

# **Moral Cosmologies: History, Experience, and Contemporary Ministry**

**BU STH TS/TT 875 – Room 319: 2-5 PM  
Boston University School of Theology  
Instructor, Rodney L. Petersen, Executive Director  
The Boston Theological Institute and Adjunct, BUSTh  
with lecturers from the schools associated with the BTI  
and Massachusetts Institute of Technology**

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## **I. Course Description**

This course surveys the development and evolution of cosmological thinking, the bifurcation of moral cosmology from physical cosmology, and the retrieval of moral cosmology as a discipline subsequent to the new physics of the last century. We will follow the evolution of mathematics as an aspect of this story, an emerging discipline in its own right and one that becomes integral to a new way of understanding the world through processes rather than causes. Different ways of relating science and religion through various models and paradigms are analyzed as a part of a growing pattern of science and religion dialogue concerning human needs and global crises. Contemporary theories of science, such as the rediscovery of time through relativity theory, the impact of the observer through quantum theory, complexity through chaos theory, and of the origin of the universe in “Big Bang” cosmogony, are a part of a retrieval of moral cosmology. This has implications for contemporary patterns of spirituality and ministry.

## **II. Course Format**

The format of this course will follow the integrative nature of the course description. While the majority of our time will be spent in classroom lecture and discussion, additional activities are planned for the class. These may include field trips to places of significance for our course that introduce the course objectives from an experiential perspective, laboratories at MIT, an area hospital, and the Museum of Science.

There are five guest lecturers in this course. They are Dr. Elzbieta Jung-Palczewska (Lodz, Poland); Dr. Owen Gingerich (Professor of Astronomy, Harvard University); Dr. Rosalind Picard (Media Laboratory, Artificial Intelligence, M. I. T.); Dr. Mugur Roz, M.D. (Harvard Medical School and M. I. T.); and Dr. Callista Roy (Professor of Nursing, Boston College).

## **III. Prerequisites**

Those participants in this course will tend to do best who have had basic courses of orientation in theology, history, the social sciences, and some mathematics and general science. A sense of history and the development of philosophy is more important than particular analytical skills.

## **IV. Course Objectives and Requirements**

The objectives of this course include the integration of thought and the recovery of moral cosmology as a discipline with implications for ministry. Toward this end course material will draw upon the history of mathematics, an understanding of the natural world and theological reflection. Active class participation and two brief integrative presentations are expected. A term paper on an issue growing out of the MIT Conference, “Faith and Science in an Unjust World,” is required or an issue of related

significance.

1. Active class participation with occasional oral reports on reading as assigned;
2. Two Integrative Projects (3-5 pages) that draw attention to the three integrative aspects of the course, the history of mathematics, an understanding of the natural world, and theological reflection on the implications of such for the retrieval of moral cosmology as a discipline and for ministry.
3. Research paper (15-20 pp.) on an issue growing out of the MIT Conference: "Faith and Science in an Unjust World" (e.g., economics, energy, the biological revolution, the information revolution, weaponry, etc.) indicating how moral cosmology shapes ones work and conclusions.

## V. Schedule

Guest Lecturers (dates may vary)

September 29 Dr. Elzbieta Jung-Palczewska (Lodz, Poland)

October 20 Professor Owen Gingerich (Harvard University and the Harvard-Smithsonian Observatory)

November 17 Professor Rosalind Picard (Media Laboratory, Artificial Intelligence, Massachusetts Institute of Technology)

December 1 Dr. Mugur Roz, M.D., Ph.D. (Harvard Medical School and M.I.T.)

December 8 Professor Callista Roy (Director of the School of Nursing, Boston College)

### I. A History of Understanding

Monday, September 8

Class One Introduction to the Course: Rational (ratio) Thoughts – An Evolving Relationship in Ordering Our World

The purpose of this class is to provide a platform from which to understand the objectives of the course and how they will be attained. It is also to begin to introduce the question of how we order our world and make sense of the experiences that come to us.

