

22 Biology and Religion

INTRODUCTION

The historical, conceptual, and cultural interplay between biology and religion involves a complex and philosophically fascinating set of relationships. Certainly the simple view that religion has uniformly been a hindrance to biological research is an unfair caricature. Religion has sometimes had a positive effect, often indirectly stimulating or even directly encouraging scientific research of the biological world. Similarly, biology has had a profound effect on religion, sometimes offering challenges that require believers to reassess basic theological assumptions. Scholars have examined both directions of influence, finding both expected and unexpected connections (e.g., Cantor 2005, Rolston 1999, Russell, Stoeger, and Ayala 1999). This chapter will give a necessarily selective account of some of the mutual influences between biology and religion. Its major purpose will be to highlight a deep pattern underlying their interplay, namely, the pervasive effect of the religious idea of the divinely created normativity of nature.

How this pattern is exemplified in multiple ways in the ongoing creationist controversy will be a recurring example, but we will also examine how it may be seen in a wide range of issues from questions about what it means to be human; to religious warnings against “playing God”; to views about gender roles and sexual morality, environmentalism, personhood, and the status of the fetus; and ultimately to metaphysics and the question of ultimate priority in creation. We begin by looking at biological evolution, a critical topic that intertwines with many of these other cases.

RELIGION AND EVOLUTION

Certainly one of the best cases by which to examine the interplay between science and religion is the ongoing religious controversy over evolution and creation. Although this controversy is often stereotyped as little more than a simple attack upon biology by naïve biblical literalists, this superficial view misses the way the battle distills the essence of the deep conceptual divisions in the ways that people conceptualize and deal with scientific and religious world-views and their implications. As we will see, the issue touches not only upon the gross features of the so-called culture war and the broad struggle between science and religion, but is connected to a wide range of the philosophically interesting topics in the relationship of biology and religion, including evidential, ethical, meta-physical, and even existential questions.

Being Human

The effect that the discovery of evolution had and continues to have upon the religious, especially the Christian, worldview may be even more profound than the earlier scientific revolutions that displaced human beings from the physical center of creation. If we were not specially created, what does it mean to be human? Does humanness begin and end with the biological notion of the species *Homo sapiens*? The traditional Christian understanding of human dignity took it to be based in the Genesis notion that humans are created in God's image. What can be retained of human uniqueness and dignity if we evolved from apes and are "just" one more branch on the evolutionary tree? And what happens now that genetic technology puts our future evolution in our own hands?

Through its discoveries and the questions that these lead to, biology has challenged religious thinkers to reassess old notions of *Imago Dei*. Though a literal reading of "God's image" would suggest that human beings resemble God in visual shape, surely it is an odd notion in more ways than one that human beings get their dignity because their body looks like God's. Evolution gives further impetus to separate that notion from the body itself and to focus on more abstract candidates for the human essence. It is common now for religious thinkers to identify instead traits such as human freedom

and ethics. Some like the philosopher of religion and biology Patricia A. Williams place this explicitly in an evolutionary framework and see human freedom as emerging as hominids evolved to be able to recognize and make choices. Williams has no problem accepting evolution and argues that God's love was first manifested in the universe when it could be expressed through the evolution of creatures with symbolic language. The scientific discovery of our evolutionary connections to all living things, she says, helps us understand that the commandment to love one's neighbor should embrace all of the living world (Williams 2001).

While Williams's particular account may not yet be widely shared, it demonstrates how religious views are absorbing and processing discoveries from biology. Similar processing and accommodation have happened numerous times in the past. To give just one further example, consider historical changes in views regarding the possibility of living beings on other worlds, an idea that evolutionary biology makes one consider more seriously.

