains fixed. It is in...my mind that I measure times.’<sup>2</sup> It is as though time were a completely interior process, a product purely of human thinking and feeling.

Yet the previous chapters have shown how the patterns of the universe give evidence for their own forms of non-human time.<sup>3</sup> The standard model for the asymmetrical cosmos is narrated in the material of the gases, planets, galaxies, and stars. Far-from-equilibrium chaotic systems develop their own determined inner impulses. The evolution of species, including human beings, unwinds temporally in cooperative and/or competitive strategies. In fact, the prolonged temporal evolution of the universe was required for the appearance of human beings. So human time, however ‘subjective’ it may seem, has its roots in material, temporal sequences that long pre-date and condition its emergence.

In this chapter we examine the time that marks human life. Human temporal experience is not 'subjective' in the sense that it is solipsistically imposed upon a materially neutral substrate. Human bodies have internal, circadian rhythms. The human heart has a regular pumping pattern; if it does not, it dies. Each of our major organs has its own operative temporal sequencing. Here I will discuss the particular time that emanates from and governs the human brain. In the brain, memory, anticipation, feeling, and desire all coalesce to guide and coordinate our way of being in our world. All the activities of human beings have an empirical neural substrate.

Artistic, philosophical, and theological analyses have again preceded the empirical attempts to interpret the nature of thought. Yet just as it is important to think about how images and analyses for the temporal unfolding of brain activity affect our understanding of human consciousness, so too it is central to theology to think about the empirical, time-laden qualities of human experience. What are the current aspects of brain research that might affect Christian thought? And conversely, are there themes in the Christian understanding of human time that could be explored experimentally? Are there empirical conditions for the claims about time made by Christian theologians?

The field is vast, so we will focus on limited dimensions of current research: 1) some empirical findings about memory and human agency in the neurosciences; 2) the philosophical interpretation of time-consciousness by Edmund Husserl (1859–1938); and 3) Aquinas's interpretation of the Christian notion of the soul and consciousness that might correlate with a philosophical understanding of consciousness and the empirical conditions found in neuroscience. Does brain science use metaphors? Do the neurosciences tell stories? Are the synapses of our brains cooperating with one another in coherent neural networks or competing for resources? What does this say about human time?

I will focus upon the neuroscience, philosophy, and theology of memory and time-consciousness. Why memory? Because it is often described as a passive repository for filed information, as though there were no available agent-subject accomplishing the tasks. In the pre-modern theological world, memory and the *anima* or *psyche* were intertwined.<sup>4</sup> And soul became a Christian language for interpreting both memory and consciousness.

## 5.2 Brain imaging

Neural imaging, such as fMRI and PET-scans, has transformed contemporary research by providing 'live' information about the interactive, functioning brain.<sup>5</sup> Instead of speculating philosophically about what happens physically when humans think, feel, or act, investigators can watch the dynamic neural patterns emerge, develop, and change during relatively noninvasive procedures. What was invisible or opaque is now visible and clear. With considerable assistance to therapeutic endeavors, such processes continue the intellectual war of the Enlightenment in favor of reason, visibility, and clarity against opacity, the unknown, and the superstitious. Just as Piranesi (1720–78) used his architectural etchings to excavate the antiquities of Rome and Dagoty (1648–1730) and Cowper (1660–1709) drew their dissected bodies, contemporary images of brain activity provide an entry into what is covered by skin, the physical operations of the mind wrapped in its sheath.<sup>6</sup> The 'Vesalian technique of opening a severed head, removed from the pathos of the total human subject, continues in present-day MRI scans.'<sup>7</sup> Each involves a commitment to determine the physical conditions for memory, thinking, and action.

The role of images, image-making, and visual analysis in current understanding of neural activity means that scientific investigation not only makes use of images as *models* in inquiry (a heuristic); but they also operate as *modes of communicating results* to scientists and non-scientists (a rhetoric).<sup>8</sup> The modeling and communicative dimensions of neural imaging involve the neurosciences in more extensive and controverted questions about the power of images over mathematical or verbal formulae.<sup>9</sup> They lift the veil on the larger cultural issue of the initiating agency of human beings. Are the images of the active brain simply the responses to external stimuli? Can the thinking or feeling brain initiate activity that exceeds its neural base? Do the images tell us that 'mind' is simply 'brain' in action?

## 5.3 What do metaphors say about the brain?

### 5.3.1 Metaphors for brain activity

It would, of course, be possible to survey the multiple metaphors that neuroscientists use when speaking about the brain and brain functions. Indeed, as I have argued in chapter 1, metaphors function as guides and models, heuristically determining the paths of investigation and the rhetorical modes of communication.<sup>10</sup> Neuroscientists

speak of landscapes and maps;<sup>11</sup> transmitters and receivers;<sup>12</sup> keyboards;<sup>13</sup> housing and rooms; mosaics;<sup>14</sup> networks;<sup>15</sup> machines; computing centers with inputs and outputs;<sup>16</sup> and scripts, dramas, actors, and audiences!<sup>17</sup> An incomplete inventory indicates that there are even more metaphors, without any clear priority at the investigative or communicative level. The non-dominance, or perhaps better, occasional importance of one model over another, is no doubt due to the relatively youthful nature of the disciplines that study the brain and the intellectual history that spawned the various perspectives on brain activity. There is no 'standard model' as there is for astrophysical cosmology ('Big Bang') or for macro-evolutionary biology ('survival of the fittest'). On the other hand, metaphorical diversity may simply be required by the complex functions of the brain itself.

The presence of these metaphors in the scientific literature, however, makes one study the scientists as writers of literature, a particularly precise, experimental literature, to be sure – but of prose nonetheless.<sup>18</sup> I will not examine these metaphors extensively here; I would focus briefly upon three dimensions of the neuroscientific literature: mental agency, time-awareness, and knowing as bodily and interpretive. Despite what appears to be the diversity of these topics, I agree with Flanagan that the unity of the empirical subject or the search for a theory of consciousness that unites these dimensions is not an 'idle fantasy.'<sup>19</sup> In many ways, these topics could shape questions that an experimental program might answer; they also set up some of the conditions for the particular kind of divine-human interaction that Christians and Jews claim is central to their religious commitments.

### 5.3.2 The brain and mental agents

The struggle of neuroscientists to understand the brain through experimental procedures is only an exacerbated example of nineteenth-century philosophical problems about how historical beings can understand their own history, without changing what they understand!<sup>20</sup> By intervening in brain activity, other brains are changing the ways in which they themselves interpret the world. Even if there is no specific region of the brain given over to the 'I,' the subject, many would like to speak not just of a 'powerful processing mechanism,'<sup>21</sup> but about some kind of executive, an editor. How the prefrontal cortex operates in working memory is central to this discussion.<sup>22</sup> It is possible, even in this context, to speak not so much of a single editor, but a group or 'hetararchy, in which many different modules dominate the

overall behavior as appropriate.<sup>23</sup> The problem of ‘initiation’ – whether humans are simply reactive, passive to the environment or whether they ‘script’ the environment – is at the heart of current study. If human agency is not top-down hierarchy, is it a well-functioning committee? What metaphors are heuristically guiding the investigations?

The layering of brain activity converges in such a way that it acts as a unity, however conditioned by lower manifolds.<sup>24</sup> For perceptual and motor schemas, the model is an ‘active, information-seeking process composed of an assemblage of instances of perceptual schemas.’<sup>25</sup> There emerge at the upper levels characteristics that the network provides that are not available at lower levels of neuronal activity. On the one hand, the brain’s electrochemical impulses are produced by interaction with the environment; on the other, they are potential for agency.<sup>26</sup> The initiatory capabilities of the brain stir investigators to speak consistently of ‘higher-level’ operations and philosophers to speak of emerging mind or consciousness.<sup>27</sup>

### 5.3.3 Schemas and consciousness

Arbib’s schemas and Damasio’s somatic markers perform this mediating role between sensation, evaluation, judgment, and action.<sup>28</sup> Like Kant’s *schemata of the understanding*, they operate at a level differentiated from the neural input, grouping groups of sensations, selecting, and ordering for the sake of determining the composition of subjects and predicates, evaluating evidence, and prompting action. What is doing the ‘ordering’? Kant required an intermediate notion to function between sensibility and pure understanding.<sup>29</sup> On the one hand, he wanted to preserve the independent power of minds to calculate and reason (mathematics and theory) and on the other, to argue for the dependability of the senses (*contra* David Hume), thus grounding the two-fold inquiry of the new science. Although these schemata are products of the imagination, they provide a unity of ‘inner sense.’<sup>30</sup> The schemata ground every concept with its sensible evidence. They are the process by which the mind emerges as an agent. They also determine the inner sense of time; they do not exhaust the ‘transcendental unity of apperception.’<sup>31</sup> For Kant, even the rules that govern the normal internal processes of cognition are temporal, expressing a fundamentally unthematizable ongoing present.

Kant was, however, not able to foresee the scientific or technological future. He maintained that the schematism of the understanding ‘is an art concealed in the depths of the human soul, whose real modes



of activity nature is hardly likely ever to allow us to discover, and to have open to our gaze.<sup>32</sup> With the PET-scan and fMRI work of neuroscientists, the governing patterns of neural input are indeed present to view. In light of these views, Arbib's schemas are processes, if I understand them correctly. They are internal models that guide 'the organism's interaction with the world.'<sup>33</sup> Arbib emphasizes that both visual and bodily maps are coded in a multi-leveled fashion in our neural architecture, where intelligence is a 'multiple, layered plexus of properties.'<sup>34</sup> They exist not in a temporally linear string, receding into the past, but in a three-dimensional lattice that models the subject's way of being in the world. The network is an active, information-seeking process.<sup>35</sup>

#### **5.3.4 Schemas as active**

Schemas and subsequent schema assemblages are not passive associations.<sup>36</sup> They frame, script and shape our perceptions and actions.<sup>37</sup> All knowing is hermeneutical;<sup>38</sup> language itself for Arbib is an extension among humans of perception.<sup>39</sup> Long-term memory (LTM) is the network of schemas that not only stores our understanding of the world, but also of the subject who composes and interprets the world.<sup>40</sup> For Arbib, these schemas are an approximation of the way the mind thinks, an hypothesis that can be tested for probability and accuracy.<sup>41</sup>

#### **5.3.5 Somatic markers as active**

Where Arbib searches primarily for frames for cognition, Damasio studies the role of emotions in thinking and deciding. He distinguishes among non-intentional feelings such as hunger; intentional, but pre-reflexive responses such as avoiding a recklessly speeding automobile; and reflexive choices such as befriending someone.<sup>42</sup> He notes that many would have argued that emotion and passion do not have a role in thoughtful choice. Passion makes humans 'subjectively' biased. He believes that the neurochemical tag that adheres to some images, questions, stories, or concepts is a somatic marker that functions as an 'automated alarm signal' or a selector for pleasurable outcomes.<sup>43</sup> These markers mediate, sometimes preconsciously, among our alternatives for decision-making. 'Somatic markers do not deliberate for us,' but they do focus certain options before others and permit rapid elimination of some possibilities.<sup>44</sup>

Somatic markers mediate among options, determining one's characteristic habits of action, of virtuous or vicious propensities.<sup>45</sup> Like

Arbib's schemas, somatic markers are interpretive, neither the 'pure data' of sensations, nor conceptual abstractions. They have a history; they are the framework of our personal and social histories. Due to his own research on fear, Damasio sees these somatic markers primarily related to survival. 'Achieving survival coincides with the ultimate reduction of unpleasant body states and the attaining of homeostatic ones, i.e. functionally balanced biological states.'<sup>46</sup>

The physical loci of this marking system are the prefrontal cortices.<sup>47</sup> Because they have to do with emotional history, they provide 'categorized contingencies' that reject present options and project possible outcomes. The prefrontal cortices are 'ideally suited' for this work because they are directly connected to all motor and chemical neural pathways.<sup>48</sup> Somatic markers can function both inside and outside reflection;<sup>49</sup> both in either case, they partake of consciousness (in the sense of being aware of an object), which is an intentional (but not necessarily deliberative) process. 'Coherent mental activity' (knowing, in effect) requires 'basic attention' and working memory, both of which function within the frameworks set by somatic markers.<sup>50</sup> The cumulative preferences that occur as a result of these interactions define the style of a person, her character, and anticipated courses of action. Because these markers are defined within a social environment, they also reflect and shape cultures.<sup>51</sup> As Brothers makes clear, 'only brains in a social field can generate the kind of consciousness that includes I.'<sup>52</sup>

The study of schemas and somatic markers provides a way of asking a series of important research questions. But in this context, the issue that I wish to highlight is the following: Does this layered, grouping of groups of sensitive data, offer a neural, somatic way of asking about agency within human experience? The empirical subject, described by the sciences of the Enlightenment, is often seen as either passive to its environment (sheer passive sensation as registration) or as manipulative of data outside itself. On the one hand, 'inner' consciousness is seen as the victim of the 'outside' environment'; on the other, inwardness is an inner power controlling the other. Neither is accurate; neuroscientific studies struggle to determine the active, cognitive dimensions of 'transcendence within immanence,' the empirical, nonindividualist subject.

### **5.3.6 Memory and time-awareness**

Just as the notion of somatic markers and schemas give some evidence for the search for agency in neurological research on human

consciousness, so analyses of memory point to empirical interpretations of a perduring, self-constituting subject. The 'convergence zones' in the prefrontal cortices record the 'unique contingencies of our life experience.'<sup>53</sup> When we lose our ability to recall our history, we lose ourselves.<sup>54</sup>

Current research concerns not only the reminiscence or estimation that humans share with other animals, but also the non-deliberative and deliberative memory that marks human consciousness. There is the cogitation or estimation that our primordial, reptilian brains share with the animals; in addition, there is memory grounded not only there but also in the prefrontal cortices. Experiments are conducted to study somatic markers at the level of embodied emotions, recollection by choice of explicitly memorized conceptual data, and the reminiscences of learned skills and habits. 'Many current memory researchers still think that there is little or no evidence that genuine *forgetting* ... occurs from LTM in healthy people.'<sup>55</sup> But what is available is not always accessible.<sup>56</sup> Consolidation of memory occurs over time so that trivial, non-significant input does not get stored.<sup>57</sup>

### 5.3.7 Memory as active

Research in memory recognizes that there is likely no single memory storage facility in the brain. Researchers distinguish long-term memory (LTM) and short-term or working memory (WM), each contributing in a three-dimensional way to the texture of the subject.<sup>58</sup> How and why impressions get from working memory to long-term memory is an important research question. Some postulate a 'central executive' in the working memory that coordinates attentional resources that derive from speech-based information and visual-spatial data.<sup>59</sup> Nondeclarative learning (sometimes called implicit memory) is inaccessible to reflective mental activity; declarative knowledge (or explicit memory) can be learned in a single trial and stored for ready use.<sup>60</sup> Selective, filtered forgetting too is crucial. There are the basic limits to retrieval due to data that intervene and take the place of what has receded from immediate attention. Some diseases, certain types of head injuries, and toxic agents (such as alcohol) can affect our ability to recall.<sup>61</sup> But besides retrospective memory, the recovery of our past, there is also prospective memory, the ability to plan for future tasks. In both cases, it should be noticed that it is the constituted and self-constituting self that is operating. We gain our personal reputations for effective dependability by remembering what we are to do in the future!

Researchers have discovered the multiple biological and neural frameworks to account for the layered, temporally consolidating nature of human memory.<sup>62</sup> Explicit or declarative memory seems to require the temporal lobe system; implicit or nondeclarative memories involve the cerebellum, amygdala, and for simple sense storage, specific sensory or motor systems. The latter form of memory-learning may operate through stimulus and response in a non-reflective manner; the former requires reflective attention.<sup>63</sup> At the level of neurotransmission and synaptic interaction, LTM and WM may simply be two points of a graded process.<sup>64</sup> Sensitization or classical conditioning as nondeclarative forms of memory/learning indicate how both genetic and developmental elements affect the regulation of both long-term and short-term effectiveness of synapses.<sup>65</sup> These changes, extending to the somatic sense of self in the human subject, indicate the fundamental, biological, and biochemical processes that constitute memory.

## 5.4 Bodily memory and subjectivity

### 5.4.1 Bodily knowing

Researchers postulating schemas and investigating memory constantly struggle to understand the levels of self-awareness that humans attribute to themselves.<sup>66</sup> Even though ‘consciousness appears to be a process, not a place,’<sup>67</sup> it is nonetheless completely embodied. It is important to note that I did not say ‘enbrained’ (even if such a barbarous neologism were possible). No thinking or feeling process in the brain takes place without connection among multiple regions of the brain; in addition, data registration, encoding in memory, etc. invariably involve complete bodily awareness. In the process of cognition, ‘the body is not passive’. For Damasio, ‘mind derives from the entire organism as an ensemble ...’<sup>68</sup>

### 5.4.2 Subject and perception

Perception is hermeneutical; as an interpretive procedure, it operates in a feedback loop in which the history of one’s perception informs future action and the attentions of the present affect how one understands the past.<sup>69</sup> Sensory processing is guided by what one is looking for; it is neither sprayed against a *tabula rasa* nor is it blind fumbling.<sup>70</sup> Perceptions initially define a body-space which humans inhabit with other human beings. It is intrinsically relational – to an environment

of things and of other people. Neural networks require an 'other' to exhibit their characteristic operations.<sup>71</sup> This builds a 'dynamic map of the overall organism anchored in body schema and body boundary' which could not be constructed in one portion of the brain, but rather in coordinated areas.<sup>72</sup> Thus in seeing something, one also 'knows' one is seeing something, although this kind of prereflective cognition (note: not pre-conscious, since it is aware of . . .) is in the background. It is a 'sense' of spatio-temporality that provides the screen against which specific 'experiences' are highlighted.<sup>73</sup>

#### **5.4.3 Subject and body**

Subjectivity should be understood as the active process by which the body-state and all reflexive awareness (perception, image-formation, schema formation, etc.) are being integrated.<sup>74</sup> Mark Johnson uses 'balance' in bodily experience to develop an understanding of how metaphor and imagination function in cognition and the natural sciences.<sup>75</sup> The 'background' (or pre-reflective process) always exceeds our ability to reflect upon it, since reflection is necessarily about what has just passed temporally. Nonetheless, the 'background' however unthematized continues as long as one has not died.

#### **5.4.4 Neuroscience, memory, and human subjectivity**

The empirical subject of modern science has turned its investigative tools upon the human brain. What had first been studied by natural philosophy and metaphysics, then by philosophical or interpersonal psychology, has now been analyzed by experiments, mathematics, and computers. At stake, however, are some of the same issues that have marked the earlier traditions: passive reception of data, the processes for understanding those data, the active nature of intelligence, and subsequent action. Investigators continue to ask questions that want to know 'how human beings know and learn?' 'how awareness of time is encoded?' and 'whether and how the brain is an agent in the environment.' To be able to situate theological analysis about human subjects, we will need to look first at a modern philosophical study of time-consciousness. Just as the neuroscientists find themselves parsing their empirical data for the nature of human subjects as networks, a cooperative matrix of semi-autonomous synapses and systems, so modern philosophy has focused upon the interactive nature of human time.

## 5.5 Philosophy and consciousness

### 5.5.1 Husserl and time-consciousness<sup>76</sup>

Husserl excludes from his analysis of time-consciousness 'real Objective time', that is, the time computed by clocks and watches (23). It is not that he is uninterested in physical, externally measured time, but that he wants to investigate the specific form of duration known in human consciousness and the ways in which the time of human consciousness knows temporal objects (94–6, 157–60).<sup>77</sup> In effect, he presumes the time of nature and brackets it for his study; and instead examines the experience of inner time-consciousness. 'When we see, hear, or in general perceive something, it happens according to rule that what is perceived remains present for an interval although not without modification (30).' But what remains, remains as 'something more or less past, as something temporally shoved back [*Zurückgeschobenes*] (30).' In reflecting upon Brentano's psychology, Husserl uses the example of a melody: individual notes do not disappear when a new note sounds, yet one does not hear all the notes simultaneously.

### 5.5.2 Intending temporal objects

What are we to understand about our interior ability to perceive a melodic line that requires not only knowing the present, but holding sounds from the past. 'By *temporal Objects*, in this *particular sense*, we mean Objects which not only are unities in time but also include temporal extension in themselves (43).' 'That the expired part of the melody is objective to me is due – one is inclined to say – to memory, and it is due to expectation which looks ahead that, on encountering the tone actually sounding, I do not assume that that is all (43).' According to Husserl, all objects (except mathematics and some values such as beauty) are temporal objects, including the intending of human consciousness itself.<sup>79</sup> Human beings are a unity in time, yet have temporal extension. How does this kind of historical existence and its knowing succeed?

Husserl studies the phenomenology of a musical tone that retains its time, but 'the sound vanishes into the remoteness of consciousness.' In the way it appears to the hearer, it is continually different (45). The receding tone is replaced by the 'actual now-point' that succeeds it, filling the time of the present. As it recedes, it loses clarity and finally 'disappears' completely. Every temporal item appears in this 'continually changing mode of running-off;' it is always something

other, and yet in continuity with the same item in the present (47). Husserl sees these 'running-off phenomena' (*Ablaufphänomene*) as having their own continuities, receding into the past.

In addition experience will be filled with further objects; it is open-ended intending. The mode of running-off is constantly modified, every 'now' being transformed into a 'past' (49–50).

### 5.5.3 The present as retention and anticipation

Once objects decay and recede into the past, no longer impress themselves upon us in the present, they nonetheless remain in retention. Retention is not simply an after-image or a reverberation, according to Husserl; it is what he calls an 'originary intuition' (53). 'Retentive consciousness includes real consciousness of the past of sound, primary remembrance of sound, and is not to be resolved into sensed sound and apprehension as memory (54).' So a sound's simple reverberation is not the same thing as the retention of sounds that have just occurred. For Husserl, retention is based upon the 'precedence of a perception or primal impression.' The 'now' is only thinkable within the horizon of a continuity of retentions, just as retentions are only thinkable as part of a continuum in which perceptual impressions continue into the future (55). So 'primary remembrance or retention [is] a comet's tail which is joined to actual perception (57).'

Recollection, or 'secondary remembrance,' is different from this primary retention. Remembering a melody from childhood 'runs through' the melody in phantasy, but at the time of recall, there still remains a now-point with primary remembrance blending in the continuum from the prior parts of the melody to its anticipated conclusion (58). We can still name this kind of recall 'perception,' but it is here an act that '*primordially constitutes* the Object' (63). This is different from the primary retentions, the shading off of a perception in the 'now' in which the past continuum is presented to us precisely as perceived in the present. In the latter, the past is experienced as present to us as the past of what is even now being perceived.<sup>80</sup>

### 5.5.4 The agent consciousness

For Husserl, the distinction between primary retention and secondary remembrance, between the 'shading off' of the 'now' and reflective recall is crucial since it distinguishes a bimodal agent-consciousness from a purely passive receiver. His argument with Brentano's psychology is that by locating time-consciousness in phantasy, Brentano has left us with a passive consciousness. For Husserl, this misunderstands

the arc of intentionality that exists between the knower and the known, between subject and object, given in the matrix of present experience. The primary intentionality or 'originary consciousness' (70) of knower and known has inscribed within it an intrinsic temporality that includes the presencing subject-object, primary retention (continual shading off of present perceptions), and anticipations of a future. The originary time-consciousness is 'precisely the transition from the actual now to the new now' (141). This temporal intention is *not* necessarily reflective, i.e., either directly thought or willed; it constitutes the agency of human consciousness. 'The originary appearing and passing away of the modes of running-off' is a process that we can only know indirectly (since all conceptual 'capture' will be of the past 'running-off'); in a particular sense, it is not freely chosen (61). On the other hand, its time-consciousness is attentive to what emerges: 'The wakeful [*wache*] consciousness, the wakeful life, is a living-in-face-of [*Entgegenleben*], living from one now toward the next' (141). This is the 'flux,' the point of the source from which 'springs the now' (100).

Recollection, on the other hand, is a freely willed activity, requiring selection and decision (71). In 'real, re-productive, recapitulative memory,' the temporal object is built up so that we seem to perceive it again (as in the remembered melody, 59). We can perceive it as a temporal unit with duration and succession (65). But in every case, we perceive the item as a now with its retentive train (61). Recollecting a temporal object, like a melody, however, is not a 'simple reproduction' (69) or a repetition of a perception. The recollection or memory of a temporal object is accomplished within that primary retentiveness of the subject with its perceptions 'running-off' (71). The reproduced flow of a temporal object coincides with or overlays the retentive flow (73). But since the recollected temporal object had its own anticipations or expectations and these terminated in the present temporal flow (76), 'events which formerly were only foreshadowed are now quasi-present, seemingly in the mode of the embodied present' (76). In other words, the ability to recall an item/event from the past depends upon the perdurance of the event in the present, upon its continued effects (77). Everything new interacts on the old; every recollection has a definite coloring given to it by the now, because the now is in some way a product of what is being remembered.

This network of retention, present, and expectation is central to Husserl's understanding of how temporal consciousness works in human beings. We do not have a 'mere chain of "associated" intentions, one after the other . . .'; we have an intentionality that is



active and unified toward past realizations and possible fulfillments. This intentionality, however, is an 'empty' intention – open-ended, without necessary contents (78). 'Every perception has its retentive and protentive halo' (139). The intentionality has its contents in the history of retentions and expectations, its recollections and their anticipations into the present. In this sense, memory and expectation differ from each other. Not only does memory continue in the questions and fulfillments of the present (toward its future and therefore the future of a particular memorialized past), but also its truth can be discerned by its accuracy to what was perceived ('Have I really had this appearance with exactly this content?' [80]). Expectations, however, are fulfilled in perceptions themselves.<sup>81</sup> What is expected is about to be perceived; once in the now of perception, it becomes present and has gone into retention. Memory is the consciousness of 'having-been-perceived'; anticipation, while rooted in the flow of the 'running-off' present, is what is 'about to be perceived' (81).

This does not mean for Husserl that all memories are certain sensations; memories can be fantastic, invented pasts.<sup>82</sup> Even when one is recalling a genuinely past experience (a 'lighted theater' in childhood is Husserl's *exemplum*), it is not the re-presentation of the perception that is recollected. 'What is meant and posited in the memory is the object of the perception together with its now, which last, moreover, is posited in relation to the actual now' (82). I bring the theater of memory to the present, but I also know it in its temporal flow as past, lying in continuity with the present perceptions that occupy intentionality. The object is constituted as past, within a flow of perceptions in the present that are not only its successors, but its progeny. The 'running-off' patterns of the present are the ancestors of current perception. Indeed, part of what makes human consciousness a unity is this flow of temporal interactions. What defines the now of consciousness is the retention of prior 'nows' as past; the past, present, and future exist only in a continuum of temporal consciousness.

This unity-in-difference of open simultaneous intending and temporal succession is what constitutes consciousness. Intentionality and time are 'inseparably constituted' (104). Can one 'get behind' (so to speak) the temporal flow of conscious objects that fill consciousness to the flow of consciousness itself (108–9)? Not exactly. The flow of sensation (even unnoticed), acts of willing, reproductions in memory can be noted, but primary consciousness (open simultaneous intending) can only be co-presented within this flow (110). It is clear, however, that for Husserl that unity, the 'indistinguishableness' of the

similar, underlies the 'consciousness of otherness, of difference' (114).

This philosophical model of intentional subjectivity (and objectivity) has occupied much of twentieth century thought. Subject and object are linked mutually and reciprocally defined within intentionality. The temporal flux through which consciousness continues to identify itself also correlates with the object as its aspects pass through time. The dialectic of presencing, retention, and anticipation provides the primordial subjectivity within which recollections of past continua or possible imagined (and fantastic) projections are inserted. It is precisely in intending objects that the passing of time is noted. Through this lens, it will be useful to re-examine the language about memory and the soul in classic medieval theology.<sup>83</sup> How is Husserl's notion of consciousness and intentionality related to Aquinas and Aristotle?