- a) Culture and Cognition: How we Order our World: Pythagoras, Geometry and Arithmetic
- b) Culture and Cognition: How we Order the World Through Narrative and Story – Selected survey of World Religions
- c) The Nature of the Liberal Arts (Trivium and Quadrivium)
- d) The Evolution of a Relationship – Religion and Science Today: Does it Matter?

Required Reading: There is no required reading for the first class prior to class. You may choose to begin reading items listed as "recommended" reading. By the second week of class you should familiarize yourself with material by Barnes, Priestley, and article by Gerhart and Russell (see below).

Recommended Reading: Barnes, Michael, Stages of Thought. The Co-Evolution of Religious Thought and Science (New York: Oxford, 2000), chapters 1-5, pp. 15-111 (on reserve); W. M. Priestley, Calculus: A Liberal Art (New York: Springer-Verlag, 1998), chapters 1-2; and Nicholas Wolterstorff, "Theology and Science: Listening to Each Other," and Mary Gerhart and Allan Melvin Russell, "Mathematics, Empirical Science, and Religion," articles found in Richardson and Wildman, Religion and Science. History, Method, Dialogue (New York: Routledge, 1996): pp. 95-104, 121-129 (on reserve).

As orientation to the class, you may also wish to read J. Wentzel van Huysteen, The Shaping of Rationality. Toward Interdisciplinarity in Theology and Science (Grand Rapids: Eerdmans, 1999); Thomas F. Torrance, Preaching Christ Today. The Gospel and Scientific Thinking (Grand Rapids:

Eerdmans, 1994).

Monday, September 15

Class Two Measurement (logos) – How We Measure Our World

The purpose of this class is to understand how all aspects of the world, ouranos and polis, were linked together in a cosmic whole. This made nature a model of the logos (or ‘rational law’), a pattern for individual and social life which today is most immediately recognized in fields like psychology and ecology. The division between physical and moral cosmology plays a key role in distinguishing between cosmic ideas and cosmological images, as they shape an inclusive worldview.

- a) Deriving Principles for Measurement and Classification: Plato, Aristotle, and Mathematics; Measuring the Earth (Eratosthenes, Euclid, and Archimedes)
- b) Finding Norms for Narrative and Story: The West and a Wider Story - Hindu and Arabic Numerals and Narratives, Islamic Mathematics and al-jabr (algebra = restoring)
- c) History in the West to the Recovery and Advance of Mathematics

Required Reading: Selections from Augustine, *De Trinitate*; Barnes, Michael, *Stages of Thought. The Co-Evolution of Religious Thought and Science* (New York: Oxford, 2000), read through p. 151 (chapter 7); and Priestley, W. M., *Calculus: A Liberal Art* (New York: Springer-Verlag, 1998), chapter 3. (All material is on reserve.)

Recommended Reading: Thomas F. Torrance, *Preaching Christ Today. The Gospel and Scientific Thinking* (Grand Rapids: Eerdmans, 1994). See also J. Wentzel van Huysteen, *The Shaping of Rationality. Toward Interdisciplinarity in Theology and Science* (Grand Rapids: Eerdmans, 1999).

Monday, September 22

Class Four The Classical Model: Seventeenth and Early Eighteenth Century Science and the Integrity of Mathematics. Physical Cosmology as the Defining Idea of Cosmology.

The purpose of this class is to begin to trace the rise of modern science and modernity marked by an apparent bifurcation between physical cosmology and moral cosmology. The Copernican model of the solar system, confirmed by Galileo’s telescopic observations, the Newtonian synthesis, and Kepler’s laws of planetary motion are a part of this changing worldview. This was crystallized in Laplace’s image of the Omniscient Calculator who through systematic detachment and knowledge of the initial positions and velocities of all the particles in the universe could in principle compute the entire subsequent history of the physical world. This science was accompanied by the philosophical enlightenment and subsequent political revolutions that led to the ascendancy of political liberalism. Within this scheme of emerging physical cosmology and consequent moral cosmologies, Immanuel Kant looms large as a philosopher and cosmological thinker, viewing the natural world as known by experience and the faculty of pure reason, while the moral world is known by intuition and practical reason. From here followed an apparent further separation of religion and ethics from the scientific enterprise.