Extraterrestrial Life

Discussions of the possibility of life on other planets go back well before Darwin. In de Fontenelle's 1686 classic *Conversations on the Plurality of Worlds*, a philosopher and his hostess discuss the implications of the new Copernican cosmology and find the idea of people on the Moon and planets to be a light-hearted and entrancing possibility. But William Whewell's 1853 treatment of the issue was more sober. In *Of the Plurality of Worlds*, Whewell argued that no life existed anywhere else in the universe (Whewell and Ruse 2001). His argument bore the stamp of a theological worry: God's relationship to humans is supposed to be personal and unique, with the idea of His appearing on Earth as a man, the savior Jesus, being so fundamental to the Christian view that it would be impossible and equally repugnant to imagine either other worlds with analogous saviors or bereft of salvation. Admitting the possibility of living beings on other worlds would threaten our special relationship with God, not to mention opening the door to supporters of evolution. Indeed, Thomas Paine used just this kind of an argument to criticize Christian beliefs, citing the absurdity of the idea of God's traveling from world to world in an endless succession of death to redeem the

progeny of alien Adams and Eves. But few contemporary Christians seem bothered by the possibility of extraterrestrial life and the Catholic philosopher of science Ernan McMullin (2000) has explained how Christian theology can be formulated to accommodate such notions.

Rethinking Religion in Light of Evolution

It is important to recognize the extent to which most mainstream religions have already accommodated evolutionary biology. Even Christian theology, for which evolution might be thought to pose the greatest challenges, has for the most part made peace with the findings of Darwin and the evolutionary biologists who have followed. Mainstream Christianity has done this in much the same way that it eventually came to terms with the earlier challenges from physics and astronomy.

Rather than following a simplistic reading of Scripture, religious thinkers have followed Galileo's advice that truth should not contradict truth and that believers should allow God to speak through the book of the world and not just the book of the word. Rather than insisting that God must have used a direct form of miraculous creation to bring about biological complexity, they have taken a more broad-minded and generous view of God's powers of creation. They allow, or even insist, that God created the world indirectly, by endowing it with a complete set of laws that did not require periodic intervention and adjustment. Rather than tying Christian theology to metaphors of God's "design" or "plan", theologians like John Haught (2000) suggest that these may be misleading, and that notions of God's "vision" or "dream" for the universe might be better. Rather than getting hung up over the evolution of our material body, they say, remember that what is essential to Christian doctrine is the immaterial soul.

For these and other reasons, the Catholic Church and other Christian denominations say that evolution should not be seen as in conflict with Christian faith. Nor are these only recent accommodations. Even in Darwin's day many evangelical Christians were among the earliest defenders of the theory, as documented in David Livingstone's (1987) revealing history of the encounter between evangelical theology and evolutionary thought.

Creationism

However, evolution continues to be viewed as theologically anathema to most Christian fundamentalists, especially in the United States. With about a third of all Americans identifying themselves as fundamentalist according to polls, and many evangelicals holding similar views, there is a huge receptive audience for various forms of creationism.

The general concept of creationism is the rejection of the scientific account of evolution in favor of supernatural special creation, but there are many variations of this idea that reflect different theological assumptions. By far the dominant form of creationism is the variety that holds that the Earth is 6,000 to 10,000 years old. These "young Earth" creationists calculate from the days and the generations listed in the Bible to get this figure. However, other creationists read the days of creation in Genesis as being long ages of time, since a day from God's point of view need not correspond to our solar day, and so they accept the standard scientific chronology. Other "old Earth" creationists interpret Scripture in other ways that allow this. Some creationists hold that the major global geographical features were caused by a catastrophic worldwide flood, while others believe that Noah's flood may have been local or "tranquil". And so on. Moreover, there are also non-Christian creationists who reject evolution in favor of the creation stories of their own religions (Pennock 1999).

The public controversy about creationism as we experience it today can be traced to the *Epperson v. Arkansas* decision of the United States Supreme Court in 1968, which ruled that laws that banned the teaching of evolution were unconstitutional. When the courts also ruled that teaching biblical creationism was unconstitutional, young Earth creationists tried a new approach. Dropping the overt references to Scripture, they claimed to promote merely a scientific view, which they called "creation science". They had some success at getting legislatures to pass "balanced treatment" acts, but again the courts found such laws to be unconstitutional. The testimony of the philosopher of biology Michael Ruse on the nature of science provided a critical element of the decision. In 1987, the Supreme Court ruled in *Edwards v. Aguillard* that creation science was not science but was disguised religion, and thus that

teaching it in the public schools violated the Establishment Clause of the Constitution. Quickly adapting to this loss, creationists changed their terminology. For instance, manuscripts of a major creationist biology textbook – *Of Pandas and People* – that was in preparation dropped the term “creation-science” in 1987 immediately after the *Edwards* decision and replaced it with the term “intelligent design”. For obvious reasons, intelligent design (ID) advocates now deny that they are creationists, but their history and their substantive views show otherwise.