## 5.6 Agency and the soul

Classical philosophy and theology would have argued that consciousness of time, mental activity, ethical intentionality, and feelings such as love or a passion for justice were to be located in the soul.<sup>84</sup> Whether this 'soul,' however, was to be understood by believers as a separate and distinct substance, immortal and invisible, 'free' of the body so that human beings could be defined in a dualist fashion as 'body and soul' remains controverted. Despite contemporary, popular interest in the soul, academic writers in science and religion, suspicious of any disembodied subjectivity, have tended to avoid soul-language.<sup>85</sup> Instead, they have focused upon mind, consciousness, and self-consciousness. These continue to be questions about the human soul as well as the human brain. Modifying Keith Ward's rhetoric slightly: the embodied 'brain is the way the soul appears to others.'<sup>86</sup> How could one make such a claim? Do we have anything to learn from the classical theological critique that can help in understanding the human brain?

Medieval philosophers and theologians, while affirming the existence of the soul, did not reject corporeality. 'Those who wrote about body in the thirteenth and fourteenth centuries were in fact concerned to bridge the gap between material and spiritual and to give to body positive significance. Nor should we be surprised to find this so in a religion whose central tenet was the incarnation – the enfleshing of its God.'<sup>87</sup> Given the human experience of bodily birth and death, yet also a thirst for union with God, psychosomatic unity was a fact to be

explained, not denied. How could the Christian tradition provide a theoretically differentiated, but practically applicable interpretation of human nature (the human *persona*) such that the scriptural beliefs in creation, sanctification, and eschatological transformation might be understood?

### 5.6.1 Aquinas and the soul

It is generally agreed that the early Greeks did not have a unitary notion of the body and the mind.<sup>88</sup> Only in Athens during the fifth century BCE did *psyché* become the center of human consciousness, a principle of discrimination in public life, influenced by the rise of literacy, politics, and law.<sup>89</sup> Aristotle's use of the term acknowledges that 'to attain any assured knowledge about the soul is one of the most difficult things in the world.'<sup>90</sup> When Aristotle's *De Anima* appeared in Europe by the thirteenth century, Aquinas used it as his primary critical tool for interpreting the traditional Christian vocabulary. In his treatise on the soul in the *Summa Theologiae* and the *Summa Contra Gentiles*, his dialogue with the Platonic thought of Augustine and the Muslim interpreters of Aristotle is evident.<sup>91</sup> Aquinas had two requirements: 1) to develop his theology with a strong anthropological basis for the practice of the virtues (*ST*, I, Q.78; *SCG*, II, 5,1) and 2) to offer a critique of popular images of the soul as a small, inner, childlike body that was swept off to heaven, purgatory, or hell after death (see *SCG*, II, 49,11).<sup>92</sup>

In the interpretation of Aquinas, I follow his thought in light of cognitional theory developed by his theological interpreters in this century.<sup>93</sup> As will be evident, Aquinas's understanding of the soul is not the contemporary notion of subject.<sup>94</sup> His language is metaphysical, like Aristotle's; his analysis is theoretic, a philosophical critique of medieval common sense (both biblical and cultural). In his interpretation, the soul is a metaphysical, theoretic reality, the first act of an organic body (see *SCG* II, 57, 14).<sup>95</sup> The soul is labeled a *substantia*, or more accurately, 'body and soul are not two actually existing substances; rather, the two of them together constitute one actually existing substance' (*SCG*, II, 69, 2).<sup>96</sup> If one understands *substance* in a Lockean, post-Cartesian sense, one can misinterpret Aquinas's claim that soul is the 'substantial form' of the body (*ST*, I, 76, a. 4), thinking of it as a material thing, pre-dating or coterminous with an already constituted body. Aquinas is particularly clear that this is not what he means (*ST*, I, Q 75, a. 1; *SCG*, 49; 69,1). With some attention to detail, it is not difficult to think through Aquinas's understanding of the

soul's operations and discover precisely the attention to the cognitive and practical intentions of which Husserl speaks. What Aquinas described in metaphysical terms, he based in an introspective psychology that noted human operations and developed an epistemology (in terms of a rational psychology) that supported the metaphysics.<sup>97</sup> He believed that he had analyzed not only the empirical operations of an embodied soul, but had left room for God's interaction.

Loneragan argues that current inattention to the soul is actually a refusal to attend to the intelligibility of 'what is.'<sup>98</sup> According to William Barrett, the banishing of the soul is a rejection of consciousness in modernity.<sup>99</sup> By capitulating to an empiricist and reductionist view of the subject, modernity has denied that human understanding has an active role to play in apprehending the world as true; it neglects to analyze the kind of interaction that humans have with 'what is.' To discuss 'soul' in Aquinas, therefore, is not to study an arcane leftover of pre-modern piety, but to think about the nature of human mental activity in our world. Is there anything unique about human cognitive interventions in the patterns of our world? Does the analysis of Aquinas tell us anything about what is necessary to approach the empirical ego of contemporary neuroscience?

### 5.6.2 The soul and consciousness

The soul, for Aquinas, is a term that explains the data of consciousness in the human person.<sup>100</sup> Consciousness, however, should not be confused here with 'reflective activity.'<sup>101</sup> Consciousness is first of all the 'powers' of the intellect for sensing, asking questions, understanding concepts, weighing evidence, and judging the truth or falsity of things; it decides what is worthwhile or valuable. Consciousness is aware of itself, knows itself in the performance of its tasks. As the epigraph states: 'The human soul knows itself by its own act of understanding (*intelligere*).' This 'knowing itself' is not an introspective intuitive grasping; consciousness knows itself in and through the objects it apprehends. The self-reflexive 'intellect knows itself, and knows that it knows' (SCG, II, 66, 5). Aquinas distinguishes between our seeing an object and seeing the process of seeing, but points out that the second is not 'extrinsic to the seeing faculty.'<sup>102</sup> Sense, understanding, and reflection are conscious acts, even if only the latter can be self-reflexive and can therefore reflect back upon the activities of sensing (SCG, II, 58).

### 5.6.3 The soul and agency in Aquinas

Aquinas's analysis focuses upon the soul as a term that labels the agency within the human person (*ST I*, Q. 77, a. 1). If there were no interior agency, human beings would simply be a collage of exteriorly related pieces (*ST I*, 76, a. 3; *SCG II*, 56). Aquinas, in his dialogue with the Muslim commentators about the agent intellect, is concerned to understand the relatively autonomous agency of each individual person. Soul is the language that specifies the principle of activity in human life; it insures a voice by which subjects understand themselves, the world, and God.<sup>103</sup> Following Aristotle, he specifies the data for this agency as knowing, willing, and moving. Although these data include what contemporary thinkers would call intelligence, the body and affective awareness, Aquinas discusses these issues only in so far as they relate to his theological concerns: the knowledge and love of God as well as the practice of virtue (*ST I*, QQ. 75,78, intro.). Hence, in his treatises on the soul, he studies primarily the essence, powers, and operations of the soul in desire and thinking. Since this is a normative, theological study, he examines the senses and the appetites only in so far as they impinge upon making decisions for the good and thinking about the world.

### 5.6.4 The embodied soul

Aquinas's reflection on the senses, however, is not minimal. Humans are 'mixed' creatures whose thinking can only take place in relation to images (phantasms) and whose decisions require a discrimination of desire in their choice and use of material objects. The intellect knows itself only by intending objects. On the one hand, knowing is a passive, receptive activity in which the first level of awareness is sensing; yet this reception of images remains only a partial, potential knowing. The active intellect must interpret the data that have been abstracted, compose identities and definitions, and make judgments about their truth or falsity. However, in every case, the action of thinking must return to the data of sense (the phantasms), for evidence as well as for examples to illustrate its judgments (*SCG II*, 73, 38).<sup>104</sup> Aquinas sees it as a mistake to locate knowledge merely in a passive reception of data (*SCG II*, 73, 26). In fact, he thinks this fallacy (empiricism *avant la lettre*) is rooted in the fact that some investigators simply have powerful memories and strong imaginations! The active and passive character of intelligence is a unity. Intelligence potentially is available for all objects within its horizon; but sometimes it is inat-

tentive or asleep; and it can ask the wrong questions. At other times, it actively construes the world (SCG, II, 78, 4). At no time, however, can human knowledge take place without the senses. Even our knowledge of first principles (like that of non-contradiction), according to Aquinas, is derived from sensible things (SCG, II, 83, 26, 32).

The dependence of human beings upon objects that are external to the knowing subject is characteristic of a creature that is embodied. The soul is not an extrinsic, already-out-there spirit that imperiously rides an already constituted body; nor is it an intrinsic, already-in-there magic motor that moves the pre-formed machine (ST I, Q. 76, a. 3). Humans are a composite of *anima* and *materia prima*, of form and prime matter that appear as an ensouled body (see ST I, Q. 77, a.6).<sup>105</sup> The soul is known by its operations, by what it does in its embodiment; it is to be found at all levels of human knowing and desiring. In this way, human intelligence includes the principles of life that animate lower forms, such as plants and animals (ST I, Q. 76, aa. 3–4; SCG, II, 58, 4–7). Touch, the primary sense for Aristotle and Aquinas, is an act of the sensitive soul, seemingly shared with animals; but it is an act of the entire conscious human being. The senses, hunger, sexual desire all operate within the unity of our intelligent consciousness, our one soul (ST I, Q. 75 a. 3). To be human is to be a bodily soul or ensouled body (ST I, Q. 76, a. 8). Every human act is both bodily and soul-full. There is a single soul in each individual that expresses itself in a bodily fashion, each part of the body accomplishing its animated purpose both individually (e.g., seeing) and for the whole (interpreting and understanding in the mind) (ST I, Q. 76, a.8).<sup>106</sup> Aquinas even argues that it was necessary for the soul that it be endowed with intelligence and feeling (ST I, Q. 76, a. 5). In the *Summa contra Gentiles*, he argues in addition that it is the ‘desire of the body’ for its own perfection that acquires the kind of knowing (or soul) humans now have (SCG, II, 83, 14, 28).<sup>107</sup>

### 5.6.5 The soul and memory

Like Aristotle, Aquinas distinguishes *memory* and *reminiscence*.<sup>108</sup> In a culture in which memorized rhetorical commonplaces were crucial for political oratory, Aristotle concerns himself not so much with the sheer storage of sensations, but with the possibility of recovering issues, ideas, or examples that were once present. It is the ability to recollect, to make choices in one’s investigation of the past that distinguishes humans from animals. Aquinas agrees: animals remember objects and places that are fearful or pleasurable (ST I, Q.78, a. 4).

But what is called 'instinct' in animals is actually cogitation or estimation in humans; in addition, humans have *reminiscence*, an intellectual application of the past to specific present intentions. But humans have *memory* which is the free recall from the inventory of the past relevant information, values, and plans of action.

Intelligence is both passive and active; it receives sensations as data and inquires about their meanings (*ST I*, 79, aa. 2–3). Memory is part of the passive dimension of intelligence; it retains both universal ideas and specific particulars (*ST I*, Q. 79, a. 7; *SCG*, II, 60, 3). But because it involves both universal and particular dimensions, it can be recovered by both sense and intelligence (*ST I*, Q. 79, a. 6). Since Aquinas thinks of historical particulars as 'accidental' rather than essential, he locates human recollective memory within universalizing intellectual capacities. It holds the past as past individual events within sensation; it holds the ideas that integrate them in intellect.<sup>109</sup> Willing, for Aquinas, integrates in its pursuit of the good, the senses, desire, intelligence, memory, and action. This claim for the integration of sense, intelligence, and will, however, shows how and why Aquinas can maintain a number of conclusions. First, human beings do not know specific individual things in themselves, in their 'inwardness' (*ST I*, 85, a. 1; Q. 86, a. 1) except through turning to the phantasm 'to perceive the universal nature existing in the individual' (*ST I*, 84, 7). What we know, we know by our senses and comparison to the senses (*ST I*, Q. 84, a. 8). Second, this intimate relationship of knowing to the body means that when our bodies are tired or alert, our soul is likewise lethargic (*ST I*, Q. 84, 7; *SCG*, II, 79, 11) or more attentive (*ST I*, Q. 85, 7; *SCG* II, 90, 2). People with better imagination, calculating powers, or stronger memories can think better.

#### 5.6.6 The soul as the knowing subject

Aquinas's language and his metaphysics may hide for the modern reader his careful attention to the knowing subject. What philosophical claims can he make that would guide current research and discussion? First, he states that human knowing is an active as well as a receptive process, both dependent upon the empirical world and independently critical in relationship to this world and to its operations. Second, this knowing only takes place within the intimate cooperation of the individual's body. Third, intelligence is open-ended; it intends by wondering and inquiring about everything within its horizon. Fourth, this intelligence can reflect upon itself. Human beings genuinely understand 'for we would not inquire into the nature

of the intellect were it not for the fact that we understand ourselves' (SCG, II, 59, 10). Fifth, open-ended intelligence can go beyond the senses, intending and estimating, even understanding the reality of God and of all things in God. Sixth, it is not this 'higher agent,' i.e., God, who makes us understand (SCG, II, 13). Human intelligence rightly apprehends reality ('what is' – *quid quod est*)<sup>110</sup> through its senses and makes correct judgments on the basis of the evidence provided.

Let us recall earlier remarks about *mediation* and *mutual mediation* from chapter 3. The notion of *mediation* is a common one in logic, since it is the term that intervenes between the first principle and the conclusion that follows. In an organic example, one can see the heart as the 'source' for the circulation of the blood, but the flow of blood is mediated through the arteries and the veins. In *mutual mediation*, however, the systems operate as a functional whole. The principle of movement from an origin and the principle of control in a system are combined. There are differing centers of immediacy and their mediations overlap.

If one adds to this notion *self-mediation*, one can see that the different centers of immediacy creating a functional whole are governed by an internal *teleonomy* that directs the identity of the system itself. Change is not simply a replication of identities, but a genuine integration that produces higher level functions through the operation of its parts. Lonergan sees a final notion of self-mediation *inward* through which *self-conscious mediation* occurs. Self-consciousness implies a pre-reflexive presence to self that is the condition for all mediations.

[F]or you to be present to me, I have to be present to myself. This presence of the subject to [the self] is not the result of some act of introspection or reflection . . . . Consciousness is a presence of the subject to [the self] that is distinct from, but concomitant with, the presence of objects to the subject.<sup>111</sup>

The self-awareness articulated by Aquinas in soul-language describes the *self-conscious mediation* of the human subject. In the final chapter, we will see how this notion of mediation can apply to God.



## 5.7 Aquinas and Husserl

Although an extensive dialogue is not possible here, it is worth noting that Aquinas's metaphysical vocabulary about powers in intelligence coheres performatively with Husserl's notion of subjective time-consciousness. How? The phenomenological subtleties of temporal duration in Husserl are obviously not matched in Aquinas. However, in both, active and passive intelligence is present to itself prior to knowing objects, but only available in and through knowing itself. The pre-thematic unity of consciousness escapes empirical detection except as a network of cognitive activities. It co-presents itself in the process of knowing; at the same time, it also evades 'complete' self-presentation in the sense that at no time is the temporal subject totally available, except in Aquinas's case, to God.<sup>112</sup> The images that emerge passively from the senses are converted into intelligibility by active intending, but they have become part of past memory. 'Phantasms are temporal, new ones springing up in us every day from the senses' (SCG, II, 73, 31).

Intelligence for both Husserl and Aquinas is nonetheless (infinitely) open-ended, oriented toward the future. Aquinas's work does not constitute a sufficient analysis of subjectivity or of human temporality; but it does indicate that in a premodern environment of thought, a Christian thinker could analyze his own performance as a thoughtful believer and coherently thematize that performance through a systematic, theoretic vocabulary.<sup>113</sup> The world of interiority that Husserl examines turns from consciousness of the subject to a self-reflexive knowledge of that subject.<sup>114</sup> The world of the metaphysical body and soul becomes a self-conscious subject, examining itself introspectively.

## 5.8 Modernity and the subject

### 5.8.1 The Enlightenment critique

Language about the soul was later reified in the post-Cartesian philosophical environment.<sup>115</sup> Discussions about the material body and immaterial soul became embedded in the Enlightenment and Romantic themes of subjectivity, interiority, consciousness, and individual autonomy. Debates about the value of these modern notions have themselves been controverted in the postmodern situation.<sup>116</sup> How is human subjectivity to be conceived? Is self-conscious life with its rational control of the planet a good or has it been destructive?

Eighteenth-century philosophers initially provided epistemological and methodological foundations for Newtonian science and Cartesian or Leibnizian mathematics and freed human subjects from religious obfuscation and political repression.<sup>117</sup> By the twentieth century, these sciences, their supportive philosophies, and attendant technologies have been accused of destroying human freedom.<sup>118</sup> Instrumental or disengaged reason has evolved from being the savior of human culture to become the calculating perpetrator of fascist bureaucracy, gender discrimination, genocidal destruction, and emotional annihilation.<sup>119</sup>

Enlightenment figures understood religion as anti-humanist. But just as philosophy has developed since the eighteenth century, so too theology has migrated from its pre-Enlightenment marriage to folk medicine, ancient natural philosophy, and hierarchical politics, giving birth to policies of social liberation, recovery of human feelings, and the embrace of pluralist diversity in history.<sup>120</sup> Simultaneously, theologies after Nietzsche and Heidegger have proposed not only the death of God, but also the death of the subject, the closure of the book, and the end of history.<sup>121</sup> Hence, in the course of discussions between theology and science, it is crucial to know the terms of the debate and the identity of the dialogue partners.<sup>122</sup>

### 5.8.2 The agency of the subject

The *power of the human subject* described by modernity is the context for the discussion of memory, the soul, and neuroscience. The anti-humanist and humanist interpretations of modernist subjectivity have claimed to know the meaning of human autonomy. The affirmative and negative attitudes toward these notions of individual autonomy can be found on both sides of the science–religion conversations.<sup>123</sup> How much agency is to be attributed to subjects? From what does this agency originate, if it exists? Is it self-generated; does it emerge as a command, rule, a task, and/or gift from others or an Other? Is it determined by nature and genetics or history and nurture? Both? The answers to these questions focus our understanding of the autonomy of human subjects in modernity and postmodernity. I have cited Renaut earlier: ‘[T]he overarching ... principle is that the *modern* consists in a relation to the world according to which [humanity] posits itself as capable of providing the foundation for its own acts and representations, as well as for history, of truth, and the law.’<sup>124</sup> The seeming liberation of the Enlightenment subject from past politics, history, and religion may be partially illusory, but in what does the ‘partially’ consist?

Renaut claims that individualism is only one way of reading modernist subjectivity. He distinguishes autonomy from independence, with several differing forms of the subject in modernity: rationalist, empiricist, metaphysical, and criticist subjects. The one-dimensional reduction of subjectivity to individualism with its polar notion of autonomy prohibits a genuine understanding of what he considers to be *the* question in contemporary thought: the possibility of *transcendence in immanence*, of the reality of the other within and to the subject. His notion of autonomy would recover a *relative independence* in which subjects chose to limit their power through negotiated commitments to a common good.

Although I do not find Renaut's solution to this problem completely persuasive,<sup>125</sup> his contextualization is important for two reasons: First, it is precisely the closure of the empirical, autonomous, self-determining agent to transcendence (or divine action) that has prohibited much dialogue between theology and the sciences; and second, recent neuroscience is rife with underlying philosophical questions about human agency, self-originating autonomy, the role of intersubjectivity and the social context in that agency. It wants some dialogue partner to speak about its own evidence, but it does not know where to turn without alienating its own methods and results.

## 5.9 Conclusions and questions

Ashbrook and Albright argue that the soul is our unique ability to integrate 'the sensory and the symbolic processes of meaning making.'<sup>126</sup> Far from being a non-material entity, the soul is stamped with the unique identity of each individual brain. At the same time, brains 'affect and change' bodies.<sup>127</sup> This seemingly 'naturalist' view of the soul, while it creates problems for traditional philosophical notions of immortality,<sup>128</sup> coheres at least with Aquinas's emphases upon the soul as 'form of the body', with the body and images as always implicated in cognition, and the role of various levels of memory in the classical theological tradition.

The soul as a term explains the agency as well as the passivity of human consciousness; it exists, however, within the concrete neural networks of the human brain in their interactions with the body and its location in an environment of things and people. The integration of vegetative, sensitive, and rational aspects of soul in Aquinas, while maintaining the priority of self-conscious life, nonetheless marks humans as an embodied species with all the lower-level information

loops that mark plant and animal species. The 'lower' levels of tropic and sensitive dimensions are not erased by the rational soul; they are integrated. Reminiscence as instinct or the implicit memory of skills is not subverted by intelligence; it is enveloped by deliberative forms of memory. In short, the more passive dimensions of cognition are subsumed in the active ones; but the two aspects of human consciousness are intertwined in what contemporary thinkers would call a feedback loop. Body and soul are terms used to interpret the unity of the human subject.

The distinctions that Husserl draws between ordinary temporal consciousness and the consciousness that is the active, unthematizable presencing of the agent-subject are more complex than Aquinas's rational psychology. But I think that both strands of thought underlie the metaphors and discussions in neuroscience about editors, complex processing mechanisms, schemata, etc. Is there a way to discuss or investigate the 'immediate' presence of the subject to itself? If all investigation studies what has just passed into memory, then how or who is the active integrator (including the investigator)? Husserl at least postulates this deeper form of memory tracing. Could it be related to the somatic background? What sort of research program would seek such an active presenting subject?

A neuroscientific and philosophical anthropology that 'leaves room' for human subjects is a crucial condition for Christian theology. These transactional subjects must be embodied, conscious, and intelligent. Otherwise, subjects could not see themselves as either a *task* to be completed or as a *responsibility* to be weighed and evaluated. More importantly, however, the element that has escaped this discussion altogether is how human subjects experience themselves as *gift*, as contingent beings in the world, originating in some Other. Ashbrook and Albright see the role of humans to be making order and meaning, a constructive, investigative role.<sup>129</sup> But humans' role with the world, the way in which cognition occurs within human subjects, is interactive, cooperative. Christians and Jews claim that this interaction is so cooperative that the subjects' very ability to perceive another object or subject is itself a gift from an Other. This openness to the other characterizes empirical subjects in all their investigative, task-oriented strategies. Can it extend beyond the empirical world, as Aquinas would argue? What would be the conditions under which the empirical subject could first, entertain such a possibility, secondly affirm its presence or absence within the world?

I have argued that there are links between the so-called transcen-

dental subject of nineteenth- and twentieth-century philosophy (Husserl) and the empirical subject (neurosciences) since the Enlightenment, and I have placed these links in dialogue with the neo-scholastic tradition concerning the soul. By focusing upon memory and subjectivity in each, it may be possible to think through the forms of transcendence within immanence in contemporary culture.<sup>130</sup> Examining neurocognitive emergent transcendence may provide some of the empirical, 'objective' conditions within which human subjects experience the possibility of God's interaction with the universe.

Presumably for Christians, God interacts with all levels of creation in distinct fashion. In this account of the soul, perhaps it is precisely within the neural network that God has chosen to cooperate with human agency.<sup>131</sup> In the world of early Christianity, when God's existence was less problematic, this strategy was described as the 'divine condescension' – God's loving choice to work within the patterns of creation at any level that was necessary so that God could be experienced. Without that generosity and the neural network that is one of its conditions, we humans would not be able to appreciate the glory of God. God would be radically unknown or stun us into silence.

# 6

## Time as Gift: God's Journey

Things, events, that occupy space yet come to an end when someone dies may make us stop in wonder – and yet one thing, or an infinite number of things, dies with every man's or woman's death, unless the universe itself has a memory, as theologians have suggested.

Jorge Luis Borges, 'The Witness' (1960)

### 6.1 Introduction

Augustine, meditating in his *Confessions*, maintains that the passage of time is as filled with mystery as is God. Time speaks and sings and acts, simultaneously present, drifting into the past, and anticipating in its overtones the future melody or words. The past and the future have reality only in the surplus within the present, not in a reified fashion on their own. God, in an analogous way, is eternal simultaneity, always present, yet God knows and loves all times.<sup>1</sup> When Aquinas studies God's eternity, he notes that since it is 'outside time' and 'indivisible,' it can coexist with any other point in the temporal order. 'The divine intellect, therefore, sees in the whole of its eternity, as being present to it, whatever takes place through the whole course of time.'<sup>2</sup> This parallel poses the *theological* question of this chapter: How are God and time co-implicated? What is it about time that evokes a notion of God? What is it about God that can include a divine relationship to time?

Religion and the sciences have always been in dialogue about time.<sup>3</sup> Classical medieval philosophy and theology, while criticizing popular images of mythic origins, the supernatural and the soul conversed about time with ancient natural philosophy, science, and medicine.

The new sciences of the early modern period with their aggressive programs of experimentation and mathematical analysis challenged the religious stories and theologies as mythic or ideologically oppressive, and developed their own stories and images to interpret humanity and the larger universe. Some religious traditions responded with their own hyper-rationalized theologies, such as Deism. Others retreated into various forms of textual literalism, private devotion, domestic morality, or ritual archaism; or they camouflaged themselves in the reigning culture of science by forms of relativism in textual hermeneutics, morality, and ecclesiastical restructuring. What must continue, in between the extremes, is a constructive, non-defensive dialogue about time with the data and rhetoric of the sciences.

In earlier chapters, we studied how time is inscribed empirically in the emergent, unrolling narrative of the universe (chapter 2). We have also examined how time appears in chaotic, self-organizing systems (chapter 3); what the political organization of time is for macro-evolutionary biology (chapter 4); and the interior workings of empirical memory in neuroscience (chapter 5). These studies have been linked through an analysis of the heuristic and truth-telling nature of metaphors (chapter 1). By offering parallel accounts of how metaphors for time work in the various sciences and Christianity, we have been able to see some similarities and differences. The multiple meanings that strike even readers in poetry or religion may evoke confusion or wonder; but when metaphors are used in science, they provoke questions about their status. Are they mere decoration? Are they what scientists use to communicate their results to the less initiated? How does the surplus of meaning in science work? Does the excess lead beyond itself, referring to an Ultimate Transcendence? Can one discriminate between the metaphors of excess that guide the Holocaust or other 'terrors of history' and those that awaken ecstatic love or altruistic generosity? Does the work of scientists require judgments about its metaphors that are similar to the claims and judgments that must be made about religious metaphors?

This chapter explores the ways in which God can be understood to interact with the empirical patterns of the universe. In systematic or constructive theology, it would be labeled a study in 'continuous creation' – the belief that God's action in or upon the universe did not cease with creation, but that God forever tends intimately to all created history. As Aquinas states: 'No thing can remain in being if divine operation cease.'<sup>4</sup> At the heart of all that is perdures a cooperative, divine-creational relationality.<sup>5</sup> God continues to be an 'actor' in

the drama, a 'character' in the narrative, a co-present, interactive term in the religious metaphors that describe the universe.

In the prior chapters, we have seen the empirical language that marks different interlocking forms of time in science, religion, and language. If God is to be a credible word in our vocabulary, let alone a Christian term for the One who created, sustains, and continues to energize things, people, and thought itself, then my argument has been that some empirical conditions in time itself must exist for the viability of the term God.<sup>6</sup> But the investigation must be two-sided: both theological and linguistic. What is it about God that permits, establishes, and nourishes the reality of time? Who is God that time is possible? And what is it about the 'excess' in time that awakens or invites the religious claims for Ultimate Transcendence?

To pursue these questions, we first establish the cognitional and even ontological status of the 'surplus of meaning' or the 'excess in being' that appears within metaphors. To do this, I will focus on how language about God and time works in two contemporary thinkers: Jean-Luc Marion and Ghislain Lafont (Sections 6.2; 6.3). We will then examine the ways in which ancient neo-Platonic thought in Plotinus and Proclus (Section 6.4) provided a philosophical way of describing the transcendental operation of matter with the 'world soul.' Their attempts to include the multifaceted, transient, empirical world in the emerging unity of the One provided the context in which Christianity worked out its theology of God for almost a thousand years.<sup>7</sup>

These three moves from the neo-Platonic revival in philosophy in recent years (although Lafont less so)<sup>8</sup> are not because I think the positions are adequate to the task or completely on target. I do so for methodological reasons. Marion offers an understanding of reality that places God beyond Being in the usual transcendental triad of the True, Good, and Beautiful. What is spoken about God must always exceed itself since God is radically 'beyond being/beings.' In this he offers a contrast to what I believe is the ontological structure of the metaphor and its attempts to refer to God. Lafont situates his meditation on the biblical narratives in their rhetorical competition with evolutionary anthropology, sociology, and political philosophy, thus recognizing that religious thinkers must contend with their public role in society. He offers a 'comparative narrativity' that is not unlike my own commitment in the previous four chapters. To turn to classic neo-Platonist philosophy and its consequent theology in Pseudo-Dionysius is to see how previous generations of philosophical and religious thinkers integrated the planets and the stars into their theology.



