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Abstract The theory of intelligent design is an explanation for the origin and evolution of life on earth. Latter-day Saints should be sympathetic toward intelligent design.

Mormonism and Intelligent Design

Richard Sherlock

Over the last fifteen years, and especially in the last four or five, the concept of intelligent design in nature has emerged as an intensely controversial alternative to the standard neo-Darwinian account of the emergence and evolution of life on earth.[1] Whether intelligent design succeeds in replacing what Larry Laudan has called "a research tradition" with another is at this point unknown.[2] It is, however, a framework with which Latter-day Saints have much to engage. The literature and controversy is vast, and I cannot hope to provide comprehensive

1. Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996); William A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (New York: Cambridge University Press, 1998); Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Lanham, MD: Rowman and Littlefield, 2002); Dembski, *Intelligent Design: The Bridge between Science and Theology* (Downers Grove, IL: InterVarsity, 1999); John A. Campbell and Stephen C. Meyer, eds., *Darwinism, Design, and Public Education* (East Lansing: Michigan State University Press, 2003); William A. Dembski and Michael Ruse, eds., *Debating Design: From Darwin to DNA* (New York: Cambridge University Press, 2004); Robert T. Pennock, ed., *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives* (Cambridge: MIT Press, 2001); Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004); Kenneth Miller, *Finding Darwin's God: A Scientist's Search for Common Ground between God and Evolution* (New York: HarperCollins, 1999); Matt Young and Taner Edis, eds., *Why Intelligent Design Fails: A Scientific Critique of the New Creationism* (New Brunswick: Rutgers University Press, 2004).

2. Larry Laudan, *Progress and Its Problems: Toward a Theory of Scientific Growth* (Berkeley: University of California Press, 1977).

coverage of every issue associated with it. What I will do is define intelligent design by contrasting it with other views, discuss its scientific status, describe its main concepts, and show how Latter-day Saints might engage it. Having read a good deal of the literature and also having taught design theory for years, I am increasingly convinced of its fruitfulness. I also have some suggestions on how and why Latter-day Saints should engage and even embrace it.

Intelligent design is not, of course, a single movement with a defined credo or set of principles to which all proponents of design pledge themselves. There are a number of differences among design thinkers on various issues in science as well as in theology and philosophy. I will present a view that I think will represent the mainstream of the intelligent design approach to the origin and development of life on earth. I will also give some attention to cosmological issues as well.

I. Thinking about Design

In 2005 the historical Voyager I spacecraft became the first human-produced object to leave the boundaries of the solar system and head into the uncharted depths of interstellar space. Let us suppose that at some future date Voyager lands on a distant planet inhabited by beings with intelligence and knowledge much like our own.

When the Voyager craft lands on this faraway world, a team of scientists immediately begins to examine this unfamiliar object. Upon close inspection, what would be the most reasonable conclusion for our distant scientists to reach? Would it be that the random action of physical forces came together in a strange new way to create it, or would it be that it was designed and constructed by an intelligent agent or agents? In this hypothetical case I submit that the answer is obvious. Design would be the most reasonable belief of beings like us in a distant solar system.

This story illustrates the view of what is now called intelligent design. Broadly, intelligent design is the view that certain features of the biological world are so complex and have such a distinct pattern that the best explanation for their existence and complexity is that

they were designed by a superior intelligence. In other words, when we examine features of the world around us we are in the position of the scientists on a distant planet. We observe things in our world for which the best explanation is not randomness or brute necessity but intelligent design.

Thinking about design theory in this fashion, we can present the basic outlook in a set of formal propositions such as:

• With artifacts like Voyager, we know that the type of complex structure we see goes beyond what the material elements themselves have the capacity to produce.

• We know that the best explanation for this complex structure is that artifacts are designed.

• With living things it seems that the complex structure we see also goes beyond what the material constituents themselves have the capacity to produce.

• Therefore, living things are best understood as designed.

Intelligent design does not, however, by itself constitute a wholesale rejection of all parts of the modern neo-Darwinian evolutionary approach to the origin and development of life. The modern evolutionary framework has two essential parts. The first holds that life on earth has evolved or developed from simple single-celled organisms to ever more complex forms down to and including the human body. In the jargon of the specialists this is usually called descent with modification.[3]

The second broad part of the evolutionary synthesis is the mechanism of macroevolutionary change: random variations combined with natural selection. The claim is that in any generation of a species there are variations between individuals in that generation as the result of random genetic change: keener senses, stronger muscles, or thicker hide or fur. These variations interact with the changing environment, and some are found to be better adapted to survival in that environment. Over a very long time period literally millions of microvariations will,

3. Any standard treatment of evolution will cover these parts. See, for example, Douglas J. Futuyama, *Evolution* (New York: Sinauer Associates, 2005).

it is held, lead to large or macro evolutions, creating new and possibly more biologically complex species.[4]

Intelligent design is not fundamentally a critique of either the long age of the earth's existence or the general idea of descent with modification of living things from simple to complex forms. The focus of intelligent design is, instead, on the second part of the evolutionary framework: the idea of randomness and natural selection as the whole story about the mechanism of evolutionary change. Like our scientists far away, intelligent design thinkers do not believe that it is reasonable to hold that complex features of living beings can be best explained by randomness. Before we examine intelligent design and its features further, I will sort out and define some terms and concepts.

II. Some Terms and Concepts

Young-Earth Creationism

This is the view that the earth came into existence pretty much as it is a few thousand years ago. Those who hold this view strive to take the creation story in Genesis literally, especially the time frame. This means that the days in Genesis 1 are our twenty-four-hour days or, using the ratio provided in 2 Peter 3:8, that they are thousand-year periods.[5]

Latter-day Saints have never had a problem with a very old earth. Those Mormon leaders sympathetic to evolutionary development were obviously prepared to accept a very old earth. But so were leaders like James E. Talmage and Charles W. Penrose who were otherwise unsympathetic to macroevolution.[6]

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4. On selection specifically, see Gary Cziko, *Without Miracles: Universal Selection Theory and the Second Darwinian Revolution* (Cambridge: MIT Press, 1995); for a theological discussion that distinguishes these two parts, see Joseph Cardinal Ratzinger (Pope Benedict XVI), *"In the Beginning . . .": A Catholic Understanding of the Story of Creation and the Fall,* trans. Boniface Ramsey (Grand Rapids, MI: Eerdmans, 1995).

5. The two leading young-earth creationist organizations are Answers in Genesis (answersingenesis.org) and the Institute for Creation Research (icr.org). See Ronald L. Numbers, *The Creationists* (New York: Knopf, 1992); Paul Nelson and John Mark Reynolds, "Young Earth Creationism," in *Three Views on Creation and Evolution,* ed. James P. Moreland and John M. Reynolds (Grand Rapids, MI: Zondervan, 1999), 39–102.

6. Richard Sherlock, "A Turbulent Spectrum: Mormon Reactions to the Darwinist Legacy," *Journal of Mormon History* 5 (1978): 45–59.

Old-Earth Creationism

This is the view that "days" referred to in the creation story of Genesis are simply long time periods of indefinite and unknown length. The progression of creation from nonliving elements through bacteria, plants, animals, and finally man is taken as literally correct. But since the Hebrew word *day* can also mean "time period," those in this camp do not object to the belief that the earth was created billions of years ago.[7]

I believe that a close reading of a number of Mormon thinkers (like Talmage) would show that they fit most easily into this camp. They accept an ancient earth, they reject macroevolution of the Darwinian sort, and they require a literal Adam.[8]

Theistic Evolution

This is a view held by many scientists who are themselves religious and by many theologians who believe that theological views should be construed as being compatible with what modern science holds as true. For our purposes we can say that theistic evolution holds that, while God created the universe, the solar system, and life, he did so with the tools and in the manner more or less described by modern science. From this perspective, God did it but he used evolution—Genesis and similar accounts describe the *who* and the *why,* and science strives to tell us *how*. In much of mainstream Catholicism and Protestantism theistic evolution is a dominant view. For the theistic evolutionist, God set up and guides evolution but he has left no footprints or marks of his activity.[9]

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7. This was the view of B. H. Roberts; see Roberts, *The Truth, The Way, The Life: An Elementary Treatise on Theology,* ed. Stan Larson (San Francisco: Smith Research Associates, 1994), 261–62.

