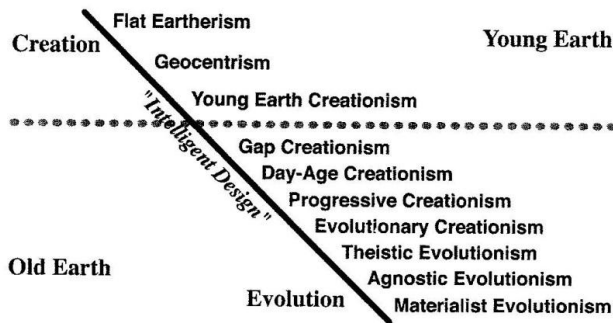


Full section on the “Creation/Evolution continuum” from Eugenie Scott, *Evolution vs. Creationism* related to CR WS 8-15-17-11

THE CREATION/EVOLUTION CONTINUUM

Figure 3.1 presents a continuum of religious views with creationism at one end and evolution at the other. The most extreme views are, of course, at the ends of the continuum. The creation/evolution continuum reflects the degree to which the Bible is interpreted to be literally true; with the greatest degree of literalism at the top.

Figure 3.1
The Creation/Evolution Continuum. Courtesy of Alan Gishlick



Although it is a continuum of religious and philosophical beliefs, it inversely reflects how much modern science is accepted by holders of these different views. I will begin with the strictest biblical literalists, the Flat Earthers. (For readers not familiar with the Bible, references take the form of book chapter: verse; thus, Genesis 1:4 would refer to the book of Genesis, chapter 1, verse 4.)

Flat Earthism

Until his death in March 2001, Charles K. Johnson of Lancaster, California, was the head of the International Flat Earth Research Society, an organization with a claimed membership of 3,500 (Martin 2001) which may not long outlive its leader's demise. Mr. Johnson—and we assume the members of his society—were very serious about their contention that the shape of Earth is flat, rather than spherical, because they are the most strict of biblical literalists. Few other biblical literalists hold to such stringent interpretations of the Bible. To Flat Earthers, many passages in the Bible imply that God created an Earth that is shaped like a coin, not a ball: flat, and round at the edges. Earth's disklike (not spherical) shape reflects biblical passages referring to the "circle" of the Earth (Isaiah 40: 22), and permits sailing around the planet and returning to one's starting point: one merely has to sail to the edge of Earth and make the circuit.

Because in this interpretation the Bible must be read as literally true, Earth must be flat (Schadewald 1991). The Englishman responsible for the nineteenth-century revival of Flat Earthism, Samuel Birley Rowbotham, "cited 76 scriptures in the last chapter of his monumental second edition of *Earth Not a Globe*" (Schadewald 1987: 27). Many of these refer to "ends of the Earth" (Deuteronomy, 28:64; 33:17; Psalms 98:3; 135:7; Jeremiah 25:33) or "quadrants" (Revelation 20:8). For Flat Earthers—and other literalists—the Bible takes primacy over the information provided by science; thus, because modern geology, physics, biology, and astronomy contradict a strict biblical interpretation, these sciences are held to be in error.

Geocentrism

Geocentrists accept that Earth is a sphere but deny that the sun is the center of the solar system. Like Flat Earthers, they reject virtually all of modern physics and astronomy as well as biology. Geocentrism is a somewhat larger, though still insignificant, component of modern antievolutionism. At the Bible-Science Association creationism conference in 1985, the plenary session debate was between two geocentrists and two heliocentrists (Bible-Science Association 1985). Similarly, as recently as 1985, the secretary of the still influential Creation Research Society was a published geocentrist (Kaufmann 1985).