The shift to Aristotelian thought in the last thousand years was, for many medieval theologians, a somewhat scandalous turn away from the disembodied spiritual world to the empirical senses. Aristotelian scholasticism was a philosophy that could study the inner workings of 'things,' even when they applied to the rational psychology of Christ and his place in the Trinity or the conversion of the elements of bread and wine into the Body and Blood of Christ. In this sense, the previous chapters have been unabashedly within the Aristotelian tradition, reviewing the empirical dimensions of time in the universe from its origins to the emergence of humanity. Christians want to know whether and how God is intimately involved in the empirical fabric of the universe. Early modern theologies were concerned to show how God could suspend the laws of nature through miracles; nineteenth century theologies avoided these investigations by focusing upon God's work in the human heart. Knowing about the material interactions within rocks, trees, and flowers or about the evolution of humanity studies the ways in which God has chosen to work in creation.

If God is present in and to these processes, then God's own reality is implicated in time – by divine choice. As Augustine and Aquinas claimed, to be able to achieve some explanatory adequacy about the meaning of time required a Trinitarian Theology. The final section (6.5) examines the ways that Aquinas, interpreted by Bernard Lonergan, understands how the Christian God acts within our universe of time to energize and free the natural, material processes with which he cooperates to bring about divine love. In other words, the governance of God includes the pre-human evolution of the universe.

## 6.2 God beyond being: love rules

Jean-Luc Marion, rooting himself in the theology of Pseudo-Dionysius and Bonaventure, believes that the traditional modern Catholic and Protestant anthropocentric theologies of the nineteenth and twentieth centuries have made a major 'category mistake.' They have followed the Aristotelianism of Aquinas and encased God within Being, thus limiting the reality of God and divine action to a 'this-worldly' affair. Prior to being and beings (including the being of time), there is a God who is both love and gift.

Theology is never self-referential; it always depends upon an Other who is making an invitation.<sup>9</sup> In completely thought-provoking (if not

mind-bending) prose, Marion shows two ways of approaching 'what is' – through the *idol* in which the artist consigns to the visible a 'quantum' of the invisible and the *icon* which has its own agency independent of the artist.<sup>10</sup> The icon always speaks the 'excessiveness' of the invisible, never presuming to have captured any measure of its transcendence of the empirical. In a sense, the icon is merely a 'momentary resting place' for a reality over which it has no control.<sup>11</sup> The icon is the domain of the theological, declaring its dependence upon an Other; the idol makes claims to absolute truth, consistent in itself. It confronts the viewer with a hieratic frontal portrait to display the eternal world facing our world of transient temporal creation.<sup>12</sup> Our attitude must be to attend to its appeal, its 'call.'

In a meditation on Heidegger, Marion argues that any theology that uses the definition of God as *causa sui* is idolatrous, not a god to worship. This god is an idol because it continues to be limited by the 'in-house' causes through which we structure our world. For god to be truly God would require that he exceed not only any differentiation between (created) things, but between the very Being of those things and the things themselves. For Marion, it becomes crucial to think about God *beyond the difference* between Being and beings.<sup>13</sup> 'Being says nothing about God that God cannot immediately reject.'<sup>14</sup> Marion recognizes that this may make 'thinking' itself impossible.<sup>15</sup>

Yet if one can recognize that the primary self-designation of the Other is Love which by its very act does not need to be, then 'by definition, no condition can continue to restrict his initiative, amplitude, and ecstasy. Love loves without condition.'<sup>16</sup> Theology, therefore, does not have to do with *our* notions about God, but about the 'fact of faith' – faith in the Crucified One. This fact is received and appropriated, not first interpreted and located within the universe's historical range of beings and actions. God always precedes the gift of being and action.<sup>17</sup> The infinitely good and loving God always exceeds created beings and precedes them by calling them to an analogous level of the good. For Marion, it is precisely this gift of the good that delivers Being/beings, launching creation on its destiny.<sup>18</sup>

An infinite distance obtains between the giver and the gift given. Love (*agape*) is intrinsically not known in itself, but only in the act of giving and the gift. The discourse that is left to the receiver of the gift, formerly the inquirer into being/beings, is the performance of doxology, praise. The act of love is reborn in human beings as 'enjoyment, a jubilation, a praise.'<sup>19</sup> There are negative, self-corrupting, isolating responses, of course: self-adulation and vanity, boredom,

stoic avoidance, and skepticism and refusal to take the risk; but they now appear as the nihilism that denies beings their true value rooted in the call to love.

The goal of the theologian is therefore to create the space in which the gift may be received and praise may be sung. No sophisticated theological hermeneutic of the text can ever 'bring to light other than a meaning, whereas we desire the referent in its very advent.'<sup>20</sup> Human beings experience the call and confrontation that permit response. The theologian who listens to the Word will allow the word to be spoken in ordinary human life.

Although this is not the place to engage in a detailed critique of Marion's interpretation of the Aristotelian Aquinas,<sup>21</sup> it is necessary to see why the detour through this sometimes hypnotic theological position is important to our immediate enterprise. Marion has focused several clear notions. First, God always exceeds 'what is.' There is a radical difference between Being/beings and a uniquely other God, a difference that cannot be 'thought' in itself. Second, concrete created things can only 'speak' this excessive difference negatively, never positively. Third, only by accepting the Word of love announced from God can the true meaning of the world (including human beings) be known. And fourth, without God's Word confronting the violent destruction and insufficient palliatives of human history, there would be only suffering and occasional glimpses of divine presence. Time, in this reading, is at best confrontation and suffering without acceptance of the Word; the occasional resting places of love can only hint from the outside at what should be heard. Time, without faith, is experienced as duty without reference, with no clear rational motives.

If we reverse the strong post-metaphysical (and highly abstract) thinking, what we see is this: first, material things in our world always display an ambiguous something beyond themselves (an excess); but second, without the accepted call of God as gift of love, there would be only melancholy – desire without completion. And third, language is always waiting for its reference.<sup>22</sup> Critical histories can only speak about an 'abolished referent' in the past of memory; poetry provokes its referent in the future by awakening an emotion for it in us, but it can be illusory, remaining insufficient and subjective. Only theology appears as the 'proper' reflection on human temporality; it announces the past of the Crucified and Risen as repeatable; but it does not 'make it happen.'<sup>23</sup> This occurs only in prayer. Unless theology is intimately linked with prayer, especially the Eucharist, it will return to its 'false

infinite.' So finally, the theological referent is always a person, not a concept for Christians – Christ crucified.

Methodologically and theoretically, Marion maintains that the Good precedes the True and its correlate Being. While this emphasizes the priority of God, it creates problems. First, for ethics, since by his definition, it would be difficult to know under what conditions a particular decision for any localized good could be taken. The ultimate model for Marion is martyrdom as witness in the extreme to the Good. Under what conditions is this an appropriate 'submission'? Second, in ontology, since the Good always exceeds Being, the relationship of the two would be (from the side of Being) pure obedience, but without 'inner worldly' warrants. On the basis of 'what is,' how do I know the 'ought'? Third, in comparative religious history, since, as in Karl Barth, there would seem to be a radical disjunction between the religions of the world and Christianity. Fourth, in language, since no genuine analogical language can exist from the side of Being, there can only be a sort of *analogia fidei*.<sup>24</sup> Metaphors in this context would necessarily provide only a conflicting interaction of terms in which subject and predicate cancel each other, never providing any 'direction' for the emergence of the Good. I would prefer to see what is partially good and partially true disclosed in the 'already-but-not-yet' ontology of metaphoric language. Metaphors embody, but also evoke, the future, with the conditions for the world of the metaphor embedded in the language itself.

Marion contrasts with the position on metaphor that I took in chapter 1. There I stated that the interactive nature of metaphoric predication (s is p) includes an implied judgment, not mere emotional explosion or intellectual possibility. The world will be like 'this' under certain conditions; and for the moments of 'living within' the metaphor, the performer (actor, audience, poet, singer, dancer, musician) does in fact live in that world. If the conditions are fulfilled beyond the immediate performance, the referent will be fulfilled. Marion maintains that reality is in an 'unfinished' state, one in which language is always waiting for the completion of its referents. With this I agree, but his projected world sets no conditions in this world. It cannot, for if it does, it would be dictating to God who is calling and confronting the world from the realm of grace (love and gift). God owes the world nothing based upon what it has completed. If God has 'chosen' to occupy upon occasion out of love certain moments of beauty in our universe, so be it; but these provide only hints, nothing secure. If my position on metaphor is to have *ontological* value, we

would need to know the *theological* status of those 'conditions' under which the referents appear. The 'conditions' that function within religious metaphors must participate in who God is. If they are not the gift of God as well as the work of human beings, then metaphors are decorative, emotional, or 'merely' confrontational (as Ricoeur argues). Consequently, a theology of God must resolve the conflict.

Time also is affected by Marion's position. If the 'before' and 'after' of subject and predicate are purely confrontational, even violent, then time itself, lacking divine intervention, is a melancholy tedium. If, however, the particular temporal schemes that are inscribed in the cosmos (genetic dissemination, evolutionary history, and the neural networks) are *actually* and *performatively* the way in which God acts in and through our 'inner worldly' patterns, then the conditions under which metaphors and narratives promote reality or destroy it are of paramount importance to us. So too is the comparative rhetoric of these stories. At heart, the difficulties between science and the religions have entailed the disagreement about what conditions are involved in the understanding and development of the planet.<sup>25</sup> Whose stories will govern the emergence of time?

### 6.3 Evolution and technology: a tragedy?

Ghislain Lafont, a French monk and theologian, understands that evolutionary biology offers a story that competes with salvation history for attention in our world.<sup>26</sup> In his three-part work, *God, Time and Being* (Fr., 1986), Lafont outlines first the cultural landscape of evolutionary history, then responds to it by showing how God undertakes narrative and analogy. As a comparative narrative exercise, his work and Paul Ricoeur's *Symbolism of Evil* bear some resemblance.<sup>27</sup> Both are interested in the witness or 'confession' that such 'grand stories' investigate, as well as the symbolic criteria by which they might be valid.<sup>28</sup>

By turning to the past, human beings discern their present meaning. In Lafont's reading of the literature then current on evolutionary anthropology, it was not clear whether one could answer the question: 'does man have a future?'<sup>29</sup> Rooted in zoological history, the evolution of *homo sapiens* is linked to the material conditions of development: nutrition, locomotion, and the 'organs of reference,' i.e., how human beings are 'oriented' in the world through their senses.<sup>30</sup> 'Learning' to walk upright radically changed human orientation with regard to both locomotion and nutrition. Humans lost an immediacy to the ground

and nutrition, but gained a distance that required *symbolization*. Its first manifestation was the appearance of tools. Initially, tools were simply extensions of human appendages, especially the hands; but quickly they determined modes of leveraging the non-human for human ends. The immediacy of the relationships between humans and their tools continued in equilibrium until the industrial revolution. 'The basic layout of the city hardly changes at all between antiquity and the end of the eighteenth century; it explodes in the nineteenth century.'<sup>31</sup> In the current anthropological situation, the power to exteriorize the hand and the head in computers has been extrapolated to the extent that a global lower-middle-class culture, speaking 'an impoverished English everywhere in the world,' has triumphed. Lafont commiserates that humanity may be at the end of its evolutionary spiral in a depotentiated, toothless state – mindless insects pushing buttons to do their work.<sup>32</sup>

Are there exits from this dismal ending? For the anthropologist, only aggression and love. Aggression is linked to acquisition of more 'things' and the satisfaction of human primary needs. Its alternate, the 'cosmic disinsertion' of love, is produced by those willing to enter a counter-cultural relationship with spacetime. Neither seems promising on its own merits to Lafont. 'Is the ascetical condition the only alternative to this process of exteriorization and to this global organization of humanity in its service?'<sup>33</sup> Lafont believes that further exploration of the 'symbolic principle' will permit other solutions. He begins with Engels and Baudrillard, neither of whom he finds sufficient for his purposes of a 'comparative narrative.'

Lafont's analysis of the development of the 'symbolic principle' begins with Engels and his interpretation of revolutionary changes in human history. Engels postulates a pre-history in which the domestic economy is achieved through equitable distribution of goods and a fairly gendered discussion of means. As society progresses, the accumulation of wealth and the differentiation of responsibilities eventually create the divided bourgeois state in which the 'haves' and the 'have-nots' are locked in a master-slave relationship, including a redefinition of the role of men and women. Only the proletarian revolution will undermine these fundamental antagonisms. But underlying Engels' defective historical understanding is the recognition that there is a norm within the evolution of human time that must account for evil.<sup>34</sup>

The current human situation in the 'Westernized' world of an economy of bourgeois consumption requires the 'reestablishment of

the authentic social form, defined as “symbolic exchange”.<sup>1</sup> Symbolic exchange, following Baudrillard, operates spontaneously in human affairs, a word calling for a response, the gift evoking a counter-gift. Symbolic exchange is the underlying relational nature of human interaction. The exchanged item has no value in itself, except insofar as it establishes the relationship itself. Such relationships are reciprocal, ambivalent, and reversible. The king who is in authority and to be obeyed can be sacrificed by the ‘subject’ who is to obey. Every word carries this symbolic exchange by including both its own meaning and the ‘other,’ a presence and an absence of reference.

Life, in other words, is not about an accumulation of things, but the ‘perennial process of coming and going, of blossoming and decay.’ Death is the inner intelligibility of the reversibility of the exchange. The negative sense of death we usually apprehend is being cut off permanently ‘from the cycle of symbolic exchanges.’<sup>35</sup>

For Lafont, these diachronic descriptions of the development of human evolution are mythical. Whether it is Engels’ anticipated proletarian revolution or Baudrillard’s immediate overturning of the consumerist codes, they do not provide an adequate view of the ‘question of time’ in humanity. They announce a recognized insufficiency in human history based upon mythic norms. But taking the guidance of Baudrillard on the notion of ‘death’ or negation as everywhere present within things (the ‘coming and going of reality’), Lafont explores Heidegger and Derrida as philosophical proponents of a critique of traditional metaphysics that refuses to include its own limitations, that avoids death.<sup>36</sup> At the heart of these limits, however, remains the question of whether this is the ‘end’ of human hope, or whether time can be experienced as open-ended.

Lafont turns to art as an exit-strategy, another cultural competitor: the theater of Artaud and the novel, both of which he believes provide ways of exploring the ‘escape out of time and Being’ and an anticipatory eschatology, announcing a new world. Theater can be seen (especially in Artaud) as a form of ritual; the novel as a form of self-authorized history, ‘the secret desire which man nurtures not to have been born of anyone, to have begotten himself and to be the child of his own works.’<sup>37</sup>

Lafont’s reflections on anthropology, sociology, history, theater, and literature provide him with the cultural contexts to see the ‘locus’ in which the Christian stories and explanations find their dialogue. His conclusions from this cultural analysis parallel those philosophical positions of Marion. First, humanity is not its own ‘ultimate principle;’

no one is a 'pure presence' to himself or herself. Second, understanding human temporality, therefore, requires knowledge of the limited empirical conditions under which that history has emerged; humanity depends upon an 'Other.' Third, to become truly human, one must 'consent to this native excentration,' discovering that autonomy and the project of being a *causa sui* are utterly self-destructive. Fourth, communicating is first hearing, listening to the word addressed to oneself; humans cannot supply their own 'founding narrative' without replicating the in-built limits of being human. The adequate 'founding narrative' for Lafont is, of course, the Paschal Mystery of Christ. Finally, what Lafont also detects in the cultural critics is a bleak historical process, winding into confusion and self-abnegation. None of the figures studied tell us who is 'responsible' for this misshapen history. From Lafont's point of view, this conflation of finite necessity and fall without clear origin has its analogues in ancient gnosticism.

The possibility of rethinking human history, by providing another version in which the development of tools does not generate evil, by studying the inner dialectic of nature and culture, and finally a reassessment of the question of Being, could offer an alternate mode of discourse. If these theoretic notions are tended to, then 'more nuanced histories' could be written than the ones we currently use. By rooting the analysis of time in a 'heard' narrative, one gives time back its possible true origin, evoking a future, giving the present a direction, defining the conditions under which the present has taken place. To speak of God in this context is not to lay claim to God by extrapolating to infinity the available inner-worldly referents, but to find the 'proper nomination' of God. We will reserve Lafont's remarks about God's name until the end of the chapter.

#### 6.4 The world-soul: divine embedment in the cosmos

Plato's remarks in the *Timaeus* sparked reflections about the inner unity and structure of the physical cosmos. They provided non-magical ways of speaking about how the divine 'interacted' with the universe. 'When the creator had framed the soul according to his will, he formed within her the corporeal universe, and brought the two together and united them center to center. The soul, interfused everywhere from the center to the circumference of heaven, of which also she is the external envelopment, herself turning in herself, began a divine beginning of never-ceasing and rational life enduring throughout all time.'<sup>38</sup> By the twelfth century, theologians in the West



had absorbed aspects of Platonic thought through Boethius and Augustine.<sup>39</sup> These included that the world was ordered and beautiful; even in its multiplicity, it constituted a whole. It was modeled upon a changeless exemplar in the mind of the Divine who worked as an Artisan or Demiurge because of its essence as kenotic or self-emptying Good. The universe had a Soul that animated it and gave it order; all was not chaos and the whim of the gods. Human beings were a microcosm of the macrocosmic world. Indeed, Augustine and Basil had been willing to identify the Holy Spirit with the 'soul of the world,' overseeing cosmic evolution.<sup>40</sup> With the introduction of Pseudo-Dionysius and his mediations on Proclus and Iamblichus, western theology added a systematic world-view based on these principles.

I will reverse the usual Plotinian analysis that begins from the emanations of the One. For Plotinus, the ultimate 'intelligibility' of the universe is due to the dependence of the Many on the One from which all particular realities emanate. For him, there are three divine, eternal principles: the One, *Nous* or Intellect, and *Psyche* or Soul. However, beginning from the empirical world shows how the notion of a 'world-soul' offered rational ways for understanding the unity of the physical universe and its intelligibility.

Buried in the metaphysical analysis of Plotinus lie the experiences that prompted him to postulate a non-material, unifying and unified soul and the higher principles of unity. We see movement and sensation, i.e. life, in a body and we infer a principle of animation – a soul, although this level of local motion is of least interest to Plotinus.<sup>41</sup> Plotinus even compares this lowest level to 'insect life' which needs to be removed by the higher level gardener; but he nonetheless goes to some length to say that the human soul and other souls are *not* extrinsic to the material world, inhabiting bodies like a steersman.<sup>42</sup> Each human organ, each sense participates in its own particular way in the total life that is named by soul; without this participative unity, there would be not a single human being, but a collection of pieces.

In like manner, every lower-level soul is actually the Universal Soul, not subject to partition.<sup>43</sup> All that is, insofar as it moves or has had life, shares in Soul. Each successively higher layer of experience needs further 'ensouled' explanation, and remains an exemplar of the Universal Soul. The lowest power of soul pervades the earth, with a second level including sensation, then a higher level with reason. At the upper levels, we experience order, the pattern and discipline of the heavens.<sup>44</sup> Each level has its own inner energy and intelligibility; yet

each separate manifestation is a complete soul, participating in the Universal Soul.<sup>45</sup>

The Soul has power to interpret between these levels because it is closest to an Idea uttered by the *Nous*; it can produce order in the lower levels, while at the same time, raise them to the next intellectual level.<sup>46</sup> Harmony among the levels, therefore, becomes the best witness to the ultimate truth in the One. Each soul is aptly matched to its embedment in the material. No soul needs an extrinsic leader or sender to tell it how to do its work; soul is the principle of agency in matter. '[I]t is as much as, in any living thing, the Soul itself effects the fulfillment of the natural career, stirring and bringing forth, in due season, every element – beard, horn, and all the successive stages of tendency and of output – or, as it leads a tree through its normal course within set periods.'<sup>47</sup> Plotinus compares the active presence of Soul in entities to 'sexual desire' or the contemplative 'pursuit of virtue.' The generative Soul is the principle of growth, 'immanent in the body of the growing thing,' but absent after a time in some objects (like rocks) now separated from that principle.<sup>48</sup> Because of Soul's unity, all differences among realities are mere accidents of life, of variations in bodily matter, of upbringing, or the inherent peculiarities of temperament. Thus, although there can be 'hurt' even in the vegetable world (the sucking out of moisture), there is no 'fault,' only difference.<sup>49</sup> Poverty, illness, and disaster are accidents, cracks in the material mirror that reflects the Unity of the universe.<sup>50</sup> But taken as a whole, the interaction of Soul in all the levels is like a choric dance that is perfect, despite the fact that 'at each partial stage it was imperfect.'<sup>51</sup>

Every dimension of Plotinus's universe is intimately interrelated. Soul provides the basis for claiming likeness *and* difference. Soul explains the presence of both unity and multiplicity within our world, 'participant in the nature divided in body, but at the same time a unity by virtue of belonging to that Order which suffers no division.'<sup>52</sup> Defects in the lower parts of the system have only minor effects; but painful or blissful experiences at the higher levels may affect the entire body. If our bodies did not have some kind of relational hierarchical unity, this would not be so. In addition, however, if each of us did not share in the Universal Soul, how is it, Plotinus asks, that we could have sympathy with one another, suffer, be overcome at the sight of pain or make personal attachments? Soul explains the sympathetic nature of our universe. By honoring ourselves, we honor Soul and allow ourselves to be drawn into the higher realms – to God as Father.<sup>53</sup>

Proclus (fifth century) and his Christian follower Pseudo-Dionysius (fifth–sixth centuries) created a system from Plotinus's (as well as others') reflections.<sup>54</sup> For Proclus, the divine principle penetrates to the lowest level of soul in the series, but the Universal Soul remains unparticipated and supramundane.<sup>55</sup> Hence, all inner worldly souls are separable, able to be free of the body.<sup>56</sup> An elaborate ladder of ascent to the highest principle includes three orders of the soul: the divine, the intelligent, and those that waiver between knowledge and ignorance. It is the lowest level of temporality that governs the inner workings of the universe, and that has within it potentially the higher intellectual forms.<sup>57</sup> Each soul has its own characteristic time and movement. 'If all souls had the same period and traversed the same course, all would occupy the same time; but if their reinstatements do not coincide, they vary also in the periodic times which bring about the reinstatements.'<sup>58</sup> Only the Universal Soul can attend to all times.

Pseudo-Dionysius so radically distinguishes God and creation that, although there is an inner worldly order determined by creation's normal rhythms, there can be no 'world-soul' that *participates* in the divine presence. The Divine Subsistence is the Good in itself and everything owes its existence and its ability to do good to God.<sup>59</sup> The highest realm is that of the angelic powers which occur beyond the cosmos. Next to these beings are the souls which derive their intelligence, immortality and existence from the transcendent Good. Even material things, such as birds, fish, amphibians, and earth-bound animals have souls and life. 'Each according to his measure' hopes to share in the 'illuminations streaming from the Source.' Each can 'possess the gift of exemplifying the Good.'<sup>60</sup> But the Good remains above them all, 'superior to the highest and yet stretching out to the lowest.'<sup>61</sup> It has neither shape nor form, quality, quantity, nor weight. It can neither be perceived, nor is it perceptible.<sup>62</sup> In this scheme, the only unity of the 'souls' must be through adherence by choice to the Good.

Beauty for Pseudo-Dionysius is akin to the Universal Soul in Plotinus; it mediates between multiplicity and unity, models and energizes diversity while gathering and leading all things toward the Good. It is the harmony and love that exists among the One, Good, and the Beautiful that mark the Universe.<sup>63</sup> From this sun's rays come the celestial (angelic) and ecclesiastical (sacramental) hierarchies. The material presence of this hierarchy provides the beautiful elements that are 'signs of an invisible loveliness.'<sup>64</sup> God made concessions to the nature of our minds so that we could apprehend the truth. Hierarchy (order, understanding, and activity) is the means by

which God communicates to us and by which humans can ascend to God.<sup>65</sup> Within hierarchy, everything shares in the 'being and source of everything.'<sup>66</sup> Life, therefore, participates in this hierarchy; but life is first a Divine Name that, out of gratuity, God shares with what exists. It communicates to all that live both existence and the capacity to live. 'The transcendentally originating Life is the cause of all life, produces it, brings it to completion, gives it specific form.'<sup>67</sup> It is clear that for Dionysius, the body is not to be avoided, but purified; it is not the cause of evil and it will be united with the soul in eternity.<sup>68</sup>

The detour through the neo-Platonist world-order is not so distant from our project as it may seem. First, Plotinus is searching for ways to understand how and why compassion, joy, and suffering could be shared among human beings. In addition, he recognizes that these 'sympathies' have empirical conditions not just among humans, but in the wider non-human universe in which we live. Second, he wants to maintain that some values continue to perdure and have ultimate significance in both human and non-human events. If these experiences are not rooted in the first principles, they are merely transient – precisely what he abhors. Pseudo-Dionysius, building upon more systematic neo-Platonists like Proclus, has two concerns: first, to maintain that God and creation are utterly and for ever distinct; but second, that they are inseparable due to the gracious Good who has chosen to create and redeem the world. For Plotinus, there is an intrinsic link between the transient world we see and touch and the eternal world of the First Principles. They are embedded in matter, not by mistake or by a fault, but simply because 'that is the way things are.' The imperfections in this process are due to the fact that the universe can only mimetically be an image of the One. For Christians like Pseudo-Dionysius, this 'difference' was inexplicable unless the Good cared profoundly enough for the world to transform it completely. Evil was not simply a defect in a mirror of eternity; it included malice. Time required healing.

Plotinus argued against the 'gnostics' (among whom he included all 'revelatory' religious traditions, including Christians) because, first, they believed that the knowledge to understand the cosmos needed to be *revealed from outside the rational universe*, and second, they claimed that *matter and bodies were either irreparably evil or required healing*. Plotinus thought this simply unnecessary, if one took seriously the rational asceticism of thought from reflection through meditation to contemplation and union with the One. He was a genuine philosophical mystic, who was convinced that all could reach such unitive

heights. The genius of Pseudo-Dionysius and his successors is that he combined, however ambiguously, a contemplative spirit with the commitment to the Universe as a gift. Plotinus forged a vocabulary and grammar in the World-Soul for understanding the life that linked human beings, animals, plants, and the divine Principles. It could be integrated by Christians if its interpretation of the inner workings of the material world could be perceived as a gracious participation in a divine gift, somehow distinct, yet connected to God.

## 6.5 Trinity and time

### 6.5.1 Aquinas and Triune Life

Thomas Aquinas' studies of the Trinity are exercises in relationality. There is the experienced relationship of human beings to one another; there is the commitment in faith to a relationship to the one God. But this God has chosen to create, thus establishing a relationship with what he has made. In turn, this relationship, valuable as it is, creates questions that arise from fits and starts in human development as well as the malice of which human beings are capable. So God chooses to speak a Word of Love, proclaiming the divine reality as relational in itself. The evidence for this is in the presence of God in Christ. Trinity is the language Christians use to explore the creating and redeeming relationships God has with the world (the missions of God) as well as the inner life of God (the 'immanent Trinity').<sup>69</sup> Although we will explore only some dimensions of Christian interpretations of the Trinity, the ongoing drama in which humans exist is this relational nature of God.

