

# STUDY MATERIALS: Science and Belief

Peter Hodgson, Ph.D.

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## Preface

*These lectures on Science and Belief were given in Oxford in 1996 and 1998. The aim was to give a brief overview of the natures of science and of belief and how they have developed over the centuries from the basic insights of the Hebrews and the Greeks to the detailed understanding of the world that has been attained in the present century. This can be done only at the expense of great simplification but it is hoped that the lectures will provide a framework into which further more detailed studies can be situated.*

*This website contains the lectures essentially in the form they were given and distributed to those attending. Many of the subjects discussed and the views presented are controversial, and I have simply tried to present my own views as clearly as I can. I welcome comments and suggestions for improvement.*

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*P. E. Hodgson,*

*Corpus Christi College, Oxford.*

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## **Lesson 1: The Nature of Belief**

1. Types of belief. How do we obtain knowledge and how do we know that it is true? Degrees of belief. The beginning of knowledge. Do we just receive and order sense impressions? Which is fundamental: our mind, or external reality directly perceived by our mind? The epistemic cycle: building up our knowledge not by passively receiving sense impressions, but by interacting with our surroundings. Pattern recognition. The problem of innate ideas and its resolution by the epistemic cycle. Higher epistemic cycles. Language and reality. Ontological realism.
2. Early Man. Discoveries in Serengeti, Sterkfontein and Peking. Cave paintings in Lascaux and Altamira. The bone-markings of Ishango. The uniqueness of man.
3. Early civilisations. Sumeria, Babylon, Assyria, Egypt, India, China.
4. Greece. The art of asking the correct questions and the first attempts to find ways to answer them. The Ionian philosophers Thales, Anaximander and Parmenides. The atomists Democritus and Leucippus. Socrates, Plato and Aristotle. The development of logic and the mathematics of Euclid. The problem of change. The mathematical structure of the world. The world as an organism. Celestial and terrestrial matter. Theories of motion. Essentialist and descriptive theories of nature. The problem of time: is the universe eternal or cyclic?

5. Reasons for the failure of science in all ancient cultures. The myth of the eternal return and the Great Year.

### Reading List

- S.G.F. Brandon, *Creation Legends of the Ancient Near East*. Hodder and Stoughton, 1963.
- T.A. Brody, *The Philosophy behind Physics*. Springer, 1993.
- G.K. Chesterton, *The Everlasting Man*. Hodder and Stoughton, 1975.
- M. Clagett, *The Exact Sciences in Antiquity*. Collier Books, 1963.
- F.C. Copelston, *The History of Philosophy. Vol. I. Greece and Rome*. Burns, Oates and Washbourne, 1944.
- C. Dawson, *Progress and Religion*. Sheed and Ward, 1929.
- D.R. Dicks, *Early Greek Astronomy to Aristotle*. Cornell, 1970.
- B. Farrington, *Greek Science*. Pelican.
- H. Frankfurt, *Before Philosophy*. Pelican.
- I.G. Frazer, *The Golden Bough*. London, 1911.
- E. Gilson, *Methodical Realism*. Christendom Press, 1990.
- G. Holton and D.H.D. Ridler, *Foundations of Modern Physical Science*. Addison-Wesley, 1958.
- R. Leakey and R. Lewin, *Origins Reconsidered: In Search of What Makes us Human*. Little, Brown and Co. 1992.
- A. Marschak, *The Roots of Civilisation*. Wiedenfeld and Nicholson, 1972.
- O. Neugebauer, *The Exact Sciences in Antiquity*.
- S. Sambursky, *The Physical World of the Greeks*. Routledge and Kegan Paul, 1956.
- A.G. Van Melsen, *From Atomos to Atom: A History of the Concept 'Atom'*. Duquesne, 1953.