8. See Sherlock, "A Turbulent Spectrum."

9. Major statements of theistic evolution include Howard J. Van Till, *The Fourth Day: What the Bible and the Heavens Are Telling Us about Creation* (Grand Rapids, MI: Eerdmans, 1986); A. R. Peacocke, *God and the New Biology* (London: Dent, 1986); John C. Polkinghorne, *Science and Providence* (London: SPCK, 1989); Holmes Rolston, *Genes, Genesis and God* (New York: Cambridge University Press, 1999); John F. Haught, *God after Darwin* (Boulder, CO: Westview, 2000); Miller, *Finding Darwin's God*.

Many Latter-day Saint writers with scientific training have adopted this view with some modifications such as the idea that evolution was guided or directed by God as a sort of overseer. One can find this view in early twentieth-century writers like Nels Nelson and Fredrick Pack, and later in scientists like William Lee Stokes and many others.[10]

Naturalism

In the literature supporting intelligent design, much criticism is directed toward what is called *naturalism*. Metaphysical naturalism holds that nature, pretty much as science describes it, is all there really is. Methodological naturalism holds that nature, understood as matter and energy, is all that science can treat. Either there is no supernatural, or science cannot deal with it.[11]

Naturalism, however, may not be the best term to describe what the critics are aiming at. As shown by David Hume and John Stuart Mill, among others, *nature* is an ambiguous term.[12] If it means all that exists or all that can be described by true statements then, for a theist, excluding God makes little sense. The statement "God exists" is as true as the statement "Water exists." If one wants to exclude God one ought to select a more discriminating term.

Materialism

Perhaps the best term to describe what the critics are focusing on is *materialism*. To follow from what I just said, metaphysical mate-

10. Nels Nelson, *Scientific Aspects of Mormonism; or, Religion in Terms of Life* (New York: Putnam's Sons, 1904); Fredrick Pack, *Science and Belief in God: A Discussion of Certain Phases of Science and Their Bearing upon Belief in the Supreme Being* (Salt Lake City: Deseret News Press, 1924); William Lee Stokes, *The Creation Scriptures: A Witness for God in the Scientific Age* (Bountiful, UT: Horizon Publishers, 1979).

11. Phillip Johnson, *Darwin on Trial* (Downers Grove, IL: InterVarsity, 1993); Robert C. Koons, "The Incompatibility of Naturalism and Scientific Realism" in *Naturalism: A Critical Analysis,* ed. William L. Craig and James P. Moreland (New York: Routledge, 2000), 49–63.

12. David Hume, *A Treatise of Human Nature,* ed. L. A. Selby-Bigge, 2nd ed. (Oxford: Clarendon, 1978), 473–75; John Stuart Mill, *Three Essays on Religion: Nature, the Utility of Religion, Theism* (Amherst, NY: Prometheus Books, 1998).

rialism would be the view that matter and energy—much as science describes them—are all that actually exist. Methodological materialism would be the view that matter and its companion energy is all that science can study. I shall have much more to say about materialism below. Suffice it to state here that I regard both forms of materialism as false on both religious and empirical grounds.

Anthropic Principle

Though technically not part of intelligent design as a critique of the complete sufficiency of the neo-Darwinian synthesis, anthropic regularities show much the same pattern of reasoning. They have also been pointed to quite frequently as evidence of theism and design in the universe.[13]

The basic argument is as follows: At the moment of creation—that is, at the moment of the "big bang" from whence all the known universe began—events had to happen in an extraordinarily precise order and time such that this highly specific design is most reasonably explained by a designer. The precision we are talking about is so small that our minds cannot really comprehend it. It is on the order of Planck time 10^{-50} seconds. This is a decimal point followed by 50 zeros and then a 1. If the expansion after the big bang were slower, gravity would have pulled emerging matter back on itself and the nascent universe would have collapsed. If it were faster, then the emerging subatomic particles would have flown apart and never come together in atoms and then larger clumps of matter. The argument is that such a precise order is best explained by a designer, likely God.

Some have claimed that such a precise order tells us nothing because if it had not happened we would not be here to think about it. Though true, this is hardly a sufficient response. Suppose you went into a casino and played a dollar on ten consecutive dollar slot machines in a row and hit the jackpot on each one. Would you shrug your shoulders and say "that's nothing, if I had not been here I would not have

13. John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (1986; repr. New York: Oxford University Press, 1998).

won." Of course not. You would quite naturally believe that someone had rigged the machines for you.

III. Intelligent Design and Science

Intelligent design is widely held by its opponents not to be good science for a variety of reasons, both large and small. I will later address some of the smaller reasons, but now I wish to address one very large one. This is the claim that intelligent design does not use the "scientific method" or that it "shortcuts science." Quite to the contrary, proponents of intelligent design can make two eminently sound responses. The first, which I shall not discuss in detail, is that few serious students of science would now hold that we have something called "the scientific method" that confidently demarcates science from other forms of human inquiry or belief. We do not. Trotting out examples of confirmed experiments, which are only one form of science, will not make the argument any stronger.[14]

We might examine this point in some detail by considering the recent court case involving intelligent design, *Kitzmiller et al. v. Dover Area School District*.[15] The case involved an attempt by the Dover, Pennsylvania, school board to mandate the teaching of intelligent design as an alternative to Darwinism. Darwinism was not to be ignored. It was simply that when Darwinism was taught, design was to be presented as an alternative. The court ruled against the school board, holding that intelligent design was actually religion and not science and, hence, could not be part of the public school science curriculum.[16]

14. Any good treatment of the philosophy of science will show the problem. See, for example, Jan A. Cover and Martin Curd, eds., *Philosophy of Science: The Central Issues* (New York: Norton, 1998); and Larry Laudan, "The Demise of the Demarcation Problem," in *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy,* ed. Michael Ruse (Buffalo: Prometheus Books, 1988), 337–50.

15. *Kitzmiller et al. v. Dover Area School District,* 400 F. Supp 2d 707 (M.D. Pa. 2005).

16. For criticism, see David K. DeWolf et al., *Traipsing into Evolution: Intelligent Design and the Kitzmiller v. Dover Decision* (Seattle: Discovery Institute, 2006); Bradley Monton, "Is Intelligent Design Science? Dissecting the Dover Decision" online at philsci-archive.pitt.edu (accessed 11 October 2006).

To reach this conclusion, Federal Judge John Jones had to advance a set of claims about how to demarcate science from other forms of inquiry. Unfortunately, in this decision the court failed miserably. Judge Jones offered three reasons: "1) ID [intelligent design] violates the centuries-old ground rules of science by invoking and permitting supernatural causation; 2) the argument of irreducible complexity, central to ID, employs the same flawed and illogical contrived dualism that doomed creation science in the 1980s; and 3) ID's negative attacks on evolution have been refuted by the scientific community."[17]

I will consider these points in reverse order since only the first has real bite and needs to be addressed at length. The mere fact, even if it is granted (which it is not by me), that the criticisms of Darwinism by design thinkers have been successfully addressed says nothing about the positive claims of intelligent design. To answer the critiques of Darwinism does not show that design theory has a weak case. It merely shows that their criticisms of the alternatives are not sound.

The second claim is that intelligent design is only about "irreducible complexity" as described by biochemist Michael Behe.[18] But this is flawed in several ways. First, intelligent design is not just about irreducible complexity in the biochemistry of cells. It also may include the anthropic regularities that seem designed, as well as problems relating to the origin of life on earth for which no sufficient materialist explanation exists. Furthermore, just because a theory is flawed does not make it unscientific. Copernicus's theory of perfect circular orbits of the planets was flawed. But does anyone doubt he was doing science? Newtonian physics predicts that clocks in different gravitational fields will run at the same time. This claim has been shown to be false, yet does anyone wish to claim that Newton's idea was not science?

Third, intelligent design or irreducible complexity does not require an either/or dualism as the court implies: either my theory or yours—either Darwin or design. It only claims that there are phenomena that design explains better than randomness. If a third theory such as

17. *Kitzmiller et al. v. Dover Area School District,* 400 F. Supp 2d at 747.