Human beings would not know about the inner life of God if God had not chosen to address us.<sup>70</sup> Indeed, God remains radically mysterious (out of an excess of intelligibility, not the need for further clues!) even in light of this self-revelation.<sup>71</sup> All knowledge of who God is comes from 'hearing,' making use of any and all analogies based in the Scriptures. Before revelation, our rational knowledge about God is partial and sometimes confused, 'mystifying' because we need clues; after revelation, our knowledge remains mysterious, but now due to the 'not-knowing' of why God would choose to speak and to love. There is an excess that is inexplicable within our limited horizons. The relationships of truth-telling and loving that God has with creation are not deceptive; they have their origins within the relations that constitute who God is.<sup>72</sup> Hence it is worthwhile to understand the primary

analogue used by the Christian tradition to understand how these inner relations of God exist.

The primary analogue for Christian understanding of God as Triune has been the 'psychological analogy.' Derived from Augustine's *De Trinitate*, it seems that the best interpretation to offer about God's inner life is the unity and diversity of consciousness. Human consciousness is a unity of knowing through a variety of spontaneous and reflected acts: sensing, understanding, and judging. Sensing is not 'separate' from the unity of consciousness; it is consciousness-in-act doing the work of gathering data for interpretation. The same is true for understanding the data and making judgments. Love is also an act of consciousness; it is not mere tropism or an emotional urge. To choose to offer oneself out of love is not to offer something other than oneself; it is one's own self making an offer to another. It may be foolish, wise, or a mixture of both; but it is 'I' who make the offer. This area of experience – knowing and loving – is the realm of the analogy from consciousness that the Christian tradition has explored.

God is a single consciousness who chooses to speak a Word of Love. God's Word is a complete self-expression, as is God's Love; but they speak with one voice. The Speaker, the Word Spoken, and the Love that abides have been named as 'persons.' They are not abstract principles, nor are they separate 'actors.' As truth and as love, they each reflect the very nature of God with a different relation. God is an Infinite Act of Understanding and Love. How do we know this? Only through God's missions to creation; but those missions are not deceitful. They are God speaking the truth and loving others in our world. The argument is, of course, circular in that only by 'hearing' can we speculate about who is speaking and why. Theology as an explanatory language is always derivative, dependent upon the words it hears. It cannot separate itself from the images, stories, and metaphors in the Scriptures. But *faith seeking understanding* validates the 'reasonableness' and 'appropriateness' of what is heard.

The self-expression of God in a Word could have been entirely 'internal' in the sense that no 'created term' 'outside' divine life need occur.<sup>73</sup> What God knows infinitely is the divine identity with all its virtual possibilities. 'But in God not only is *ipsum esse* the ocean of all perfection, comprehensively grasped by *ipsum intelligere*, in complete identity, but also perfectly expressed in a single Word.'<sup>74</sup> 'Moved' by the good inherent in a perfect Word of Truth, God wills to love. To love is to be drawn to someone or something.<sup>75</sup> The dynamic presence

'inclining and being inclined' to God's own goodness is God loving and being loved.<sup>76</sup>

God's inner life is known to us only because God has chosen to speak to us and to love us. The evidence is in the language of the Scriptures; but philosophically, one can ask further questions. Do God's missions to creation have an effect in the world? Aquinas argues that, even though God is not the 'soul of the world', he leaves *vestigia*, traces of Triune life in the world.<sup>77</sup> Insofar as it has its own being, it acts and causes events, reflecting the Father as creator. Insofar as created reality acts out of its own form and relates to its species, it reflects the Word 'as the form of a thing made by art is from the conception of the craftsman.' Insofar as it appears within order and creates order, it re-presents the Holy Spirit who wills and establishes order out of love. From these it is *possible*, however obliquely, to discern some dimensions of God's triune life in nature, but they do not have their proper names.<sup>78</sup> They 'prove' nothing. We needed God's self-disclosure in revelation so that we would know that God created, not out of necessity, but out of love, and that God loves us, not because he needed us, but because he simply chose to love. The Mystery remains.

In Lonergan's interpretation of Aquinas, each of the missions of God's inner life toward the Universe establishes a specific relationship. This relationship, initiated by God, leaves a '*created marker*' in the world.<sup>79</sup> Effectively, it is the physical lure in creation that evidences God's interaction. God never acts upon creation without real, concrete effects. In speaking a Word of Truth, God creates the human nature of Christ. In other words, God does not take an already created human being and supplant it with divine abilities; rather, God in becoming part of our human history effects a person who is both completely divine and completely human. Christ's humanity is the 'contingent effect' distinct from God, necessary for God's presence as a human being. This 'non-invasive' model for divine-human cooperation establishes the pattern through which we can understand the physical effects of God's other interactions. Lonergan speaks about the created effects of sanctifying grace and the habit of charity due to the life of the Spirit. The effects of God's actions are at once created, perceivable events in our world – and at the same time, experienced as gifts.

For Lonergan, these created gifts (the '*created markers*') participate in the inner relations of the Trinity. To return to the language of the last two chapters about *mediation*, we can state that God is the perfect self-conscious, self-mediating subjectivity. God is simultaneously present to the divine self as well as present in and through that act of self-

presence to the other. The Mystery is that God announces that he has loved in such a way that he has mediated the divine reality in and through created time – the times of the universe, the world of chaotic systems, human evolution, and the temporality of the human brain. God knows and loves all created reality precisely through the divine relationality. For Aquinas, this self-presencing activity is completely knowing and loving, but inexhaustibly mysterious. The divine act continues to become ‘more and more’ itself in and through the divine relational identity. Here God’s temporality as sequence can be understood as the deepening of love’s mystery and the continual exercise of wisdom and justice; God’s eternal simultaneity can be interpreted as the intense and constant exercise of encountering the other. Created others are enveloped within divine self-knowing and loving. The characteristic temporality of created realities is activated, engaged, and brought to its highest form of complexity by mutual self-mediation within the divine. The gracious action of the divine within our world is not violent confrontation, extrinsic intervention, but a cooperation.

In our world, the experience of knowing something as true, grasping its evidence, is a trace of the Trinity, a ‘*created marker*’ in God’s own knowledge of the divine Truth; to love the Good and act upon it shares in God’s love and generosity. So for Aquinas, *sacra doctrina* is, first of all, God’s own knowledge (and that of the blessed Communion of Saints) of the divine identity. Insofar as we share that knowledge first by faith, then *scientia*, then in the eternal vision in glory, we participate, however analogously, in God’s knowledge of the divine essence. God so far surpasses our own capacities that without the divine condescension in speaking to us, we would be filled with error. Theology, or *scientia*, is always dependent upon the knowledge that God chooses to reveal.<sup>80</sup>

### 6.5.2 God and time

Christian believers and their theologies are ‘in the highest degree concerned with the concept of time.’<sup>81</sup> From the beginning, I have maintained that Christian metaphors for time are in dialogue with the metaphors used by various natural sciences. Christians give the universe a beginning in time, indeed believe time began with that universe. They think that the stories of salvation are historical, i.e., both factual and interpretive; and they believe that individuals have free personal histories that will determine their ultimate destinies. The individual and group choices for those futures and the conversions from the past contribute to the building up or the tearing down of a public as well as private event called the ‘reign of God.’ While



Christians claim that God is eternal, they also maintain that God entered this planet's history at a particular place and time in fulfillment of an overarching benign providence that began before creation, continued with the divine choice of the Jews, and will enter fulfillment when God is all in all. God assumes time as part of the divine identity. 'God *himself*, in the otherness of the world, undergoes history, change, and so too time; the time of the world is his own history.'<sup>82</sup> The sequence of time becomes the semi-independent condition within which God can freely choose to offer Truth and Love. Without time's interlocking frames of reference, there would be only simultaneity.<sup>83</sup>

With the notion of contingent '*created markers*' and '*mutual self-mediation*', we have a *theological* language to articulate the ways in which God interacts with pre-human empirical manifolds. The '*created markers*' articulate concrete inner-worldly events that can be measured, timed, and analyzed. They are *not a vitalist force*. But at the same time, they reveal in their very temporality an excess, a surplus that articulates a future. It is often these moments in a physical system that are described in metaphors by scientists themselves; they lead to further investigations; they provoke controversy. So in astrophysical cosmology, the 'Big Bang' as a metaphor pushes scientists to explore the excess that created the inflationary universe and the unwinding of time. Autocatalytic self-organizing systems establish the semi-autonomous pre-human movement that develops its own internal rhythms and clocks. The haploid-diploid meiosis of *encheridia coli* has its own generational clock that changes dependent upon the initial conditions of the system. 'Survival of the fittest' and 'cooperation with the environmental resources' compete for interpretive attention in the marketplace of macro-evolutionary history. 'Neural networks,' while insufficiently analytic, struggles to find an agent-subject in the operations of the brain. Each of these physical manifolds offers its own internal intelligibility to the scientist; at the same time, each has its own '*created markers*' that metaphorically announce 'something more.'

'*Created Markers*' are not a new version of the neo-Platonist soul. They are physical processes that work 'on their own' in the world. As '*created*,' they are the contingent, dependent way through which God takes intimate responsibility for the spatio-temporal continuum. As '*markers*,' they provide the 'nodes in the narrative' through which history can be interpreted at many levels, including theological ones. Without these empirical processes, our universe would be missing the theoretic conditions under which Christians would be able to make claims about God's interaction with the universe.

### 6.5.3 Sharing God's time

Christianity can be interpreted as a religion in which mysticism and prophecy, manifestation and proclamation are equiprimordial.<sup>84</sup> In the classical systematic theology of the immanent Trinity, sameness and otherness, identity and difference are differentiated only by opposition of relations among the divine persons.<sup>85</sup> This 'opposition' should not be understood as negative conflict, but as co-originating cooperation. In the economic Trinity (God's missions), created realities, Christ, and the gift of love are Christianity's announcement that the identity and difference of the divine and the human continue to be co-implied.<sup>86</sup> What should be noted, therefore, is that in classical theological language, narrative and non-narrative dimensions of the ultimate reference for Christian discourse are integrally intertwined. There is a *narrative economy* of immanence in which identity and difference are operative; and there is a *mystical immanence* in the story of divine action on behalf of others.

For theologians, there are many avenues for investigation: First, if the triune identity co-implies both teleological narratives and mystical identity, can theologians examine how they are mutually mediating? Second, the doctrine of the Trinity includes a narrative relationship between identity and difference, does this imply any particular cosmic narrative as a condition for Christian beliefs? The triune interpenetration of relative otherness, of distinction within unity, of communion among differences, of temporality as both teleological and simultaneous announces that the universe is to be experienced as generosity, rather than as a struggle, competition, stalemate, intrusion, or invasion.<sup>87</sup> As it has been said, the universe may be the 'ultimate free lunch.'<sup>88</sup>

Christianity claims that whether time is experienced as polyhedral simultaneities in mysticism or as a prophetic, linear, narrative challenge toward the good, God's involvement is to be trusted. This is based in the very nature of the Godhead. The divine is the ultimate partner, an other who is never destructive. The dialogue immanent within time of identity and difference, of 'before' and 'after,' is not pernicious or vicious. According to this inclusive view, the history of the universe, whether it expands into infinity or contracts into implosion, remains a tragi-comedy, a combination of narrative and non-teleological forms that involve both identity and difference, presence and absence. At the center of the debates about the metaphors for time, whether mathematical, physical, or philosophical, are questions about whether time is a threat or a gift. Christian thinkers maintain that they would investigate the excess as gift. The '*created markers*' are the signal, the clues.

#### 6.5.4 Risking God's time

God's time is the prime analogue for all temporality. It can be conceived as a 'before' and 'after' and a simultaneity in both of which there is only cooperative love. Providence, as the fundamental divine intention, is for 'all that is' to be itself in love. For that to take place, there must be a relatively independent other in whom and with whom God mediates the divine identity. Reality is intrinsically relational, because God is present to it as inner relationality. Within divine life, there is the experience of knowledge and love as identity and difference, the same and other.

If we used *our* experience of simultaneity as the prime analogue for God, then we would mix an intense attachment for the other with boredom, anger, fear, and rejection that consists of 'more of the same.' If we use our 'sequencing' as the norm, we would have the experience of our history as a mixture of evil and grace. However, for Aquinas, Love is the ultimate temporality of divine presence. In God, there is only the *mutual self-mediation* of knowledge and love.<sup>89</sup> Divine love is ever active. God's time is the 'real' temporality; all other temporalities are analogous and participative. Human beings enter 'real' time by more intensely cooperating in and with divine temporality, i.e., love and knowledge. As humans become more just, loving, and truth-telling, they share more deeply in divine inner life (temporality). By investigating the '*created markers*' in our universe, scientists share, even unknowingly, in God's journey through time. In effect, it means that not only does the finite created reality become more knowledgeable and more loving, but we mediate our own temporality through and with God's intentionality.

An allegory illustrates this theological position. How does paper catch fire? It must draw closer to a flame already burning. As the paper grows closer to the flame, it reaches combustibility, until finally it too is consumed. God is an eternal fire, burning but not consumed. As all realities draw closer to this burning flame, they participate in the fire itself, eventually becoming that toward which they are drawn. The human fear continues to be (not just since Nietzsche, but certainly philosophically stated by him) that to mediate oneself in and through such an all-encompassing Other will destroy the temporality that human beings struggle to maintain in the context of harsh environments and the horrors of history. The Christian claim is that a timely cooperation with an Other, while it may be the ultimate risk, is also the primary way to become one's truest self.

# Notes

## Acknowledgements

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## Introduction

1. Samuel Taylor Coleridge, *Biographia Literaria*, ed. James Engell and W. Jackson Bate (Princeton, NJ: Princeton University Press, 1983), I, 303; see his marginal notations to *Siris* in Samuel Taylor Coleridge, *Marginalia*, ed. George Whalley (Princeton, NJ: Princeton University Press, 1980), I, 409–410.
2. I hold the dialectical position offered by Bernard J.F. Lonergan in 'Lectures on Religious Studies and Theology,' *Third Collection*, ed. Frederick E. Crowe, S.J. (New York: Paulist Press, 1985), 113–65. There Lonergan argues that as the social scientific and philosophical methods of religious studies become more self-reflectively normative and classical theological investigations become more empirical, the two disciplines will tend to 'move asymptotically towards an ideal situation in which they overlap and become easily interchangeable' (164). Although a political hermeneutics would need to be applied to this optimism, the basic position seems to me correct.
3. See, for example, Peter Dear, *Discipline and Experience: The Mathematical Way in the Scientific Revolution* (Chicago: University of Chicago Press, 1995), esp. 151–79; for a popular presentation, see Mary Midgley, *Science and Poetry* (London: Routledge, 2000), esp. 195–6.
4. For a particular position that believes that it has overcome the post-Cartesian dichotomies in science through a form of rhetoric, see Marcello Pera, *The Discourses of Science*, trans. Clarissa Botsford (Chicago: University of Chicago Press, 1994).
5. I first explored this in 'Religious Rhetoric and the Language of Theological

- Foundations,' in *Religion and Culture: Essays in Honor of Bernard Lonergan*, S.J., ed. Timothy P. Fallon, S.J. and Philip Boo Riley (Albany, NY: State University of New York Press, 1987), 191–203; see also David Klemm, 'Toward a Rhetoric of Postmodern Theology,' *Journal of the American Academy of Religion* LV/3(1987), 443–69.
6. See Alain Renaut, *The Era of the Individual: A Contribution to a History of Subjectivity*, trans. M. B. DeBevoise and Franklin Philip (Princeton, NJ: Princeton University Press, 1997), esp. 3–87. See also Charles Taylor, *Sources of the Self: The Making of the Modern Identity* (Cambridge, MA: Harvard University Press, 1989), esp. 143–207.
  7. *Ibid.*, 3.
  8. See William James, *Varieties of Religious Experience: A Study in Human Nature* (New York: Collier, 1961), 114–260.
  9. See Emile Durkheim, *The Elementary Forms of the Religious Life*, trans. Joseph Ward Swain (New York: Collier Books, 1961), 426–28.
  10. Renaut, *Era of the Individual*, 61–87.
  11. *Ibid.*, 137.
  12. See Fredric Jameson, *Postmodernism or, The Cultural Logic of Late Capitalism* (Durham, NC: Duke University Press, 1994) for a discussion of these issues.
  13. *Ibid.*, 10–13 where Renaut terms it the 'empiricist cogito'.
  14. See *ibid.*, 23, 104–5, 125–26.
  15. See Bernard J.F. Lonergan, *Method in Theology* (London: Darton, Longman & Todd, 1972), 57–85.
  16. *Ibid.*, 101–9.
  17. See P.C.W. Davies, 'The Intelligibility of Nature,' *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Nancey Murphy and C.J. Isham (Vatican City State: Vatican Observatory Publications, 1993), 145–61.
  18. Lonergan, *Method in Theology*, 102; see also Paul Davies, *God & the New Physics* (New York: Simon & Schuster, 1983), esp. 135–43.
  19. See Mary Midgley, *Science as Salvation: A Modern Myth and Its Meaning* (New York: Routledge, 1992), esp. 51–61.
  20. Paul Ricoeur, *Symbolism of Evil*, trans. Emerson Buchanan (Boston: Beacon Press, 1967).
  21. For a Catholic interpretation, see Robert Sokolowski, *The God of Faith and Reason: Foundations of Christian Theology* (Notre Dame: University of Notre Dame Press, 1982).

## Chapter 1

1. Genesis 1.1–5. All quotations are taken from the *New American Bible* (Nashville, TN: Thomas Nelson, Inc., 1987).
2. For example, Matthew 6.9 (God as Father); John 10.15, Hebrews 13.20 (Jesus as Shepherd); John 10.7 (Jesus as Sheepgate); John 1.29 (Jesus as Lamb); Revelations 21.2 (Jerusalem as heavenly city).
3. See, with some nuances, David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, 600 B.C. to A.D. 1450* (Chicago: University of Chicago

- Press, 1992), 360–8; Amos Funkenstein, *Theology and the Scientific Imagination from the Middle Ages to the Seventeenth Century* (Princeton, NJ: Princeton University Press, 1986), esp. 290–327; see the case studies in John Hedley Brooke, Margaret J. Osler, and Jitse van der Meer (eds.), *Science in Theistic Contexts: Cognitive Dimensions* *Osiris* 16 (2nd Ser. 2001).
4. Marcello Pera and William R. Shea eds., *Persuading Science: The Art of Scientific Rhetoric* (Canton, MA: Science History Publ., 1991); Herbert W. Simon ed., *The Rhetorical Turn: Conviction and Persuasion in the Conduct of Inquiry* (Chicago: University of Chicago Press, 1990).
  5. The classic collection of essays on metalinguistic issues in philosophy is *The Linguistic Turn: Recent Essays in Philosophical Method*, ed. Richard Rorty (Chicago: University of Chicago Press, 1967). My own positions on language are more indebted to continental hermeneutical phenomenology (Gadamer, Ricoeur, Habermas) than to linguistic analysis. Though both have had their effect on the philosophy of science, linguistic analysis, particularly in its Anglo-American forms (especially in England, where the use of continental hermeneutics continues to be suspect), has more affected issues in the ‘hard sciences.’ For a brief discussion of the ways in which linguistic analysis has affected science and religion debates, see Ian G. Barbour, *Religion in an Age of Science* (The Gifford Lectures, 1989–91) (San Francisco: HarperCollins, 1990), 13–16. For an argument about the role of hermeneutics in science more closely related to my own, see Marjorie Grene, ‘Perception, Interpretation, and the Sciences: Toward a New Philosophy of Science,’ in *Evolution at the Crossroads: The New Biology and the New Philosophy of Science*, ed. David J. Depew and Bruce H. Weber (Cambridge, MA: MIT Press, 1985), 1–20 and in an application to neurobiology, see Gunther S. Stent, ‘Hermeneutics and Complex Biological Systems,’ *Evolution at the Crossroads*, 209–25.
  6. Bruce J. Hunt, ‘Rigorous Discipline: Oliver Heaviside Versus the Mathematicians,’ *The Literary Structure of Scientific Argument: Historical Studies*, ed. Peter Dear (Philadelphia: University of Pennsylvania Press, 1991), 74–5.
  7. For what follows, see Geoffrey N. Cantor, ‘Weighing Light: The Role of Metaphor in Eighteenth-century Optical Discourse,’ in *The Figural and the Literal: Problems of Language in the History of Science and Philosophy: 1630–1800*, ed. Andrew E. Benjamin, Geoffrey N. Cantor, and John R.R. Christie (Manchester: Manchester University Press, 1987), 124–46.
  8. Hunt, ‘Rigorous Discipline’, 85.
  9. Heaviside (n.2), ‘Part II,’ 121 as cited in *ibid.*, 81.
  10. See Peter Dear, *Discipline and Experience: The Mathematical Way in the Scientific Revolution* (Chicago: University of Chicago Press, 1995), 32–46, 246.
  11. See Bernard J. F. Lonergan, *Method in Theology* (London: Darton, Longman, & Todd, 1972), 345–6.
  12. Hunt, ‘Rigorous Discipline’, 93.
  13. *Ibid.*, 88.
  14. As Heaviside himself stated: ‘We define a thing in a phrase, using words. These words have to be explained in other words, and so on, for ever, in a complicated maze. There is no bottom to anything’ (Heaviside, *EMT* 2 [23 November 1894], 2–3 as quoted in Hunt, ‘Rigorous Discipline,’ 93). See also

- James Robert Brown, 'Illustration and Inference,' in *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science*, ed. Brian S. Baigrie (Toronto: University of Toronto Press, 1996), 250–68.
15. Cantor, 'Weighing Light,' 124–46.
  16. Cantor uses Max Black's theory and Ricoeur's interpretation to support his claims; see *ibid.*, 125–6; see Max Black, *Models and Metaphors* (Ithaca, NY: Cornell University Press, 1962); and for a general discussion, Sheldon Sacks, ed., *On Metaphor* (Chicago: University of Chicago Press, 1979).
  17. Cantor, 'Weighing Light,' 132.
  18. *Ibid.*, 129.
  19. *Ibid.*, 140–1.
  20. Hans Reichenbach, *The Direction of Time*, ed. Maria Reichenbach (Berkeley: University of California Press, 1956), 5.
  21. Abner Shimony, 'Events and Processes in the Quantum World,' in *Quantum Concepts of Space and Time*, ed. R. Penrose and C.J. Isham (Oxford: Clarendon Press, 1986), 201–2.
  22. See the discussion of pre-Augustinian attitudes to images in Paul Corby Finney, *The Invisible God: The Earliest Christians on Art* (New York: Oxford University Press, 1994), 3–145; and Hans Belting, *Likeness and Presence: A History of the Image before the Era of Art*, trans. Edmund Jephcott (Chicago: University of Chicago Press, 1994), esp. 30–46.
  23. See Russell Fraser, *The Language of Adam: On the Limits and Systems of Discourse* (New York: Columbia University Press, 1977), 38.
  24. See Michael A. Arbib and Mary B. Hesse, *The Construction of Reality* (Cambridge: Cambridge University Press, 1986), 147–54.
  25. Fraser, *Language of Adam*, ix–x, 1–40; see Coleridge's reflections for his patron Josiah Wedgwood on these issues early (1801) in his philosophical career, *Collected Letters of Samuel Taylor Coleridge*, ed. Earl Leslie Griggs (Oxford: Clarendon Press, 1966), II, 678–703.
  26. Paul Ricoeur, *The Rule of Metaphor: Multidisciplinary Studies of the Creation of Meaning in Language*, trans. Robert Czerny et al. (Toronto: University of Toronto Press, 1977), 9–64.
  27. Janet Soskice, *Metaphor and Religious Language* (Oxford: Clarendon, 1989), 67ff.
  28. Arbib and Hesse, *Construction of Reality*, 152.
  29. Jürgen Habermas, 'On Hermeneutics' Claim to Universality,' in *The Hermeneutics Reader*, ed. Kurt Mueller-Vollmer (New York: Continuum, 1985), 299.
  30. Mary Hesse, *Science and the Human Imagination: Aspects of the History and Logic of Physical Science* (London: SCM, 1954), 144–5. In later work, as we shall see below, she does not so strongly distinguish the exploratory process in metaphors and analogies.
  31. *Ibid.*, 141.
  32. Mary Hesse, *Models and Analogies in Science* (South Bend, IN: University of Notre Dame Press, 1966), 19.
  33. The logic of this process is later developed in Mary Hesse, *The Structure of Scientific Inference* (London: Macmillan, 1974), esp. 197–222.
  34. Hesse, *Models and Analogies*, 152.
  35. Black, *Models and Metaphors*, chapter 3.

36. Hesse, *Models and Analogies*, 154.
37. *Ibid.*, 154. In this and the following, Hesse seems to step back from the mutually interactive form of metaphor that Black (and this writer) would espouse. It is not clear that there is a *primary* and a *secondary* system at stake, unless a specific *prior* question is engaged. The metaphor itself, though it may begin temporally with the subject, modifies both subject and predicate by its juxtaposition of the terms.
38. *Ibid.*, 166.
39. *Ibid.*, 176.
40. Arbib and Hesse, *Construction of Reality*, 1–23, 147–70.
41. *Ibid.*, 165.
42. George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 1980), 4.
43. Arbib and Hesse, *Construction of Reality*, 156.
44. Mary Gerhart and Allan Russell, *The Metaphoric Process: The Creation of Scientific and Religious Understanding* (Fort Worth, TX: TCU Press, 1984). It will be clear by the conclusion of this chapter that I am convinced that metaphors have referential power and contribute to our knowledge of the world. In this, the moderate realism of Hesse, Soskice, and Lonergan is the basis for my analysis of the temporal character of metaphors. Each of the thinkers involved has distinct, if interrelated, theories of the process through which metaphors refer, primarily derived from Max Black. Soskice stresses the social and causal contexts of language that corroborate experience; Hesse argues the exploratory character of analogical knowledge; Gerhart and Sally McFague (*Metaphorical Theology: Models of God in Religious Language* [Philadelphia: Fortress Press, 1982]) depend perhaps too much upon the position of Ricoeur with which I disagree (see below).
45. Paul Ricoeur, *Interpretation Theory: Discourse and the Surplus of Meaning* (Ft Worth, Tx: Texas Christian University Press, 1990), 45–69.
46. Paul Ricoeur, *The Symbolism of Evil*, trans. Emerson Buchanan (Boston: Beacon Press, 1967), esp. 3–24, 347–67.
47. Ricoeur, *Interpretation Theory*, 57, 59, 61; *Rule of Metaphor*, 51.
48. Ricoeur, *Interpretation Theory*, 59, 64.
49. Ricoeur, *Rule of Metaphor*, 245–55.
50. Hesse makes the same point about the ‘possible’ social and individual worlds created by metaphors in science as well as any other field, including religion. See Arbib and Hesse, *Construction of Reality*, 170.
51. Paul Ricoeur, ‘Metaphor and the Central Problem of Hermeneutics,’ in *Hermeneutics and the Human Sciences: Essays on Language, Action, and Interpretation*, ed. and trans. John B. Thompson (Cambridge: Cambridge University Press, 1981), 165–81.
52. Ricoeur, *Rule of Metaphor*, 309. It is difficult sometimes to determine exactly *what* dimension of the metaphoric process leads toward reference in Ricoeur. But once the interactive nature of subject and predicate occur, ordinary references are destroyed; and the only guiding access speakers have to the new world is through *le sentiment*.
53. Note that this is similar, but not identical, to Soskice’s remarks about the role of the undefinable or indecipherable aspects of metaphor. Metaphors refer without defining, leaving an openness. But unlike Ricoeur, Soskice is



- convinced that there is a cognitive *lead* that metaphors offer. In the next section, I hope to show some of the mechanisms of that guidance toward the future. See Soskice, *Metaphor and Religious Language*, 125–33; see also her ‘Knowledge and Experience in Science and Religion: Can We Be Realists?’, in *Physics, Philosophy, and Theology: A Common Quest for Understanding*, ed. Robert John Russell, William R. Stoeger, and George V. Coyne (Vatican Observatory: Vatican City State, 1988), 174, 177–80.
54. One could trace this discussion of virtual worlds as evidenced in Sallie McFague, *Models of God: Theology for an Ecological, Nuclear Age* (Philadelphia: Fortress, 1987), 192, fn. 37, where language about God ‘projects a possibility’; or in David Tracy, *Analogical Imagination: Christian Theology and the Culture of Pluralism* (New York: Crossroad, 1981), 354 and 362, esp. the complex fn. 34 in which no clear vocabulary emerges for treating the finite actualization of possibility; or in sacramental theology and ritual studies with David N. Power, *Unsearchable Riches: The Symbolic Nature of Liturgy* (New York: Pueblo, 1984), 130–9. In each theological position, the use of Ricoeur’s interpretation of metaphor makes the reference of religious language the *existential world* of the believer, actualizing the possibility that metaphors awaken.
  55. Soskice, *Metaphor and Religious Language*, 107.
  56. Arbib and Hesse, *Construction of Reality*, 197.
  57. Soskice, ‘Knowledge and Experience,’ 182.
  58. McFague, *Metaphorical Theology*, 22, 39, 192–93 fn. 37.
  59. In a prior essay, I have elaborated this proposal in relationship to the nature of the Christian sacraments; at the same time, I have criticized other interpretations of metaphor. See Stephen Happel, ‘Worship as a Grammar of Social Transformation,’ *Proceedings of the Catholic Theological Society of America* (Philadelphia, 1987) 42 (1987), 123–42.
  60. Ernst Bloch, *A Philosophy of the Future*, trans. John Cumming (New York: Herder, 1970), 96.
  61. Hans-Georg Gadamer, *Truth and Method*, trans. Joel Weinsheimer and Donald G. Marshall (New York: Crossroad, 1989) Revised Edition, 285–90.
  62. Karl Popper states that all predicates are predictive (‘This is a cup’), since they maintain that something is the case about the world, open to falsification if they do not continue to act in an identical manner. See Karl Popper, *The Logic of Scientific Discovery* (New York: Basic Books, 1961), 32–3, 313–14; *idem*, *Objective Knowledge: An Evolutionary Approach* (Oxford: Clarendon Press, 1972), 352–7; and *idem*, *Realism and the Aim of Science*, ed. W.W. Bartley III (London: Hutchinson, 1983), 206–9, 211–14. I would add that, because the metaphoric process has a hypothetical and heuristic nature (predictive in its own way), it contains an *implicit judgment* about the way the world is in the present. This judgment continues to be true if the conditions remain fulfilled. Though there is some similarity between what I am arguing and what Popper maintains, I am making a stronger historical and (simultaneously) ontological claim than I understand him to be arguing. It is not simply a matter of whether the projected state of affairs continues to behave in the same fashion. Popper’s point is methodological and experimental; mine is initially epistemological, then historical and ontological.

