CHAOS THEOLOGY: A NEW APPROACH TO THE SCIENCE-THEOLOGY DIALOGUE

by Sjoerd L. Bonting

Abstract. Comparison of the concepts of creation from chaos and creation out of nothing (*creatio ex nihilo*) leads me to reject the latter for several reasons: it is not the biblical concept, and it presents serious conceptual, scientific, and theological problems. Chaos theology is outlined under the headings creation from chaos; chaos and contingency; chaos, evil, and creativity; chaos and incarnation; chaos and eschatology. It is shown to be well suited for the science-theology dialogue by some examples of its application to aspects of cosmic and biological evolution: initial mystery, separation and ordering; chaos and entropy; contingency and fine-tuning of the universe; purpose and progressiveness in evolution; and complexity theory and chaos events.

Keywords: Big Bang theory; chaos; chaos events; creation out of nothing (*creatio ex nihilo*); eschatology; evil; incarnation; initial chaos; theodicy.

In attempting to reconcile the theological concept of creation with the scientific concept of evolution, I have reconsidered creation out of nothing (*ex nihilo*) as opposed to creation from primordial chaos (Bonting 1996, 1998). This has led me to abandon the *creatio ex nihilo* concept and to construct a *chaos theology,* which is described here with some illustrations of its usefulness for the dialogue between the two worldviews.

Creation from a primordial chaos is the view taken in the creation stories in Genesis. The older story speaks about a lifeless desert (Genesis 2:5–6), the later story about an initial watery chaos (Genesis 1:2). The early

Sjoerd L. Bonting is emeritus professor of biochemistry, Catholic University of Nijmegen, and active as an Anglican priest in the Diocese in Europe. His address is Specreyse 12, 7471 TH Goor, the Netherlands (tel/fax: 31-547-26.09.47). His e-mail address is s.l.bonting@wxs.nl.

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Fathers Justin (c. 150) and Clement of Alexandria (c. 200) followed this view. Clement pointed to a passage in the Wisdom of Solomon 11:17: "For thy all-powerful hand, which created the world out of formless matter. . . ." Creation from initial chaos is also found nearly universally in nonbiblical creation stories.

The concept of creation out of nothing (*creatio ex nihilo*) arose in the battle of the early church against Marcionism and Gnostic dualism, both of which proposed the formation of the material universe by a demiurge. The new concept was first expounded by Theophilus of Antioch (c. 185) and later by Augustine, and it was thereafter almost universally accepted in the church, although it was not included in the ancient creeds. It was formulated dogmatically at the Fourth Lateran Council (1215) and reaffirmed by the Vatican Council of 1870. It was also accepted by Luther and Calvin.

Problems with *Creatio ex Nihilo*

Notwithstanding its nearly universal acceptance for many centuries, *creatio ex nihilo* presents serious difficulties:

1. Conceptually, because none of us can picture absolute nothingness, which may explain why so many philosophers and theologians consider it as an existing nothing (*nihil ontologicum*) which is not essentially different from an initial chaos.
2. Biblically, because it conflicts with both creation accounts in Genesis, and the texts quoted in support, Romans 4:17 ("God who calls into existence the things that do not exist"), Hebrews 11:3 ("the world was created by the word of God, so that what is seen was made out of things which do not appear"), and 2 Maccabees 7:28 ("God did not make them out of things that existed") can hardly be seen as clear evidence for creation *ex nihilo,* because they fit equally well with creation from initial chaos. In his authoritative commentary on Genesis, Claus Westermann (1994, 110, 121) writes: "Such an abstract idea (*creatio ex nihilo*) was foreign to both the language and thought of P [the unknown author of Genesis 1]; it is clear here that there can be no question of a *creatio ex nihilo;* our query about the origin of matter is not answered; the idea of an initial chaos goes back to mythical and premythical thinking."
3. Scientifically, because physical science, whether classical, quantum mechanical, or relativistic, is unable to explain the origin of the universe from a *nihil,* defined as the absence of matter, energy, physical laws, structure, and order (Worthing 1996, 73–110; Polkinghorne 1994, 71–87). A "quantum fluctuation in a vacuum," to which the initial Big Bang has been ascribed by some theoreticians, does not constitute a "nihil" (Polkinghorne 1988, 59). Arthur Peacocke (1997,