The intelligent design movement is most characterized by what it called “the Wedge”, a strategy devised by Phillip Johnson, a law professor who is credited with negotiating a truce between young Earth and old Earth creationists to improve their chance of success by uniting around a banner of “mere creation”. So long as they stayed focused on their common view that evolutionary thinking is profoundly anti-Christian, and that God, not natural processes, created the world and human beings, they could agree temporarily to drop their battles about the flood and the age of the Earth. Such issues could be introduced later after the sharp edge of the wedge had penetrated the constitutional barrier. ID is often misidentified as a form of old Earth creationism; in fact, the young Earthers in the group have simply agreed to hold off pressing their case until ID reaches the classroom. The Wedge was also a metaphor they used to speak of how they would split apart the materialist, naturalist worldview of science so they could replace it with their theistic science. When lobbying for their view to be taught in the public schools, they continued the old creation science claim that ID was based entirely in science and was not religious. When speaking with supporters, however, they revealed the hidden agenda. Here is a representative example from Phillip Johnson:

My colleagues and I speak of “theistic realism” – or sometimes, “mere creation” – as the defining concept of our movement. This means that we affirm that God is objectively real as Creator, and that the reality of God is tangibly recorded in evidence accessible to science, particularly in biology. We avoid the tangled arguments about how or whether to reconcile the Biblical account with the present state of scientific knowledge, because we think these issues can be much more constructively engaged when we have a scientific picture that is not distorted by naturalistic prejudice. If life is not simply matter evolving by natural selection, but is something that had to be

designed by a creator who is *real*, then the nature of that creator, and the possibility of revelation, will become a matter of widespread interest among thoughtful people who are currently being taught that evolutionary science has shown God to be a product of the human imagination. (Johnson 1996, emphasis added)

The ultimate goal of ID creationists is to reintroduce supernatural explanations into biology and into science generally. They claim that biological complexity in particular, but also other functional complexity they believe they can identify in the universe, can be explained only by the purposeful action of a transcendent intelligence.

RELIGIOUS EXPLANATION IN BIOLOGY

Of course, creationists are not alone in offering mystical explanations. Nor is it only in trying to explain the creation of life and its myriad complexities that religious believers have appealed to the supernatural. We can here only briefly touch upon a few representative cases of the many examples of purported religious explanations in biology.

An important set of examples involves how to understand illness and disease. Early inklings of the transition from a religious to a scientific explanatory framework are often illustrated in the Hippocratic writings on epilepsy. Rather than thinking of epileptic seizures as a "sacred disease" involving some sort of divine possession, Hippocrates recommended that medical doctors understand it in natural terms. The idea that sickness is the result of possession, perhaps by evil spirits, is common across many religious traditions, not just animistic ones. Renaissance Christians offered similar explanations for the dancing mania, what became known as St. Vitus dance. On this kind of religious view of disease, cures necessarily will involve an appeasement of or struggle with immaterial spirits. The materialistic explanations of medical science may be viewed as irrelevant or even as suspect.

A related religious concept of disease is that it is the result of sin. In some cases the disease is taken to be a punishment for sin, sometimes even directly inflicted by God. A classic example of this view of disease as divine punishment view was seen in the plagues of the Middle Ages, which led to self-flagellation and other displays of

public penance as believers attempted to atone for some unknown offense to God. Paintings from the period display Christ's throwing bolts of plague from heaven to punish the sinners.