- a) The Medieval World-View
- b) The Impact of Galileo
- c) The Newtonian World-Machine
- d) Religious and Philosophical Implications: Religion and the Rise of Modern Science (Robert Merton, I. B. Cohen and the debate over the “Puritan thesis”)

Reading: Barbour, Ian, *Religion and Science. Historical and Contemporary Issues* (HarperSanFrancisco, 1997), pp. 1-32 (chapter 1); selections on reserve from Brooke, John Hedley, *Science and Religion. Some Historical Perspectives* (Cambridge University Press, 1991); articles on reserve by John Morgan, “The Puritan Thesis Revisited,” and Edward B. Davis, “Christianity and Early Modern Science: The Foster Thesis reconsidered,” in Livingstone, David N., Hart, D. G., and Noll,

Mark A., *Evangelicals and Science in Historical Perspective* (New York: Oxford, 1999), pp. 43-98

Recommended Reading: You may wish to continue to complete Priestley, W. M., *Calculus: A Liberal Art* (New York: Springer-Verlag, 1998) chapters 3-7.

Monday, September 29  
Class Three: Guest Lecturer

Dr. Elzbieta Jung-Palczewska (Lodz, Poland)  
Topic: "The Rise and Development of 'Mathematical Theology' in the Middle Ages"

Reading: Copy of Paper by Jung-Palczewska: "Why Was the 'Medieval Mechanics' Doomed? The Failure to Substitute Mathematical Physics for Aristotelianism" (on reserve); J. E. Murdoch, "Mathesis in Philosophiam Scholasticam Introducta: The Rise and Development of the Application of Mathematics in Fourteenth-Century Philosophy and Theology," in *Arts liberaux et philosophie au moyen âge. Actes du quatrième congrès international de philosophie médiévale* (Montréal, 1969): 215-254; and E. D. Sylla, "Autonomous and Handmaiden Science: St. Thomas and William of Ockham on the Physics of the Eucharist," in J. E. Murdoch and E. D. Sylla, eds., *The Cultural Context of Medieval Learning* (Dordrecht, 1975): 349-396.

Recommended Reading:

Monday, October 1  
Class Five The Bifurcation of Nature and God in the Eighteenth Century

The purpose of this class is to continue to trace ideas as raised in the previous class with respect to their impact upon science and religion thinking in the Eighteenth Century. Immanuel Kant's work symbolizes emergent philosophical and cosmological thinking, viewing the natural world as known by experience and the faculty of pure reason, while the moral world is known by intuition and practical reason. From here followed a fundamental dualism that underlay the reordering of human ideas and feelings about the natural world and place of humans in that world, ideas that shape the moral cosmologies implicit in the work of such theorists as John Locke in politics, Adam Smith for economics, and in the ethics or moral thinking Jeremy Bentham and John Stuart Mill. By the end of the nineteenth century, as synthesized in the new psycho-analysis of Sigmund Freud, many viewed the method of modern science as providing the universal recipe, not just for the study of inanimate nature but for rational inquiries of all kinds.

- a) Science in an Age of Reason
- b) Religion and Romanticism
- c) Experience in Science and Religion
- d) The Continuing Impact of the Eighteenth Century upon Contemporary Religious Life

Reading: Barbour, Ian, *Religion and Science. Historical and Contemporary Issues* (HarperSanFrancisco, 1997), pp. 33-48 (chapter 2); selection on reserve from George Marsden, Jonathan Edwards. *A Life* (New Haven: Yale, 2003): 59-81; selections on reserve Brooke, John Hedley, *Science and Religion. Some Historical Perspectives* (Cambridge University Press, 1991).