63. Arbib and Hesse, *Construction of Reality*, 217.
64. See Wayne C. Booth, 'Metaphor as Rhetoric: The Problem of Evaluation,' in Sheldon Sacks, *On Metaphor* (Chicago: University of Chicago Press, 1979), 47–70.
65. See David Freedberg, *Iconoclasts and their Motives* (Maarsen, Netherlands: Gary Schwartz, 1985); and *idem*, *The Power of Images: Studies in the History and Theory of Response* (Chicago: University of Chicago Press, 1989), esp. 378–428.
66. For a discussion of the German developments in aesthetics, see Michael Podro, *The Critical Historians of Art* (New Haven: Yale University Press, 1982); see Anthony, Earl of Shaftesbury, *Characteristics of Men, Manners, Opinions, Times* [1714] (Westmead, Farnborough, Hants.: Gregg International Publishers Reprint, 1968), I, 115.
67. See Arbib and Hesse, *Construction of Reality*, 7–11; see Olaf Pedersen, 'Christian Belief and Science,' *Physics, Philosophy, and Theology*, 128–9.
68. Judges 11. 29–40.
69. Victor Nell, *Lost in a Book: The Psychology of Reading for Pleasure* (New Haven, CT: Yale University Press, 1988), xiii.
70. Notice the similarity to Ricoeur's understanding of reading as an interpretive spiral that begins with a *guess*, develops through *validation* and *explanation*, and issues in *comprehension* and *appropriation*. In turn, therefore, the reader moves from a naive appreciation of symbols and metaphors through criticism to a second naiveté. See Ricoeur, *Interpretation Theory*, 71–88.
71. Nell, *Lost in a Book*, 7–10.
72. *Ibid.*, 47–69.
73. See Paul Ricoeur, *Time and Narrative*, trans. Kathleen McLaughlin and David Pellauer (Chicago: University of Chicago Press, 1984), I, 149–55.
74. *Ibid.*, 64. The reduction of the desire for metaphors and narratives to the fear of being alone shares the strengths and the weaknesses of the Freudian paradigm.
75. *Ibid.*, 74–8.
76. In this, imagination is distinct from fantasy, since in the latter, there appear to be no 'feedback controls' from the world. Unicorns, griffins, hobbits, and elves are fantastic creations with no conditions in the world for their reality; imaginative dystopias like Orwell's *1984* establish aversive conditions within them so that the world will *not* be embodied in the way described. The difference between imagination and fantasy is important since both scientists and theologians claim that their models are imaginative, i.e. governed by some conditions in the referential world.
77. *Ibid.*, 78–83.
78. *Ibid.*, 199–225.
79. *Ibid.*, 211; compare this to Wolfgang Iser, 'The Reading Process: A Phenomenological Approach,' *The Implied Reader* (Baltimore: Johns Hopkins Press, 1974), 274–94.
80. Although Ricoeur sees estrangement from the other as the ontological condition (and hence the propulsion toward interpretation), his remarks about appropriation of the other and the role of metaphor in this regard are useful; see Ricoeur, *Interpretation Theory*, 43–4, 91–5.
81. See Paul Ricoeur, *Freud and Philosophy: An Essay on Interpretation*, trans.

- Denis Savage (New Haven: Yale University Press, 1970), e.g. 159–77; Nell, *Lost in a Book*, 199–225.
82. See Paul Ricoeur, 'A Philosophical Interpretation of Freud,' and 'The Question of Proof in Freud's Psychoanalytic Writings,' in *The Philosophy of Paul Ricoeur: An Anthology of His Work*, ed. Charles E. Reagan and David Stewart (Boston: Beacon Press, 1978), 169–210.
  83. The gendered character of the relationship between words and images has been noted in Mary Midgley, *Science as Salvation: A Modern Myth and its Meaning* (London: Routledge, 1992), 75–91, where she quotes Francis Bacon among others who use dominative, violent language about mathematics' control of nature. In theological contexts, see Margaret S. Miles, *Image as Insight: Visual Understanding in Western Christianity and Secular Culture* (Boston: Beacon Press, 1985); see also Ricoeur, *Interpretation Theory*, 53–63; see below, chapter 4.
  84. Ricoeur has argued for many years that symbols and then metaphors have a fundamental role to play in philosophy. See Paul Ricoeur, 'Herméneutique des Symboles et Réflexion philosophique (I & II),' in *Le Conflit des Interprétations: essais d'herméneutique* (Paris: Seuil, 1969), originally published in 1961. See also Miles, *Image as Insight*, 15–39.
  85. See Stephen Happel, 'Picturing God: The Rhetoric of Religious Images and Caravaggio's *Conversion of St. Paul*,' *Rhetorical Invention & Religious Inquiry: New Perspectives*, ed. Walter Jost and Wendy Olmsted (New Haven: Yale University Press, 2000).
  86. See Mieke Bal, *Reading 'Rembrandt': Beyond the Word Image Opposition* (Cambridge: Cambridge University Press, 1991), esp. 25–59; and W.J.T. Mitchell, 'Ekphrasis and the Other,' *Picture Theory: Essays on Verbal and Visual Representation* (Chicago: University of Chicago Press, 1994), 162.
  87. For this discussion, see Walter J. Ong, *Orality and Literacy: The Technologizing of the Word* (London: Methuen, 1982), esp. 5–15, 31–77.
  88. See Paul Ricoeur, 'Toward a Hermeneutic of the Idea of Revelation,' in *Essays in Biblical Interpretation*, ed. Lewis S. Mudge (Philadelphia: Fortress, 1980), esp. 73–95.
  89. For a nineteenth-century version of this multileveled understanding of faith, see Samuel Taylor Coleridge, *Confessions of An Inquiring Spirit*, ed. Henry Nelson Coleridge (London: William Pickering, 1840; rpt. Menston: Scolar Press, 1971).
  90. It is a *subalternated* discipline, as Aquinas stated. *Summa Theologiae*, Q 1, a. 2, *corp.* The 'higher science' or knowledge in this case is God's own knowledge of the divine identity disclosed to human beings out of mysterious love. See chapter 6.
  91. For an argument that foundational theology is a rhetoric, see my 'Religious Rhetoric and the Language of Theological Foundations,' in *Religion and Culture: Essays in Honor of Bernard Lonergan, S.J.*, ed. Timothy P. Fallon and Philip Boo Riley (Albany, NY: SUNY Press, 1987), 191–203.

## Chapter 2

1. Quoted by Martin Heidegger, *Being and Time*, trans. John Macquarrie and Edward Robinson (New York: Harper & Row, 1962), 289.

2. Vincent Icke, 'Time Scales,' in *Time*, ed. A.J. Turner (Amsterdam: Tijd voor Tijd Foundation, 1990), 10.
3. See Lawrence W. Fagg, *The Becoming of Time: Integrating Physical and Religious Time* (Atlanta, GA: Scholars Press, 1995), esp. 79–91, 95–8.
4. c. 1450–1500, Flemish (possibly Tournai, Belgium), Museo de Santa Cruz, Toledo (on loan from the Toledo Cathedral) in Jay A. Levenson, *Circa 1492: Art in the Age of Exploration* (New Haven: Yale University Press, National Gallery of Art, 1991), 214–15.
5. David Tracy, *The Analogical Imagination: Christian Theology and the Culture of Pluralism* (New York: Crossroad, 1981), 9–49.
6. Immanuel Kant, *Critique of Judgment*, trans. J.H. Bernard (New York: Hafner, 1968), 82–181.
7. *Ibid.*, 105.
8. It has been argued that the spatial dimensions of time should be excised in this discussion (see Fagg, *Becoming of Time*, 156–9). Metaphors do not provide that possibility; indeed, they mix spatiotemporal operation, meaning, and reference such that conditions for their emergence are entailed with the metaphors themselves. It is precisely this spatiotemporal character of metaphor that is important for both scientific and religious notions of time.
9. 'Only someone completely unacquainted with the language of the natural sciences could believe that it contains no metaphors at all ...' Janet Soskice, *Metaphor and Religious Language* (Oxford: Clarendon Press, 1985), 99.
10. See Didier Coste, *Narrative as Communication* (Minneapolis, University of Minnesota Press, 1989).
11. See Willem Dijkhuis, 'A Hinge in Time,' *Time*, 41.
12. Paul Davies, *The Physics of Time Asymmetry* (Berkeley: University of California Press, 1974), 1; for his more recent views, see *About Time: Einstein's Unfinished Revolution* (New York: Simon and Schuster, 1996).
13. *Ibid.*, 3. Underlying Davies' remarks is a philosophical and psychological position that believes that human beings act upon an objectively inert world. It should already be clear to the reader that I find this non-interactive view of interpretation inadequate. Hermeneutics, whether in the natural or the human sciences, involves both 'subject' and 'object.'
14. *Ibid.*, 30. The discussion of far-from-equilibrium systems, though crucial, must be left to the next chapter. See Ilya Prigogine, *From Being to Becoming: Time and Complexity in the Physical Sciences* (New York: W.H. Freeman and Company, 1980), 131–50; Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (Toronto: Bantam, 1988), 177–209. Some of Prigogine's 'story' of the universe will be included later in this chapter.
15. *Ibid.*, 7, 197–200. Note that J.T. Fraser argues that the various levels of time (cosmological, biological, psychological) nest inside each other in a hierarchical fashion that leads *narratively* from one to another. He argues that 'time itself has evolved along a path corresponding to the evolutionary complexification of matter.' J.T. Fraser, *The Genesis and Evolution of Time: A Critique of Interpretation in Physics* (Amherst, MA: University of Massachusetts Press, 1982), 35.
16. Fagg, *Becoming of Time*, 103.

17. See Chris J. Isham, 'Creation as a Quantum Process,' in Robert John Russell, William R. Stoeger, and George V. Coyne eds., *Physics, Philosophy, and Theology: A Common Quest for Understanding* (Vatican City State: Vatican Observatory, 1988), 383. In conversation, Isham has pointed out that the term *origination* would be preferable to creation in the title of his article.
18. This is, of course, a controverted opinion on the nature of mathematical models and on the relationship of such models to the rhetoric of ordinary discourse, which I have tried to argue in chapter one. We must recognize that all distensions of speech, whether for the purposes of clear and distinct language (as in science) or for creative extension (as in poetry), move from the rhetorical mid-point of ordinary language. These remarks have their origin in Maurice Merleau-Ponty's interpretation of language; for a systematic overview, see H.L. Dreyfus and S. J. Todes, 'The Three Worlds of Merleau-Ponty,' *Philosophy and Phenomenological Research* XXII (1961–62), 559–65.
19. See Steven Weinberg, *The First Three Minutes: A Modern View of the Origin of the Universe* (New York: Basic Books, 1988); and Roger Penrose, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics* (New York: Oxford University Press, 1989), 322–45.
20. For a current survey, see Louis Bernstein, 'The Big Bang and Beyond – A Century of Modern Cosmology,' in *Cosmos*, ed. David H. Levy (New York: St. Martin's Press, 2000), 65–71.
21. Stephen Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (New York: Bantam, 1988), 35–51; Richard Morris, *Time's Arrows: Scientific Attitudes Toward Time* (New York: Simon & Schuster, 1986), 186; Roger S. Jones, *Physics as Metaphor* (Minneapolis, MN: University of Minnesota Press, 1982), 99ff; Paul Davies, *Superforce: The Search for a Grand Unified Theory of Nature* (New York: Simon & Schuster, 1984), 183; Weinberg, *First Three Minutes*, 12.
22. Paul Davies, *God and the New Physics* (New York: Simon & Schuster, 1983), 20.
23. Weinberg, *First Three Minutes*, 21.
24. John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1988), 411.
25. Weinberg, *First Three Minutes*, 102.
26. Hawking, *Brief History*, 76; Barrow and Tipler, *Anthropologic Cosmological Principle*, 259; Morris, *Time's Arrows*, 173. 'But something in this primordial state, an asymmetry not yet recognized or perhaps pure chance, has led to the initial predominance of matter. Once assured, antimatter became metastable, if for no other reason than for the presence of an overwhelming amount of matter' (in J.T. Fraser, *Evolution of Time*, 125).
27. Barrow and Tipler, *Anthropic Principle*, 377; Davies, *God and New Physics*, 30.
28. Davies, *God and New Physics*, 22.
29. Barrow and Tipler, *Anthropic Principle*, 415.
30. *Ibid.*, 370.
31. Hawking, *Brief History*, 76, 121; Morris, *Time's Arrows*, 173.
32. Davies, *God and New Physics*, 51.
33. Hans Reichenbach, *The Direction of Time*, ed. Maria Reichenbach (Berkeley: University of California Press, 1956), 38–9.

34. Davies, *God and New Physics*, 30.
35. Prigogine and Stengers, *Order Out of Chaos*, 46.
36. Don N. Page, 'Hawking's Wave Function for the Universe,' in *Quantum Concepts in Space and Time*, ed. R. Penrose and C.J. Isham (Oxford: Clarendon, 1986), 275.
37. David Layzer, *Cosmogogenesis: The Growth of Order in the Universe* (Oxford: Clarendon, 1990), 133–70; Ilya Prigogine, *From Being to Becoming: Time and Complexity in the Physical Sciences* (New York: W.H. Freeman & Co., 1980), 46.
38. Peter Coveney and Roger Highfield, *The Arrow of Time: A Voyage Through Science to Solve Time's Greatest Mystery* (New York: Fawcett, 1990), 184.
39. Prigogine and Stengers, *Order Out of Chaos*, 192. Note that this is dependent upon their understanding of far-from-equilibrium systems, which we will explore in the next chapter.
40. Layzer, *Cosmogogenesis*, 144, 159.
41. *Ibid.*, 164.
42. *Ibid.*, 163.
43. *Ibid.*, 170.
44. Davies, *God and New Physics*, 199–213; Reichenbach, *Direction of Time*, 3.
45. Prigogine and Stengers, *Order Out of Chaos*, 177–209.
46. See, for example, the 'superstring' descriptions of Michio Kaku, *Hyperspace: A Scientific Odyssey through Parallel Universes, Time Warps, and the 10th Dimension* (New York: Oxford, 1994), esp. 232–69; and Huw Price, *Time's Arrow and Archimedes' Point: New Directions for the Physics of Time* (New York: Oxford University Press, 1996).
47. John Barrow, *The World Within the World* (Oxford: Oxford University Press, 1990), 151–57.
48. Penrose, *Emperor's New Mind*, 295–96.
49. Paul Davies, *The Mind of God: The Scientific Basic for a Rational World* (New York: Simon & Schuster, 1992), 70–2.
50. Barrow and Tipler, *Anthropic Principle*, 273–5.
51. What follows interprets Paul Ricoeur, 'Biblical Hermeneutics,' in *Semeia* 4 (1975), 30–6, 75–106.
52. Although one should note that Frank Tipler has conjectured ways in which there will be a 'physical' immortality for self-conscious life even in the dead-end of the universe; see Frank J. Tipler, *The Physics of Immortality: Modern Cosmology, God, and the Resurrection of the Dead* (New York: Doubleday, 1995), esp. 217–40. Tipler believes that theology is a branch of physics.
53. So Price argues that the 'subjective' point of view (our particular form of temporal extension) has been misplaced in 'objective' symmetrical time. Price, *Time's Arrow*, 8, 18.
54. To be able to prove in science that such metaphors generate predictions or conclusions of time asymmetry would require a search for particular examples in which this has been the case. One would develop experiments that might permit the appearance of temporal asymmetry in the (usually understood) temporal symmetry of the microworld. One would need to study other solutions to the temporal reversibility of the formulae and realities of the quantum world. This would permit linking the signals of the

- microworld to the macroworld of entropic time, free energy, and the growing organization and self-organization in biology and human history. Such investigative programs link analysts of language, method, and experimental scientists. This is what I take to be a 'critical realist' view of investigation, whether in science or religion; see chapter one and Richard Boyd, 'Realism, Approximate Truth, and Philosophical Method,' *Scientific Theories*, ed. C. Wade Savage (Minneapolis, MN: University of Minnesota Press, 1990), 355–91, even if I would modify his notion of 'foundationalism.' For recent scientific attempts to discover the empirical basis for temporal asymmetry, see Davies, *About Time*, 196–218.
55. Kant, *Critique of Judgment*, 17.
  56. 'Purposefulness' in Kant must be understood to include both willed intention and teleology. If one understands the goal-directedness of an art object, can one then understand and ascribe a *telos* to nature with any legitimacy? Kant, of course, eventually describes nature as sublime, not beautiful. It *escapes* (as a thing in itself, separated from our intelligence) our ability to know if it has an intention or a goal.
  57. Kant, *Critique of Judgment*, 20. Fagg's philosophical and scientific positions on time as 'subjective' and 'objective' derive from Kant. See Fagg, *Becoming of Time*, 3, 21, 122.
  58. Kant, *Critique of Judgment*, 23.
  59. *Ibid.*, 29.
  60. *Ibid.*, 30.
  61. *Ibid.*, 206.
  62. *Ibid.*, 211. Note that the subject alone determines the purpose in nature. Just as Kant places the enlargement of art in the mind of the viewer, so Ricoeur places the 'open space' of metaphor in the freedom of the speaker. And Davies, Fagg, and Price argue that while 'nature' itself has symmetrical equations, temporal asymmetry is nonetheless ascribed to nature by human minds.
  63. *Ibid.*, 212.
  64. *Ibid.*, 217–18.
  65. *Ibid.*, 298.
  66. Bernard Lonergan, *Insight: A Study of Human Understanding* (New York: Longmans, 1967), 122; Kenneth R. Melchin, *History, Ethics and Emergent Probability: Ethics, Society, and History in the Work of Bernard Lonergan* (Lanham, MD: University Press of America, 1987), 97–121.
  67. *Ibid.*, 151.
  68. *Ibid.*, 157.
  69. *Ibid.*, 124. Although, in this chapter, I am interested in the notion of emergent probability as it applies to astrophysical cosmology and the origins and evolution of the physical universe, Lonergan's theory is an explanatory framework for all of history as it emerges from the Big Bang through the evolution of matter to the emergence of self-conscious life. I will sketch the entire process to provide a basis for arguing that this historical ontology, open-ended and dynamic, is the appropriate reference world for metaphor as it generates narrative.
  70. *Ibid.*, 172. Though Lonergan in other places argues for the complementarity of classical and statistical laws, time is clearly in the realm of statistical

probabilities. Neither purely random, nor absolutely necessary, time is the descriptive term we use for the emerging schemes of recurrence and the conditions under which they appear. 'Emergent probability is the successive realization of the possibilities of concrete situations in accord with their probabilities.' See Lonergan, *Insight* 170; also 105–15.

71. *Ibid.*, 445.
72. *Ibid.*, 446. Note that, *contra* Kant, the cosmos itself has temporality, but that this is *not* unrelated to the successive levels of temporality that ultimately include human time. Nonetheless, the conditions for the emergence of the schematics of human time must be present in prior levels of cosmic and biological duration. This position is not dissimilar to that found in Fraser, *The Genesis and Evolution of Time*.
73. *Ibid.*, 450.
74. *Ibid.*, 454.
75. See Melchin, *History, Ethics, and Emergent Probability*, 108–17. I will discuss the nature of the metaphors surrounding self-organizing systems, life, and the evolution of human consciousness in chapters 3 and 4.
76. Note the similar discussions in Prigogine and Stenger, *Order Out of Chaos*, 177–212; and Layzer, *Cosmogogenesis*, 177–230.
77. Lonergan, *Insight*, 461.
78. *Ibid.*, 689.
79. *Ibid.*, 238–42, 690.
80. For a useful introduction to Derrida's work, see Christopher Norris, *Derrida* (Cambridge, MA: MIT Press, 1987); for a positive reading of Derrida's work in theology, see Mark C. Taylor, *Erring: A Postmodern A/theology* (Chicago: University of Chicago Press, 1984); for an intermediate reading, see David Tracy, *Plurality and Ambiguity: Hermeneutics, Religion, Hope* (San Francisco: Harper and Row, 1987), esp. 54–62.
81. David Wood, *The Deconstruction of Time* (Atlantic Highlands, NJ: Humanities Press, 1989), 122.
82. *Ibid.*, 29.
83. Hayden White, *Tropics of Discourse: Essays in Cultural Criticism* (Baltimore, MD: Johns Hopkins University Press, 1978), 234; see also Don Cupitt, *Creation Out of Nothing* (Philadelphia: Trinity Press, 1990), 4.
84. Taylor, *Erring*, 52–73.
85. Wood, *Deconstruction of Time*, 132–3.
86. *Ibid.*, 334.
87. Taylor, *Erring*, 156.
88. See Martin Heidegger, *Identity and Difference*, trans. Joan Stambaugh (New York: Harper and Row, 1969).
89. Michael Theunissen, *The Other: Studies in the Social Ontology of Husserl, Heidegger, Sartre, and Buber*, trans. Christopher Macann (Cambridge, MA: MIT Press, 1984), 53–4, 308–29.
90. David Tracy, *Dialogue with the Other: The Interreligious Dialogue* (Louvain: Peeters Press, 1990), 17–26.
91. James Robertson Price, 'Transcendence and Images: the Apophatic and Kataphatic Reconsidered,' *Studies in Formative Spirituality* XI, 2 (May, 1990), 197.
92. Tracy, *Analogical Imagination*, 405–19; in this, he is dependent upon Paul



Ricoeur, 'Manifestation and Proclamation,' *Figuring the Sacred: Religion, Narrative, and Imagination*, trans. David Pellauer, ed. Mark I. Wallace (Minneapolis: Fortress Press, 1995), 48–67 [originally published *Blaisdell Institute Journal* 11 [1978], 13–35].

### Chapter 3

1. Steven Weinberg, *Dreams of a Final Theory: The Search for the Fundamental Laws of Nature* (New York: Pantheon, 1992), 245–61. A standard position among Christian theologians has been that religion is about personal attitudes; science is about the public world. Weinberg finds this position evasive and contradictory if religion claims public significance; he asks simply for intellectual and systematic rigor on the part of his religious interlocutors (257). We can find this Christian position in Philip Hefner, 'Christian Assumptions about the Cosmos,' in *Cosmology, History, and Theology*, ed. W. Yourgrau and A.D. Breck (New York: Plenum Press, 1977), 351: 'Religious cosmological myths, then, do not really answer directly the question, "What is the Universe like?" Rather, they speak to the question, "What must we believe about the Universe – as we know it to be from our science – in order for us to live optimally?"'
2. Weinberg, *Final Theory*, 261.
3. Bernard D'Espagnat, *Reality and the Physicist: Knowledge, Duration, and the Quantum World*, trans. J.C. Whitehouse and Bernard D'Espagnat (Cambridge: Cambridge University Press, 1989), 139: 'With regard to time, for example, the scientific community has admitted, since the advent of relativity theory, that the concept the post-Newtonian scientist had of it must be amended, and it now accepts the view that, in principle at least, our new conception of time applies to every part of physics ...'
4. For examples, see James Gleick, *Chaos: Making a New Science* (New York: Viking, 1987).
5. *Ibid.*, 5.
6. Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (New York: Bantam Books, 1984), xxi.
7. See Bert S. Hall, 'The Didactic and the Elegant: Some Thoughts on Scientific and Technological Illustrations in the Middle Ages and Renaissance,' in *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science*, ed. Brian S. Baigrie (Toronto: University of Toronto Press, 1996), 3–39, esp. 36–8.
8. For a survey of these changes in modernity, see Stephen Happel, 'The Arts as a Matrix of Spiritual Experience: Frederick Hart's *Three Soldiers* and the Vietnam Veterans Memorial,' in *Spirituality and the Secular Quest*, ed. Peter H. Van Ness (New York: Crossroad, 1996), 465–97.
9. See Leonard Shlain, *Art and Physics: Parallel Visions in Space, Time and Light* (New York: William Morrow, 1991), esp. 97–118; and John D. Barrow, *The Artful Universe* (Oxford: Clarendon Press, 1995).
10. Shlain, *Art and Physics*, 115.
11. Maurice Merleau-Ponty, 'Cézanne's Doubt,' in *Sense and Non-Sense*, trans. Hubert L. Dreyfus and Patricia Allen Dreyfus (Evanston, IL: Northwestern

- University Press, 1968), 15.
12. See the similar remarks of Maurice Merleau-Ponty, *Phenomenology of Perception*, trans. Colin Smith (London: Routledge & Kegan Paul, 1967), esp. 318–30.
  13. See Schlain, *Art and Physics*, 119–37.
  14. *Ibid.*, 204–19.
  15. *Ibid.*, 220–42; Roger S. Jones, *Physics as Metaphor* (Minneapolis: University of Minnesota Press, 1990), 100–13 shows how the very notion of linear causality is related to our understanding of the speed of light.
  16. Prigogine and Stengers, *Order Out of Chaos*, 17, 23.
  17. Ilya Prigogine, 'The Rediscovery of Time,' *Zygon* 19 (1984) 4, 434.
  18. Ilya Prigogine, *From Being to Becoming: Time and Complexity in the Physical Sciences* (New York: W.H. Freeman, 1980), 206–10; see comparable remarks in Grégoire Nicolis and Ilya Prigogine, *Exploring Complexity: An Introduction* (New York: W.H. Freeman, 1989), 171–8.
  19. Paul Ricoeur, *Time and Narrative*, trans. Kathleen McLaughlin and David Pellauer (Chicago: University of Chicago Press, 1984), 14–15.
  20. See Umberto Eco, 'Travels in Hyperreality,' in *Travels in Hyperreality*, trans. William Weaver (New York: Harcourt, Brace, Jovanovich, 1986), 9–10.
  21. See Frank Kermode, 'What Precisely are the Facts?,' in *The Genesis of Secrecy: On the Interpretation of Narrative* (Cambridge, MA: Harvard University Press, 1979), 101–23. Kermode's own stoicism is evidenced in the following: 'World and book, it may be, are hopelessly plural, endlessly disappointing; we stand alone before them, aware of their arbitrariness and impenetrability, knowing that they may be narratives only because of our impudent intervention, and susceptible of interpretation only by our hermetic tricks' (145).
  22. See the sensitivity of D'Espagnat, *Reality and the Physicist*, 130–1, to questions of language.
  23. See A.R. Peacocke, *An Introduction to the Physical Chemistry of Biological Organization* (Oxford: Clarendon Press, 1983), 148–9. Also Milos Marek and Igor Schreiber, *Chaotic Behaviour of Deterministic Dissipative Systems* (Cambridge: Cambridge University Press, 1991); Prigogine, *From Being to Becoming*; *idem*, 'Irreversibility and Space-Time Structure,' *Physics and the Ultimate Significance of Time: Bohm, Prigogine, and Process Philosophy*, ed. David R. Griffin (Albany, NY: State University of New York, 1986), 232–50. There is a summary in Ian Barbour, *Religion in an Age of Science: The Gifford Lectures, 1989–1991* (New York: HarperSan Francisco, 1990), 156–65.
  24. Prigogine and Stengers, *Order Out of Chaos*, 141.
  25. *Ibid.*, 142; see also Gleick, *Chaos*, 121–31.
  26. Prigogine, *From Being to Becoming*, 123.
  27. See Nicolis and Prigogine, *Complexity*, 26–8.
  28. See James P. Crutchfield et al., 'Chaos,' *Scientific American* (December 1986), 46–57; in fact, Prigogine would go so far as to say that '[i]rreversibility is the manifestation on a macroscopic scale of "randomness" on the microscopic scale' (*Being to Becoming*, 176, 204–6). For an emphasis upon the mathematical dimensions of chaos, see Denny Gulick, *Encounters with Chaos* (New York: McGraw-Hill, 1992), esp. 84–94 on sensitivity to initial conditions.