Nor are such religious "explanations" in terms of immaterial spirits and divine punishment confined to the dark ages of history. Among the many recent examples one particularly salient one was the view expressed by many fundamentalist Christians that the disease that eventually was identified as AIDS but that had initially been called the "gay disease" was God's punishment for the sin of homosexuality. Even after the human immunodeficiency virus (HIV) was identified as the cause, many continued to view the disease as a modern plague sent to punish sinners and questioned whether HIV was indeed the cause.¹

Such examples of religious explanations of disease are illustrative of the way in which this influential religious worldview mixes empirical and moral issues. What we are seeing in such cases is the playing out of the religious view of the normativity of nature.

NORMATIVITY OF NATURE

The idea that nature has a built-in moral structure is common to many religions, but here we will focus on the way this is seen from a Christian perspective. The basic idea is simple. God designed the world with a plan in mind. He set it up and saw to it that the world was good. Leaving aside the complexities associated with the Fall, the general idea is that God created the world with an innate moral structure. Persons who overlook this divinely created inherent normative structure cannot possibly have ethical relationships with the world and with God.

Creation and Morality

The intelligent design leader Phillip Johnson has explained what he and what all creationists take to be the significance of the evolution/creation debate.

If you have a biblical creation story, then getting the right relationship with God and getting to heaven are the most important things. If you throw that overboard and you have a naturalistic creation story, those things become unimportant and what becomes important is how we apply scientific

knowledge to make a heaven here on earth. That's a dream of various kinds of reform programs – socialism, for example. (Quoted in Goode 1999)

This view that the Christian creation story informs us of how to have the right relationship with God is common among many Christian believers. Fundamentalists in particular look to the biblical stories of creation for guidance about the plan that God has for human beings. For instance, the story of how God created one man, Adam, and then later one woman, Eve, is seen to be informative of the proper biological order of creation. It defines the proper core components of the family – one man and one woman. It defines what are supposed to be the appropriate gender roles: the woman is to be the helpmate of her husband. It explains why women should suffer the pains of childbirth: they are a punishment for Eve's sin. And so on. Again, the world is seen to have a built-in normativity, much of it related to sexual morality.

This view is by no means peculiar to creationism, but it is pervasive in creationist writings. A Freudian could easily analyze creationism as a sublimation and displacement of a repressed sexual obsession.

ID AND SEX

Creation science writings are rife with warnings about how evolutionist thinking is to blame for sexual promiscuity, divorce, pornography, abortion, and even bestiality. Intelligent design creationists make reference to exactly the same list. Philip Johnson and others regularly illustrate what they take to be at stake in the battle between the naturalistic worldview of evolution and the theistic worldview of intelligent design using examples involving sex. Premarital sex, adultery, divorce, and flexible gender roles, all purportedly the fruits of the former, are put up against chastity, faithful, stable marriages, and "proper" gender roles that are supposedly the fruits of the latter. In a single book Johnson twice mentions sex-education classes in which girls practice unrolling condoms over cucumbers as an example of the sorry effects of the evolutionist, naturalist worldview.

But creationists typically reserve their greatest ire for what they, as do other Christian fundamentalists, see as the worst of the sexual

sins against nature. In arguing against evolution, creationists regularly cite the lines from Romans 1 that says that ever since the creation of the world God's invisible attributes of eternal power and divinity have been able to be understood and perceived in what he has made. Those who refuse to see this are fools without excuse. Johnson says that the self-deceptive thinking of evolutionists further affirms the correctness of that chapter of the biblical worldview. And what else does Romans 1 say? That when they exchange the truth of creation for the lie of evolution, God hands these sinners over to the unnatural passions of homosexuality.

HOMOSEXUALITY

Christian fundamentalists and evangelicals take homosexuality to be one of the major problems of the day. The culture war against what they see as the immorality of homosexuality goes hand in glove with the war against evolution. Both arise in part from the religious idea of normativity built into nature. This is another example in which biology as a science both affects and is affected by religion.