Recommended Reading: Consult the larger bibliography for readings on Eighteenth Century philosophy and the history of science.

Tuesday, October 14  
Class Six The Discovery of History and Evolution: Biology and Theology since the Nineteenth Century – Separation and Retrieval

The discovery of the idea of history and of evolution in the nineteenth century carries us into the 20th century with impact upon all areas of thought from cosmology and origins (Darwin) to the formation of the human person and personality (Freud) with implications for rational inquiries of all kinds. Nevertheless, in the 20th century, contemporary science outgrew the prevailing paradigm (Thomas Kuhn) for early modern and modern cosmological understanding while retaining and deepening an historical perspective. Alfred North Whitehead is among those who finds in the end of the Cartesian and Newtonian period the possibility of a reconsideration of the separation of scientific (or physical) cosmology and moral cosmology, attaching religious expressions to the latter. Any perception of a reintegration of humanity into nature – possible now with the shift from modern to postmodern science – needs to be considered for the ways in which it reopens questions of moral cosmology.

- a) Darwin, Natural Selection, and Theological Issues in Evolution
- b) The Roots of Twentieth Century Theology
- c) The New Physics and Emergence of Historicism
- d) Implications for Science and Religion Dialogue into the 21st Century

Required Reading: Barbour, Ian, *Religion and Science. Historical and Contemporary Issues* (HarperSanFrancisco, 1997), pp. 49-76 (chapter 3); begin reading of Murphy, Nancey and George F. R. Ellis, *On the Moral Nature of the Universe. Theology, Cosmology, and Ethics* (Minneapolis: Fortress Press, 1996); see additional titles in the expanded bibliography.

Recommended Reading: Kuhn, Thomas, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1996); additional literature to be added.

Monday, October 20  
Class Seven: Guest Lecturer

Professor Owen Gingerich (Senior Astronomer, Smithsonian Astrophysical Observatory and chair, emeritus, History of Science Department, Harvard University)  
Topic: “The Emergence of Physical Cosmology as the Defining Idea of Cosmology with Reference to the Seventeenth Century from the Perspective of Contemporary Science and Religion Reflection”

Topics to be discussed may include some or all of the following: a) The Medieval World-Drama and New Foundations in Galileo and Newton; b) Protestantism and the Rise of Science... Leibnitz, Infinites, and Limits; c) Newton and the Physics of Motion... God’s “Two Books,” and the Implications for “Practical” Theology (with particular reference to Harvard College)

Reading: “Ptolemy, Copernicus, and Kepler,” and “The Astronomy and Cosmology of Copernicus,” in Owen Gingerich, *The Eye of Heaven: Ptolemy, Copernicus, Kepler* (New York: The American Institute of Physics, 1993), pp. 1-51, 161-184; Barbour, Ian, *Religion and Science. Historical and Contemporary Issues* (HarperSanFrancisco, 1997), pp. 77-105 (chapter 4).

Recommended Reading: See expanded bibliography.

## II. Patterns in an Evolving Relationship

Monday, October 27  
Class Eight Understanding: Method of Science and in Religion

The purpose of this class is to trace the way in which different theologies, as they have developed in relation to cosmology have sketched out different paradigms or systems for appropriation by churches, the general society, and in ethics. We will conclude by considering the ways in which the sciences and religion were seen to relate at The MIT Conference: “Faith and Science in an Unjust World” (1979)

- a) Experience, Community, and Parallelism in Science
- b) Experience, Community, and Parallelism in Religion
- c) Objectivity and Personal Involvement; Contingency and Law

Reading: Barbour, Ian, Religion and Science. Historical and Contemporary Issues (HarperSanFrancisco, 1997), pp. 77-164 (chapters 4-6); Shinn, Roger, ed., Faith and Science in an Unjust World. Report of the World Council of Churches' Conference on Faith, Science and the Future; Vol. I, "Plenary Presentations"; Vol. II, "Reports and Recommendations (WCC, 1980)

Recommended Reading: See expanded bibliography.