Both Flat Earthers and geocentrists reflect to a greater or lesser degree the perception of Earth held by the ancient Hebrews, which was that it was a disk-shaped structure (Figure 3.2). They believed that the heavens were held up by a dome (*raqiya* or firmament) that arched over the land, and the land was surrounded by water. The firmament was perceived as a solid, metal-like structure which could be hammered and shaped (as in Job 37:18: "Can you beat out [*raqa*] the vault of the skies, as he

does, hard as a mirror of cast metal?" [New English Bible]). The surface of the firmament is solid enough that God can walk on it (as in Job 22:14: "He walks to and fro on the dome of heaven" [New English Bible]). The sun, moon, and stars were attached to the firmament, which means that these heavenly bodies circled Earth *beneath* the firmament and, hence, were part of a geocentric universe. Further support for the idea of a solid sky and a geocentric solar system is found in Revelation 6:13-16: "... the stars in the sky fell to the earth, like figs shaken down by a gale; the sky vanished, as a scroll is rolled up. . . ." Stars were regarded as small, bright objects rather than massive suns hugely larger than Earth. They could fall upon Earth because they were below the firmament, a solid object which, if rolled aside, would reveal the throne of God (Schadewald 1987, 1981-1982).

The Bible also speaks of the "waters above the firmament"; ancient Hebrews conceived of the firmament supporting a body of water which came to earth as rain through the "windows of heaven" and was also the source of the 40 days and nights of rain of Noah's Flood.

Ancient and modern geocentricity reflects the idea that humans, other living things, and Earth are central to God, so to symbolize this importance God would make Earth the center of the universe. Taking Earth out of this central position reduces its importance, which reduces (according to some) man's place as the most important element in creation. Although not supporting geocentrism, the Institute for Creation

The next group of creationists on the continuum are less biblically literal than the previous two, but all three endorse a theological doctrine called Special Creationism. Special Creationism is the view that God created the universe, Earth, plants and animals, and humans during the course of six days, as indicated by a literal interpretation of Genesis. It is more than the conclusion that God created: it makes very specific claims about *how* God created. The most common form of Special Creationism holds that the creation event took place relatively recently, and is thus called Young Earth Creationism.

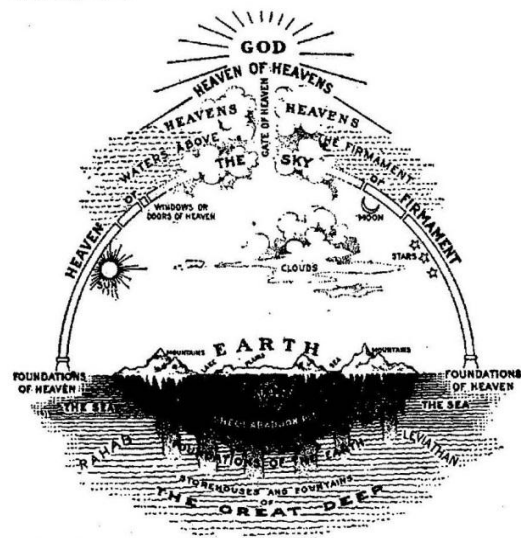
Young Earth Creationism

Few proponents of Young Earth Creationism (YEC) interpret the flat Earth and geocentric passages of the Bible literally. They accept heliocentrism, but they reject the results of modern physics, astronomy, chemistry, and geology concerning the age of Earth, and they deny biological descent with modification. Earth, in their view, is 6,000-10,000 years old. Although comparatively radical YECs will accept an age of Earth of 15,000 years, none accept the standard scientific view of billions of years of Earth history. They reject the big bang and postulate catastrophic mechanisms as the cause of most of the world's geological features. The Flood of Noah, for example, is supposedly responsible for carving the Grand Canyon and other geological features.

YECs reject the inference that earlier forms of life are ancestral to later ones: "kinds" are separate creations; descent with modification occurs only within "kinds," which are viewed as genetically limited. The definition of kinds is inconsistent but usually refers to a higher taxonomic level than species. Most YECs accept that God created creatures possessing at least as much genetic variation as occurs within a biological family (such as Felidae [the cat family] or Bovidae [the cattle family]), and then considerable "evolution within a kind" occurred. The created cat kind thus would have possessed sufficient genetic variability to differentiate into lions, tigers, leopards, pumas, bobcats, and house cats, through the normal microevolutionary processes of mutation and recombination, natural selection, genetic drift, and speciation. The basic body plans of major phyla that appear in the "Cambrian Explosion" are seen by most YECs as evidence of Special Creation.