31) appears to agree when he says: "It was not just 'nothing at all' even if it was 'no thing'"! Mark W. Worthing (1996, 105) ends his survey with the conclusion, "Any theory explaining how something has come from nothing must assume some preexisting laws or energy or quantum activity in order to have a credible theory. Nothing comes out of nothing." To say, as John Polkinghorne (1994, 71–87) does, that *creatio ex nihilo* is merely a "metaphysical" statement, is giving up on a true *nihil.*

4. Theologically, the problem is apparent from the fact that many theologians abandon a true *nihil.* Karl Barth (1960) tries to reconcile the initial chaos of Genesis 1:2 with "nothing" by speaking about "'*das Nichtige*,' a 'nothing' of things already existing, but not real before they were created." Emil Brunner basically denies *creatio ex nihilo* when stating that "there never was a 'nothing' alongside of God. . . . What we know as creation is never *creatio ex nihilo*, it is always the shaping of some given material" (Brunner 1960, 9–21). Jürgen Moltmann (1991, 86–93) makes a rather desperate attempt to provide a theological explanation of *creatio ex nihilo.* He notes that an initial "nothingness" would limit God's omnipresence and omnipotence, and he tries to overcome this problem by invoking the Jewish cabalistic ideas of *zimsum* and *shekinah*, the Pauline idea of *kenosis* (God's self-emptying in the incarnation, Philippians 2:5–8), and God's self-humiliation. This leads him to the statements (a) God withdraws *into* himself in order to go *out of* himself in creation; (b) if God is creatively active in the "nothing" which he has ceded and conceded, then the resulting creation still remains in God who yielded up the initial "nothing" in himself; (c) the initial self-limitation of God, which permits creation, then assumes the glorious, unrestricted boundlessness in which the whole creation is transfigured; (d) in relating initial creation to eschatological creation, he states that the death of Christ overcomes the "annihilating nothingness, which persists in sin and death."

Against Moltmann's reasoning I have the following objections. (1) The attraction of a strict *creatio ex nihilo*, as emphasizing the absolute creative power of the Creator, is largely negated by the need to assume in creation *zimsum*, *shekinah*, *kenosis*, and God's self-humiliation. (2) The latter two concepts have traditionally been used for the incarnation and crucifixion of Christ, not for creation. (3) Ordering initial chaos seems to me to require as much power as abolishing "nothingness." (4) An "annihilating nothingness, which persists in sin and death," is no less mysterious than an unexplained initial chaos. (5) A nothingness that annihilates can hardly be considered a true *nihil,* and a relaxed *nihil* is not essentially different from an initial chaos, as explained before. (6) Finally, creation from chaos is the biblical concept of creation.

Thus, I prefer to retain the biblical concept of creation from chaos, to which I see only two objections: (1) *creatio ex nihilo* has been nearly universally held by the church since the third century, and (2) creation from chaos raises the specter of dualism. To the first I say: *Creatio ex nihilo* is neither biblical nor contained in the ancient creeds, so it belongs to the tradition of the church, which is not unchangeable. To the second: Acceptance of the biblical idea of creation from chaos does not introduce a Gnostic-Marcionite dualism, as long as we do not invoke a demiurge but maintain with Genesis 1 the absolute sovereignty of God who creates by the authoritative Word. Like the authors of Genesis, I simply leave the initial chaos as a mystery and refrain from speculating about its origin and composition, in the same way that cosmologists must leave the initial Big Bang as a mystery. The fact that process theologians also reject *creatio ex nihilo* (Cobb and Griffin 1976, 65) does not mean that I accept their theology, because I reject their notion of an evolving creator. In the next section I expand the idea of creation from chaos into a *chaos theology* that can clarify some important theological concepts and facilitate the reconciliation of the theological and scientific accounts of the origin and destiny of the universe and our place in it.