29. Prigogine, *Being to Becoming*, 206–10; Nicolis and Prigogine, *Complexity*, 171–8.
30. The phrase 'time as operator' is Prigogine's. Though I cannot claim to be thoroughly knowledgeable concerning the physics and mathematics of this assertion, I find Prigogine's position persuasive. He argues for a 'microscopic entropy operator  $M$  and the time operator  $T$ ,' as an 'internal time quite different from the time that in classical or quantum mechanics simply labels trajectories or wave functions' (Prigogine, *Being to Becoming* 209; in this book, 'the physical meaning of entropy and time as operators' is discussed in Chapters 7 as well as appendices A and C); see also Prigogine, 'Irreversibility,' 243–45.
31. Prigogine, *From Being to Becoming*, 100; see Peacocke's discussion of the thermodynamics of dissipative structures in *Biological Organization*, 17–72.
32. Joseph Ford, 'What is Chaos, That We Should Be Mindful of It?' in *The New Physics*, ed. Paul Davies (New York: Cambridge University Press, 1989), 351.
33. See Ernst Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist* (Cambridge, MA: Belknap Press of Harvard University Press, 1988); on predictability, see Crutchfield et al., 'Chaos,' *The New Physics*, 53. One should think of the discussion of Kant on 'aesthetic judgments' and 'teleological judgments' in the previous chapter.
34. Ford, 'What is Chaos ...?' *The New Physics*, 106; see Marek and Schreiber, *Chaotic Behaviour*, 51–102; Gulick, *Encounters with Chaos*, 52–62; Nicolis and Prigogine, *Complexity*, 71–5. This is *not* to say, as Peacocke points out, that there are absolutely unqualified *uncaused* events. Randomness is not non-causal; see Peacocke, *Creation and the World of Science*, 92, 95. There always remain conditions under which events occur – even in the 'decision-making' of chaotic systems.
35. Grégoire Nicolis, 'Physics of Far-from-Equilibrium Systems and Self-organization,' *New Physics*, 331.
36. *Ibid.*, 316.
37. Prigogine, *Being to Becoming*, 104: 'chemical instabilities involve *long-range order* through which the system acts *as a whole*.' Note that here we have the beginning of an argument that the *whole* is not *totally given* in the present. If it only exists as a system in transition, in history, that means that its future state is part of the teleonomy of the present situation, despite the fact that the system in operation does not 'know' what its future state is or might be. These positions seem to assume that this is true of pre-human far-from-equilibrium systems. One could argue that this lower-level indeterminacy is a condition for the possibility of human freedom.
38. John H. Campbell, 'An Organizational Interpretation of Evolution,' *Evolution at a Crossroads*, 154. Arguments by scientists are both synchronic and diachronic. The part and the whole are synchronically co-implicated; *and* the future states of the whole in relationship to a present state are diachronically co-implicated.
39. *Ibid.*, 154–61. Note that Küppers maintains that 'holistic phenomena are a part of normal physical and chemical experience, and that they therefore do not cast doubt on the validity of the reductionistic program'

- (Bernd-Olaf Küppers, *Information and the Origin of Life* [Cambridge, MA: MIT Press, 1990], 121).
40. This is no longer an uncommon assertion. See Hans Meinhardt, *Models of Biological Pattern Formation* (London: Academic Press, 1982), 10 on autocatalysis and his attempt to provide mathematical models for the process of self-organization or Peacocke, *Biological Organization*, 114–24. David Bohm aims at self-organization and complexity with his notion of ‘implicate order’ opposed to ‘mechanistic’ order; see his *Wholeness and the Implicate Order* (London: Routledge & Kegan Paul, 1981), 172–86. An application of self-organization can be found in Eric Jantsch, *The Self-Organizing Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution* (Oxford: Pergamon Press, 1984), though there is probably a (not so crypto-) vitalism in evidence. See similar remarks about the ‘nesting’ of temporalities, in J.T. Fraser, *The Genesis and Evolution of Time: A Critique of Interpretation in Physics* (Amherst, MA: University of Massachusetts Press, 1982), 144–75.
  41. Meinhardt, *Models*, 322; see Peacocke, *Biological Organization*, 189–95; Gleick, *Chaos*, 273–300.
  42. Küppers, *Information*, xx; an earlier version of his argument may be found in ‘On the Prior Probability of the Existence of Life,’ in *The Probabilistic Revolution 1806–1930: Dynamic of Scientific Development*, ed. G. Gigerentzer, L. Krüger and M.S. Morgan (Cambridge: Cambridge University Press, 1987), 355–69. Even Driesch would argue for the *methods* of physicists in biology, but not their *results*; see Hans Driesch, *The Science and Philosophy of the Organism* (London: A. & C. Black, 1929, 2nd edn.), 32. See the refinements by Peacocke, distinguishing *epistemological* reductionism, in *Biological Organization*, 268–72 and his interpretation of information theory, 255–63; and Barbour, *Religion in an Age of Science*, 165–8 who would probably describe Küppers position as *organicism*. For a more popular account of what reductionism means as a methodological option, see Weinberg, *Final Theory*, 51–64.
  43. Küppers, *Information*, 26; Peacocke, *Biological Organization*, 214–41. Prigogine argues that the origin of life is related to the successive instabilities of far-from-equilibrium systems; see Prigogine, *Being to Becoming*, 123.
  44. Küppers, *Information*, 27.
  45. *Ibid.*, 49; see Nicolis and Prigogine, *Complexity*, 143: ‘it is selection that enables us to detect, interpret, and transmit the “message” hidden in the nonlinear, nonequilibrium dynamics of the systems. *Selection decodes information* and that allows the transfer of complexity from one level to another’ (original italics).
  46. Meinhardt (*Models*, 13) avoids the axiological dimension by defining biological development as ‘alteration in time.’ For an analysis of the reasons for the changes in natural selection, see John Beatty, ‘Dobzhansky and Drift: Facts, Values, and Chance in Evolutionary Biology,’ in *Probabilistic Revolution, 1806–1930*, 271–311.
  47. Küppers, *Information*, 56.
  48. *Ibid.*, 81; see Ernst Mayr on the development of hierarchical systems in ‘How Biology Differs from the Natural Sciences,’ in *Evolution at the Crossroads*, 57–60, where his understanding of the difference between

- animate and inanimate matter ('possession of a genetic program') can be developed to include production of genetic information.
49. *Ibid.*, 85. This is a concrete translation of Prigogine, *Being to Becoming*, 123: 'the origin of life may be related to successive instabilities somewhat analogous to the successive bifurcations that have led to a state of matter of increasing coherence.'
  50. *Ibid.*, 122. Many thinkers point to Driesch's sea-urchin experiments and the teleonomy of an organism (what Driesch called its entelechy) without subscribing to his claims for a vitalistic principle distinct from the infra-structural integrations of a biological organism; see Driesch, *Science and Philosophy of the Organism*, 38–43, 245.
  51. Küppers, *Information*, 131–2.
  52. *Ibid.*, 148. See Prigogine, *Being to Becoming*, 123–26. Meinhardt sees 'competition' at the primary level. See Meinhardt, *Models*, 189. See John H. Campbell, 'An Organizational Interpretation of Evolution,' in *Evolution at a Crossroads*, esp. 141–6 on alternative paths for evolution; and Stuart A. Kauffman, 'Self-Organization, Selective Adaptation, and its Limits,' *Evolution at a Crossroads*, 169–203.
  53. Küppers, *Information*, 150: 'The selection value of every single species will as a rule depend on the population variables of the other species taking part in selection, so that every evolutionary "step" changes the structure of the value profile . . . This means that goal and goal-directedness, even at the level of biological macromolecules, are interdependent.' Note that this is not to say that some species are better or more important than others; it is simply to explain *why* some systems continue and others do not.
  54. See Robert J. O'Hara, 'Representations of the Natural Systems in the Nineteenth Century,' *Picturing Knowledge*, 169. O'Hara, however, has argued that 'any sort of directedness in the Natural system, apart from that of time itself, is mistaken' (see Robert J. O'Hara, 'Homage to Clio, or, toward an Historical Philosophy of Evolutionary Biology,' *Systematic Zoology* 37 (2), 142–55).
  55. I distinguish 'supranatural' and 'supernatural.' 'Supranatural' involves a 'beyond creation' intervention in the universe, evidenced by the divine being as a more forceful cause than internal natural structures and operations; 'supernatural' will be defined below.
  56. See David Topper, 'Towards an Epistemology of Scientific Illustration,' in *Picturing Knowledge*, 215–49.
  57. Bernard Lonergan, *Grace and Freedom: Operative Grace in the Thought of St. Thomas Aquinas*, ed. J. Patout Burns (London: Darton, Longman & Todd, 1971; orig. 1941–42), 16.
  58. See Lucien Lévy-Bruhl, *Primitives and the Supernatural*, trans. Lilian A. Clare (New York: Dutton, 1935) for a classic, if flawed description. The data, however, if not all the interpretations, can be integrated with Claude Lévi-Strauss, *The Savage Mind* (Chicago: University of Chicago Press, 1966), 251–68 with its emphasis upon the concrete immediacy of primitive logic.
  59. *Ibid.*, 20; see also *idem*, *Primitive Mentality*, trans. Lilian A. Clare (New York: Macmillan, 1923), 36–7. For a somewhat controversial discussion of the transition from *mythos* to *logos* in the Western world, see Bruno Snell, *The*

- Discovery of Mind: The Greek Origins of European Thought*, trans. T.G. Rosenmeyer (Cambridge, MA: Harvard University Press, 1953), 191–245; for a complex view of the relationships between traditional knowledge and the emergence of science, see G.E.R. Lloyd, *Magic, Reason, and Experience: Studies in the Origin and Development of Greek Science* (Cambridge: Cambridge University Press, 1979), esp. 1–8, 10–58.
60. Lévy-Bruhl, *Primitives and the Supernatural*, 34.
  61. I would point out that more anthropologists point to fear as the origin of religious action than to the celebration of joy or success. This may have as much to do with Enlightenment prejudices about priestcraft and the normative espousal of human autonomy as about field data. See Lévy-Bruhl, *Primitives and the Supernatural*, 24–7 for an example of the conviction that fear motivates primitive religious activity.
  62. *Ibid.*, 32 *et passim*; see the earlier *idem*, *How Natives Think*, trans. Lilian A. Clare (New York: Washington Square Press, 1966), 22–32.
  63. Lévy-Bruhl focuses upon the negative dimensions of experience (loss, misfortune, disease, death) where the following is representative. ‘How is [the primitive] to account for these misfortunes which at times seem to have combined to overwhelm him?’ He contrasts the response of preliterate cultures with the contemporary search for scientific answers. *Ibid.*, 153–4. See his remarks about the causes of success in *Primitive Mentality*, 307–51. Lévy-Bruhl maintains that ‘not only the data, but even the limits of experience fail to coincide with our own’ (*Primitive Mentality*, 96). But he means by this the fact that data always involve interpretation and that the preliterate mentality ‘is accustomed to a type of causality which obscures, as it were, the network of such [secondary] causes’ (92).
  64. *Ibid.*, 65.
  65. Lévy-Bruhl, *Primitive Mentality*, 59–96. One must note that Malinowski disagrees with this position, asserting that preliterate cultures distinguish magical from primitive technological agricultural or hunting devices, though magic continues to be useful for unexpected situations. See Bronislaw Malinowski, *Magic, Science, and Religion and Other Essays* (Boston: Beacon Press, 1948), 12–17.
  66. Lévy-Bruhl, *Primitives and the Supernatural*, 197–8, my italics.
  67. See Lévi-Strauss, *Savage Mind*, 30–2 on the (social) equilibrium achieved through ritual.
  68. Lévy-Bruhl, *Primitives and the Supernatural*, 57, 64; see also Lévy-Bruhl, *Primitive Mentality*, 57–8.
  69. Lévi-Strauss, *Savage Mind*, 16.
  70. For a helpful comparison on this issue between a Mayan story and the book of Genesis, see Dennis Tedlock, *The Spoken Word and the Work of Interpretation* (Philadelphia: University of Pennsylvania Press, 1983), 261–71.
  71. Lonergan, *Grace and Freedom*, 143; Lonergan also studied these issues later in *Insight: A Study of Human Understanding* (New York: Longmans, 1967), esp. 634–86, in regard to the meaning of transcendence.
  72. See Jacques Le Goff, ‘The Marvelous in the Medieval West,’ in *The Medieval Imagination*, trans. Arthur Goldhammer (Chicago: University of Chicago Press, 1988), 31.

73. See Karl Rahner's parallel interpretation of 'pure nature' as a *Restbegriff*, a theological abstraction, that sorts out from our mixed, i.e., graced and sinful, experience what is sinful from what is divine initiative and human cooperation. Karl Rahner, 'Concerning the Relationship between Nature and Grace,' in *Theological Investigations*, trans. Cornelius Ernst (Baltimore: Helicon Press, 1965) I, 313–17. For a more popular, but similar, interpretation, see Piet Fransen, *Divine Grace and Man* (New York: Desclée, 1962), 88–91.
74. Lonergan, *Grace and Freedom*, 105; see *idem*, *Insight*, 657–77.
75. Lonergan, *Insight*, 635.
76. See Bernard Lonergan, 'Religious Experience,' in *A Third Collection: Papers by Bernard J.F. Lonergan, S.J.* ed., Frederick E. Crowe (New York: Paulist Press, 1985), 119–22.
77. See Gordon D. Kaufman, 'Two Models of Transcendence: An Inquiry into the Problem of Theological Meaning,' in *The Heritage of Christian Thought: Essays in Honor of Robert Lowry Calhoun*, ed. Robert E. Cushman and Egil Grisliis (New York: Harper & Row, 1965), 182–96. In this early essay, he distinguishes scientific and religious language as cognitive, empirical language vs. intersubjective mystery. Images and stories are necessary because of the interpersonal dimension of revelation (193). Again, notice how this is another version of science as 'objective' fact and religion as 'subjective' value. In Kaufman's *In Face of Mystery: A Constructive Theology* (Cambridge, MA: Harvard University Press, 1993), e.g. 250–63, there is a more subtle, but similar interpretation.
78. Lonergan, *Grace and Freedom*, 108.
79. 15 (Marietti edition), #137; as quoted in Lonergan, *Grace and Freedom*, 108 and fn. 79.
80. Lonergan, *Grace and Freedom*, 109. This is, of course, Rahner's argument about the doctrine of the Incarnation; see Karl Rahner, 'The Theology of the Symbol,' *Theological Investigations*, trans. Kevin Smyth (Baltimore: Helicon Press, 1966), 235–40.
81. Lonergan, *Grace and Freedom*, 43.
82. Lonergan, *Method in Theology*, 310, fn. 13.
83. Lonergan, *Grace and Freedom*, 82.
84. See Bernard Leeming, *Principles of Sacramental Theology* (London: Longmans, 1960 ed.), esp. 283–345 for an overview of the various uses of instrumental causality to discuss sacramental efficacy.
85. Keith Vivian Thomas, *Religion and the Decline of Magic* (New York: Charles Scribner's Sons, 1971), esp. 25–50; see also Valerie Flint, *The Rise of Magic in Early Modern Europe* (Princeton, NJ: Princeton University Press, 1991). For an art historical appreciation of the power of these images, see David Freedberg, *The Power of Images: Studies in the History and Theory of Response* (Chicago: University of Chicago Press, 1989), esp. 82–135.
86. Thomas, *Decline of Magic*, 35; see Miri Rubin, *Corpus Christi: The Eucharist in Late Medieval Culture* (Cambridge: Cambridge University Press, 1991), 338–42. To understand the context of these practices, see David N. Power, *The Eucharistic Mystery: Revitalizing the Tradition* (New York: Crossroad, 1992), 180–207; and Edward Muir, *Ritual in Early Modern Europe* (Cambridge: Cambridge University Press, 1997), esp. 158–65.

87. Michael Camille, *The Gothic Idol: Ideology and Image-making in Medieval Art* (Cambridge: Cambridge University Press, 1991), 213.
88. *Ibid.*, 233.
89. Le Goff, 'The Marvelous in the Medieval West,' 28.
90. *Ibid.*, 29.
91. *Ibid.*, 31–3.
92. Lonergan, *Grace and Freedom*, 81.
93. Aquinas is incorporating Augustine's distinction between *uti* and *frui* from *De Doctrina Christiana* into his interpretation. To enjoy something is self-referential, to 'rest with satisfaction in it'; to use a thing is to desire it and to employ any appropriate means to obtain it' (I, 4). This world is to be used, but not enjoyed; the only true 'objects' of enjoyment are the Trinity (I, 5). (See Augustine, 'On Christian Doctrine,' *Nicene and Post-Nicene Fathers* (New York: Charles Scribner's Sons, 1903), II, 522–97.
94. Lonergan, *Grace and Freedom*, 81.
95. *Ibid.*, 82–4. See *Summa Theologiae*, I, Q. 116, aa. 2, *ad 2um et 3am*, and 3, in which fate is precisely a 'contingent necessity.' God's providence orders the universe toward love through both contingent and necessary secondary causes.
96. Lonergan, *Grace and Freedom*, 84.
97. *Ibid.*, 89: '[fate] is the dynamic pattern of world events, the totality of relations that constitute the combinations and interferences of created causes ...' Note how different this is from Gordon Kaufman's 'primary and widest meaning' for an act of God in which an attenuated deism seems to be proposed in 'On the Meaning of "Act of God"', in *God the Problem* (Cambridge, MA: Harvard University Press, 1972), esp. 136–40.
98. See my 'The "Bent World": Sacrament as Orthopraxis,' *CTSA Proceedings* 35 (1980), 98–9.
99. Thomas Aquinas, *Summa Theologiae*, III, Q. 60, a. 6 corp and *ad 1um*.
100. *Summa Theologiae*, III, Q. 60, a. 3, corp; a. 5, corp, *ad 2um*.
101. *Summae Theologiae*, III, Q. 75, a. 4, *ad 3am*: '[V]irtute agentis finiti non potest forma in formam mutari, nec materia in materiam. Sed virtute agentis infiniti, quod habet actionem in totum ens, potest talis conversio fieri: quia utrique formae et utrique materiae est communis natura entis; et id quod est entitatis in una, potest auctor entis convertere ad id quod est entitatis in altera, sublato eo per quod ab illa distinguebatur.'
102. Lest this appear as a romanticism about creation, it is necessary to say that for Aquinas, *all* created reality needs redemption. Everything participates in the decline that is initiated by the sin of the first human parents. See Lonergan, *Grace and Freedom*, 43–53.
103. *Summa Theologiae*, III, Q. 60, a. 6, corp.
104. Nor do all interpreters of Aquinas agree with my reading of the relationship between signs and causes in the theology of the sacraments. See, for a recent example, Power, *The Eucharistic Mystery*, esp. 219–36, 269–85.
105. See Leeming, *Principles*, 287–94.
106. Lonergan, *Grace and Freedom*, 3.
107. Though the language sometimes used by theologians about the world as 'God's body' is rhetorically descriptive, the explanatory value of such a metaphor requires an understanding of the historical, self-organizing



- structures of the universe's systems to be helpful. So, for example, see Sallie McFague, 'Models of God for an Ecological, Evolutionary Era: God as Mother of the Universe,' in Robert John Russell, William R. Stoeger, and George V. Coyne (eds.), *Physics, Philosophy and Theology: A Common Quest for Understanding* (Vatican City State: Vatican Observatory, 1988), 261–63.
108. Gerard Manley Hopkins, 'As Kingfishers Catch Fire,' *Gerard Manley Hopkins*, ed. Catherine Phillips (Oxford: Oxford University Press, 1986), 129.
  109. These criteria for activity are likely true of human actions as well as of lower self-organizing systems.
  110. This is what I have called elsewhere the 'double dative of presence.'

## Chapter 4

1. John McPhee, *Basin and Range* (New York: Farrar, Strauss, and Giroux, 1981), 128–9; Stephen Jay Gould also uses the language in *Time's Arrow, Time's Cycle: Myth and Metaphor in the Discovery of Geological Time* (Cambridge, MA: Harvard University Press, 1987), 1–8. He reviewed McPhee's book: 'Deep Time and Ceaseless Motion,' *An Urchin in the Storm: Essays about Books and Ideas* (New York: W.W. Norton, 1987), 93–103.
2. McPhee, *Basin and Range*, 128–9.
3. As a descriptive adjective, *shallow* also lends to human time something of the not terribly thorough and precarious dimension that marks human beings' existence on a planet and in a universe much older than they are. We are 'far-from-equilibrium' systems located in an ancient universe.
4. Paul Davies, *The Physics of Time Asymmetry* (Berkeley: University of California Press, 1974), 7, 197–200; see his more popular account in *Space and Time in the Modern Universe* (Cambridge: Cambridge University Press, 1977), esp. 56–85.
5. Davies, *Time Asymmetry*, 30.
6. For a general standard description, see Roger Penrose, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics* (New York: Oxford University Press, 1989), 302–47.
7. Stephen Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (New York: Bantam, 1988), 35–51; Richard Morris, *Time's Arrows: Scientific Attitudes Toward Time* (New York: Simon & Schuster, 1986), 186; Roger S. Jones, *Physics as Metaphor* (Minneapolis, MN.: University of Minnesota Press, 1982), 99ff; Paul Davies, *Superforce: The Search for a Grand Unified Theory of Nature* (New York: Simon & Schuster, 1984), 183.
8. Paul Davies, *God and the New Physics* (New York: Simon & Schuster, 1983), 20.
9. David Lindley, *The End of Physics: The Myth of a Unified Theory* (New York: Basic Books, 1993), 146–50.
10. Steven Weinberg, *The First Three Minutes: A Modern View of the Origin of the Universe* (New York: Basic Books, 1988), 21.
11. John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1988), 411.
12. Weinberg, *First Three Minutes*, 102.
13. Davies, *God and the New Physics*, 51.