18. Behe, *Darwin's Black Box*; Michael J. Behe, "Irreducible Complexity: Obstacle to Darwinian Evolution," in *Debating Design,* 352–70.

self-organization as presented by those associated with the Santa Fe Institute proves fruitful, let it come forward with a third alternative. Let the debate begin.

Finally, we come to the judge's commitment to naturalism or materialism. Judge Jones claims that this is an essential part of science "by definition and convention." This is hardly a sound move. Science is said to be defined by convention and by a set of stipulative definitions. But stipulative definitions do not resolve intellectual debates. They are an attempt to avoid arguments by simply stating that the other position is wrong without bothering to show how it is wrong. Appeal to convention is notoriously unreliable and stifles the unconventional. The great advances in science are always unconventional. They go beyond the known into the unknown and uncharted. For example, as I shall show in detail below, the conventions of current work in the neurosciences hold that mental phenomena such as deciding or thinking can be fully explained as material brain phenomena. When presented with considerable evidence from studies of meditation and prayer that show this convention to be false, should those who hold to the convention reply that the studies are not scientific because they violated the conventions either in the hypothesis or in the results?

The power of materialism as an article of faith and the corollary that intelligent design must be banished from science can be seen in recent responses to the acknowledged anthropic regularities at the beginning of the universe. In the eighteenth century David Hume argued against British natural theologians that the design they observed might only be an artifact of where the observer is standing. In Hume's day one could only think of possibly thousands or a few million planets. But given enough random chances, perhaps we were the only planet that got it right for complex life. Even a blind man will hit a bull's-eye with enough chances. The point is even more relevant in a universe with about one hundred billion galaxies and about one hundred billion stars in each galaxy. Could not the apparent design on earth only be the blind man hitting the target?

This line of argument, however, does not work with the creation of the cosmos and the anthropic regularities present there. At this point it

appears that divine design is the best explanation since there is only one beginning to the universe or one data point, and it is perfectly set up to create the universe we have. But hard opponents of design do not just give in at this point. Materialism is more than science; it is an article of faith, and its devotees are as protective of it as any religious believer.

What critics have resorted to is a wildly imaginary but inventive claim that there may be an infinite number of parallel universes.[19] At one time it was suggested that the universe might go through an infinite number of expansions followed by contractions, a big bang and a big crunch, if you will. This idea, however, has been refuted by recent data. But no problem. The hypothesized infinite multiverses will do equally well. We might be simply the universe that was "organized" in the design-specific manner that it appears to be. The other universes or multiverses as they are called may be "organized" in much less inviting ways. Or maybe they started and failed, collapsing back on themselves or flying apart. The question is why would one want to multiply entities for which we have absolutely no evidence? The reason for the multiplication is not science, for the appeal to hidden entities or forces violates what scientists claim to seek above all else: explanation, not mystery. The reason is the deeply held faith in materialism and in the equally strong article of faith by some against God or divine design.

The second and more important point is that intelligent design relies on one of the most widely used patterns of reasoning in all of science: abduction. *Abduction* is a technical term for what is otherwise called "inference to the best explanation."[20] Given a set of observations about the world, what is the best explanation for the observations? When Galileo, for example, saw in his telescope the phases of Venus, he could then explain this observation by postulating that Copernicus was generally right: the planets revolve around the sun.

Abduction is so widely used in science that we often hardly notice it. Perhaps some examples will show how frequent it is. Astronomers

19. Max Tegmark, "Parallel Universes," *Scientific American* 288 (May 2003): 40–51.

20. Peter Lipton, *Inference to the Best Explanation,* 2nd ed. (New York: Routledge, 2004).

accept the big bang as the start of the known universe because such a postulate best explains the observations from earth and from space. So too is the belief that the universe is expanding and at an increasing rate the best explanation for the observational data.[21]

In the 1920s Harvard astronomer Edwin Hubble found that light from distant stars was distorted to the lower or infrared end of the light spectrum. For astronomers the best explanation was what we can call the "train whistle" effect. Stand by a railroad when a train is blowing its horn. As the train comes toward you the horn will sound higher pitched than if it was right in front of you. It will be distorted toward the high end of the spectrum. As it goes away from you it will sound lower pitched; it will shift toward the lower end of the spectrum. The same test can be done with light. Hubble then inferred that the best explanation of the "red shift" he saw was that stars are moving away from us as the universe expands.[22]

A third example is paleontology—that is, the study of fossil life forms. Paleontologists almost universally hold that life on earth descended from simple, single-celled organisms to more complex forms because that is what appears in the rock strata. What they are doing is inferring from the overwhelming observations of the strata to the best explanation.[23] As a final example we might note that ecology, the study of the relationship between organisms and environments, was universally acknowledged as a science for decades before ecologists did any experiments. During these decades they were studying complex interrelationships in nature and then offering models that they thought best explained the relationships they observed.[24]

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21. John R. Gribbin, *In Search of the Big Bang: Quantum Physics and Cosmology* (London: Heinemann, 1986); Timothy Ferris, *The Whole Shebang: A State of the Universe(s) Report* (New York: Simon and Schuster, 1997).

22. John D. Barrow and Joseph Silk, *The Left Hand of Creation: The Origin and Evolution of the Expanding Universe* (London: Heinemann, 1983).

23. David M. Raup and Steven M. Stanley, *Principles of Paleontology,* 2nd ed. (San Francisco: Freeman, 1978); Donald R. Prothero, *Bringing Fossils to Life: An Introduction to Paleobiology,* 2nd ed. (Maidenhead, England: McGraw-Hill, 2003).

24. Gary L. Miller and Robert E. Ricklefs, *Ecology,* 4th ed. (New York: Freeman, 2000); Robert L. Smith and Thomas M. Smith, *Elements of Ecology,* 6th ed. (San Francisco: Cummings, 2006).

Many more examples could be used from universally recognized sciences. Abduction is clearly a widely used approach to the practice of science, especially where observation and theory is all that is possible, such as in the case of string theory and in the case of the big bang, which is a single event probably happening about 14.5 billion years ago. We can study the aftereffects and then infer that the best explanation is the big bang.

IV. Intelligent Design and God

Intelligent design thinkers are often of two minds about God as the designer whose existence, they argue, is the best explanation for complex phenomena in nature. Some advocates of intelligent design (or at least friends of it) are not religious. Philosopher/mathematician David Berlinski and biologist Michael Denton belong in this category of agnostics.[25] It is also true that granting the intelligent design critique of Darwinism does not automatically commit one to the design alternative nor, especially, to God as the designer. As many complexity theorists like Stuart Kauffman do, one can find Darwinism unconvincing as a complete explanation of biological change and development without fully accepting design. Hence, in a technical sense, intelligent design proponents are right to deny that the designer is or must be God.[26]

Yet it is also true that most intelligent design proponents are personally religious; they are found in various Christian denominations, and many teach at religious schools. Some are Catholic, and many are

25. Michael Denton, *Evolution: A Theory in Crisis* (Bethesda, MD: Adler and Adler, 1985); Michael Denton, "An Anti-Darwinian Intellectual Journey: Biological Order as an Inherent Property of Matter," in *Uncommon Dissent: Intellectuals Who Find Darwinism Unconvincing,* ed. William A. Dembski (Wilmington, DL: ISI Books, 2004): 153–76; David Berlinski, "The Deniable Darwin," in *Uncommon Dissent,* 263–306; originally in *Commentary* (June 1996), which is available online at www.rae.org/dendar.html (accessed 10 October 2006).

26. See Stuart A. Kauffman, *At Home in the Universe: The Search for Laws of Self-Organization and Complexity* (New York: Oxford University Press, 1995); Kauffman, *Investigations* (New York: Oxford University Press, 2000); Scott Camazine et al., *Self-Organization in Biological Systems* (Princeton, NJ: Princeton University Press, 2001).

evangelical Protestants. Thus we come to a crucial crossroad. Should advocates of intelligent design continue to insist that they are not talking about God when they talk about a designer? This is especially an issue because leading proponents often refer positively to British natural theologians of the eighteenth century such as Thomas Reid who used the design complexity of organs like the eye as evidence for the existence of God.[27] They also refer positively to immensely important scientists like Newton whose theological commitments are patent—commitments that definitely influenced their scientific conclusions.