Monday, November 3

Class Nine Philosophical and Theological Implications Arising from Theories of Contemporary Science

Contemporary theories of science, such as the rediscovery of time through relativity theory, the impact of the observer through quantum theory, complexity through chaos theory, and of the origin of the universe in "Big Bang" cosmogony, are a part of a retrieval of moral cosmology. This has implications for contemporary patterns of spirituality and ministry.

- a) The rediscovery of time through relativity theory (Albert Einstein);
- b) The rediscovery of the observer through quantum theory (Max Planck);
- c) The discovery of complexity through chaos theory (Henri Poincaré);
- d) The idea of the origin of the universe in "Big Bang" cosmogony (Arno Penzias, Robert Wilson, et al). moral cosmology. This has implications for contemporary patterns of spirituality and ministry.

Required Reading: Barbour, Ian, Religion and Science. Historical and Contemporary Issues (HarperSanFrancisco, 1997), pp. 165-245 (chapters 7-9); Murphy, Nancey and George F. R. Ellis, On the Moral Nature of the Universe. Theology, Cosmology, and Ethics (Minneapolis: Fortress Press, 1996).

Recommended Reading: See the expanded bibliography. If you have not done this yet, this is a good time to consult the collection of research papers, the result of several international research conferences co-sponsored by the Vatican Observatory in Rome and the Center for Theology and the Natural Sciences represent an important collection to be consulted for purposes of discussion and research.

### III. Application in Ethical Analysis and Religious Practice

Monday, November 11

Class Ten:

The purpose of this class is to explore the nature of an evolving or created universe. All things participate in the giving and taking of life. Evolutionary biology emphasizes the taking of life, whether interpreted as the survival of the (temporary) fittest (Darwin) or as self-sacrifice (Rolston). Although causation in cosmogony might be grounded in a variety of perspectives – random chance, high probability, necessity, universality, and design – causation by design suggests evidence of intention in the setting of the laws of physics and their boundary conditions.

- a) Theism and Creation
- b) Arguments from Design
- c) Evolutionary Theism and the Immanence of God
- d) Evolutionary Naturalism and the Status of Humanity

Reading: Complete your reading of the previous week: Barbour, Ian, Religion and Science. Historical and Contemporary Issues (HarperSanFrancisco, 1997), pp. 165-245 (chapters 7-9); Murphy, Nancey

and George F. R. Ellis, *On the Moral Nature of the Universe. Theology, Cosmology, and Ethics* (Minneapolis: Fortress Press, 1996); Also Davis, John Jefferson, *The Frontiers of Science and Faith: Examining Questions from the Big Bang to the End of the Universe* (Downers Grove: InterVarsity, 2002).

Recommended Reading: Davies, Paul, *The Mind of God. The Scientific Basis for a Rational World* (New York: Simon and Schuster, 1992); Hawking, Stephen, *A Brief History of Time* (New York: Bantam, 10th ed., 1998); Schroeder, *Genesis and the Big Bang* (New York: Bantam Books, 1990); and additional items from the expanded bibliography.

Monday, November 17  
Class Eleven: Guest Lecturer

Professor Rosalind Picard (Media Laboratory, Artificial Intelligence, Massachusetts Institute of Technology)

Topic:

The purpose of this class is to explore the ways in which artificial intelligence in its different generations of development press the question about the meaning of personhood and, by implication, about meaning itself.

Topics may include some or all of the following: a) The Physical Basis of Life; b) Emergence and Reductionism; c) Teleology and Mechanism; d) AI and the Status of Mind

Reading: Selections from Gregersen, Niels Henrik, William B. Drees and Ulf Görman, eds., *The Human Person in Science and Theology* (Grand Rapids: Eerdmans, 2000).

Recommended Reading: Brown, Warren. S., Nancey Murphy and H. Newton Malony, *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998).