The term Young Earth Creationist is often associated with the followers of Henry Morris, founder and recently retired director of the Institute for Creation Research (ICR) and arguably the most influential creationist of the second half of the twentieth century. He and John C. Whitcomb published *The Genesis Flood*, a seminal work that claimed to provide the scientific rationale for Young Earth Creationism (Whitcomb and Morris 1961). As the title suggests, the authors accept Genesis literally, including not just the special, separate creation of humans and all other "kinds," but also the historicity of Noah's Flood. Whitcomb and Morris proposed that there is scientific evidence to demonstrate the truth of Special Creationism: Earth is young, the universe appeared in essentially its present form about 10,000 years ago, and plants and animals appeared in their present forms as created kinds, rather than having

Figure 3.2
An early twentieth century conceptualization of ancient cosmology. (From Robinson, 1913 frontispiece)



THE ANCIENT HEBREW CONCEPTION
OF THE UNIVERSE
TO ILLUSTRATE THE ACCOUNT OF CREATION AND THE FLOOD

evolved over millions of years through common ancestors. Although efforts to insist that a literal interpretation of the Bible is compatible with science, especially geology, occurred throughout the eighteenth and nineteenth centuries, *The Genesis Flood* was the first twentieth-century effort to attract a large following. Religious antievolutionists were greatly encouraged by the thought that there might be evidence that evolution was not only religiously objectionable but also scientifically flawed. Creation Science has been augmented by hundreds of books and pamphlets written by Morris and those inspired by him (McIver 1988).

The Institute for Creation Research (ICR) remains the flagship creationist institution to which all other YEC organizations look. It founded a publishing arm (Master Books) and maintains a graduate school offering master's degrees in science and science education, as well as a public museum. Most other YEC organizations sell and otherwise distribute ICR books, pamphlets, filmstrips, videos, movies, and other materials through their newsletters, and the movement leans heavily on Morris's writings and perspectives (Toumey 1994). The ICR also sponsors "Back to Genesis" and other revivals, hosted primarily in churches, during which ICR faculty lecture for one to three days. Thousands of people may attend these sessions, including many children from Christian schools and many home-schooled children. Other outreach activities include radio programs broadcast on several Christian radio networks, and occasional tours of the Grand Canyon and other sites. In proportion to the mission activity, little scientific research is performed by ICR faculty.

Old Earth Creationism

As mentioned, the idea that Earth is ancient was well established in science by the mid-1800s and was not considered a radical idea in either the Church of England or the Catholic Church (Eiseley 1961). From the mid-1700s on, the theology of Special Creationism has been partly harmonized with scientific data and theory showing that Earth is ancient. To many Christians, the most critical element of Special Creation is God's personal involvement in Creation; precise details of *how* God created are considered secondary. The present may indeed be different from the past, but Old Earth Creationists (OECs) see God as a direct causal agent of the observed changes.

The creation/evolution continuum, like most continua, has few sharp boundaries. Although there is a sharp division between YEC and OEC, the separation among the various OEC persuasions are less clear-cut. Even though OECs accept most of modern physics, chemistry, and geology, they are not very dissimilar to YECs in their rejection of biological evolution. There are several religious views that can be classed as OEC.

Gap Creationism. One of the better-known nineteenth-century accommodations allowing Christianity to accept the science of its time was Gap or Restitution Creationism, which claimed that there was a large temporal gap between verses 1 and 2 of chapter 1 of Genesis (Young 1982). Articulated from approximately the late eighteenth century on, Gap Creationism assumes a pre-Adamic creation that was destroyed before Genesis 1:2, when God re-created the world in six days and created Adam and Eve. A time gap between

two separate creations allows for an accommodation of Special Creationism with the evidence for an ancient age of Earth. In Gap Creationism, the six days of Genesis 1:2 and following are considered to be 24-hour days.