I shall venture to delineate what I know will be an extremely controversial argument on this point, directed first to the LDS community, but also having broader implications for all Christian scientists. To put the matter bluntly, I believe that it is wrong, especially for religious scientists, to keep God out of science. The idea that religion and science do not need to be in a state of continuous war is a position put forward in a Latter-day Saint context most passionately by John A. Widtsoe.[28] I wish to attach my name to this point of view. Too frequently, however, the discussion has been turned into a one-way street. Religious beliefs must always be construed to fit the latest findings from science. I do not doubt that well-attested findings of science like quantum mechanics or the big bang should be accounted for in a fully developed theology. But I believe that the reverse is just as true: scientists should not ignore God in their research. I think it is biased and wrong to expect Latter-day Saints or other Christians to accommodate science while science continues without the slightest reciprocation.

Consider an example in another field. For years Louis Midgley has argued strenuously that it is wrong for Latter-day Saint historians to write our history as if God was not involved as an actor in it and to accept only naturalistic explanations for events, explanations of the sort favored by post-Enlightenment rationalism.[29] Midgley has never

27. Thomas Reid, *Lectures on Natural Theology,* ed. Elmer H. Duncan (Washington DC: University Press of America, 1980).

28. John A. Widtsoe, *A Rational Theology,* repr. ed. (Whitefish, MT: Kessinger, 2004).

29. Louis Midgley, "The First Steps," *FARMS Review* 17/1 (2005): xi–lv.

argued that we should ignore the influence of secular natural causes, nor has he ever held that we should not have an honest "warts-and-all" history. If economic factors influenced the practice of the Word of Wisdom, then that factor must be acknowledged. If a number of Mormons other than John D. Lee were involved in the Mountain Meadows massacre, I have never seen Midgley or those who agree with him argue that we should ignore such an inconvenient fact. Midgley simply wants God to be given his due. We should write history in light of our convictions about the first vision, the Book of Mormon, and prophetic leadership. It should be an honest history, true even to difficult facts and secular causes. But it should also be, in the words of Richard Bushman a "faithful history."[30]

I believe that Midgley and Bushman are profoundly correct. Furthermore, I believe that their analyses are as applicable to science as they are to any of the humanities disciplines. If one accepts God as part of the reality of the cosmos, why should one ignore that belief in studying order in nature? For example, physicists believe that all of nature can be explained as the ultimate result of the action of four fundamental forces: strong force, weak force, electromagnetism, and gravity. As yet, theoretical physicists have not completely shown how to hold these forces together in a unified framework, or what is called a unified field. But the brightest minds continue to work on it. So do astronomers believe that the universe is completely comprehensible by uniform physical law? Why should a believing scientist ignore God as an explanation for the uniformity in nature? Divine design is, I believe, the best ground for accepting the framework within which they carry on their studies—that is, the commitment to the order and uniformity in nature. For believers, God is as much a part of reality as is gravity or the electromagnetic spectrum. If so, then why should believing scientists hold that gravity is an acceptable explanation for some phenomena but divine action is not? I do not think a sound argument can be given for omitting God's action.

More broadly, even if one only thinks that it is plausible that there is a God, I maintain that one should keep divine design as part of one's

30. Richard L. Bushman, "Faithful History," *Dialogue* 4/4 (1969): 11–25.

explanatory tool kit for science. If God's activity as a direct cause of some event is part of the explanatory tool kit, then for some exceedingly complex phenomena in nature would not divine design be the simplest explanation—distinct from the "just so" stories or fig leaves often offered by leading biologists, which are nothing more than a check drawn on an empty account?[31]

At this point I wish to borrow and refashion an argument from the eminent philosopher Richard Swinburne.[32] What counts as the best explanation for some observation about nature such as gene complexity or the anthropic regularities is never decided in the abstract, outside of some view of the world, which includes that which we firmly believe, that which we firmly reject, and that which we only believe is possibly correct. Theists firmly accept God as part of their view of reality. Many others are on the proverbial "fence." They accept that there might be a God. But they remain not completely convinced. Even many professed atheists think it possible that God exists; else why spend so much time and effort arguing for atheism. Green men on Mars do not get such attention, nor does the idea that ancient astronauts built the pyramids.

But if you accept the premise that God might possibly exist, then what is the best explanation for highly complex events in nature such as the origin of life or the astonishing uniformity of physical law in the cosmos? Is it more likely that life just appeared out of a prebiotic soup of chemicals or that the anthropic regularities just happened, or is it preferable to accept divine causation? Ignoring the technical mathematics but using the widely employed Bayes Theorem shows that what we observe about complexity is more probable with a God than with-

31. In her popularized account of the origin and development of life, leading cell biologist Ursula Goodenough writes: "Here our story is obscured by a very large fig leaf. We don't yet know the sequence of events that gave rise to the first biomolecules and perhaps we never will." Ursula Goodenough, *The Sacred Depths of Nature* (New York: Oxford University Press, 1998), 21; also see Robert Koons, "The Check Is in the Mail," in *Uncommon Dissent,* 3–22.

32. Richard Swinburne, *The Existence of God* (New York: Oxford University Press, 1979).

out. Only those relatively few who cannot even admit the possibility of the existence of God can fail to grant this conclusion.

Take as an analogy the search for a unified field theory in physics, which is engaging some of the best minds of this generation. To continue their work they assume that there is a unified structure that will someday be found to hold together the four forces of nature. They have yet to show such a structure, but, to carry on their work, they assume it is plausible. It is their background belief that makes their work possible. In the same way, the belief in God is a background belief that makes the search for complex order in nature plausible, a pursuit that science regularly engages in.

Finally, in thinking about the relation of intelligent design and theism, we must note a serious distinction between intelligent design and the concept of "theistic" evolution. Theistic evolution is best understood as the view that God's creation of living things was accomplished by evolution. Evolution was God's method of creation. God set up the process and evolutionary change did the rest.[33]

On this view science is separate from faith, and the claims of faith do not impinge on the findings of biologists. Science will, supposedly, decide how life developed on our planet and even how life came to be. But, whatever way it was done, it was God's way. In this position, belief in God has no effect on how the world is viewed nor does design affect the way science is done. In general it is argued that God is a first or primary cause of all that happens in nature but that the actual work is done by secondary causes. Secondary causes bring weather, solar systems, disease, and DNA, etc. It is only secondary causes that science studies.

Intelligent design thinkers disagree. First, they point out that the Bible (and we could include modern revelation as well) clearly holds that God has left visible signposts of his activity in history and nature and continues to do so with miracles. Second, we may note the pervasive appeal to miracles in the Book of Mormon as evidence for both

33. Dembski, *Intelligent Design,* 29–35; also Denyse O'Leary, *By Design or by Chance: The Growing Controversy on the Origins of Life in the Universe* (Minneapolis: Augsburg Books, 2004).

the existence of and care from God. Miracles cannot be understood in this way apart from a belief that they can be recognized in a way that properly distinguishes them from the general flow of nature. The Book of Mormon teaches that miracles can be recognized as specific, intentional acts of God. They are not just the working out of blind forces in nature. As such, the existence and recognition of miracles cannot be squared with theistic evolution understood as God working, from the moment of creation on, only through secondary causes. On the contrary, miracles show that, at some point, God is the primary and immediate cause of some intentional event.[34]

An attack on miracles as specific moments of divine action has been a central feature of hard materialism and of theological speculation developed in the shadow of the Enlightenment. Latter-day Saints, as well as other serious Christians, must reject this denial of miracles. And, therefore, theistic evolution must also be rejected as an explanation of the relation of God to the world. We should have no doubt that God works through secondary causes and, hence, that the process of evolution by secondary causes was established by him. Secondary causes, however, cannot be the whole story of God's action in the world for two reasons. First, workers, as secondary causes, built something like Ramses' palace. We can study the work of the craftsmen and the materials used. But we also know we are missing something unless we also study how and why it was designed by an intelligent agent who is more than just a robotlike worker. Secondly God sometimes acts as a primary cause of something like weather activity. God set up a chain of secondary causes that caused a storm on the Sea of Galilee. But Jesus could directly command the storm to stop, and it did, if we believe the New Testament account (see Matthew 8:23–27; Mark 4:35–41; Luke 8:22–25).