Monday, November 24 – AAR and Thanksgiving Week (no class)

Monday, December 1  
Class Twelve: Guest Lecture

Dr. Mugur Roz (Researcher, Health Sciences and Technology, Harvard-MIT Division)  
Topic: “Artificial Intelligence, Mathematics and the Human Genome Project”

The purpose of this lecture is to offer insight into how the data offered brought by the Human Genome Project might be analyzed by using mathematical methods that arise from artificial intelligence and how the outcomes of this analysis can challenge ethical and religious ideas and ministerial practice.

Reading: Richard Hanley, *Is Data Human?* (New York: Basic Books, 1997): selections to be given; John Breck, *The Sacred Gift of Life* (New York: SVS Press, 1998): chapter 3: pp. 127-144; H. Tristram Engelhardt, Jr., *The Foundations of Christian Bioethics* (Exton, PA: Swets & Zeitlinger, 2000): chapter 5: pp. 233-308.

Recommended Reading: Gregersen, Niels Henrik, William B. Drees and Ulf Görman, eds., *The Human Person in Science and Theology* (Grand Rapids: Eerdmans, 2000).

Monday, December 8  
Class Thirteen: Guest Lecturer

Professor Callista Roy (Director of the School of Nursing, Boston College)  
Topic:

The possibilities for moral cosmology(ies) open the way to new understandings of spirituality and of ministry. The purpose of this class is to develop a model for the interrelationship between theology and moral cosmology for patterns for ministry.

Reading: Barbour, Ian, Religion and Science. Historical and Contemporary Issues (HarperSanFrancisco, 1997): pp. 253-332 (chapters 10-12); Cole-Turner, Ronald, The New Genesis. Theology and the Genetic Revolution (Louisville: Westminster/John Knox Press, 1993).

Recommended Reading: Peters, Ted, ed., Genetics. Issues of Social Justice (Cleveland: Pilgrim Press, 1998); and additional items from the expanded bibliography.

Monday, December 15  
Class Fourteen Meaning and Science: The Recovery of Moral Cosmology

While inherently untestable, causation in relation to contingency, indeterminacy, and complexity, together with the moral, aesthetic, and religious experience of humanity, opens questions concerning the anthropic nature of the universe. This opens further possibilities for moral cosmology(ies). The purpose of this class is to develop a model for the interrelationship between theology and moral cosmology and patterns for ministry. The purpose of this class is to conclude the discussion on theology and cosmology and introduce the student to different science and religion centers with a focus on the nature of their theological and cosmological reflection.

- a) Contingency, Law, and Community
- b) Spirituality and Divine Action
- c) Ethics and a Theology of Stewardship

Reading: Clayton, Philip D., God and Contemporary Science (Grand Rapids, MI: Eerdmans, 1997); George Marsden, "The Meaning of Science for Christians: A New Dialogue on Olympus," in Livingstone, David N., Hart, D. G., and Noll, Mark A., Evangelicals and Science in Historical Perspective (New York: Oxford, 1999), pp. 329-340.

Recommended Reading: Recommended Reading: Davies, Paul, God and the New Physics (New York: Simon and Schuster, 1984); Powell, Corey, God in the Equation: How Einstein Became the Prophet of the New Religious Era (New York: The Free Press, 2002); see the survey of different positions on religion and nature in Conroy and Petersen, Earth at Risk (Amherst, NY: Humanity Books, 2000); Capra, Fritjof and Steindl-Rast, David, Belonging to the Universe. Explorations on the Frontiers of Science and Spirituality (San Francisco: HarperSan Francisco, 1991); Peters, Ted, God – The World's Future. Systematic Theology for a New Era (Minneapolis: Fortress Press, 2000).

## **VI. Bibliography and Required Texts**

### **A. Required Texts**

Some excellent information is available on the web and should be consulted. In this light the collection of research papers, the result of several international research conferences co-sponsored by the Vatican Observatory in Rome and the Center for Theology and the Natural Sciences represent an important collection to be consulted for purposes of discussion and research.