Day-Age Creationism. Another attempt to accommodate science to a literal, or mostly literal, reading of the Bible is the Day-Age theory, which was more popular than Gap Creationism in the nineteenth century and the earlier part of the twentieth (Young 1982). Here religion is accommodated to science by having each of the six days of creation be not 24 hours but long periods of time—even thousands or millions of years. This allows for recognition of an ancient age of Earth but still retains a quite literal interpretation of Genesis. Many literalists have found comfort in what they interpret to be a rough parallel between organic evolution and Genesis, in which plants appear before animals, and human beings appear afterward. Anomalies such as flowering plants being created before animals, and birds occurring before land animals—incidents unsupported by the fossil record—are usually ignored.

Progressive Creationism. Although some modern activist antievolutionists may still hold to Day-Age and Gap views, the view held by the majority of today's Old Earth Creationists is some form of Progressive Creationism (PC). The PC view accepts more of modern science than do Day-Age and Gap Creationisms: Progressive Creationists do not dispute scientific data concerning the big bang, the age of Earth, or the long period of time it has taken for Earth to come to its current form. Indeed, some cite the big bang as confirmation of Genesis, in that the big bang is viewed as the origin of matter, energy, and time, which in the PC view is equivalent to *creation ex nihilo*, the doctrine of "creation out of nothing." As in other forms of OEC, although theories of modern physical science are accepted, only parts of modern biological science are incorporated into PC.

For example, the fossil record shows a consistent distribution of plants and animals through time: mammals are never found in the Cambrian, for example, and flowering plants are never found in the Devonian. YECs believe that flowering plants, dinosaurs, humans, and trilobites were all created at the same time and therefore all lived at the same time. They regard the orderly distribution of fossils in strata around the world to be an artifact of Noah's Flood, which is thought to have differentially sorted organisms into groups, even if they all died at the same time. PCs, on the other hand, generally accept the fossil distribution of organisms as "real" because they believe God created "kinds" of animals sequentially. To PCs, the geological column reflects history: God first created simple, single-celled organisms, then more complex ones, then simple multicellular organisms, then more complex ones, and so on up until the present time. With PC, there is no difficulty with seed-bearing plants appearing after ferns and cycads: God created the more "advanced" plants at a later time. PCs do not, however, accept that the "kinds" evolved from one another, though they are no more specific about what constitutes a "kind" than are YECs. As in YEC, though, a "kind" is viewed as being genetically limited: as a result, one kind *cannot* change into another.

Evolutionary Creationism. Despite its name, evolutionary creationism (EC) is actually a type of evolution. Here, God the Creator uses evolution to bring about the universe

according to His plan. From a scientific point of view, evolutionary creationism is hardly distinguishable from Theistic Evolution, which follows it on the continuum. The differences between EC and Theistic Evolution lie not in science but in theology, with EC being held by more conservative (Evangelical) Christians, who view God as being more actively involved in evolution than do most Theistic Evolutionists (D. Lamoureux, personal communication).

Intelligent Design Creationism has been positioned on the continuum as overlapping YEC and OEC because some of its proponents can be found in each camp.

Intelligent Design Creationism

Intelligent Design Creationism (IDC) is the newest form of creationism, and yet it resembles a much earlier idea. In some ways, IDC is a descendant of William Paley's Argument from Design (Paley 1803), which argued that God's existence could be proved by examining His works. Paley used a metaphor: if one found a watch, it was obvious that such a complex object could not have come together by chance; the existence of a watch implied a watchmaker who had designed the watch with a purpose in mind. By analogy, the finding of order, purpose, and design in the world was proof of an omniscient designer.

The vertebrate eye was Paley's classic example of design in nature, well known to educated people of the nineteenth century. Because of its familiarity, Darwin deliberately used the vertebrate eye in *On the Origin of Species* to demonstrate how complexity and intricate design *could* come about through natural selection and did not require divine intervention.