14. Hans Reichenbach, *The Direction of Time*, ed. Maria Reichenbach (Berkeley: University of California Press, 1956), 38–9.
15. Davies, *God and the New Physics*, 30.
16. Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (Toronto: Bantam, 1988), 46.
17. Don N. Page, 'Hawking's Wave Function for the Universe,' in *Quantum Concepts in Space and Time*, ed. R. Penrose and C.J. Isham (Oxford: Clarendon, 1986), 275.
18. David Layzer, *Cosmogogenesis: The Growth of Order in the Universe* (Oxford: Clarendon, 1990), 133–70.
19. Frank Close, *Lucifer's Legacy: The Meaning of Asymmetry* (Oxford: Oxford University Press, 2000), 6.
20. Peter Coveney and Roger Highfield, *The Arrow of Time: A Voyage Through Science to Solve Time's Greatest Mystery* (New York: Fawcett, 1990), 184.
21. Davies, *God and the New Physics*, 199–213; Reichenbach, *Direction of Time*, 3.
22. Prigogine and Stengers, *Order Out of Chaos*, 177–209.
23. Michio Kaku, *Hyperspace: A Scientific Odyssey Through Parallel Universes, Time Warps, and the 10th Dimension* (New York: Oxford University Press, 1994), 27.
24. *Ibid.*, 194–5.
25. See Chapter 2.
26. Mary Midgley, *Science as Salvation: A Modern Myth and its Meaning* (London: Routledge, 1992), esp. 138–64.
27. J.T. Fraser, *The Genesis and Evolution of Time: A Critique of Interpretation in Physics* (Amherst, MA: University of Massachusetts Press, 1982), 104.
28. The course was entitled 'Problems Arising from Biology' and was taught for biologists, philosophers, and theologians in the Hoger Instituut voor Wijsbegeerte. An element of his work can be seen in M.-J. Heuts, 'Dialogue autour d'une Asymptote', *Archives de Philosophie* 23 (1970), 59–78. He had clearly been influenced by the work of his Brussels' colleague Prigogine.
29. Ilya Prigogine, 'The Rediscovery of Time,' *Zygon* 19 (1984) 4, 443.
30. T. S. Eliot, 'Burnt Norton,' *Four Quartets in The Complete Poems and Plays, 1909–1950* (New York: Harcourt, Brace & World, 1962), 117.
31. Fraser, *Genesis and Evolution*, 145.
32. Bernd-Olaf Küppers, *Information and the Origin of Life* (Cambridge, MA: MIT Press, 1990), 85. Note how this is a concrete translation of Ilya Prigogine, *From Being to Becoming: Time and Complexity in the Physical Sciences* (New York: W.H. Freeman, 1980), 123: 'the origin of life may be related to successive instabilities somewhat analogous to the successive bifurcations that have led to a state of matter of increasing coherence.'
33. See Francisco J. Ayala, 'Can "Progress" be Defined as a Biological Concept,' in *Evolutionary Progress*, ed. Matthew H. Nitecki (Chicago: University of Chicago Press, 1988), 76–9.
34. *Ibid.*, 78.
35. *Ibid.*, 89.
36. *Ibid.*, 92.
37. See a clear exposition in Ernst Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist* (Cambridge, MA: Harvard University Press,

- 1988), 133–47.
38. Stephen Jay Gould, 'Darwin's Middle Road,' *The Panda's Thumb: More Reflections in Natural History* (New York: W.W. Norton & Co., 1980), 66–7 among others. See however, the argument that Darwin's early notions of evolutionary progress might have some origin in his Christian language in Robert J. Richards, 'The Moral Foundations of the Idea of Evolutionary Progress: Darwin, Spencer, and the Neo-Darwinians,' in *Evolutionary Progress*, 129–48.
  39. See Thomas Hobbes, *Leviathan, or the Matter, Forme, and Power of a Commonwealth: Ecclesiasticall and Civil*, ed. Michael Oakeshott (New York: Collier, 1962), 98–9: 'And therefore if any two men desire the same thing, which nevertheless they cannot both enjoy, they become enemies; and in the way to their end, which is principally their own conservation and sometimes their delectation only, endeavour to destroy, or subdue one another.' 'The Right of Nature . . . is the liberty each man hath, to use his own power, as he will himself, for the preservation of his own nature; that is to say, of his own life; and consequently, of doing any thing, which in his own judgment, and reason, he shall conceive to be the aptest means thereunto' (103).
  40. See the somewhat mollifying remarks of G.G. Simpson: 'Advantage in differential reproduction is usually a peaceful process in which the concept of struggle is really irrelevant. It more often involves such things as better integration into the ecological situation, maintenance of a balance of nature, more efficient utilization of available food, better care of the young, elimination of intragroup discords (struggles) that might hamper reproduction, exploitation of environmental possibilities that are not the objects of competition or are less effectively exploited by others' (G.G. Simpson, *The Meaning of Evolution* [New Haven, Yale University Press, 1971 edn.], 201) as quoted in A.R. Peacocke, *Creation and the World of Science* (Oxford: Clarendon Press, 1979), 165–6.
  41. Küppers, *Information*, 148. See Prigogine, *Being to Becoming*, 123–26. Meinhardt sees 'competition' at the primary level. See Hans Meinhardt, *Models of Biological Pattern Formation* (London: Academic Press, 1982), 189. See John H. Campbell, 'An Organizational Interpretation of Evolution,' in *Evolution at a Crossroads*, esp. 141–6 on alternative paths for evolution and Stuart A. Kauffman, 'Self-Organization, Selective Adaptation, and Its Limits,' *Evolution at a Crossroads*, 169–203.
  42. Küppers, *Information*, 151–2.
  43. *Ibid.*, 171; see the subtle dialectic that Ayala negotiates for the relationship of microevolutionary genetics and macroevolution in 'Reduction in Biology: a Recent Challenge,' *Evolution at the Crossroads*, esp. 73–7.
  44. Küppers, *Information*, 148, 171. Jantsch, for example, offers similar but different, criteria (*intensity*): the degree of time- and space-binding; *autonomy*: in the establishment and organization of relations; and *evolutionary connectedness* or *meaning*: the degree of aligning with neither total adaptation nor total independence), Eric Jantsch, *The Self-Organizing Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution* (Oxford: Pergamon Press, 1984), 297–8.
  45. Here the discussion links with the issue of 'development' and 'progress' in

- evolutionary biology. See above.
46. Küppers, *Information*, 150: 'The selection value of every single species will as a rule depend on the population variables of the other species taking part in selection, so that every evolutionary "step" changes the structure of the value profile . . . . This means that goal and goal-directedness, even at the level of biological macromolecules, are interdependent.' Note that this is *not* to say that some species are better or more important than others; it is simply to explain *why* some systems continue and others do not.
  47. Stephen Jay Gould, *The Flamingo's Smile: Reflections in Natural History* (New York: W.W. Norton & Co., 1985), 13–14.
  48. Stephen Jay Gould, *Dinosaur in a Haystack: Reflections in Natural History* (New York: Crown Trade, 1995), 48.
  49. Stephen Jay Gould, *Bully for Brontosaurus: Reflections in Natural History* (New York: W.W. Norton & Co., 1992), 400.
  50. Gould, *Urchin*, 245–6; *idem*, *Dinosaur*, 361–3; *idem*, *Hen's Teeth*, 253–90; *idem*, *Brontosaurus*, 455–60. He has a fellow-traveler in Michael Ruse, *Can a Darwinian Be a Christian? The Relationship between Science and Religion* (Cambridge: Cambridge University Press, 2001), 10–11.
  51. Gould, *Brontosaurus*, 412–15.
  52. Stephen Jay Gould, *An Urchin in the Storm: Essays about Books and Ideas* (New York: W.W. Norton & Co., 1987), 211, 232–3; *idem*, *The Panda's Thumb: More Reflections in Natural History* (New York: W.W. Norton & Co, 1980), 179; *idem*, *Dinosaur*, 128–9; *idem*, *Brontosaurus*, 380. Dr. Gould has written approximately 25 volumes of essays and treatises in addition to his scholarly analyses. I have perforce been selective in my choice of supportive material.
  53. Gould, *Dinosaur*, 444; *idem*, *Urchin*, 114, 165.
  54. Gould, *Dinosaur*, 444.
  55. See Gould, *Panda's Thumb*, 60, 243.
  56. *Ibid.*, 433. As we will see below, the politics of metaphoric usage is also 'ineluctable.' The question is not *whether* there will be a politics of metaphor, but *what kind of politics* it will be.
  57. Gould, *Brontosaurus*, 57.
  58. *Ibid.*, 29–30.
  59. Gould, *Dinosaur*, 344.
  60. Gould *Panda's Thumb*, 236.
  61. Gould, *Dinosaur*, 94, 119.
  62. *Ibid.*, 28.
  63. Gould, *Urchin*, 91.
  64. Stephen Jay Gould, *Hens Teeth and Horse's Toes: Further Reflections in Natural History* (New York: W.W. Norton & Co, 1984), 123–29.
  65. Gould, *Urchin*, 90.
  66. Gould, *Brontosaurus*, 115.
  67. Gould, *Urchin*, 43.
  68. Gould, *Panda's Thumb*, 28.
  69. *Ibid.*, 138–41.
  70. Gould, *Brontosaurus*, 61.
  71. Gould, *Urchin*, 48.
  72. Stephen Jay Gould, 'On Replacing the Idea of Progress with an

- Operational Notion of Directionality,' in *Evolutionary Progress*, ed. Matthew Nitecki (Chicago: University of Chicago Press, 1988), 319.
73. *Ibid.*, 333.
  74. *Ibid.*, 334–5.
  75. Gould, *Ever Since Darwin*, 57.
  76. Gould, *Brontosaurus*, 180.
  77. Gould, *Ever Since Darwin*, 59.
  78. Gould, *Brontosaurus*, 181.
  79. Gould, *Dinosaur*, 341.
  80. Gould, *Ever Since Darwin*, 45.
  81. Gould, *Panda's Thumb*, 66.
  82. Gould, *Ever Since Darwin*, 41.
  83. Gould, *Urchin*, 59–60, 213; *idem*, *Ever Since Darwin*, 44, 91; *idem*, *Hen's Teeth*, 138.
  84. Gould, *Panda's Thumb*, 50.
  85. *Ibid.*, 130.
  86. Gould, *Urchin*, 94.
  87. Gould, *Dinosaur*, 100–01.
  88. Gould, *Ever Since Darwin*, 239–42.
  89. Gould, *Urchin*, 69–70.
  90. *Ibid.*, 50.
  91. *Ibid.*, 168.
  92. Gould, *Panda's Thumb*, 14.
  93. Gould, *Dinosaur*, 316.
  94. Gould, *Brontosaurus*, 421.
  95. *Ibid.*, 328.
  96. *Ibid.*, 331.
  97. Kropotkin, quoted in *Ibid.*, 336.
  98. Gould, *Dinosaur*, 326.
  99. *Ibid.*, 327.
  100. Gould, *Brontosaurus*, 71.
  101. Gould, *Ever Since Darwin*, 13.
  102. For such a position, see John F. Haught, *God After Darwin: A Theology of Evolution* (Boulder, CO: Westview Press, 2000).
  103. Prigogine and Stengers, *Order Out of Chaos*, 192.
  104. Layzer, *Cosmogogenesis*, 144, 159.
  105. *Ibid.*, 164.
  106. *Ibid.*, 163.
  107. *Ibid.*, 170.
  108. Küppers, *Information*, 85.
  109. For an excellent history of aspects of empathy, see Karl F. Morrison, *'I AM YOU': The Hermeneutics of Empathy in Western Literature, Theology, and Art* (Princeton, NJ: Princeton University Press, 1988). It seems plausible that Gould's willingness to include metaphors and rhetoric in the work of science permits him to examine 'cooperation' and mutual aid as dimensions of his Darwinian research projects. For him, stories and metaphors cooperate, however dialectically, in the sciences.
  110. The gendered character of the relationship between words and images has been noted in Midgley, *Science as Salvation*, 75–91, where she quotes

- Francis Bacon among others who use dominative, violent language about mathematics' control of nature. Men use words and have power over them; women have more often been denied access to verbal education in the West and are associated with images – or being the objective and projective image for men. In the theological context, see Margaret S. Miles, *Image as Insight: Visual Understanding in Western Christianity and Secular Culture* (Boston: Beacon Press, 1985); see also Paul Ricoeur's distinction between metaphors and symbols in *Interpretation Theory: Discourse and the Surplus of Meaning* (Waco, TX: TCU Press, 1976), 53–63; and my article, 'On Picturing God: The Rhetoric of Religious Images and Caravaggio's *Conversion of St. Paul*,' *Rhetorical Invention and Religious Inquiry*, ed. Walter Jost and Wendy Olmstead (New Haven: Yale University Press, 2000) 323–55.
111. It has been Ricoeur's argument for many years that symbols and then metaphors have a fundamental role to play in philosophy. See Paul Ricoeur, 'Herméneutique des Symboles et Réflexion philosophique (I & II),' in *Le Conflit des Interprétations: essais d'herméneutique* (Paris: Seuil, 1969), originally published in 1961. See also Miles, *Image as Insight*, 15–39.
  112. For an argument about the power of iconic representation, see David Freedberg, *The Power of Images: Studies in the History and Theory of Response* (Chicago: University of Chicago Press, 1989). To understand some recent art historical criticism that emphasizes the rhetorical dimension of images, see Michael Fried, *Absorption and Theatricality: Painting and Beholder in the Age of Diderot* (Berkeley: University of California Press, 1980).
  113. Miles, *Image as Insight*, 30: 'An image may seduce a viewer to a certain message, but it will not bully him to that message. From the side of the image, there is multivalence, a range of possible interpretations.' One must ask Miles to examine the effects of propaganda, however, or the role of pornography in various civilizations. Both are a form of 'power politics.' Indeed, Caesar Augustus expended no little energy establishing images of himself to solidify the empire; see Paul Zanker, *The Power of Images in the Age of Augustus*, trans. Alan Shapiro (Ann Arbor: University of Michigan Press, 1988), esp. 85–100, 297–333.
  114. See Mieke Bal, *Reading 'Rembrandt': Beyond the Word Image Opposition* (Cambridge: Cambridge University Press, 1991), esp. 25–59.
  115. See Walter J. Ong, *Orality and Literacy: The Technologizing of the Word* (London: Methuen, 1982), esp. 5–15, 31–77.
  116. The classic study is Paul Oskar Kristeller, 'The Modern System of the Arts: A Study in the History of Aesthetics,' *Journal of the History of Ideas* XII (1951): 496–527 [part one] and XIII (1952): 17–46 [part two].
  117. See Earl R. MacCormac, 'Meaning Variance and Metaphor,' *British Journal for the Philosophy of Science* 22 (1971), 145–59. Note that many more disciplines have become cognizant of their rhetoric in recent years. See Donald N. McCloskey, 'The Rhetoric of Economics,' *Journal of Economic Literature* XXI (June, 1983), esp. 502–8.
  118. For a clear and highly nuanced interpretation of the supportive relationships between images and early modern science, see Martin J.S. Rudwick, *Scenes from Deep Time: Early Pictorial Representations of the Prehistoric World*

- (Chicago: University of Chicago Press, 1996), esp. 219–53.
119. Galileo Galilei, *Two New Sciences*, trans. Stillman Drake (Madison, WI: University of Wisconsin Press, 1974), 34.
  120. Midgley, *Science as Salvation*, 73.
  121. W.J.T. Mitchell, *Iconology: Image, Text, Ideology* (Chicago: University of Chicago Press, 1986), 105.
  122. *Ibid.*, 129.
  123. *Ibid.*, 136–7.
  124. Paul Ricoeur, 'Metaphor and the Main Problem of Hermeneutics,' in *The Philosophy of Paul Ricoeur*, ed. Charles E. Reagan and David Stewart (Boston: Beacon Press, 1978), 134–48; 'The Task of Hermeneutics,' in *idem, Hermeneutics and the Social Sciences*, ed. and trans. John B. Thompson (Cambridge: Cambridge University Press, 1982), 43–62.
  125. Ricoeur maintains that this recovers Hegel through Kant. My position is that it is not even necessary to discover a 'Kantian' Hegel through Kant. In Hegel's 'Lectures on the Philosophy of Religion,' it is quite clear that in the final appearance of philosophy as truth, its 'event-character' is simply the recovery of the content of Christianity in conceptual form, at once both subjectively appropriated and objectively witnessed. In this sense, philosophy is a symbiotic discipline, dependent upon another form of language for its content. See, for example, G.W.F. Hegel, *Lectures on the Philosophy of Religion*, trans. E.B. Speirs and J. Burdon Sanderson (New York: Humanities Press, 1968), Vol. III, 107–8, 145–9.
  126. Paul Ricoeur, 'Toward a Hermeneutic of the Idea of Revelation,' and 'The Hermeneutics of Testimony,' in *Essays in Biblical Interpretation*, ed. Lewis S. Mudge (Philadelphia: Fortress Press, 1980), 73–154; and his 'Personal Identity and Narrative Identity,' *Oneself as Another*, trans. Kathleen Blamey (Chicago: University of Chicago Press, 1992), 113–39.
  127. W.J.T. Mitchell, 'Ekphrasis and the Other,' in *Picture Theory: Essays on Verbal and Visual Imagination* (Chicago: University of Chicago Press, 1994), 160.
  128. As quoted in M.-D. Chenu, *Nature, Man, and Society in the Twelfth Century: Essays on New Theological Perspectives in the Latin West*, selected, edited and translated, Jerome Taylor and Lester K. Little (Chicago: University of Chicago Press, 1968), 11.
  129. *Ibid.*, 17–18.
  130. See Jean Gimpel, *The Medieval Machine: The Industrial Revolution of the Middle Ages* (New York: Holt, Rinehart and Winston, 1976).
  131. See for a description and social significance, G.J. Whitrow, *Time in History: Views of Time from Prehistory to the Present Day* (Oxford: Oxford University Press, 1989), 104–14.
  132. Gimpel, *Medieval Machine*, 169–70.
  133. Chenu, *Man, Nature, and Society*, 39–40.
  134. Midgley points out that the conflicts of science and faith are competition between two sorts of faith – a different basic trust. See Midgley, *Science as Salvation*, 57.
  135. Thomas Aquinas, *Summa Theologiae*, I, Q. 1, a. 2, *corp.* in which he points out that theology, like some other sciences, 'receives' its principles from elsewhere.

136. See Mieke Bal, *Death and Dissymmetry: The Politics of Coherence in the Book of Judges* (Chicago: University of Chicago Press, 1988), 103: 'Icons are proscribed from worship precisely because they initiate the dangerous identity between deity and humans that terminated the sojourn in paradise.'
137. G.W. Bromiley (ed.), *Zwingli and Bullinger* (Philadelphia: Westminster Press, 1953). One should note that Zwingli was trained as a rhetorician and found *words* the appropriate vehicle for Christian discourse.
138. See, for examples, Karl Rahner's argument for the intrinsic inclusion of the nonverbal and visual arts in theology in 'Theology and the Arts,' *Thought* 57 (March 1982), 17–29; or Paul Tillich, 'On the Theology of Fine Art and Architecture,' in *Paul Tillich: On Art and Architecture*, ed. John Dillenberger and Jane Daggett Dillenberger, trans. Robert P. Scharlemann (New York: Crossroad, 1987), 204–13, esp. 206f. Much of the contemporary work on the relationship of words and images is dependent upon Roland Barthes, *Image/Music/Text* (New York: Hill and Wang, 1977).
139. Miles, *Image as Insight*, 33.
140. 'Mutual mediation' is Bernard Lonergan's term in 'The mediation of Christ in Prayer,' *Method: Journal of Lonergan Studies* 2 (1984) 1, 1–20; see also for this discussion of words and images, Mitchell, *Iconology*; and Wendy Steiner, *The Colors of Rhetoric: Problems in the Relation between Modern Literature and Painting* (Chicago: University of Chicago Press, 1982), esp. 1–69.
141. See, for example, Aquinas, *Summa Theologiae*, I, Q. 1, a. 9 where Aquinas argues that religious metaphors and symbols are appropriate to human cognitional processes which depend upon the senses. He sees this language as directed to all human beings. Figures are useful for exercising the intelligence and avoiding simplistic disclosure. Since it is clearer to us in this life what God is not than what God is, metaphors provide an appropriate hiddenness inside language (*ad 3am*). Moreover, metaphors provide a plurality of meanings to the texts of the scriptures (a. 10).
142. Even the reputed rationalist Hegel believes that the sensuous language of the Scriptures may be necessary for some people. 'The witness of the Spirit may, however, be present in manifold and various ways; we have no right to demand that the truth should in the case of all men be got at in a philosophical way.' G.W. F. Hegel, *Lectures on the Philosophy of Religion*, trans. E.B. Speirs and J. Burdon Sanderson, ed. E.B. Speirs (New York: Humanities Press, 1968), II, 340.
143. Mieke Bal, *Reading 'Rembrandt': Beyond the Word-Image Opposition* (Cambridge: Cambridge University Press, 1991); Miles also articulates her version of a visual poetics in *Image as Insight*, 27–35, 139–54.
144. Bal, 'Rembrandt,' 54.
145. *Ibid.*, 57.
146. One of the other advantages in Bal's interpretation is that the 'subject' of theater is a social group, not an individual. In artwriting that focuses upon painting, it has been easier to think of the participants as a highly subjective audience of one.
147. The relationship between images and the female body is also explored by Margaret R. Miles, *Carnal Knowing: Female Nakedness and Religious Meaning*



- in the Christian West* (Boston: Beacon Press, 1989).
148. Lonergan, 'The Mediation of Christ in Prayer,' *Method* (1984), 1–20.
  149. This work is borne out in neurophysiology. See Antonio Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: Avon Books, 1994) and Joseph LeDoux, *The Emotional Brain: The Mysterious Underpinnings of our Emotional Life* (New York: Simon & Schuster, 1996) whose work will reappear more extensively in chapter 5.
  150. Terrence W. Deacon, *The Symbolic Species: The Co-evolution of Language and the Brain* (New York: W.W. Norton & Co., 1997), 59–68, 214–20.
  151. Marc Jeannerod, *The Cognitive Neuroscience of Action* (Oxford: Blackwell, 1997), 94–125.
  152. Lonergan, 'Mediation of Christ,' *Method*, 8–9.
  153. Bernard Lonergan, *Method in Theology* (London: Darton, Longman & Todd, 1972), 63.
  154. See, in the Lonergan context, Robert Doran, 'Self-Knowledge and the Interpretation of Imaginal Expression,' *Method: Journal of Lonergan Studies* 4 (October, 1986) 2, 55–84; in another context, Paul Ricoeur, 'Personal Identity and Narrative Identity' and 'The Self and Narrative Identity,' in *Oneself as Another*, trans. Kathleen Blamey (Chicago: University of Chicago Press, 1992), 113–68. For Lonergan, *descriptive languages* (images, metaphors, etc.) and *explanatory languages* (abstract concepts and categories) can cooperate rather than conflict. Lonergan roots this distinction in the authentic, self-transcending subject. See Bernard Lonergan, *Insight: A Study of Human Understanding* (New York: Longmans, 1967), 332–5.
  155. Barbara Maria Stafford, *Body Criticism: Imaging the Unseen in Enlightenment Art and Medicine* (Cambridge, MA: MIT Press, 1994), 469; see also her *Artful Science: Enlightenment Entertainment and the Eclipse of Visual Education* (Cambridge, MA: MIT Press, 1994), 281ff.
  156. Bernard J. F. Lonergan, 'Dialectic of Authority,' in *A Third Collection*, ed. Frederick E. Crowe (New York: Paulist Press, 1985), 5.
  157. Doran, *Theology and the Dialectics of History*, 502.
  158. Emmanuel Levinas, *Totality and Infinity: An Essay on Exteriority*, trans. Alphonso Lingis (Pittsburgh, PA: Duquesne University Press, 1969), 253.
  159. For the notion of *deep silence*, see Bernard Dauenhauer, *Silence: The Phenomenon and Its Ontological Significance* (Bloomington: Indiana University Press, 1980), 16–25, 61–82.

## Chapter 5

1. 'Anima humana intelligit se ipsum per suum intelligere, quod est actus proprius eius, perfecte demonstrans virtutem eius et naturam,' *Summa Theologiae* I, Q. 88, a. 2, ad 3m. (my translation).
2. *The Confessions of St. Augustine*, translated Edward W. Pusey (New York: Pocket Books, 1957), 235.
3. The standard scientific argument, however, is that the 'direction of time' is subjective. See Marc Lachièze-Rey, 'Du temps et sa flèche,' *Le Temps, Vite: Sciences* (Belgium: Snoeck-Ducaju & Zoon for Paris: Centre Georges

- Pompidou, 2000), 20. For a more nuanced account, see Paul Davies, *About Time: Einstein's Unfinished Revolution* (New York: Simon & Schuster, 1996), 196–218.
4. See Frances A. Yates, *The Art of Memory* (Chicago: University of Chicago Press, 1966), 27–49.
  5. For the hermeneutical role of neural imagining in contemporary science, see Barbara Maria Stafford, *Good Looking: Essays on the Virtue of Images* (Cambridge, MA: MIT Press, 1996), 24–5.
  6. See Barbara Maria Stafford, *Body Criticism: Imaging the Unseen in Enlightenment Art and Medicine* (Cambridge, MA: MIT Press, 1994), esp. 47–129.
  7. Stafford, *Good Looking*, 133.
  8. Although I do not agree with all the strongly reductionist view of applying rhetoric to science, see Alan G. Gross, *The Rhetoric of Science* (Cambridge, MA: Harvard University Press, 1996), esp. 6–32.
  9. See Gerald Holton, 'Einstein's Influence on the Culture of our Time,' in *Einstein, History and Other Passions: The Rebellion against Science at the End of the Twentieth Century* (Reading, MA: Addison-Wesley Publishing Co., 1995), 143.
  10. See Chapter 1 and Michael Arbib and Mary Hesse, *The Construction of Reality* (Cambridge: Cambridge University Press, 1986).
  11. See Michael Arbib, *Metaphorical Brain 2: Neural Networks and Beyond* (New York: Wiley Interscience, 1989), 14; Jon H. Kaas, 'The Reorganization of Sensory and Motor Maps in Adult Mammals,' in *The Cognitive Neurosciences*, ed. Michael S. Gazzaniga (Cambridge, MA: MIT Press, 1995), 53ff; Antonio R. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: Avon Books, 1994), xiv–xv.
  12. Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, *Essentials of Neural Science and Behavior* (Norwalk, CT: Appleton & Lange, 1995), 219–306; Damasio, *Descartes' Error*, 181.
  13. Sherrington cited in Marc Jeannerod, *The Cognitive Neuroscience of Action* (Cambridge, MA: Blackwell, 1997), 2–3.
  14. Luria quoted by Arbib, *Metaphorical Brain 2*, 17; William H. Calvin, *The Cerebral Code: Thinking a Thought in the Mosaics of the Mind* (Cambridge, MA: MIT Press, 1996), 2, 39–48.
  15. *Ibid.*, 48; Revor W. Robbins, 'Refining the Taxonomy of Memory,' *Science* 273 (6 September 1996), 1354; Alan Prince and Paul Smolensky, 'Optimality: From Neural Networks to Universal Grammar,' *Science* 275 (14 March 1997), 1606–8. The complexities that figure in the use of 'neural networks' can be seen in Daniel Gardner, ed., *The Neurobiology of Neural Networks* (Cambridge, MA: MIT Press, 1993).
  16. Herbert Killackey, 'Evolution of the Human Brain: a Neuroanatomical Perspective,' *Cognitive Neurosciences*, 1247; Francis Crick, *The Astonishing Hypothesis: The Scientific Search for the Soul* (New York: Charles Scribners' Sons, 1994), 177–99.
  17. Joseph LeDoux, *The Emotional Brain: The Mysterious Underpinnings of Emotional Life* (New York: Simon & Schuster, 1996), 116–21; Leslie Brothers, *Friday's Footprint: How Society Shapes the Human Mind* (New York: Oxford University Press, 1997), 80–99; Alan Searleman and Douglas

- Herrmann, *Memory from a Broader Perspective* (New York: McGraw-Hill, 1994), 125–7.
18. For an intriguing history of the role of imagination in the natural sciences, see Lorraine Daston, 'Fear and Loathing of the Imagination in Science,' *Daedalus* 127:1 (Winter, 1998), 73–95; for the role of 'thematic imagination' in science, see Gerald Holton, *The Scientific Imagination: Case Studies* (Cambridge: Cambridge University Press, 1978), esp. 3–24.
  19. Owen Flanagan, *Consciousness Reconsidered* (Cambridge, MA: MIT Press, 1992), 213. Flanagan's 'naturalist' bias will need to be examined in the context of how far the notion of the brain is constituted by social experience and how far sociality should be extended (to include an infinite Other?); but his emphasis upon the lower neural pathways as the basis of consciousness must be taken seriously. I will use the term 'conscious' in the sense of some philosophical phenomenologists to include all forms of awareness by somaticized, neural pathways. That means that self-reflective activity is not the only form of conscious activity. There are pre-reflective forms of consciousness such as the immediacy of some sensations. These can be reflected upon; they may include a separate marker for such activity. There are also unconscious activities of the body (e.g. metabolism of one's cells) to which one attends only in the laboratory; but unconsciously, they are still occurring in the investigator. Much of human activity is pre-reflective; but that does not mean that it is not conscious; it has an intentional frame. (See Bernard Lonergan, *Insight: A Study in Human Understanding* [New York: Longmans, 1957], esp. 319–47.)
  20. This was examined in the evolution of psychology as a science and its relationship to biology in Robert M. Young, *Mind, Brain, and Adaptation in the Nineteenth Century. Cerebral Localization and its Biological Context from Gall to Ferrier* (Oxford: Clarendon Press, 1970).
  21. Mark S. Seidenberg, 'Language Acquisition and Use: Learning and Applying Probabilistic Constraints,' *Science* 275 (14 March 1997), 1600.
  22. Ingrid Wickelgren, 'Getting a Grasp on Working Memory,' *Science* 275 (14 March 1997), 1581–2.
  23. These are Michael Arbib's comments (personal communication) on William L. Kilmer, W.S. McCulloch, and J. Blum, 'A Model of the Vertebrate Central Command system,' *International Journal of Man-Machine Studies* 1 (1969), 279–309.
  24. James B. Ashbrook and Carol Rausch Albright, *The Humanizing Brain: Where Religion and Neuroscience Meet* (Cleveland, OH: Pilgrim Press, 1997), 113.
  25. Arbib, *Metaphorical Brain* 2, 18.
  26. Ashbrook and Albright, *Humanizing Brain*, 148.
  27. This does not necessarily mean that consciousness is uninvolved in neural circuitry. 'As the brain evolves, it exhibits new patterns of neural activity which can provide new "ecological niches" for the evolution of new neural circuitry to exploit those patterns. But once such new circuitry evolves, there is a new "information environment" for its earlier circuitry – so it may evolve in turn to exploit these new patterns' (Arbib, *Metaphorical Brain* 2, sec. 7.2). It is precisely this 'initiating' sequence (in which a new information environment 'exploits' [i.e., actively perpe-