34. On miracles, see Richard G. Swinburne, "Miracles," *Philosophical Quarterly* 18 (1968): 27–45; for a comprehensive treatment, see R. Douglas Geivett and Gary R. Habermas, eds., *In Defense of Miracles: A Comprehensive Case for God's Action in History* (Downers Grove, IL: InterVarsity, 1997); for analysis and criticism of Hume's celebrated argument against miracles, see David Johnson, *Hume, Holism, and Miracles* (Ithaca: Cornell University Press, 1999).

I want to be clear on the question of miracles. What I label miracles are one-time events. As such they are not considered design by most design advocates. But the reality of divine action in nature, to which all sincere Christians, and especially Latter-day Saints, must be attached because of the immense scriptural record of miracles, does clear the way for intelligent design. If one grants miracles, what follows is the conviction that brute necessity and blind chance cannot account for all events in the natural world. Furthermore, scripture plainly teaches that we can comprehend the existence of miracles as intentional divine acts in nature. God acts in nature and we can recognize it.

V. Intelligent Design: What It Claims

Now we come to the heart of the matter. What exactly does intelligent design claim? In my view there are three interconnected claims advanced by proponents of intelligent design as an alternative to the complete sufficiency of the neo-Darwinian synthesis. The first of these is a critique of the sufficiency of materialist explanations for all the phenomena of the world. To be successful, this critique must show that in at least one area materialist explanations fail to adequately account for some phenomena or set of related phenomena. If this is the case in one area of our experience, then metaphysical materialism fails as a sort of article of faith or worldview that automatically excludes divine design as an explanation in other areas. Furthermore, if we can show by rigorous study and analysis that it fails in one area, then even methodological materialism, the idea that science can only deal with material causality, also fails. At least we could say that careful study will show that material causality is insufficient to account for all the phenomena encountered in scientific investigation.

In at least one area we have strong reasons to believe that materialism is false: the study of the mind and consciousness. First, consciousness is always intentional. This means that consciousness always has an end or object about which one is conscious. You cannot just be conscious without being conscious of something. Try it for yourself.

Try thinking without thinking of something. You can't, and your own experience confirms it for you.[35]

Since consciousness is necessarily intentional, then we must ask whether consciousness can be accounted for by the operation of physical laws or principles. The answer to this query is quite plainly no. No modern physical law or principle has ever been successfully stated in an intentional form as having some intentional object or aiming at some end or purpose. Now we can see the theoretical problem. The explanation proffered, physical law, cannot do what it is supposed to do—account for consciousness. Consciousness simply cannot be understood only as the result of the operation of physical law. As physicist Stephen Barr has put it, materialism is "nothing more than an anti-religious mythology."[36]

What I have just shown is a fundamental theoretical problem for the sufficiency and completeness of materialism. For the scientist, however, we actually have a large and growing body of research that shows the poverty of metaphysical and even methodological materialism. Much of the research has been done on long-term practitioners of specific meditative techniques such as nuns in deep prayer, Zen, and transcendental meditation as practiced by followers of Maharishi Mahesh Yogi. What has been clearly shown is that long-term meditators have altered the physical operation of their brain as measured by functional magnetic resonance imaging (FMRI). Take a group of long-term meditators whose average length of meditation is seven years on a regular, often daily, schedule. Compare their brain scans at rest with those of a control group who were taught the same meditative practice over a week. The long-term practitioners have significantly altered scans. The same result is seen when meditators are compared with what is regarded as a normal or standard scan.[37]

35. David J. Chalmers, *The Conscious Mind: In Search of a Fundamental Theory* (New York: Oxford University Press, 1997).

36. Stephen M. Barr, *Modern Physics and Ancient Faith* (Notre Dame, IN: University of Notre Dame Press, 2003).

37. Richard Monastersky, "Religion on the Brain," *Chronicle of Higher Education,* 26 May 2006; Sara Lazar et al., "Meditation Experience Is Associated with Increased Cortical Thickness," *NeuroReport* 16 (28 November 2005): 1893–97; Antoine Lutz et al.,

What these sorts of studies show is that a conscious, intentional practice actually changes the physical operation of the brain. Thus, even rigorous scientific investigations show that material causality is insufficient to account for the data that science itself reveals. Even empirical investigation shows that materialism in any form fails. To accept materialism is to accept a premise that will distort our view of the reality we experience around us.

The second crucial element of intelligent design is the concept of irreducible complexity in nature. Things that are irreducibly complex are defined by a leading advocate, Behe, as "a single system that is necessarily composed of several well matched interacting parts that contribute to the basic function and where the removal of any one of the parts causes the system to effectively cease functioning."[38] What this means is that each part of the complex system must be present at the same time for the system to function. In an evolutionary context one cannot have one part appear and, having no function without the others, be selected out because it is useless and then have a second part come into existence. All parts must exist at the same time. Intelligent design thinkers have pointed to a number of exceedingly complex phenomena that cannot function without all parts being present, such as the eukaryotic cilium, the intracellular transport system, and the blood-clotting cascade.[39]

The key role that irreducibly complex phenomena play in intelligent design is just this: they are so unlikely to have come into existence at random that the best explanation of their existence is that they were specifically designed. Let us consider a relatively uncomplicated protein made up of a chain of amino acids with what biologists call "left and right hands." The probability that this protein could have come into existence by the random combination of amino acids is 1 chance

"Long-Term Meditators Self-Induce High-Amplitude Gamma Synchrony during Mental Practice," *Proceedings of the National Academy of Science* 101 (2004): 16369–73.

38. Behe, "Irreducible Complexity," 353.
39. Behe, *Darwin's Black Box.*

in 10^{-125}. This is a number so small that it is effectively zero. Yet these proteins are everywhere in living organisms.[40]

We can also point to other key examples such as the origin of life and the Cambrian explosion. The origin of life on earth is currently a black hole in evolutionary theory. No answer exists, nor is one even on the horizon. There are many hypotheses but none that commands general acceptance, despite decades of study. The fundamental problem is that in the case of the origin of life we must show how a very complex information code, DNA, can arise from the essentially information-empty starting point of an early earth with only soil, water, water vapor, and primitive chemicals.[41]

A third example regularly cited by advocates is what Stephen Meyer, a Cambridge-trained biological theorist and design thinker, calls the "Cambrian Information Explosion." Often referred to simply as the Cambrian explosion, this phenomenon is a well-known event in paleontology. What it refers to is the sudden appearance about 550 million years ago of many new body plans or forms. At that time in the Cambrian era, at least nineteen and perhaps as many as thirty-five out of a total of forty phyla made their first appearance in a geologically narrow five-million-year window. Paleontologists admit that before this time we have no record of phylenic gradualism—that is, the evolution of life from single celled pre-Cambrian fossils to more complex yet intermediate forms.[42] It is just such a feature as this in the record of the rocks that led the leading paleontologist of the last generation, Harvard's Stephen J. Gould, to reject gradualism in favor of his view of "punctuated equilibrium." His view was that evolutionary change happened in leaps or jumps like that in the Cambrian era,

40. This figure can be calculated easily from known biology. For examples, see the work of Frank Salisbury and Stephen Meyer.

41. Walter L. Bradley, "Information, Entropy, and the Origin of Life," in *Debating Design,* 331–51; Charles B. Thaxton, Walter L. Bradley, and Roger L. Olsen, *The Mystery of Life's Origin: Reassessing Current Theories* (Dallas: Lewis and Stanley, 1992).

42. Stephen Meyer, "The Cambrian Explosion: Biology's Big Bang," in *Darwinism, Design and Public Education,* 223–85; S. C. Meyer, "The Cambrian Information Explosion," in *Debating Design,* 371–91.

which "punctuated" or broke through an otherwise steady or "equilibrium" state of life.

The general Cambrian explosion required a rapid and quite extraordinary increase in biological information or what design theorists call complex specified information. It is complex like that of any protein and specified because it is directed to a specific end of producing a specific body plan or form. Consider the following: Sponges, which appeared late in the pre-Cambrian era, required five different cell types, while the more complex forms that appeared suddenly in the narrow Cambrian window would have required fifty or more cell types. The growth in information needed in such a short time is quite staggering when we recognize that what we think of as a simple living organism requires the precise ordering of 120 million base pairs of DNA, with precise coding, switching, and other mechanisms for each cell function in each different type of cell. It is of course quite correct to say that not every base pair needs to be properly aligned for the form to be functionally organized. But enough do that the explosion of biological information required in the Cambrian window is astonishing—just as it is astonishing that life began at all, with its need for complicated DNA codes emerging out of an empty starting point.