Principles of Chaos Theology

Creation from Chaos. In the Genesis 1 story, God turns initial chaos into created order by the sovereign Word, which means that dualism is totally excluded. God does not issue from chaos and is not limited by it, as is the case for the gods in the Babylonian creation story *Enuma elish.* God creates not by destroying chaos but by ordering it, by pushing back chaos in the three separations (Genesis 1:2–10). God assigns boundaries to the primeval sea (Job 38:8–11; Psalms 104:7–9; Proverbs 8:27–31), watches over the chaos (Job 7:12), and orders the waters back (Psalms 18:15, 77:16). This implies that an element of chaos, symbolized as *sea*, remains in the created universe, and thus that created order has a tendency to return to chaos if left to itself. The presentation of creation in six "days" plus a "day" of rest, which is not found in any other creation myth, suggests a continuation of the process of creation (*creatio continua*) toward a transcendent goal, the destiny of creation. This is even more evident when we consider the first eleven chapters of Genesis as the full creation story (Westermann 1974, 4–15), which then becomes a pre-scientific account of cosmic, biological, and social evolution guided by a transcendent Creator.

A widespread, prominent element of primitive religion is the distinction between the sacred and the profane (Long 1998). The sacred is the world of reality, so a village is laid out in a manner that imitates a divine model, and it thus participates in sacred reality. The space outside the village is considered profane, because it is not ordered according to the divine model; it remains chaos. The sacred can serve as a principle of

order, because it possesses the power to order. The village needs continued ordering of its sacred space in order to keep it from being overwhelmed by the disorder of the profane, the surrounding jungle. This is the contingency of creation, to which I return in the next paragraph. Since creation from initial chaos occurs in nearly all creation stories, this concept assumes the character of an *archetype* in the Jungian sense, a primordial image in the collective human unconscious.

Chaos and Contingency of Creation. The contingency of the creation, its absolute dependence on God, is a generally held theological idea. For many theologians this is the primary ground for the *ex nihilo* postulate. Philip Hefner even insists that *creatio ex nihilo* has less to do with origins than with dependence (1989, 226). However, contingency also includes the element of being threatened, of imperfection and evil. Augustine (absence of goodness, *privatio boni*) and Barth (*das Nichtige*) connect contingency with the evil in creation, leaving unanswered the question of how there can be imperfection and evil in a *creatio ex nihilo,* in which *everything* is created by a good and perfect Creator (see below).

I suggest that the remaining chaos element offers a better explanation for the contingency of the creation. It presents a lasting threat to the world, so that Paul can say that "the whole creation has been groaning in travail together until now" and "waits with eager longing for its final liberation" (Romans 8:19, 22). The cosmos, which continually moves between the poles of chaos and order, is permanently at critical crossroads. The scientist perceives this in the unpredictability and accidentalness of cosmic and biological evolution. The theologian concludes that the created universe is forever in need of the support of the Creator's will (von Rad 1951, 49).

Chaos, Evil, and Creativity. Theodicy, the problem of the existence of physical and moral evil in the creation of a just God, defies solution in the *creatio ex nihilo* context (Worthing 1996, 146–56). The concept of the remaining element of chaos, however, offers an explanation. Chaos can be said to have a negative or destructive as well as a positive or creative aspect. The negative aspect of chaos is expressed in evil—the physical evil in natural catastrophes (volcanic eruptions, earthquakes, hurricanes, disease, and so on), as well as the morally evil actions humans commit against each other and nature (ecological crisis). Evil is not created but is inherent in the remaining element of chaos. It is a characteristic of the ongoing creation (*creatio continua*) in which remaining chaos is pushed back. This explanation of theodicy seems to me more satisfactory than Augustine's absence of goodness (*privatio boni*) or Barth's *das Nichtige.*

The positive aspect of chaos allows the Creator freedom and creativity. In this freedom biological evolution is permitted to follow its meandering course from proto-cell to *Homo sapiens*, in which all possibilities are tried out: 2 billion species arise, and only 2 million remain. God delegates some

freedom and creativity to God's human image-bearers, thus allowing them to have free will and to become co-creators in culture, art, science, and technology. The operation of these two aspects of remaining chaos in humans explains their ambivalence, their capacity to produce the Holocaust as well as the music of Bach, nuclear arms as well as a moon walk.