To suppose that the eye, with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest possible degree. Yet reason tells me, that if numerous gradations from a perfect and complex eye to one very imperfect and simple, each grade being useful to its possessor, can be shown to exist; if further, the eye does vary ever so slightly, and the variations be inherited, which is certainly the case; and if any variation or modification in the organ be ever useful to an animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could be formed by natural selection, though insuperable by our imagination, can hardly be considered real. (Darwin 1966: 186)

Structures and organs that accomplish a purpose for the organism—allow capture of prey, escape from predators, or attracting a mate—could be designed directly by an omniscient designer, or they could be “designed” by a natural process that produced the same effect. As will be discussed in more detail elsewhere in this book, Darwin's argument that a natural process such as natural selection could explain apparent design was theologically offensive to those who believed that God created *directly*.

In IDC one is less likely to find references to the vertebrate eye and more likely to find molecular phenomena such as DNA structure or cellular mechanisms held up as too complex to have evolved “by chance.” The IDC high school biology supplemental textbook, *Of Pandas and People* (Davis and Kenyon 1993), weaves allusions

to information theory into an exposition of the “linguistics” of the DNA code in an attempt to prove that DNA is too complex to explain using natural causes.

In the PC tradition, IDC proponents accept natural selection but deny that mutation and natural selection are adequate to explain the evolution of one kind to another, such as chordates from echinoderms or humans from apes. The emergence of major anatomical body types and the origin of life, to choose just two examples popular among IDCs, supposedly are phenomena “too complex” to be explained naturally; thus IDC demands a role be left for the intelligent designer—God. IDC will be discussed in more detail in chapter 7.

Theistic Evolutionism

Theistic Evolution (TE) is a theological view in which God creates through the laws of nature. TEs accept all the results of modern science, in anthropology and biology as well as astronomy, physics, and geology. In particular, it is acceptable to TEs that one species can give rise to another; they accept descent with modification. TEs vary in whether and how much God is allowed to intervene—some believe God created the laws of nature and is allowing events to occur with no further intervention. Other TEs see God as intervening at critical intervals during the history of life (especially in the origin of humans). In a recent book, an entire continuum of Theistic Evolutionists is presented; clearly, there is much variation (Hewlett and Peters 2003). In one form or another, TE is the view of creation taught at the majority of mainline Protestant seminaries, and it is the position of the Catholic Church. In 1996, Pope John Paul II reiterated the Catholic version of the TE position, in which God created, evolution happened, humans may indeed be descended from more primitive forms, but the Hand of God was required for the production of the human soul (John Paul II 1996).

In Figure 3.1, TE is followed by two nontheistic views, Agnostic Evolutionism (AE) and Materialist Evolutionism (ME).

Agnostic Evolutionism

Although poll data indicate that most Americans have a belief in God or some higher power, a minority do not (Kosmin et al. 2002). Just as there are variations in worldview among believers, so also are there differences among those who do not believe in God. The term “agnostic” was coined by “Darwin's Bulldog,” the nineteenth-century scientist Thomas Henry Huxley, to refer to someone who suspended judgment about the existence of God. Huxley felt that in this world, it is impossible to know or even grasp ultimate reality; therefore neither belief in nor rejection of the existence of God is warranted. To Huxley, the thoughtful person should suspend judgment. Huxley was a strong supporter of science and believed that knowledge and beliefs should be based upon empirical knowledge—and that supernaturalism would eventually be supplanted by science. But he felt it was more honest not to categorically reject an ultimate force or power beyond the material world (Huxley [2002] 1884).

I have no doubt that scientific criticism will prove destructive to the forms of supernaturalism which enter into the constitution of existing religions. On trial of any so-called miracle the verdict of science is "Not proven." But true Agnosticism will not forget that existence, motion, and law-abiding operation in nature are more stupendous miracles than any recounted by the mythologies, and that there may be things, not only in the heavens and earth, but beyond the intelligible universe, which "are not dreamt of in our philosophy." The theological "gnosis" would have us believe that the world is a conjuror's house; the anti-theological "gnosis" talks as if it were a "dirt-pie" made by the two blind children, Law and Force. Agnosticism simply says that we know nothing of what may be beyond phenomena.