At this point the intelligent design critique of the sufficiency of the neo-Darwinian approach to the origin and development of life on earth becomes a relatively uncomplicated matter to understand. At key points such as the origin of life, the Cambrian explosion, and complex biochemical processes (as noted by Behe and others), the standard theory has nothing to say except "just so" stories that are told with one conclusion in mind: we really do not know how X was accomplished, but, however it was, it had to be a material, random cause. "Just so" stories are the criticism that goes like this. A scientist like Behe (or, as we shall see, even earlier, LDS plant geneticist Frank Salisbury) presents an example of an irreducibly complex mechanism like the blood-clotting cascade. The critic responds as noted: "It might have evolved like this"—without ever showing that it did or without even giving in any precise detail an explanation of how it might have.

As the fig leaves grow and the "just so" stories multiply, the core conclusion is maintained by many scientists. We cannot give up material causality, or we are not doing science. One stands speechless at the audacity of those who just stipulatively define science in such a fashion without giving any comprehensive reason for doing so. This occurs even when in given cases such as origins, divine design would give answers that their own "anti-religious mythology" cannot do. To remain wedded to a paradigm or research tradition even when it has huge weaknesses is stubbornness, not inquiry.

Intelligent design thinkers, however, also try to show more than just the fact that there are complex phenomena in nature that are best explained by design. Design thinkers also try to provide a metric or way of identifying certain things as *so* complex in *such* a specific way that design is the best explanation.

Of course, in many cases design recognition is intuitive. Consider our scientists in a world far away who encounter the Voyager craft. Their obvious recognition of design would at first be intuitive. Knowing the world as we do, they would, even on a cursory inspection, easily conclude that the action of physical forces alone would not produce such a highly complex object. Intelligent design would obviously be the best and simplest explanation even if they knew of no other intelligent agents in the universe who could have constructed it.

Many advocates of intelligent design want to go further. The most important thinker in this regard is philosopher/mathematician William Dembski. Dembski has provided what is widely regarded as the most rigorous approach to the recognition of design. Given an event, he argues, there are three explanatory possibilities.[43]

1. Necessity. The phases of Venus are the necessary result of the heliocentrical solar system. Given heliocentricity and the exact orbit of Venus, the precise phases in the precise order will appear. If something is necessary we do not consider it designed except in the extended sense of God having created all the cosmos.

2. Chance. If a leaf falls and lands in my soda cup right now, I see no design significance in that except again in the most extended

43. Dembski, *Design Inference.*

sense. Though here we should remember that even a sparrow does not fall without the notice of the Father. But this is not what we usually mean by design.

3. Design. Having eliminated the large number of events explained by necessity and the smaller but still significant number explained by chance or randomness, we are left with those that are or might be designed.

Dembski has tried to provide a rigorous metric for identifying design. In his fundamentally important book *The Design Inference* and in other works, Dembski has laid out what he calls the specificity-complexity criterion for identifying design. Complexity is the easier of the two to understand. For Dembski and those who follow him, complexity is a form of probability. Generally, the more complex an event, the lower its probability of having happened randomly. Complexity assesses the difficulty of having accomplished a task given the resources available for doing so.

Complexity by itself, however, does not lead us to suppose that an event is designed. Consider someone who flips a fair coin a thousand times and records the results of each flip in sequence, heads, tails, tails, heads, etc. The sequence of one thousand flips will be an extraordinarily complex and therefore highly improbable event. So much is this the case that one person could repeatedly perform a thousand flips from now until he dies and never repeat the same sequence twice.

To be designed, however, the complex phenomenon must follow a defined or specified pattern. It must not be merely complex. It must be complex in a specific or specified way. Consider as an example a scene from the popular 1997 movie *Contact* that deals with the Search for Extra-Terrestrial Intelligence (SETI) project. The movie is based on a novel by the eminent astronomer and SETI advocate Carl Sagan.[44] The SETI project involves scanning the sky with radio-telescopes and trying to identify patterns in the electromagnetic blips that continuously bombard the instrument. At a certain point in the movie, the lead scientist (played by Jodie Foster) recognizes that the string of blips and silences that she has just found precisely beats out the sequence

44. Carl Sagan, *Contact: A Novel* (New York: Simon and Schuster, 1985).

of prime numbers from 1 to 101 in a binary number system of 1s and 0s, or bleeps and silences. "This isn't noise" she exclaims, "This has structure." The incoming bleeps and silences are a highly complex phenomenon, just like our thousand coin tosses. But, until it has pattern or "structure," it is not evidence of an intelligent agent behind it.

To function as a specified pattern, the pattern must be detachable from the event. We cannot toss the coin a thousand times and then exclaim, "that's the pattern I was talking about." Since the pattern was not present before the event you could not have been talking about it beforehand. Moreover, you cannot just read the pattern off of the event. What you need is a pattern that can be constructed without knowing the event, like the prime numbers from 1 to 101. Then, when the complex event matches the pattern, we can identify it as designed.

For Dembski the specificity/complexity criterion provides a way of distinguishing objects or events in nature that are designed from those that are the products of necessity or chance. Necessary things have to happen. My having a certain genetic code will necessarily result in my being color-blind. Except in a very extended sense this is not a designed phenomenon. On the other hand it is pure chance which grain of sand blows into my eye on the beach. But if dirt turns up on my lawn in a perfect five-point-star pattern we would see that as the result of an intelligent agent, not random blowing of the wind or some geological necessity.

VI. Intelligent Design and Mormonism

Now we come to what will be the heart of the matter: the relation between intelligent design and the faith of the Saints. I believe that intelligent design should be seen as a welcome development for Latter-day Saints. It is a legitimate approach to science that keeps what should not be denied, such as the age of the earth and some idea of progressive development. But design theorists also deny that which the Saints should never accept, and at least some design theorists argue for a relation between God and science that Latter-day Saints should accept, even if many do not.

First, we confront materialism. For modern science, materialism means, as I demonstrated above, that matter, much as we commonly understand it, is either (1) all that there is or (2) all that can be studied in science. I have argued that both claims are false and that even the latest science shows them to be false. Latter-day Saints also have a stake in this discussion, even if we grant that spirit is a special kind of matter about which science can say nothing. Whatever "refined matter" turns out to be, it will not be the sort of matter claimed to be basic by scientific materialism. In the case of the resurrection, the scriptures are clear that resurrected bodies are not like ours. They are "spiritual bodies" that are so different that the apostle Paul is led to say that "flesh and blood cannot inherit the kingdom of God" (1 Corinthians 15:50; see 1 Corinthians 15:42–50; Alma 11:43–45; D&C 131:7).[45] James Faulconer has expanded on the point by showing that appearances of resurrected beings in the restoration demonstrate that they shimmer in extreme whiteness and brightness, they hover in the air, they can enter and leave locked rooms at their choosing, and so forth. This does not appear to be the kind of "matter" that science deals with. We are better off rejecting the scientific paradigm of materialism because we know that it is not true to the manifestations of the restoration.[46]

Second, I have already argued that it is a mistake to keep God out of science. Latter-day Saints, of all people, should agree. God is active in the world in bringing to pass his purposes. The Saints reject the ever-more remote God of the Enlightenment and post-Enlightenment liberal Protestantism. God, for the Saints, is near at hand; he hears and answers prayers; he moves persons to act. Especially, he is a God of miracles. I believe that miracles both seen in scripture and experienced regularly by the Saints involve what I shall call "counterflow." What I mean is that our experience of the world leads us to expect that event X will occur (e.g., the patient will die), yet, contrary to our understanding of the chain of natural causes, Y happens (e.g., the

45. All of these scriptures speak of a matter, a "body" that is so different from ours that it cannot be recognized by beings such as we now are. Thus it is not the matter that science comprehends.