Chaos and Incarnation. The doctrine of the Incarnation affirms that the eternal and preexisting Son of God takes flesh from his human mother and that the historical Jesus is at once fully God and fully human. He is believed to be without sin, which in my terminology means that in him the negative chaos element is definitively absent. In this way he can be said to be the new Adam (Romans 5:14; 1 Corinthians 15:45), although I do not wish to accept the idea of initial immortality that appears to some to be implied in the story of the Fall (Genesis 3:19). Paul's words in 1 Corinthians 15:21 ("For as by a man came death, by a man has come also the resurrection of the dead") seem to me to point to the forfeiting of a future eternal life rather than to the loss of an initial immortality. The latter is, of course, in direct conflict with the scientific evidence for biological evolution, which could take place only through the operation of the life cycle in all living beings, including humans. The Incarnation may be seen as the necessary introduction to the final fulfillment of the creation process, in theological terms the coming of the new kingdom.

Chaos and Eschatology. Eventually, at the end of time, God will perfect creation as foreseen by the Old Testament prophets. The belief in a new creation, *the new heaven and the new earth,* dominates the message of second Isaiah (41:17–20; 43:18–21; 66:22) and leads to the expectation of a new heart and a new covenant (Jeremiah 31:31–34; Ezekiel 36:26–28; Hosea 2:18–23). In this new creation the original intention of the Creator, threatened by the power of chaos and frustrated by human rebellion, will be fulfilled. This idea culminates in the New Testament in the vision of John: "Then I saw a new heaven and a new earth; for the first heaven and the first earth had passed away, and the sea was no more" (Revelation 21:1). We can see this as the definitive removal of the negative element of chaos (sea) immediately before the triumphant return of Christ. My earlier remark that in the incarnate Christ the negative chaos element is absent reflects his claim that in him the kingdom of God has already arrived. The view that in the future kingdom the chaos element will be completely abolished reflects the perfection and fulfillment of the present world rather than its cataclysmic destruction.

Chaos Theology and the Scientific Worldview

In this section I present some illustrations of the way in which chaos theology can facilitate the dialogue between the worldviews of science and

theology. The aim of such a dialogue is to determine to what extent the description of the reality of our world by each worldview in its own thought categories can be reconciled and thus give us a deeper understanding of this reality, and a faith to live by in our time.

Initial Mystery. The mystery of the initial chaos finds a parallel in the mystery of the singularity of the Big Bang before Planck time (10^{-43} sec) in the scientific account of the cosmological evolution. Theologian and scientist must both admit the limitations of our understanding of beginnings. "In the beginning" (Genesis 1:1) finds its parallel in the idea that time (our clock time) began at the moment of the Big Bang. I suggest that the transcendence of the Creator is manifested in the first 10^{-43} sec of the Big Bang with the initiation of the universe and its laws (*creatio originalis*), whereas the immanence of God is visible in the subsequent 15 billion years of evolution (*creatio continua*).

Separation and Ordering. The three separations in Genesis 1:3–10 (light and darkness, water and heaven, earth and sea) find a parallel in the three separations in the Big Bang theory: of time and space, of the four fundamental forces (gravity, strong and weak nuclear force, electromagnetic force), and of the elementary particles. Then follows the ordering: by the creative Word God turns primordial chaos ("without form and void, darkness," Genesis 1:2) into created order: plants, heavenly bodies, animals, and humans (Genesis 1:11–31). This finds a parallel in the ordering that took place in cosmological and biological evolution after the Big Bang (except that the plants appear before the sun, suggesting that author P was oblivious of the process of photosynthesis). Notwithstanding these analogies, the Genesis 1 story should not be taken as a scientific account, even a primitive one, but rather as a reflection about the relation between God, world, and humankind. As such, it gives a meaning and purpose to the process of cosmic and biological evolution that science by its nature cannot provide.

Chaos and Entropy. The second law of thermodynamics states that every closed system left to itself will in the course of time increase its e*ntropy,* the thermodynamic measure of disorder (Peacocke 1995, 129). Yet the production of galaxies and stars during cosmic evolution and of living organisms during biological evolution involves a decrease of entropy. This does not violate the second law of thermodynamics, because these structures and organisms are open systems exchanging energy and matter with their surroundings (e.g., the feeding and metabolism of organisms). Thus, the entropy of the former can decrease while that of their surroundings increases (Peacocke 1995, 130–33). This is a scientific expression of the theological insight that creation is an ordering from initial chaos by pushing back chaos. It also gives a scientific explanation for the observed

contingency of evolution (see next section) and for the theological insight that created order is always in danger of reverting to chaos. This poses another difficulty for *creatio ex nihilo,* since in that concept existing things would be in danger of lapsing into nothing, and that is clearly contrary to our experience and to the physical law of the conservation of mass and energy.