Agnostics believe that in this life, it is impossible truly to know whether there is a God, and although they believe that it is not probable that God exists, they tend not to be dogmatic about this conclusion. AEs accept the scientific evidence that evolution occurred, but they do not consider important the question of whether God is or was or will be involved. They differ from the next position on the continuum by not categorically ruling out the involvement of God, although like Materialist Evolutionists, they are nonbelievers.

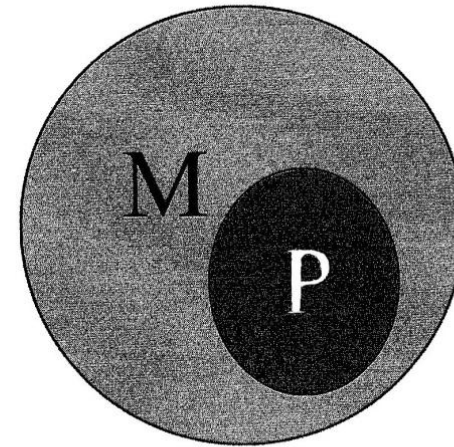
Materialist Evolutionism

We should distinguish between two uses of the term "materialism" (or "naturalism"). As we discussed earlier, modern science operates under a rule of *methodological naturalism* that limits it to attempting to explain natural phenomena using natural causes. Materialist Evolutionists (ME) go beyond the methodological naturalism of science to propose not only that natural causes are sufficient to explain natural phenomena, but also that the supernatural does not exist. This is a form of *philosophical naturalism*. To a philosophical naturalist, there is no God. The philosophy of humanism is a materialistic philosophy, as is atheism. As discussed earlier in this chapter, philosophical naturalism is distinct from the practical rules of how to do science.

This is an important distinction to the subject of this book because some anti-evolutionists criticize evolution and science in general for being not only methodologically naturalistic but also philosophically naturalistic. This is a logical error, as can be seen in Figure 3.3. It is very likely the case that all philosophical naturalists are simultaneously methodological naturalists (all Ps are Ms). It does not follow that all methodological naturalists are philosophical naturalists (not all Ms are Ps). It *might* be the case—if both circles were the same size and right on top of one another—but this would have to be determined empirically, not logically. In fact, such a claim is empirically falsified, for there are many scientists who accept methodological naturalism in their work, but who are theists and therefore not philosophical naturalists. Gregor Mendel—the monk whose research became the foundation of genetics—is a classic case of a scientist who was a methodological naturalist but not a philosophical one, and there are many scientists today who, like him, are methodological but not philosophical naturalists.

As mentioned, there are varieties of belief within the various positions on the continuum, and this is true for materialists as well. For example, although materialists

Figure 3.3
The Relationship Between Methodological
and Philosophical Naturalism



All philosophical naturalists are methodological naturalists, but it is not accurate to say that all methodological naturalists are philosophical naturalists. One can thus be a scientist practicing methodological naturalism but still be a theist.

share a high opinion of science and accept evolution, they do not all share the same attitudes toward religion. *Agnostic* materialists don't consider that the question of whether God created can be answered. *Humanists* believe that "Humanism is a progressive lifestance that, without supernaturalism, affirms our ability and responsibility to lead meaningful, ethical lives capable of adding to the greater good of humanity" (American Humanist Association 2002). The two major humanist organizations are the American Humanist Association, at the time of this writing consisting of approximately 5,000 members, and the Council for Secular Humanism, with approximately 4,000 members.

The third major group within materialists, *atheists*, reject the existence of God but tend to be more actively antireligious than the other two. There are about 2,200 members of the best-known atheist group, the American Atheists. Clearly, any single theist organization has far more members than all the materialist organizations combined. If nonbelievers are between 10 percent and 14 percent of the population, as suggested by some polls, the vast majority of them do not join groups of like-minded individuals.

This presentation of Christian and materialist views regarding creation and evolution is simplified—just as was the earlier presentation of the nature of science in chapter 1 and the presentation of the science of evolution in chapter 2. It is possible to go into far more detail on any of these beliefs, but a shorthand version will have to suffice to introduce the topic.