Science in general and biology in particular potentially have a lot to say about homosexuality. The pioneering Kinsey report made people question long-held assumptions about the prevalence of homosexual behavior. Could it be true that 10 percent of people are homosexuals? Studies by ethologists revealed cases of homosexual behavior among animals in the wild. Are there really lesbian seagulls? Studies by geneticists suggested the possibility of a genetic basis to homosexuality. Is there really a gay gene? Such information is extremely salient for religious believers who think that God built normativity into creation.

Religious conservatives take sexual orientation to be a matter of choice and believe that homosexuality is a sinful choice that goes against nature as God intended it. But if homosexuality has a biological basis, then it is not so easy to dismiss it as "unnatural". If people are "born gay", then can they be blamed for what they are? If sexual orientation is fixed biologically, then does it make sense to say that counseling can cure it? Studies have shown that people are less likely to view homosexuality as inherently immoral if they believe it is biologically determined.

This reaction to information from biology reveals a tension in the basis of the religious objection to homosexuality. Most Christian objections to homosexuality stem from taking it to be morally condemned in the Bible. But if Creation was designed with an intrinsic normative structure, then biological information may necessitate a reassessment. Indeed, this kind of argument from biology is sufficiently compelling that some Christians modify their view to say that homosexual orientation is not itself immoral but that homosexual behavior is. Others challenge the science, arguing that studies suggesting a biological basis of sexual orientation are flawed and that gays can indeed be cured of what really is a pathology.

In such an atmosphere, it is no wonder that biological research on homosexuality such as that of Dean Hamer and Simon LeVay, who claimed to find evidence of a genetic influence in male homosexuality, becomes highly contentious and politicized. The debate is made even more complicated by some philosophers who are dismissive of biology and argue that homosexuality is simply a social construction. And there is the more general criticism that much of this argument on both sides is based on a fundamental mistake in ethical reasoning involving the naturalistic fallacy. Moreover, there are also reasonable, independent objections to genetic reductionism and the idea that there could be a gay gene. Philosophers like Michael Ruse (1990) have stepped in to help sort out these and other issues.

ENVIRONMENTALISM

It is worth giving one more important example to illustrate the way in which biology and religion become entangled because of assumptions about the normativity of nature. Religious assumptions may have a profound effect on the way that people view the value of the environment.

In an influential article "The Historical Roots of Our Ecologic Crisis", Lynn White Jr. argued that Judeo-Christian religious assumptions that permeate Western culture are largely the source of the attitudes that he blamed for environmental degradation. Among these attitudes, he claimed, is a faith in perpetual progress that is indefensible apart from a particular kind of teleology. It arises from

a story of creation in which God makes the world and all living things for the express benefit of man. (Woman is an afterthought and also created for man's benefit, to prevent him from being lonely.) According to this religious view no item in physical creation, says White, has any purpose but to serve man's purposes. This is a religious philosophy that sees man as the master of nature and as having dominion over all, second only to God Himself.

Psalm 8, for example, speaks of God as giving man dominion over creation, putting all living things under his feet. And of course the justification reaches back to Genesis 1, where God says to Adam and Eve, "Be fruitful, multiply, fill the earth and conquer it. Be masters of the fish of the sea, the birds of heaven and all living animals on the earth." White says that in this sense Christianity is the most anthropocentric religion the world has ever seen. He warned that "we shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man" (White 1967, 54).

White recognized that Christianity is complex and looked to see whether it had theological resources that might mitigate this basic problem. He suggested the model of Saint Francis of Assisi, who emphasized humility of man individually and as a species, and attempted to promote what White thought was a more democratic vision of God's creation, exemplified in his notion of Brother Ant and Sister Fire. This was probably too simplistic a solution. Although Saint Francis did talk with the animals as brothers, when they spoke back to him they repeated the same problematic biblical teleology, saying that they existed "for your sake, o man".

However, Christian theologians who had felt rebuked by White's charges subsequently tried to find an alternative scriptural basis for an environmental ethic. Shifting emphasis from passages in which the dominion model is rooted, they drew upon passages like that of God's covenant with Noah and all of creation and upon the parable of the good steward in the Gospel of Luke. The rainbow was a sign of God's covenant not just with man but with the Earth and a promise never to destroy it again. And Jesus's parable of the good steward reinterprets the idea of dominion to include a responsibility of stewardship – "When a man has had a great deal given to him on trust, even more will be expected of him" (Luke 12: 48–49). As the steward cares for the household, so should man care for the Earth

and its creatures (Wright 1989). While liberal Christian denominations may not have needed this kind of justification, its articulation has had a documentable effect on some conservative believers. The nascent environmental movement among evangelical Christians who have adopted this perspective is a positive development.