Information theory contributes the interesting thought of *an end to evolution.* Tom Stonier (1990, 38–41, 70–72) assumes that information content is proportional to the order of a system. From the Boltzmann-Schrödinger formula he then derives an equation that shows that at infinite entropy, information content is zero, and vice versa. If the equation is applicable to the cosmos, we could say that infinite entropy and zero information content would represent the initial chaos at the moment of the Big Bang. In the course of cosmic and biological evolution information content would rise steadily and entropy would decrease, representing increasing order. Eventually, information content asymptotically approaches infinity and entropy zero, which would represent an end to evolution. Actually, an approaching end to the evolution of *Homo sapiens* is suggested by its low evolutionary rate (Gibbons 1995), which could eventually become zero by our elimination of natural selection through the combined effects of medicine and technology. We are reminded here of Pierre Teilhard de Chardin's *Omega Point* (Teilhard 1959, 257–64, 268–72, 288–89), or in theological terms the transformation of the created world into the new kingdom.

Contingency and Fine-tuning of the Universe. The contingency of cosmic evolution appears in the exquisite fine-tuning of the fundamental constants, which has permitted the development of planet Earth on which life could arise (Gribbin and Rees 1995). Minute deviations from the actual values of these constants would have precluded this. For example, if the strong nuclear force (which holds atomic nuclei together) were 0.3 percent larger, no hydrogen could exist, and the atoms essential for life would be unstable; if it were 2 percent smaller, no elements other than hydrogen would exist. If the electromagnetic force had deviated only a little from its existing value, this would have completely changed chemical behavior (Moreland 1994, 141–72). In biological evolution catastrophic events have played a decisive role in the course of evolution. Asteroid impacts in the Gulf of Mexico and the Arabian Sea 65 million years ago eradicated the dinosaurs but thereby opened the way to primate development and eventually to the appearance of *Homo sapiens.* This is an example of the dual action of remaining chaos, destructive and creative.

Purpose and Progressiveness in Evolution. Both believing and nonbelieving scientists must admit that science cannot deal with purpose, or even progressiveness, in the evolutionary process. When as a Christian I

see in evolution a progressive process by the purposeful action of a loving Creator, I make a theological rather than a scientific observation. It is amusing that from the same scientific facts an eminent, nonbelieving scientist like Jacques Monod can argue against any form of purpose in evolution (Monod 1972) and Stephen Gould against recognizing any form of progressiveness in biological evolution (Gould 1994).[1] Even here, we might say, the remaining chaos element is at work.

Complexity Theory and Chaos Events. A natural system governed by a nonlinear dynamic equation (living beings, solar system, weather, and so on) may encounter in the course of time a bifurcation point, where it can take either of two directions that are energetically indistinguishable (Crutchfield et al. 1995). Through amplification of small fluctuations in a succession of such bifurcations the behavior of the system becomes unpredictable, leading to chaos events. It should be noted that the meaning of *chaos* here (unpredictable behavior of a structured system) is entirely different from that in chaos theology (disorder, without any structure). The scientist concludes that chaos events make the universe unpredictable and open. The theologian may say that in chaos events God can, when choosing to do so, be active immanently and providentially through the operation of the Holy Spirit, without violating the physical laws established in God's transcendent action in the Big Bang. The theologian may also see an opportunity for the influence of the human spirit, in cooperation with God's Spirit, e.g. in a medically unexplained remission of cancer (Bonting 1998).

In closing, we note once more the crucial role of creative chaos in the large degree of freedom that God allows to evolving creation. The scientist observes this as chance and chaos events; the theologian experiences it as the love of the Creator for all creatures, as the spontaneous overflow of the fullness of divine joy and perfection (Peacocke 1979, 110).

NOTE

1. Similar views are presented in Michael Ruse, *Monad to Man: The Concept of Progress in Evolutionary Biology* (Cambridge: Harvard Univ. Press, 1996).

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