- trates] an effect) that I think is at the heart of the philosophical, psychological, neuroscientific, and theological notions of consciousness. So Chalmers argues that 'consciousness is not an explanatory construct, postulated to help explain behavior or events in the world. Rather, it is a brute explanandum, a phenomenon in its own right that is in need of explanation.' See David J. Chalmers, *The Conscious Mind: In Search of a Fundamental Theory* (New York: Oxford University Press, 1996), 188.
28. See Arbib, *Metaphorical Brain 2*, 3–84; Damasio, *Descartes' Error*, 165–201.
  29. Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith (New York: St. Martin's Press, 1965), 180. See Mark Johnson's discussion of Kant on schemata of the imagination in *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason* (Chicago: University of Chicago Press, 1987), 21–4, 152–7.
  30. Kant, *Critique of Pure Reason*, 182.
  31. *Ibid.*, 183, 185.
  32. *Ibid.*, 183.
  33. Arbib, *Metaphorical Brain 2*, 9.
  34. *Ibid.*, 6.
  35. *Ibid.*, 18.
  36. *Ibid.*, 37.
  37. *Ibid.*, 47.
  38. *Ibid.*, 19–20.
  39. *Ibid.*, 23.
  40. *Ibid.*, 31.
  41. *Ibid.*, 48.
  42. Damasio, *Descartes' Error*, 167.
  43. *Ibid.*, 173–5.
  44. *Ibid.*, 174.
  45. Christian thinkers since Augustine have spoken of the *fomes peccati*, the physical, 'somatic marks' of sinful actions in the actor's body, which, despite the believer's firm choice of amendment, would require careful monitoring. See Karl Rahner, 'The Theological Concept of Concupiscentia,' *Theological Investigations*, trans. Cornelius Ernst (Baltimore: Helicon, 1965), esp. 360–9.
  46. Damasio, *Descartes' Error*, 179.
  47. *Ibid.*, 180.
  48. *Ibid.*, 183.
  49. *Ibid.*, 187.
  50. *Ibid.*, 198.
  51. Damasio states: 'If we assume that the brain is normal and the culture in which it develops is healthy, the device has been made rational relative to social conventions and ethics' (*Descartes' Error*, 200, my italics). The relationship between nature and nurture in this field could use a healthy dose of critical theory!
  52. Brothers, *Friday's Footprint*, 103.
  53. Damasio, *Descartes' Error*, 182.
  54. *Ibid.*, 196–7.
  55. For the survey that follows, see Searleman and Herrmann, *Memory*, 57–8. More technical surveys of the multiple issues involved may be found in

- Elizabeth L. Bjork and Robert A. Bjork eds., *Memory* (New York: Academic Press, 1996) and Norman E. Spear and David C. Riccio, *Memory: Phenomena and Principles* (Boston: Allyn and Bacon, 1994).
56. Searleman and Hermann, *Memory*, 109.
  57. *Ibid.*, 166–7.
  58. *Ibid.*, 213–18.
  59. *Ibid.*, 69–70.
  60. *Ibid.*, 103. For extensive discussion, see Peter Graf and Michael E.J. Masson eds., *Implicit Memory: New Directions in Cognition, Development, and Neuropsychology* (Hillsdale, NJ: Lawrence Erlbaum Assoc, Publishers, 1993).
  61. Searleman and Herman, *Memory*, 105.
  62. See Kandel, Schwartz, and Jessell, *Essentials of Neural Science*, 651–94; for alternate views, see for example Raymond P. Kesner, 'The Neurobiology of Memory: Implicit and Explicit Assumptions,' in Gary Lynch, James L. McGaugh, Norman M. Weinberger, *Neurobiology of Learning and Memory* (New York: Guilford Press, 1984), 111–18.
  63. See the research results on two memory systems in Mortimer Mishkin, Barbara Malamut, Jocelyne Bachevalier, 'Memories and Habits: Two Neural Systems,' in Gary Lynch, James L. McGaugh, and Norman M. Weinberger eds., *Neurobiology of Learning and Memory* (New York: Guilford Press, 1984), 65–77.
  64. Searleman and Hermann, *Memory*, 671. Or as Michael Gazzaniga argues, they may be part of what he calls 'superordinate organizing systems' (similar to Arbib's schemas?). See Michael Gazzaniga, 'Advances in Cognitive Neurosciences: The Problem of Information Storage in the Human Brain,' in Lynch, McGaugh, Weinberger, *Neurobiology*, 78–88.
  65. Searleman and Hermann, *Memory*, 692. For the social dimensions of memory-formation, see Brothers, *Friday's Footprint*, 41–2, 98.
  66. Thus a philosopher like John Searle (whatever one thinks of his solutions) does not want to cede the territory of consciousness either to dualists or absolute materialists. He thinks the questions of consciousness are still worth asking for both scientists and philosophers. See John Searle, *The Rediscovery of Mind* (Cambridge, MA: MIT Press, 1994).
  67. Ashbrook and Albright, *Humanizing Brain*, 155.
  68. Damasio, *Descartes' Error*, 225.
  69. Marie Barinaga, 'Visual System Provides Clues to How the Brain Perceives,' *Science*, 275 (14 March 1997): 1583; for discussion of bodily feedback on emotional responses, see LeDoux, *Emotional Brain*, 291–6. To claim that perception is hermeneutical is not to claim that the senses are nonveridical. It may locate the discussion of their empirical validity, but it neither denies nor affirms their truth-telling. In principle, I would argue that the senses provide relatively adequate data for later adjudicated truth-claims.
  70. Ingrid Wickelgren, 'Getting the Brain's Attention,' *Science* 278 (3 October 1997), 35–7.
  71. Brothers, *Friday's Footprint*, 66–110; Ashbrook and Albright, *Humanizing Brain*, 5. As Brothers concludes, mind is 'irreducibly transactional' (146).
  72. For a discussion of the molecular constitution of this body-space in relation to the environment, see Kandel, Schwartz, Jessell, *Essentials of Neural Science*, 335–46.

73. Damasio, *Descartes' Error*, 234.
74. This seems to be *contra* Damasio (*Descartes' Error*, 242–3) who argues that subjectivity emerges when there is a self-reflective knowledge of one's perceiving and image-forming activities. This view would create a problem for calling infants fully human, let alone autistic or schizophrenic individuals.
75. Johnson, *Body in the Mind*, 74–100.
76. Edmund Husserl, *The Phenomenology of Internal Time-Consciousness*, ed. by Martin Heidegger, translated by James S. Churchill (Bloomington, IN: Indiana University Press, 1964). All pages will be cited in the text in parentheses; emphases are the author's and translators. For an overview, see Robert Sokolowski, *Husserlian Meditations: How Words Present Things* (Evanston, IL: Northwestern University Press, 1974), 138–67.
77. Husserl's interest in 'objective time' is determined by his interest in how it arises, given the flux of the human temporal flux. Indeed, he sees the regularities of objective time, the time of natural objects, as constituted within the knowing process.
78. For Brentano's understanding of intentionality and time consciousness, see Herbert Spiegelberg, *The Phenomenological Movement: A Historical Introduction* (The Hague: Martinus Nijhoff, 1969) I, 38–44; for Husserl's differences with Brentano on intentionality, see 107–18.
79. By *intentionality* in this context, Husserl does not necessarily mean a 'chosen, willed object.' He means to describe the neutral arc or cognitive relation between knower and known; but the relation is reciprocal, i.e., the object can provoke the interpret into 'intending' its presence and the interpreter can 'intend' an object without have a particular object in view. Intentionality can include the specific acts of feeling, sensing, conceptualizing, willing, judging, and so forth. The term is meant to denote a relational mutuality of intending subject and intended object.
80. For Husserl, perception is the 'temporally constitutive consciousness with its phases of flowing retentions and protentions' (176). It includes the acts of sensation, but also judgment, even the act of observing an act. They are the unities of time-consciousness.
81. This leaves aside the issue of deflated expectations in the present or unfulfilled anticipations. Husserl's account claims that the protentions that emerge from the past *must* continue into the present, even in an unfulfilled expectation in the present. In other words, there is no *completely* unanticipated event in the now. Without some intentional 'overlap,' the moment could not be recognized.
82. Imagination constructs a present and a future on the basis of possible conditions; it actively and practically mediates the past into the present. Fantasy has no possible conditions in the empirical world; its products can only be dream-like cartoons, a form of virtual reality. The boundaries between the products of the two intentional operations are, however, permeable. The term 'phantasm' (the traditional medieval term) has migrated in usage from its neutral notion in Aristotle and Aquinas as the activated and activating product of the knowing process in sensing, understanding or judging. Since the nineteenth century, it has tended to be identified with the 'fantastic,' non-empirical, unverifiable.

83. Although the medieval notions of the soul and memory apply in most areas to Jewish, Muslim, and Christian theologians (due to their derivations from Plato and Aristotle), I shall concentrate on Christian theology.
84. For a brief overview, see Warren S. Brown, Nancey Murphy, and H. Newton Malony, *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998), 2–8, 151–72.
85. See Thomas Moore, *Care of the Soul: A Guide for Cultivating Depth and Sacredness in Everyday Life* (New York: HarperCollins, 1992).
86. Keith Ward, *Defending the Soul* (Oxford: Oneworld, 1992), 142. See also Philip Clayton, 'Neuroscience, the Person, and God: An Emergentist Account,' in *Neuroscience and the Person: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Nancey Murphy, Theo C. Meyering and Michael A. Arbib (Vatican City State: Vatican Observatory Publications, 1999), 181–214.
87. Caroline Walker Bynum, *Fragmentation and Redemption: Essays on Gender and the Human Body in Medieval Religion* (New York: Zone Books, 1991), 223.
88. See Bruno Snell, *The Discovery of the Mind: The Greek Origins of European Thought*, trans. T.G. Rosenmeyer (New York: Harper & Row, 1960), 43–70, 226–63; and Jan N. Bremmer, *The Early Greek Concept of the Soul* (Princeton, N.J.: Princeton University Press, 1983), esp. 13–69.
89. Bremmer, *Greek Concept of the Soul*, 68.
90. Aristotle, *On the Soul*, in *The Basic Works of Aristotle*, ed. Richard McKeon (New York: Random House, 1941), 535.
91. Thomas Aquinas, *Summa Theologiae* (New York: Benziger, 1947). I, QQ. 75–89 and *Summa Contra Gentiles*, trans. James F. Anderson (Garden City, NY: Doubleday, 1962) II, QQ. 46–90. All citations will be in parentheses in the text in the usual fashion.
92. See Colleen McDannell and Bernhard Lang, *Heaven: A History* (New Haven: Yale University Press, 1988) 17–110; for purgatory, see Jacques Le Goff, *The Medieval Imagination*, trans. Arthur Goldhammer (Chicago: University of Chicago Press, 1988), 67–77.
93. See Josef Maréchal, *Le Point du Départ de la Métaphysique* (Paris, Louvain, 1922–44); Karl Rahner, *Spirit in the World*, trans. William Dych, S.J. (New York: Herder and Herder, 1968; German text, 1957) and especially Bernard J.F. Lonergan, *Verbum: Word and Idea in Aquinas*, ed. David B. Burrell (Notre Dame, IN: University of Notre Dame Press, 1967; orig. publ., 1946–49); *idem*, *Insight: A Study of Human Understanding* (New York: Longmans, 1957); and *idem*, *Method in Theology* (London: Darton, Longman & Todd, 1972). An historical survey can be found in Otto Muck, *The Transcendental Method*, trans. William D. Seidensticker (New York: Herder and Herder, 1968). I believe these interpretations to be consistent with his thought. I do not, however, pretend to repeat Aquinas in his own words or to provide a complete presentation of the thinker on cognition and the soul.
94. Lonergan, *Method in Theology*, 95–6; 'Christ as Subject,' 174, n. 11.
95. See Lonergan, *Verbum*, vii–xv.
96. Lonergan, *Insight*, 436–7.
97. See Lonergan, *Verbum*, 47, 72 n. 115, 74–85.
98. *Ibid.*, 20.

99. William Barrett, *Death of the Soul: From Descartes to the Computer* (Garden City, NY: Doubleday, 1986), 119–41.
100. For the general approach, see Bernard Lonergan, 'Isomorphism of Thomist and Scientific Thought,' *Collection*, ed. F.E. Crowe, S.J. (New York: Herder and Herder, 1967), 142–51.
101. Lonergan, 'Christ as Subject,' 177 n. 14.
102. Aquinas, *In III de Anima*, lect. 2 § 591 as quoted in Lonergan, 'Christ as Subject,' 181 n. 21.
103. The voice is a coordinated/coordinating voice. As Michael Arbib has pointed out, his neurological studies on schema theory (*Metaphorical Brain 2*, 211) and Leslie Brothers on the social nature of brain activity (*Friday's Footprint*, 1997) show how the unifying agency of consciousness is the interaction of distributed brain regions constructing patterns and overlapping foci of consciousness.
104. Lonergan, *Verbum*, 25–33.
105. Karl Rahner, 'The Theology of the Symbol,' *Theological Investigations*, trans. Kevin Smyth (Baltimore: Helicon, 1966), 247. For Rahner, the body is the material presence of the particular kind of *spirit* or transcendence that the finite soul is.
106. Rahner, 'Theology of the Symbol,' *Theological Investigations*, IV: 245–9.
107. Within evolutionary biology, this appears as an intriguing pre-modern insight. For reflections on this topic, see Francisco J. Ayala, 'Human Nature: One Evolutionist's View,' *Whatever Happened to the Soul?*, Brown et al. eds., 31–48.
108. Aristotle, 'De Memoria et Reminiscentia,' in *Basic Works of Aristotle*, 607–17.
109. See Mary Carruthers, *The Book of Memory: A Study of Memory in Medieval Culture* (Cambridge: Cambridge University Press, 1999), 51–7.
110. Lonergan, *Verbum*, 16–25. It is clear that the neuroscientist could find resonances with the first four areas of Aquinas's assertions.
111. Lonergan, 'Mediation of Christ in Prayer,' *Method* (1984), 8–9.
112. The opening to a radically distinct form of Other is what makes Aquinas's cognitive agent *intrinsically* dialogical; part of the problem with Husserl's subject has always been its implied solipsism.
113. For a popular account of Aquinas on the soul, see Stephen Happel and James R. Price III, 'Geography of the Soul: An Intellectual Map,' in *Nourishing the Soul*, ed. Anne Simpkinson, Charles Simpkinson & Rose Solari (New York: HarperCollins, 1995), 60–9.
114. Lonergan, *Method in Theology*, 95–6, 259–60, 288.
115. For Descartes and Malebranche, see Michael J. Buckley, *At the Origins of Modern Atheism* (New Haven: Yale University Press, 1987), 146–7; see also in this context, Ian Barbour, *Religion in an Age of Science The Gifford Lectures, 1989–1991. Volume I* (New York: HarperSanFrancisco, 1990), 195–9, 207–9; and Arthur Peacocke, *Theology for a Scientific Age: Being and Becoming – Natural, Divine and Human* (Minneapolis: Fortress Press, 1993), esp. 223–54.
116. See the conflict between Romanticism and the Enlightenment in Gerald Holton, 'What Place for Science at the "End of the Modern Era"?,', in *Einstein, History, and Other Passions*, 3–39.



117. For another reading, see David Ray Griffin, *Unsnarling the World-Knot: Consciousness, Freedom, and the Mind-Body Problem* (Berkeley: University of California Press, 1998), 11–14.
118. For what follows, see Alain Renaut, *The Era of the Individual: A Contribution to a History of Subjectivity*, translated by M.B. DeBevoise and Franklin Philip (Princeton, N.J.: Princeton University Press, 1997), esp. 3–57. See also Charles Taylor, *Sources of the Self: The Making of Modern Identity* (Cambridge, MA: Harvard University Press, 1989), 305–54.
119. The 'dialectic of the Enlightenment' is aptly described in Martin Jay, *The Dialectical Imagination: A History of the Frankfurt School and the Institute of Social Research, 1923–50* (London: Heinemann, 1973), 253–99; see Holton, 'The Public Image of Science,' in *Einstein, History, and Other Passions*, 40–57.
120. For a more lengthy description of these issues in postmodern life, see Stephen Happel and James J. Walter, *Conversion and Discipleship: A Christian Foundation for Ethics and Doctrine* (Philadelphia, PA: Fortress Press, 1986), 85–101.
121. For a positive theological reading of the enterprise of philosophy after Jacques Derrida, see Mark C. Taylor, *Erring: A Postmodern A/Theology* (Chicago: University of Chicago Press, 1984).
122. See Brown, Murphy, and Malony, *Whatever Happened to the Soul?*, 213.
123. See Holton, *Einstein*, 3–57.
124. Renaut, *Era of the Individual*, 3.
125. He creatively reads the contemporary solution through Levinas and Kant.
126. Ashbrook and Albright, *Humanizing Brain*, 15.
127. *Ibid.*, 42, 92.
128. Although it does not necessarily create problems for Christian notions about the resurrection of the body, see Ted Peters, 'Resurrection of the Very Embodied Soul?,' in *Neuroscience and the Person*, 305 – 26. I have deliberately avoided discussion of the Thomist commitment to the immortality of the soul separated from the body (ST, I, Q. 75, aa. 5–7, Q 89, a.1). For Aquinas the conscious human intelligence *naturally* desires always to exist because it intends universals (Q 75, corp); a natural desire cannot be in vain. Aquinas recognizes the problem of cognition without the senses after death (Q. 89, a. 1) and argues that human beings after death know through graded participation in the divine intellect (Q. 89, a. 1, ad 3). One must recall that Aquinas is here most evidently a theologian, attempting to make coherent a doctrine of personal continuity from death through eternal life. The residual Platonism, however, in Aquinas remains clear: 'The separated soul . . . has a greater freedom of intelligence, since the weight and care of the body is a clog upon the clearness of its intelligence in the present life' (Q. 89, a. 2, ad primum).
129. Ashbrook and Albright, *Humanizing Brain*, 33–5.
130. Given the fact that the brain is a 'far-from-equilibrium' subject, the topic of self-organizing systems is also relevant here. (See Chapter three). For work in this area, see Karl H. Pribram, *Origins: Brain & Self-Organization* (Hillsdale, NJ: Erlbaum, 1994).
131. For me, that is why the criteria with which Brothers and Wildman end their essay are important. (See Wesley J. Wildman and Leslie A. Brothers,

'A Neuropsychological-Semiotic Model of Religious Experiences,' in *Neuroscience and the Person*, esp. 389–413.) Are there conditions for making a judgment that schizophrenics or those with temporal lobe epilepsy are ill and in need of medical and pharmacological assistance and those claiming religious experiences (without the other patterns) are not? To answer that there are differences does not invalidate schizoid individuals as possible saints; but it may be *despite* their illness, not *because* of it!

## Chapter 6

1. See *The Confessions of St. Augustine*, trans. by Edward B. Pusey (New York: Pocket Books, 1957), 215–301; and Paul Ricoeur, *Time and Narrative*, Vol. 1, translated Kathleen McLaughlin and David Pellauer (Chicago: University of Chicago Press, 1984), 5–30.
2. Thomas Aquinas, *Summa Contra Gentiles*, I, 66, 7.
3. For a history, see David C. Lindberg, *The Beginnings of Modern Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, 600 B.C. to A.D. 1450* (Chicago: University of Chicago Press, 1996).
4. *SCG*, III, 65, 6.
5. For a philosophical defense of the fundamentally relational nature of reality from a post-Heideggerian viewpoint, see Xavier d'Arodes de Peyriague, 'Car Seul Surgit, en se Niant, L'Impossible: Essai sur les fondements d'une métaphysique de la relation' (Rome: PhD Dissertation, 1999).
6. See Philip Clayton, *God and Contemporary Science* (Grand Rapids, MI: Eerdmans, 1997), 189–92. This is the hypothesis that we have investigated through the entire book.
7. See Marie-Dominique Chenu, *Nature, Man and Society in the Twelfth Century: Essays on New Theological Perspectives in the Latin West*, selected, ed. and trans. by Jerome Taylor and Lester K. Little (Chicago: University of Chicago Press, 1968), 69; for the ways in which medieval artwork was also involved in these dialogues, see Meyer Schapiro, 'On the Aesthetic Attitude in Romanesque Art,' in his *Romanesque Art: Selected Papers* (New York: George Braziller, 1993), 1–27; for his strictures on these parallels, see his 'Philosophy and Worldview in Painting,' in *Worldview in Painting – Art and Society: Selected Papers* (New York: George Braziller, 1999), 11–73.
8. See Lafont's belief that a 'negative theology' based on Heidegger or Derrida is rather seductive in Ghislain Lafont, *God, Time, and Being* translated by Leonard Maluf (Petersham, MA: St. Bede's Publications, 1992), 326.
9. Jean-Luc Marion, *God Without Being*, trans. Thomas A. Carlson (Chicago: University of Chicago Press, 1995), 1.
10. *Ibid.*, 21.
11. *Ibid.*, 137.
12. For a presentation of the traditional theologies of icon, see Moshe Barasch, *Icon: Studies in the History of an Idea* (New York: New York University Press, 1992); for a history of the power of icons, see Hans Belting, *Likeness and Presence: A History of the Image before the Era of Art*, translated Edmund Jephcott (Chicago: University of Chicago Press, 1994), esp. 30–77.
13. For confirmation, see Jean-Luc Marion, *Cartesian Questions: Method and*

- Metaphysics*, foreword by Daniel Garber (Chicago: University of Chicago Press, 1999), 139–60.
14. *Ibid.*, 45.
  15. The similarities between Marion's position and the ideas of Ockham should be explored. Disentangling divine freedom from creation was certainly one of the latter's goals.
  16. *God Without Being*, 47.
  17. *Ibid.*, 77.
  18. *Ibid.*, 101.
  19. *Ibid.*, 107.
  20. *Ibid.*, 147.
  21. Marion argues that Aquinas's emphasis upon *ipsum esse subsistens* misunderstands the priority of love among the divine names (*Ibid.*, xxii–iv, 72–82). In the Trinitarian theology presented at the end of this chapter, I believe I can show that Marion has misrepresented Aquinas.
  22. *Ibid.*, 144.
  23. *Ibid.*, 146–7.
  24. In the Preface to the new English edition (1991), Marion qualifies his strictures on Thomism; see *ibid.*, xxiii.
  25. For a straightforward account of these issues, see Ian G. Barbour, *When Science Meets Religion: Enemies, Strangers, or Partners?* (New York: HarperSanFrancisco, 2000), esp. 7–38. His resolution through process theology is not one I would choose to take.
  26. Lafont, *God, Time and Being*.
  27. Paul Ricoeur, *The Symbolism of Evil*, trans. Emerson Buchanan (Boston: Beacon Press, 1969).
  28. *Ibid.*, 5, 9, 10–18; Lafont, *God, Time and Being*, 109, n.3; 131, n. 1.
  29. Lafont, *God, Time and Being*, 7.
  30. For what follows, see Lafont, *God, Time and Being*, 8–117.
  31. *Ibid.*, 11.
  32. At the end he states: One must see the 'impossibility of crediting this culture with the presence of the moral foundations necessary for the concrete management of our time and our history' (*ibid.*, 325).
  33. *Ibid.*, 16.
  34. *Ibid.*, 29.
  35. *Ibid.*, 36.
  36. *Ibid.*, 69.
  37. Lafont is reflecting on René Girard; see *ibid.*, 92.
  38. *Plato: The Collected Dialogues*, edited Edith Hamilton and Huntington Cairns, translated Benjamin Jowett (Princeton, NJ: Princeton University Press, Bollingen LXXI, 1969), 1166 (36e–37a). This parallels the remark of Plotinus in *The Enneads*, translated Stephen McKenna (London: Faber and Faber, 1962, 3rd edn.), 91 (II.2.3).
  39. Chenu, *Man, Nature and Society*, 60–98.
  40. *Ibid.*, 68–9; on the other hand, Aquinas was not. See SCG, I, 27; II, 120. God's providence, combined with human choice, provided the semi-autonomous governance of the world. See above, chapter 3.
  41. Plotinus, *Enneads*, 270 (IV.3.22).
  42. *Ibid.*, 263 (IV.3.4), 278 (IV.3.21).

43. *Ibid.*, 261 (IV.3.2).
44. *Ibid.*, 136 (II.9.5).
45. *Ibid.*, 260–3 (IV.3.2–4).
46. *Ibid.*, 271 (IV.3.12).
47. *Ibid.*, 272 (IV.3.13).
48. *Ibid.*, 309 (IV.4.27).
49. *Ibid.*, 316 (IV.4.32).
50. *Ibid.*, 135 (II.9.4); 139 (II.9.8).
51. *Ibid.*, 294 (IV.4.8).
52. *Ibid.*, 366 (IV.9.2).
53. *Ibid.*, 371 (V.1.2–3).
54. For a survey, see the introductions to Proclus, *The Elements of Theology*, translated E.R. Dodds (Oxford: Clarendon Press, 1971, 2nd edn.), ix–xxxiii; and Pseudo-Dionysius, *The Complete Works*, translated Colm Liubheid and Paul Rorem (New York: Paulist Press, 1987), 11–32.
55. Proclus, *Elements*, 115 (Prop. 129); 143 (Prop. 164).
56. *Ibid.*, 163–7 (Props. 186–90).
57. *Ibid.*, 169 (Prop. 192).
58. *Ibid.*, 175 (Prop. 200).
59. Pseudo-Dionysius, *Complete Works*, 72.
60. *Ibid.*, 73.
61. *Ibid.*, 74.
62. *Ibid.*, 140–1.
63. *Ibid.*, 80.
64. *Ibid.*, 146.
65. *Ibid.*, 153–4.
66. *Ibid.*, 156.
67. *Ibid.*, 104.
68. *Ibid.*, 92, 250.
69. I will not explore here Karl Rahner's convictions that the 'missions' of God and the 'immanent life' of God are identical. See Karl Rahner, *Foundations of Christian Faith: An Introduction to the Idea of Christianity*, trans. William V. Dych (New York: Crossroad, 1978), 136–7 and more extensively in *idem*, *The Trinity* (New York: Herder and Herder, 1970), esp. 101–3. See also his 'The Concept of Mystery in Catholic Theology', in *Theological Investigations*, trans. Kevin Smyth (Baltimore: Helicon Press, 1966), IV, 36–73.
70. This is, of course, Lafont's point as well; *God, Time, and Being*, 257, 275.
71. Bernard Lonergan, *De Deo Trino I. Pars Dogmatica* (Rome: Gregorian University Press, 1964, 2nd edn.), 269, 276. All translated citations are the author's. See Lafont, *God, Time, and Being*, 302–7.
72. Bernard Lonergan, *De Deo Trino II. Pars Systematica* (Rome: Gregorian University, 1964 3rd edn.), 226. See Thomas Aquinas, *Summa Theologiae*, I, Q. 28., a. 2.
73. Bernard J. Lonergan, *Verbum: Word and Idea in Aquinas*, ed. David Burrell (Notre Dame, IN: University of Notre Dame Press, 1967), 191–6.
74. *Ibid.*, 201.
75. SCG, IV, 19, 3–10; Lonergan, *Verbum*, 203.
76. See the similar remarks of Lafont, *God, Time, and Being*, 310.
77. ST, I, Q. 45, a. 7.

78. *ST*, I, Q. 32, a. 1.
79. 'Contingent Terminus ad extra' is the technical term. See Lonergan, *De Deo Trino* II, 232–35.
80. *ST*, I, Q. 1, aa. 1–2.
81. Karl Rahner, 'Theological Observations on the Concept of Time,' *Theological Investigations*, translated David Bourke (New York: Seabury, 1974), XI, 289. Rahner begins the essay by saying that theologians 'should' engage notions of time in the natural sciences, but that he will not.
82. *Ibid.*, 308.
83. See Frank Close, *Lucifer's Legacy: The Meaning of Asymmetry* (Oxford: Oxford University Press, 2000).
84. Raimundo Panikker, 'Le Temps Circulaire: Temporisation et Temporalité,' in *Temporalité et Alienation*, ed. E. Castelli (Paris: Aubier, 1975), esp. 231–38.
85. Lonergan, *De Deo Trino*, II, 115–51; and Quentin Quesnell, 'Three Persons – One God', in *The Desires of the Human Heart: An Introduction to the Theology of Bernard Lonergan*, ed. Vernon Gregson (New York: Paulist, 1988), 150–67.
86. If this begins to sound suspiciously like Hegel's reflections, I imagine there are good historical reasons for this. See G.W.F. Hegel, *The Phenomenology of Mind*, trans. J.G. Baillie (New York: Harper & Row, 1967), 104, 763–68, 806–7.
87. This language appears in the physicists examined in this book. See Paul Davies, *God and the New Physics*, 228; Prigogine and Stengers, *Order Out of Chaos*, 189–90.
88. See John Polkinghorne, *Science and Providence: God's Interaction with the World* (Boston: Shambala, 1989), 12. I am aware that this *metaphor* has a more precise scientific meaning, but as I have said (perhaps too many times) metaphors awaken a surplus of meanings over which we do not always have control.
89. Bernard Lonergan, 'Mediation of Christ in Prayer,' *Method* (1984), 8–9.

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