Unfortunately, there is another religious impediment to solving our environmental problems, this one especially found in the beliefs of certain fundamentalist Christian sects in the United States who hold that we are already living in what they call the "end times". They hold that biblical prophecies, particularly in the Book of Revelation, that discuss the signs and events that will herald the end of the world indicate that this will likely happen in our lifetime. Why worry about loss of biodiversity, global warming, or other environmental problems if the world is about to end and the true believers are to be taken to heaven to sit by God? This attitude was exemplified by James Watt, secretary of the interior under President Reagan, who in public testimony before Congress said that it was unimportant to protect natural resources because of the imminent return of Jesus – "[A]fter the last tree is felled, Christ will come back." Environmental destruction may not only be safely ignored, but actually welcomed or even hastened for these believers as taking us more rapidly toward the apocalypse and "the rapture". Given that polls show that 59 percent of Americans believe that the prophecies of Revelation are going to come true, this religious impediment to environmental care may be a larger problem than even the Christian stewardship model of the good Saint Francis can overcome (Moyers 2004).

BIOETHICS AND "PLAYING GOD"

This same kind of view of the normativity of nature is behind religious warnings against "playing God" that are common in religious moral assessments in bioethics. We should not play God and modify the world, some hold, because God already set it up and saw to it that the world was good. God has a plan for the world and for each person – even in birth and death – so it would be wrong to interfere in such matters. Much of the philosophical literature in bioethics, and certainly most of what is discussed in philosophy courses on biomedical ethics, involves responses to or defenses of religious moral

beliefs of this sort. We have space here only to enumerate briefly a few of these.

Beginning with bioethical issues involving the end of life, one could examine at length how this kind of religious view plays out in the literature on the definition of death, on euthanasia and physician-assisted suicide. The biological notion of brain death, for instance, continues to meet resistance from religious conservatives, as does the practice of removing life-sustaining technology or hastening death of the terminally ill by lethal injection. Indeed, there were even early objections to what was called the "God squad", a hospital committee that would decide how to allocate scarce kidney dialysis machines when these were first developed. Only God should decide who should live and die and when a life is over. Similarly, for many believers, only God should decide when a life may begin. Moral objections against contraception, *in vitro* fertilization (IVF), and reproductive cloning in large measure derive from this kind of religious view that human beings may not usurp God's powers to create new life. There continues to be a vigorous public debate about these issues. Bioethicists have struggled with this kind of religiously based objection to biomedical technologies, most recently as articulated in the works of Leon Kass, appointed by the second President Bush to head the President's Council on Bioethics in large part because of Kass's support of these sorts of religious views.

One finds the same kind of assumption behind religious objections to other sorts of biotechnology. Although there are other kinds of arguments used as well, a common reason for opposition to genetic engineering is that nature is put together as it is for a good reason and that it is hubris to presume to improve upon it. It is no wonder that the Frankenstein story, which draws upon the myth of Prometheus's theft of fire from the gods – essentially a creation story of the origin of our control of fire – is the dominant trope used against bioengineering.

Of course one should not ignore other important religious assumptions that underlie contemporary bioethical controversies. The controversy over stem cell research, for instance, exemplifies how many different religious assumptions can come into play. Thinkers writing from a Jewish perspective, for instance, have held that their religious teachings would support stem cell research. Judaism places a high value upon human life and holds that one has a religious duty to

care for one's body. The sick should accept all medical treatments, and it is our duty to do everything reasonably in our power to combat the ravages of the body. Catholic religious thinkers, on the other hand, as well as conservative Protestants, view this particular issue more in light of their religious views about the status of the fetus. If the fetus is a person even in the earliest moment after conception, then how can it be used to supply stem cells, even for a good purpose?