### Questions

1. What do we mean when we say that we believe something?

2. How do we know that our beliefs are true?
3. How do we know that there is an external world?
4. Are men unique, or are we just a higher sort of animal?
5. What was the special contribution of ancient Greece to our civilisation?
6. What are the arguments in favour of believing that all is made of atoms moving in a void?
7. What was Socrates' most important contribution to human thought?
8. Describe Plato's concept of ideal forms.
9. How is mathematics related to the world?
10. Why did Aristotle believe in the centrality of the earth, and in the difference between terrestrial and celestial matter?
11. Why did all ancient civilisations believe in the cyclic nature of time? What effect did this have on the development of science?
12. Why did science fail to develop in all ancient cultures?

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## **Lesson 2: Early Religions and the Rise of Christianity**

1. The importance for the development of science of beliefs about the material world. Is it good or evil? Does it behave regularly and rationally, or is it governed by capricious demons or gods who have to be propitiated? Is time linear or cyclic? Animism and the personification of natural forces. Buddhism and the eastern religions.
2. Israel. Belief in one supreme personal and transcendent God. The belief in creation by God out of nothing of a universe totally dependent on Him, ordered in measure, number and weight.
3. Christianity. The Incarnation shows the goodness of matter and destroys the cyclic view of time. The early Councils of the Church and their importance for the development of science. Pantheism and dualism excluded because God is distinguished from creation and all creation takes place through Christ.

Lactantius, St. Augustine and John Philoponus.

### Reading List

S.L. Jaki, *The Saviour of Science*. Regnerey Gateway, 1988.

S.L. Jaki, *Genesis 1 Through the Ages*. Thomas More Press, 1992.

R. Sorabji, (Ed). *Philoponus and the Rejection of Aristotelian Science*. Duckworth, 1987.

S. Sambursky, *The Physical World of Late Antiquity*. Routledge and Kegan Paul, 1962.

### Questions

1. Is matter good or evil?
2. Why should we believe that matter is rational and orderly?
3. Why was monotheism important for the development of science?
4. What was the importance of the Incarnation for the development of science?
5. What is the connection between the Nicene Creed and the development of science?
6. Why were pantheism and dualism harmful to the development of science?

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### Lesson 3: The High Middle Ages

1. The founding of the universities. Adelard of Badi and the distinction between the action of the Creator and the natural wonders of His creation. Robert Grosseteste, the founder of experimental science, refined the two essential bases of science, logical coherence and experimental verification, by insisting on the use of mathematics and precise measurements. Application to light.
2. Technology in the Middle Ages. The monasteries as centres of technological innovation in building, farming, cloth-making, metallurgy and book-making. There were windmills and watermills, and increasingly sophisticated clocks to

regulate the hours of work and prayer. International trade flourished, with international banking and a reliable monetary system.

3. The Origin of science. The teaching of Aristotelian philosophy in the universities. Discussions on creation and the motion of bodies. The condemnation of 1277 by Tempier. Buridan and the problem of motion. The concept of impetus and the break with Aristotelian physics. Belief in the order of nature. Duhem's work on the origin of science. Science in Eastern Christendom.
4. The rise of Islam. The insistence on the freedom of Allah relative to His rationality. Internal and external criteria for the development of science.

### Reading List

M. Clagett, *The Science of Mechanics in the Middle Ages*. Madison, 1959.

A.C. Crombie, *Augustine to Galileo, The History of Science 400-1650*. Falcon, 1952.

A.C. Crombie, *Robert Grosseteste and the Origins of Experimental Science 1100-1700*. Oxford, 1953.

C. Dawson, *Progress and Religion*. Sheed and Ward, 1929.

C. Dawson, *Religion and the Rise of Western Culture*. Sheed and Ward, 1950.

E. Gilson, *The Spirit of Medieval Philosophy*. Sheed and Ward, 1936.

E. Gilson, *The History of Christian Philosophy in the Middle Ages*. Sheed and Ward, 1954.

J. Gimpel, *The Medieval Machine*. Pimlico, 1992.

E. Grant, *Physical Science in the Middle Ages*. Cambridge, 1977.

E. Grant, *Planets, Stars and Orbs: The Medieval Cosmos 1200-1687*. Cambridge, 1994.

F. Heer, *The Medieval World*. Wiedenfeld and Nicholson, 1961 (Ch. 12).

T. E. Huff, *The Rise of Early Modern Science: Islam, China and the West*. Cambridge, 1993.

S.L. Jaki, *Science and Creation*. Scottish Academic Press, 1986.