Barbour, Ian, *Religion and Science. Historical and Contemporary Issues* (San Francisco: HarperCollins, 1997).

Brown, Warren S. et al, *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998).

Cole-Turner, Ronald, *The New Genesis. Theology and the Genetic Revolution* (Louisville: Westminster/John Knox, 1993).

Davis, John Jefferson, *The Frontiers of Science and Faith: Examining Questions from the Big Bang to the End of the Universe* (Downers Grove: InterVarsity, 2002).

Gregersen, Niels Henrik, William B. Drees and Ulf Görman, eds., *The Human Person in Science and Theology* (Grand Rapids: Eerdmans, 2000).

Murphy, Nancey and George F. R. Ellis, *On the Moral Nature of the Universe. Theology, Cosmology, and Ethics* (Minneapolis: Fortress Press, 1996).

## B. Recommended Texts

Be sure to consult volumes in the "Theology and the Sciences" series, Kevin J. Sharpe, Series Editor, Fortress Press, Minneapolis....

Arbib, Michael A. and Mary B. Hesse, *The Construction of Reality* (Cambridge: Cambridge University Press, 1986).

Michael Banner, *The Justification of Science and the Rationality of Religious Belief* (Oxford: Clarendon Press, 1990).

Barbour, Ian, *Issues in Science and Religion* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1966).

Barbour, Ian, *Religion in an Age of Science. The Gifford Lectures, 1989-1991, vol. I* (San Francisco: HarperCollins, 1990).

Barnes, Michael, *Stages of Thought. The Co-Evolution of Religious Thought and Science* (New York: Oxford, 2000)

Barrow, John and Frank Tipler, *The Anthropic Cosmological Principle* (Oxford: Clarendon Press, 1986).

Brooke, John Hedley, *Science and Religion. Some Historical Perspectives* (Cambridge University Press, 1991).

Brown, Warren. S., Nancey Murphy and H. Newton Malony, *Whatever Happened to the Soul. Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998).

Capra, Fritjof and Steindl-Rast, David, *Belonging to the Universe. Explorations on the Frontiers of Science and Spirituality* (San Francisco: HarperSan Francisco, 1991).

Chapman, Audrey, Rodney Petersen, and Barbara Smith-Moran, *Consumption, Population, and Sustainability. Perspectives from Science and Religion* (Washington, D. C.: Island Press, 2000).

Clayton, Philip D., *God and Contemporary Science* (Grand Rapids, MI: Eerdmans, 1997).

- Cole-Turner, Ronald, *The New Genesis. Theology and the Genetic Revolution* (Louisville: Westminster/John Knox Press, 1993).
- Conroy, Donald and Rodney Petersen, eds., *Earth at Risk* (Amherst, New York: Prometheus Press, 2000).
- Damasio, Antonio R., *Descartes' Error. Emotion, Reason, and the Human Brain* (New York: Avon Books, 1994).
- Davies, Paul, *God and the New Physics* (New York: Simon & Schuster, 1983).
- Davies, Paul, *The Mind of God: The Scientific Basis for a Rational World* (New York: Simon & Schuster, 1992).
- Dyson, Freeman, *Infinite in All Directions* (New York: Harper and Row, 1988),
- Ellul, Jaques, , *The Technological Society* (New York: Alfred A. Knopf, 1964).
- Fiddes, Victor H., *Science and the Gospel* (Edinburgh: Scottish Academic Press, 1987).
- Gingerich, Owen, *The Eye of Heaven: Ptolemy, Copernicus, Kepler* (New York: The American Institute of Physics, 1993).
- Gregersen, Niels Henrik, William B. Drees and Ulf Görman, eds., *The Human Person in Science and Theology* (Grand Rapids: Eerdmans, 2000).
- Gregersen, Niels Henrik and J. Wentzel van Huyssteen, eds., *Rethinking Theology and Science. Six Models for the Current Dialogue* (Grand Rapids: Eerdmans, 1998).
- Hardy, Alister, *The Spiritual Nature of Man* (Oxford: Clarendon Press, 1979).
- Haught, John F., *Science and Religion. From Conflict to Conversation* (New York: Paulist Press, 1995).
- Hawking, Stephen, *A Brief History of Time: From the Big Bang to Black Holes* (New York: Bantam Books, 1988).
- Horgan, John, *The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age* (Helix Books/Addison-Wesley, 1996).
- Holton, Gerald, *Science and Anti-Science* (Cambridge, Mass.: Harvard University Press, 1993).
- Huyssteen, W. van Huyssteen, *The Shaping of Rationality. Toward Interdisciplinarity in Theology and Science* (Grand Rapids: Eerdmans, 1999).
- Huyssteen, W. van Huyssteen, *Theology and the Justification of Faith* (Grand Rapids: Eerdmans, 1989).
- Jastrow, Robert, *God and the Astronomers* (New York: W. W. Norton and Co., 1992; 2nd ed.).
- Kuhn, Thomas, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1996).
- Livingstone, David N., Hart, D. G., and Noll, Mark A., *Evangelicals and Science in Historical Perspective* (New York: Oxford, 1999).
- Lonergan, Bernard, *Insight: A Study of Human Understanding* (New York: Philosophical Society,