46. James Faulconer, "Divine Embodiment and Transcendence: Propaedeutic Thoughts and Questions," *Element: A Journal of Mormon Philosophy and Theology* 1/1 (2005): 1–14.

patient lives in good health for years). To recognize design as our distant scientists do is to recognize counterflow against the expected outcome of natural causes.[47]

If God is an agent in specific "miraculous" instances, as our personal experiences and events in ancient and modern scriptures proclaim him to be, how can we accept a scientific framework that requires ignoring him as a possible designing agent? We should not. We would be better off to mount a clear, decisive challenge to a picture of the world we know to be distorted.

Many have, of course, argued that miracles involve only the working out of physical laws we do not yet understand. If we understood the full causal context of the event as God does, we would not regard it as the counterflow event that we do. This move is a mistake. If we say that an event E is the result of a series of causes C1, C2, C3, and so forth, we have to ask when God can specifically intervene in such a causal chain if it is already established. Is it merely that God knows all the chain of causality Cn, where we only know part of the chain Cn-x? If what we think of as miracles are only the result of an established causal chain, then praying for a miracle, as scripture clearly teaches us to do, is a waste of time. The chain of natural causes already established will work out independent of our pleas.

If we reject scientific materialism, as we must, and if we are committed to a God who is active in the natural world, as we also must be, why should we expect that God leaves no footprints in nature that we can detect? The scriptures plainly teach that God's design is visible in nature. The most important text is Romans 1:20 where Paul writes: "for the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead." This teaching about God's action and character being visible in nature is confirmed and amplified in modern revelation. Moses is shown a cosmic vision in which it is noted

47. Miracles are ubiquitous in scripture, from large ones like raising Lazarus and sending an angel to the sons of Mosiah, to seemingly less spectacular ones such as changing water to wine. For my purposes we should note that in Moroni 7 the teaching is clear: God is a God of miracles, which have not ceased and which we can recognize as such.

that there are innumerable worlds that are nevertheless "numbered" to God, each one a divine creation that Moses can recognize with its own proper order (Moses 1:36–37) or what Doctrine and Covenants 88 calls a law (D&C 88:13).

Likewise, Abraham is shown the precise ordering of the heavens, an ordering that is the product of God's creative intellect. He is shown the ordering of the solar system—that is, "the sun and the moon." But he also explicitly taught that the whole universe has a precisely ordered structure of stars, one graded above each other from God down to the lowest order of the cosmos. Both Moses and Abraham contain revised and expanded versions of the creation story found in Genesis 1. They confirm the main line of the Genesis account. A close reading, however, especially of Abraham, shows two key points. The first is that biological creation on earth is the result of an intentional divine act. It has intention or purpose built into it (see Abraham 3:5, 8–16). This is a view, incidentally, that Darwin and much modern biology reject. But it is confirmed by Alma when he notes that, in the resurrection, all things "shall be restored to their proper order, every thing to its natural frame" (Alma 41:4). There is natural, proper, purposeful order to nature given by God. If creation has a purpose, then, like our distant scientists encountering Voyager, we ought to recognize that it has intentionality built into it and to investigate what it is.

The second and closely related point that emerges from a close reading of the Abraham account is the use of the words *ordered* and *organize*. More explicitly than in the Genesis account, creation is said to be "ordered" by divine agency. Ordering is a process of design, as is organizing. But if creation is "ordered" by God and we can recognize at a minimum that it is designed and purposeful, then why should we be content with a natural science, especially biology, that has banished intelligent organization and purpose from its purview and that treats such concepts as radioactive or toxic, never to be touched by science. We should reject such a science. It comports neither with the design that all of us, from whatever faith tradition, intuitively recognize in nature nor with the scriptural account of a designed and purposeful nature.

Latter-day Saints, along with others, should not "baptize" any specific way of identifying design. No design theorist I know, including those like Bill Dembski who have offered a specific way of identifying design, asserts that the final chapter has been written. No one who loves intellectual growth should think that such a stasis is acceptable. But the debate should be held on our ground, not on that of the hard materialists and others who reject a designed universe. We should debate with others on the basis of four principles that Latter-day Saints accept as fundamental. First, hard materialism of the sort here defined is false both as a metaphysical and a methodological claim. Second, the universe is designed by God and is purposeful. Third, design in nature can be recognized and investigated by human beings. Fourth, divine intentional intervention in particular moments is real and can also be recognized by us. God is an intelligent agent who created a purposeful world and who intervenes to ensure that his purposes are fulfilled.

VII. Critiques of Intelligent Design

Critiques of intelligent design fall generally into three categories. First is the claim that intelligent design is simply old-fashioned young-earth creationism repackaged for a new era. Old wine gone sour in new wineskins still leaves one with a bitter taste. This objection is easily shown to be false. Young-earth creationism of the sort promoted by the Institute for Creation Research and Answers in Genesis has had Latter-day Saint supporters like metallurgist Melvin Cook and Joseph Fielding Smith.[48] The two main claims of young-earth creationism are that the earth has a very young age (only a few thousand years) and that species are fixed in their biological position by God—that is, no descent with modification. Neither one of these claims plays any necessary role in the concept of intelligent design. Someone who holds either one or both of these propositions may also accept intelligent design. But accepting intelligent design as a critique of and alternative

48. Melvin A. Cook, *Science and Mormonism: Correlations, Conflicts and Conciliations* (Salt Lake City: Deseret News Press, 1967); and Joseph Fielding Smith, *Man, His Origin and Destiny* (Salt Lake City: Deseret Book, 1954).

to the complete sufficiency of randomness and natural selection does not commit one to either one of these propositions that define young-earth creationism.

The second line of criticism of intelligent design claims that it is not science because either no body of scientists accepts it or because it has not been published in peer-reviewed forums. The first claim that no body of scientists accepts it is wrong and, if adhered to, would doom scientific innovators who do not accept the "prevailing wisdom." Hence, the critics argue that when innovators present their findings there is no body of scientists who accept them. So what? When Einstein published his work, most scientists remained attached to Newtonian absolute space and time. When Hubble showed that the universe was expanding, many astronomers rejected the implications of his findings. Mendel was ignored in his own day. The list could go on endlessly. Intelligent design as a specific alternative to neo-Darwinism is no more than twenty years old. Twenty years after Copernicus published his theory, the leading astronomer of the day, Tyco Brahe, was still trying to make Ptolemaic astronomy work. A list of scientists who doubt the complete sufficiency of Darwinism now comprises over six hundred names and is growing.[49]

On the matter of publication, we can also note that a number of key works in intelligent design have in fact been published by major academic presses who have rigorous peer-review standards. William Dembski's *The Design Inference* was published by Cambridge University Press. His follow-up key text *No Free Lunch* was published by Rowman and Littlefield, a major American academic publisher. A collection of work-by-design thinkers has appeared from Michigan State University Press. Most recently a collection containing the key debate over intelligent design, theistic evolution, and complexity theory, with papers from thinkers in each camp, has been published by Cambridge. A number of other book chapters and papers looking at nature from a design theoretical perspective have also been published. Latter-day Saints might note that the essential core of an intelligent design critique of Darwinism was published decades ago in one of the world's leading

49. See www.dissentfromdarwin.org (accessed 12 October 2006).

scientific journals, *Nature,* by LDS plant geneticist Frank Salisbury.[50] Salisbury's argument was that, if we take the known rate of genetic change in nature, we can get a good estimate of the time it will take to develop from single-celled organisms to complex organisms like human beings. We can then compare the time needed for randomness to do the work with the time allotted by astronomers to the age of the planet. The time estimates are wildly incongruent. The time needed was vastly more than the time available. A nonrandom (i.e., designed) process would account for the discrepancy, argued Salisbury, but that was seemingly ruled out a priori by most scientists. Salisbury's paper was critiqued by leading neo-Darwinist John Maynard Smith and defended by others. Smith, however, came to admit that we must "put an arrow on" evolution (i.e., affirm that it has a direction from simple to complex) that evolution itself does not provide.[51]

A key criticism is that design is a "science stopper." In other words, claiming design allows us to simply stop doing science with the easy claim that "oh, God designed that," without further investigation. But ignoring design when it is actually present is just as likely to be a "science stopper." Remember the other world on which Voyager lands. If those scientists ignore design as a relevant hypothesis and just assume randomness—for example, "this is just another meteor"—they will ignore a vast and relevant line of investigation. How was it designed? Who designed it? What was it designed for? Consider also the SETI project mentioned above. To do SETI research requires adopting the hypothesis that some sequences of the electromagnetic radiation from deep space they study might not be random, but designed. Furthermore, unless they are already convinced of atheism like Sagan, they cannot, on scientific grounds, rule out the idea that the intelligent agent who organizes the pattern they record is in some real sense divine. Forensic scientists too need to recognize design. Did the deceased just fall or was she pushed from the balcony? Was it a ricochet bullet or a direct, designed hit?