S.L. Jaki, *Uneasy Genius: The Life and Work of Pierre Duhem*. Martinus Nijhoff, 1984.

S.L. Jaki, *The Physics of Impetus and the Impetus of the Koran*. Science and Censorship: Helene Duhem and the Publication of the Systeme du Monde. Chapters 9 and 11 in *The Absolute Beneath the Relative*. University Press of America, 1988.

S.L. Jaki, *Reluctant Heroine: the Life and Work of Helene Duhem*. Scottish Acad. Press, 1992.

S.L. Jaki, "Medieval Christianity: Its Inventiveness in Technology and Science". Article in *Technology in the Western Political Tradition*. Ed. M.R. Zinman. Cornell U. Press, 1993.

D.C. Lindberg (Ed), *Science in the Middle Ages*. Chicago, 1978.

J.A. Weisheipl, *The Development of Physical Theory in the Middle Ages*. Sheed & Ward, 1959.

A.N. Whitehead, *Science and the Modern World*. Cambridge, 1926.

## Questions

1. Discuss the importance of the founding of the medieval universities for the development of science.
2. Give an account of the work of Grosseteste on the basis of experimental science.
3. What were the main contributions of the monasteries to medieval civilisation?
4. How important was time in the Middle Ages?
5. Describe the Aristotelian and medieval theories of local motion.
6. How did the Christian doctrine of creation influence the theories of motion?
7. Describe the gradual breakdown of Aristotelian physics.
8. Why did science not develop in Eastern Christendom?
9. What was the reason for Tempier's condemnations of 1277, and how did they influence subsequent history?
10. What was Duhem's contribution to our knowledge of the origin of science?
11. What was the contribution of Islam to the development of science, and why did science fail to develop in Islamic culture?

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## Lesson 4: The Renaissance

1. Copernicus and the heliocentric system. Scientific and theological difficulties. The distinction between a real physical explanation and saving the appearances. Brahe and Kepler. The importance of precision. Kepler's determination of the orbit of Mars.
2. Galileo. The invention of the telescope and the observation of the satellites of Jupiter the mountains on the moon and the spots on the sun. Measurements of the motions of projectiles and of falling bodies. Opposition from the Aristotelian philosophers. Advocate of the Copernican system. Difficulties with the interpretation of Scripture.
3. Newton and the foundation of modern science. Synthesis of the rationalism of Descartes and the empiricism of Bacon. Laws of motion and theory of universal gravitation. The unification of terrestrial and celestial dynamics. The world as a machine and the theology of deism.
4. The scientific attitude. What does it mean to be a scientist?

### Reading List

J. Barbour, *Absolute or Relative Motion: The Discovery of Dynamics*. Cambridge, 1989.

E.A. Burt, *The Metaphysical Foundations of Modern Physical Science*. Routledge and Kegan Paul, 1932.

S. Chandrasekhar, *Truth and Beauty*. Chicago, 1990.

R. Feynman, *Surely You're Joking, Mr. Feynman?*

A.R. Hall, *The Scientific Revolution 1500-1800*. Longmans, 1954.

G. Holton, *Thematic Origins of Scientific Thought: Kepler to Einstein*. Harvard, 1973.

A. Koestler, *The Watershed: A Biography of Johannes Kepler*. Doubleday, 1959.

D.C. Lindberg, *The Beginnings of Western Science*. Chicago, 1992.

W.R. Shea, *Galileo's Intellectual Revolution*. Science History Publications, 1977.

C.S. Singleton (Ed), *Art, Science and History in the Renaissance*. Johns Hopkins Press, Baltimore, 1967.

R.S. Westfall, *Never at Rest: A Biography of Isaac Newton*. Cambridge, 1980.