METAPHYSICS

This last point takes us to issues of religious metaphysics. The way in which such believers judge the moral status of the fetus is clearly a function of their religious beliefs about the true nature of personhood. It goes without saying that this is the main source of religious opposition to abortion. Information from biology is used by all sides in the abortion controversy, but no biological data can resolve what at base depends on the metaphysical assumption that God infuses the conceptus with a human soul and that that is what really determines personhood.

Such metaphysical religious beliefs about the soul are equally in play in debates about the nature of mind and of the possibility of free will. Those who hold that it is the immaterial soul that makes human beings unique among the animals will be unlikely to accept biological explanations of human action.

This takes us back to the ID creationists, who hold just this kind of a view. Their basic assumption is that neither evolution, nor any biological process, nor even any natural physical process is capable in principle of accounting for intelligent action. The creation of information, they say, necessarily requires a designing intelligence and this intelligence cannot be merely natural; it must transcend the material world. This includes human beings, who are "embodied" intelligences, which is their way of speaking of the soul. This is the key to their argument against evolution, against scientific naturalism, and for the existence of the transcendent master intellect who is responsible for the complexity of the universe.

It is for this reason that ID creationists see Christian metaphysics as at stake in the evolution debate. Philip Johnson explained the significance of this issue for IDCs when he was asked why he focused upon Darwinism.

I wanted to know whether the fundamentals of the Christian worldview were fact or fantasy. Darwinism is a logical place to begin because, if Darwinism is true, Christian metaphysics is fantasy. (Quoted in Anonymous 2002)

But this is asking too much. Understanding the limits of scientific methodology ought to help us here. To the degree that such spiritual possibilities are understood as truly supernatural, they will forever remain outside science. Solving such ultimate religious metaphysical questions is more than one should ask of biology.

PRIORITY CLAIMS: WHICH EXPLAINS WHICH?

At the end of the day, much of what is taken to be at stake turns on the question of whether people think that religion explains biology or biology explains religion. As we have seen, creationists think that if evolution is true, then all of their religious beliefs must be false, so it is no wonder that they oppose it so vigorously. The justification of a moral code, writes Philip Johnson, depends upon getting the creation story right. The Christian story is one in which God created human beings, whose sins separate them from God and who must be saved from sin to become whole. The Enlightenment story is of human beings whose mastery of science enables them to escape from superstition and eventually realize that their ancestors created God rather than the reverse. For many religious believers, that priority dispute is the ultimate philosophical question for understanding the relationship between biology and religion. Did God create human beings, or did human beings evolve and then make up the idea of God?

Psychological accounts of the idea of God as a projection of infantile images of the father and mother are well known, and some biologists have given similar deflationary accounts of religion. The philosopher Daniel Dennett (2006) recently applied the biologist Richard Dawkins's concept of the meme, a cultural analog to the biological concept of the gene, to religious ideas, analyzing religion as a natural phenomenon. Others have tried this in even more reductionist evolutionary terms. In the book *The Biology of Religion*, for instance, Vernon Reynolds and Ralph Tanner investigated how individuals' religious faith or membership in a religious group affected their chances of survival and their reproductive success.

That is to say, they attempted to give a sociobiological account of religious belief and religious practices. Marshaling historical and contemporary cross-cultural data about a wide range of religions, they looked at the biological effects of religious beliefs and practices involving conception and contraception, abortion and infanticide, birth and childhood, marriage, death, disease, and more. They concluded that religious practices were biologically adaptive, arising from past survival strategies and continuing to enhance reproductive fitness. Religions, as they rather audaciously stated it, are “culturally phrased biological messages . . . a primary set of ‘reproductive rules’” (Reynolds and Tanner 1983, 294).