50. Frank B. Salisbury, "Natural Selection and the Complexity of the Gene," *Nature* 224 (1969): 342–43.

51. John Maynard Smith, *On Evolution* (Edinburgh: Edinburgh University Press, 1972).

This criticism is connected to an old claim about not mixing God and science called the "god of the gaps" objection. The claim is that religious people are fond of pointing to some feature of the world we do not understand and saying "God did that." Divine action supposedly fills in the "gap" in our knowledge. Yet when we do get a scientific or material account, religious people are forced into an ever tighter corner. However, intelligent design is not a "god of the gaps" strategy. Design thinkers do not merely insist on gaps in our knowledge since this is a point that everyone recognizes but that is irrelevant. Rather, they believe that there are features of our world that are best explained as the result of a designing intelligence. The claim of design is not made on the basis of ignorance but, like our distant scientists, on the basis of our knowledge of nature and of action of natural causes.

Intelligent design does not represent a threat to science nor is it a conspiracy, as some fanatical opponents have alleged. Its explanatory framework and premises are there for all to see. Moreover, it is not a movement with a credo. There are vigorous debates within the design camp that are just as serious as those between design and the alternatives. Two examples of this will shed light on design theory itself. One has been hinted at in the earlier sections of this paper. Is there a specific framework for detecting design, such as Dembski's specificity-complexity criterion, or is the recognition of design more intuitive, recognizing counterflow against an established understanding of nature, as proposed by Del Ratzsch? This is a fundamental disagreement among those who are friends of design. This debate has serious theoretical consequences for whether a set of tests of design theory can be organized. Second is a profound debate about what can be called the metaphysics of design. Is design best understood as external to the object designed, like a sculptor who takes raw materials and designs a sculpture, or a potter who makes a vessel out of clay? Or is design something internal to the thing, especially in the case of living things like human beings? Are *telos* and form internal to us? Do we have a final purpose and a structure or form intrinsic to this purpose inherent in us? Is design something similar to what modern engineers do and should recognize, or is the plan inherent in

the living theory, as Aristotle holds? Like disputes in the sciences over such things as the big bang, Darwinian gradualism, or punctuated equilibrium, design theory has no formal creed. But it has given rise to vigorous and worthy discussion. Ignoring it or rejecting it out of hand is bias, not science.

Conclusion

In my view, Latter-day Saints as well as serious Christians generally should be sympathetic to and supportive of intelligent design. We must reject materialism. We must accept God's intervention in nature. Finally, we must hold that God's action in nature is at times plainly visible. Once these core convictions are held as control beliefs, intelligent design cannot be denied.

Appendix

Two recent works directed at an LDS audience have focused on evolution and Mormonism. Though on the surface they appear different, there is a good deal of overlap, even though the authors of the one book criticize an earlier attempt by the author of the other book to address evolution and Mormonism.

The first and most widely known book is *Evolution and Mormonism: A Quest for Understanding,* by Trent Stephens and Jeffrey Meldrum from Idaho State University. Stephens is a biologist and Meldrum primarily a vertebrate paleontologist.[52] The second work is *The Case for Divine Design: Cells, Complexity, and Creation,* by Frank Salisbury, emeritus professor of plant physiology at Utah State University.[53]

The Meldrum and Stephens book is more directly aimed at a Latter-day Saint audience. The authors discuss in some detail the literature from LDS General Authorities and official statements about evolution. From this literature, they conclude that church leaders have not taken a position on evolutionary theory. They then review the evidence for the interconnectedness of all life, especially the closeness of the human form and physiology to that of primates. Finally they conclude that evolution is at least compatible with Latter-day Saint beliefs and is currently the best science available.

The weakness of the book is its failure to distinguish between evolution as a claim about descent and evolution as a claim about random variations coupled with natural selection as a mechanism of change. When this distinction is made, it seems clear that, however much Meldrum and Stephens refer to Darwin, they are only partially his followers. This is the case because they reject pure randomness and argue instead for nonrandom, guided biological development. Nonrandom or guided development is an important area of current research on

52. Trent D. Stephens, D. Jeffrey Meldrum, and Forrest B. Peterson, *Evolution and Mormonism: A Quest for Understanding* (Salt Lake City: Signature Books, 2001); see Frank B. Salisbury's review of this book in "Creation by Evolution?" *FARMS Review* 18/1 (2006): 313–19.

53. Frank B. Salisbury, *The Case for Divine Design: Cells, Complexity, and Creation* (Springville, UT: Cedar Fort, 2006).

which Stephens has published peer-reviewed studies. For inspiration they turn to early twentieth-century British biologist D'Arcy Thompson, who argued that physical laws led to the specific forms of living things, which thus constricted the further possibilities of random development. But if evolutionary randomness is constrained by form and does not fully explain form, then rigid Darwinism must be given up.[54]

Frank Salisbury was sometimes thought of as a creationist because he thought that random variations and natural selection were an insufficient mechanism of evolutionary change. Young-earth creationists tried unsuccessfully to convert him to their cause. Salisbury, however, was never a creationist of any sort. He always accepted the evidence of a very old earth and a descent of organisms from simple to complex. The book here referred to, unlike his earlier publications in this area, is not specifically aimed at a Latter-day Saint audience. The jacket text by Morris Cline, emeritus professor of cell and molecular biology at Ohio State, refers to him as "a devoted Christian scientist." LDS authors and authoritative statements are only treated in a brief five-page appendix. But the book is published by a small Utah publisher with a largely Mormon audience, so we shall treat it in comparison with Stephens and Meldrum's book.

Salisbury's book may be most properly thought of as a direct descendent of Michael Behe's *Darwin's Black Box* in its main argument. Like Behe, Salisbury is impressed with design at the cellular and subcellular level. He is unimpressed with and critical of the responses to Behe. Most of them amount to what he, like Behe, calls "just so" stories. As noted earlier, such a criticism goes like this: Behe, or someone else such as Salisbury himself, presents an example of an irreducibly complex mechanism or event like the origin of life on earth or the blood-clotting mechanism. The critic responds by saying "it might have evolved (or started) like this" without showing that it did or without even showing in detail how it might have. Salisbury is rightly unimpressed.

54. D'Arcy W. Thompson, *On Growth and Form,* abridged, ed. John T. Bonner (New York: Cambridge University Press, 1961).

Unlike Behe, who wrote for a national audience, and Stephens and Meldrum, who include much material directed specifically at LDS audiences, Salisbury includes a survey of various views relative to the creation account, including young-earth creationism, old-earth or day-age creationism, the gap theory favored by those like Talmage, who believed in pre-Adamite hominoids, and others. He then reviews much of the same material from biochemistry and cell biology that suggests design. He adds to Behe's approach an especially rich discussion of the problem of the origin of cellular life on earth. He shows that while there are many theoretical approaches to the question of origins, none of them has gained wide acceptance. We still have no solid account of life's origin. Salisbury, of course, believes that creation was "the work of an intelligent creator." If we start here, we are not left with a complete mystery of how to get a highly complex information code (i.e., DNA in living organisms) from an information-empty or highly limited starting point. The creation starts with an agent who possesses all the necessary information. Though in the end he professes not to have made up his mind on crucial points, it is clear that he believes that divine design can be seen at the biochemical and cellular level and in the origin of life. What thus appears is that, though Stephens and Meldrum stress evolutionary development for their LDS audience and Salisbury stresses design, they both end up rejecting randomness and natural selection as a complete and sufficient explanation for the development of living things on earth. If, as the authoritative LDS materials cited in and quoted by Stephens and Meldrum universally hold, the coming of human beings (and thus the development of their physical bodies) is under God's direction, how could they not reject randomness?