## Questions

1. Discuss the arguments for preferring the heliocentric theory of the solar system to the geocentric theory.
2. What is the difference between a real theory and one that 'saves the appearances'?
3. How did Galileo's observations support the heliocentric theory?
4. Discuss the importance of Galileo's early work on the science of motion.
5. What was the most important contribution made by Galileo to the scientific method?
6. Did Galileo's discoveries conflict with the Bible?
7. What was Newton's greatest achievement?
8. If the world is a machine governed by mathematics, what has become of the Providence of God?
9. What are the main characteristics of the attitude of the scientist to the material world?

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## Lesson 5: Geology, Biology and Evolution

1. Biology and geology stimulated by the great voyages of discovery in the seventeenth and eighteenth centuries. First estimates of the age of the earth from geology and biology on the one hand and from physics on the other. Eventual solution from modern physics. All these estimates much longer than that apparently indicated by the Bible.
2. The Origin of Life and of Species. How can living things come to be: by special creation or by development from non-living matter? Apparent improbability that

living organisms can come about by the blind operation of natural forces. Haeckel and Lecomte du Nuoy. The God of the Gaps. Malthus, Darwin and Wallace. Evolution by natural selection.

3. The Bible and Science. How can we interpret the Bible so as to keep intact the spiritual truths it teaches, while at the same time taking full account of scientific discoveries?
4. The Debate between Wilberforce and Huxley. The true story behind one of the greatest myths about the relation of science to religion.
5. Newman on Evolution.
6. Science and Creationism. How the recognition of the role of the Creator, coupled with the belief that the Bible must be interpreted literally, gave rise to a damaging and unnecessary conflict.

### Reading List

W.B. Ashworth, "Natural History and the Emblematic World View." Ch.7 in *Reappraisals of the Scientific Revolution*. Ed. D.C. Lindberg and R.S. Westman, Cambridge, 1990).

J.H. Brooke, *Science and Religion*. Cambridge, 1991.

L. Biseley, *Darwin's Century*. Scientific Book Guild, 1959.

C.S. Gillespie, *Genesis and Geology*. Harper, 1959.

B. Hadley, *Evolution and Faith*. Sheed and Ward, 1931.

G. Himmelfarb, *Darwin and Darwin's Revolution*. Chatto and Windus, 1959.

S.L. Jaki, *Chesterton, A Seer of Science*. Illinois, 1986.

S.L. Jaki, *Miracles and Physics*. Christendom Press, 1989.

P. Kitcher, *Abusing Science: The Case Against Creationism*. Open University, 1983.

J.R. Lucas, *Wilberforce and Huxley: A Legendary Encounter*. The Historical Journal. 22.2.313. 1979.

J.H. Parry, *The Age of Reconnaissance*. Mentor, 1963.

## Questions

1. What was the effect on the scientific view of the world of the voyages of discovery in the seventeenth and eighteenth centuries?
  2. How was the age of the earth estimated using geological, biological and physical methods? Comment on any discrepancies between these estimates. Are they consistent with the Bible?
  3. Did life originate by special creation or by evolution from non-living matter? If by evolution, is this consistent with the Bible?
  4. Discuss the views of Huxley, Wilberforce and Newman on evolution.
  5. How would you answer the arguments of a creationist?
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## Lesson 6: Relativity and Quantum Physics

1. Einstein's Special Theory of Relativity. The invariance of the laws of nature. The Michelson-Morley experiment. The Galilean and the Lorentz transformations. The new concepts of space and time. Four-vectors and light cones. Simultaneity. Relativistic velocity, momentum and mass.
2. Quantum Physics. Planck's discovery of the quantum. The old quantum theory, Quantum mechanics. Heisenberg and Schrodinger. The interpretations of quantum mechanics: the Copenhagen interpretation of Bohr and Heisenberg. The ensemble or statistical interpretation of Einstein. The pilot wave and many-worlds interpretations. The quantum paradoxes: causality, the single and double slit experiments, Schrodinger's cat. The Heisenberg uncertainty principle. Stochastic electrodynamics. Hidden variables. The wave-particle dualism. The Einstein-Podolsky-Rosen Paradox. The Bell inequalities. The denial of reality. Chance and Providence.

## Reading List

F.I. Belinfante, *A Survey of Hidden Variable Theories*. Pergamon, 1973.