1958).

McGrath, Alister, *The Foundations of Dialogue in Science and Religion* (Oxford: Blackwell, 1998).

Murphy, Nancey and George F. R. Ellis, *On the Moral Nature of the Universe. Theology, Cosmology, and Ethics* (Minneapolis: Fortress Press, 1996).

Neville, Robert Cummings, *God the Creator. On the Transcendence and Presence of God* (New York: State University of New York Press, 1992).

Neville, Robert Cummings, *The High Road Around Modernism* (New York: State University of New York Press, 1992).

Neville, Robert Cummings, *Eternity and Time's Flow* (New York: State University of New York Press, 1993).

Newbigin, Lesslie, *Foolishness to the Greeks. The Gospel and Western Culture* (Geneva: World Council of Churches, 1986).

Peters, Ted, ed., *Genetics. Issues of Social Justice* (Cleveland: Pilgrim Press, 1998).

Peters, Ted, ed., *Toward a Theology of Nature. Essays on Science and Faith* (Louisville: Westminster/John Knox Press, 1993).

Pannenberg, Wolfhart, *Theology and the Philosophy of Science*, trans. F. McDonagh (Philadelphia: Westminster Press, 1976).

Pannenberg, Wolfhart, *Systematic Theology* (Grand Rapids: Eerdmans, 1991).

Peacocke, Arthur, *Paths from Science Towards God* (New York: One World, 2001).

Peacocke, A. R., *The Sciences and Theology in the Twentieth Century* (Notre Dame: University of Notre Dame Press, 1981).

Peacocke, Arthur, *Theology for a Scientific Age. Being and Becoming -- Natural and Divine* (Oxford: Basil Blackwell, 1990).

Peters, Ted, *God – The World's Future. Systematic Theology for a New Era* (Minneapolis: Fortress Press, 2000).

Polkinghorne, John, *Quarks, Chaos and Christianity. Questions to Science and Religion* (New York: Crossroad, 1996).

Polkinghorne, John, *Scientists as Theologians. A Comparison of the Writings of Ian Barbour, Arthur Peacocke, and John Polkinghorne* (London: SPCK, 1996).

Polanyi, Michael, *Personal Knowledge* (New York: Harper Torchbooks, 1964).

Polanyi, Michael, *The Tacit Dimension* (Garden City: Doubleday Anchor, 1967).

Priestley, W. M., *Calculus: A Liberal Art* (New York: Springer-Verlag, 1998).

Prickett, Stephen, *Narrative, Religion and Science. Fundamentalism versus Irony, 1700-1999* (Cambridge University Press, 2002).

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