It is notable that Reynolds and Tanner took to heart the critique of sociobiology and what the philosopher of biology Philip Kitcher called its “vaulting ambition” to explain such cultural complexities. They dropped the theoretical framework of sociobiology almost entirely when they revised the book, retitling it *The Social Ecology of Religion* and coining the term “socioecology” for their more eclectic (and ultimately unsatisfying) theoretical perspective. They also found empirical weaknesses in their earlier view, recognizing that religious practices can exacerbate as well as reduce the risk of disease, a fact that should not have been the “surprising discovery” they claimed it to be (Reynolds and Tanner 1995, 17). Their major revised conclusion is the weaker one that religions “evolved to provide legitimating of ‘safe’ ways of dealing with those events in life that bring human beings into a state of danger or fear or anxiety or just an overwhelming feeling of pointlessness” (1995, 42) and “to endow . . . life events with meaning” (1995, 308). However, there is little biological content to the notion of “evolved” here anymore. They believe that biology still has something to say about why religions exist, but their analysis is not aimed at explaining away religious belief.

The God Module

However, biology may yet try to do this. Biology has added fuel to the debate recently in a different way, in what has become known as the field of neurotheology. Some biologists have claimed to find evidence of a “God module” in the brain. In particular, they find an association between epileptic seizures in the left temporal lobe and

feelings of ecstasy sometimes described as experiences of the presence of God. This work takes off from a fact that has long been known, namely, that some subjects affected by temporal lobe epilepsy report having intense spiritual experiences during their seizures; some claim that God spoke to them directly. Such patients would often become preoccupied with spiritual issues even during seizure-free periods. Experiments using transcranial magnetic stimulators showed that one could produce these kinds of effects in subjects with no history of temporal lobe seizures. One researcher who stimulated his own temporal lobes reported being amazed at having the experience of God for the first time in his life. As may be expected, while some people have taken this brain area to be the seat of a special human faculty for experiencing the divine, others see it as confirmation that such religious experiences are delusions caused by electrical disturbances in the brain. The neurologist V. S. Ramachandran discusses his research on the neural basis of religious experience in the same way as he does his work with people who feel phantom limbs or who see cartoon characters in a visual blind spot. This rephrases the earlier question so that we may now ask, Did God create the brain, or did the brain create God?

In recent work, the psychiatrist Eugene D'Aguili and the radiologist Andrew Newberg used high-tech imaging devices to observe the brains of Buddhists and nuns during meditation. When these subjects reported subjective feelings of oneness with the universe or of the presence of God while in focused meditation, the researchers observed decreased activity in the brain's "object association areas" that purportedly process and mediate the boundary between self and themselves.

The data show, claim Newberg and D'Aguili (2002), that mystical experience is not a mere fabrication or a simple result of wishful thinking, but rather has a real, neurological basis. Moreover, they say that these experiences occur as part of normal, healthy neurophysiology and should not be dismissed as random, pathological events. Mystical experience, they say, is biologically, observably, and scientifically real. They argue that humans seek God because our brains are biologically programmed to do so, hypothesizing that spiritual experience is intimately interwoven with human biology. Continuing research is investigating questions such as whether religious ritual can create its own neurological environment, and

whether there is a connection between religious ecstasy and sexual orgasm. Belief in God will not go away, they conclude, because the religious impulse is hard-wired in the biology of the human brain. Some suggest that this is the common biological origin of all religions.

Theological responses to this kind of work range from taking it to be suggestive that God is both real and reachable, to criticizing it as a form of scientism. Critics question the appropriateness of trying to measure mystical experience, suggesting that it is a mistake to think that theological notions of the transcendent could correspond to empirical observations.

Did God create nature, or did nature create God? Suffice to say, neither biology nor religion is yet in a position to claim the final answer.

NOTE

1. Although he did not speak of it in these terms, it is an interesting coincidence that at the same time that Phillip Johnson was writing his initial articles and book on intelligent design, he also began writing in support of Peter Duesberg's dissident view that HIV does not cause AIDS but rather that it is the result of the homosexual lifestyle, including long-term consumption of recreational drugs and/or the AIDS drug AZT. Johnson recently wrote of a "racket" of "AIDS careerists" who may be covering up a "ghastly mistake" (2004). He and other ID creationists make the same kind of intimations of a conspiracy among scientists to cover up the purported false and fraudulent evidence for evolution.