I.S. Bell, *Speakable and Unspeakable in Quantum Mechanics*. Cambridge, 1987.

- D. Bohm, *Causality and Chance on Modern Physics*. Routledge and Kegan Paul, 1957.
- T.A. Brody, *The Philosophy behind Physics*. Springer, 1993.
- L. De Broglie, *The Revolution in Physics*. Routledge and Kegan Paul, 1954.
- P. Davies, *God and the New Physics*, Dent, 1983.
- P. Davies, *The Mind of God*. Simon and Schuster, 1992.
- S. Diner (Ed), *The Wave-Particle Dualism*. Reidel, 1984.
- A. Einstein, B. Podolsky, and N. Rosen, *Physical Review*. 47.777. 1935.
- A.P. French, and P.J. Kennedy, *Niels Bohr: A Centenary Volume*. Harwood 1985.
- R. Healy, *The Philosophy of Quantum Mechanics*. Cambridge, 1989.
- C.A. Hooker, *Contemporary Research in the foundations and Philosophy of Quantum Theory*. Reidel, 1973.
- M. Jammer, *The Philosophy of Quantum Mechanics*.
- J.R. Lucas and P.B. Hodgson, *Spacetime and Electromagnetism*. Oxford, 1990.
- A. Pais, *Subtle is the Lord. The Science and Life of Albert Einstein*. Oxford, 1982.
- A. Pais, *Niels Bohr's Times: In Physics, Philosophy and Polity*. Oxford, 1991.
- K.R. Popper, *Quantum Theory and the Schism in Physics*. Hutchinson, 1982.
- P.A. Schlipp (Ed), *Albert Einstein: Philosopher-Scientist*. Library of Living Philosophers, Evanston, 1989.
- P. Steble, *Order, Chaos, Order. The Transformation from Classical to Quantum Physics*. Oxford, 1991.
- A. Sudbery, *Quantum Mechanics and the Particles of Nature*. Cambridge, 1986.
- R. Swinburne (Ed), *Space, Time and Causality*. Reidel, 1983.
- G. Tarozzi, and A. van der Merwe, *Open Questions in Quantum Physics*. Kluwer, 1985.
- G. Tarozzi, and A. van der Merwe, *The Nature of Quantum Paradoxes*. Kluwer, 1988.

E. Wigner, *Quantum Theory and Measurement*. Princeton, 1983.

### Questions

1. How would you convince someone of the truth of Einstein's theory of relativity?
2. What is the main achievement of Einstein's theory?
3. How has relativity altered our concepts of space and time?
4. How did Planck discover the quantum?
5. What were the main problems of classical mechanics, and how were they solved by the development of quantum mechanics?
6. Summarise the arguments used by Bohr and Einstein in their dispute about the interpretation of quantum mechanics.
7. Describe the statistical, pilot wave and many-worlds interpretations.
8. Has quantum mechanics disproved the principle of causality?
9. What is Heisenberg's uncertainty principle, and what are its philosophical implications?
10. Are hidden variables possible in principle?
11. What is the Einstein-Podolsky-Rosen experiment, and what does it imply?
12. Describe the Bell inequalities and discuss their significance.

## Lesson 7: Cosmology and Chaos

### A Disturbance in Palestine

1. In its beginnings Christianity hardly registers in the records of the then mighty of the world. Scholars have found a few references to early Christians in Roman literature, but of course there was no sense at all that something had begun that would alter the course of history. Pope John Paul II cites these references in *Toward the Third Millennium*. Christianity turned ordinary human criteria of importance upside down. The humble of this world were chosen to disseminate

through the world a commission they could scarcely have understood when they were given it. The 1. The Theology of Creation. Aristotle and the eternity of the universe. Cyclic theories of time in ancient cultures. The Old Testament: Genesis and the Psalms. Creation ex nihilo. Pantheism, dualism and deism. Contingent and necessary worlds. Determinism, indeterminism and randomness. The rationality of God and the freedom of God. The importance of the theology of creation for the rise of science.

2. The Philosophy of Creation. What does it mean to create? Can there be an absolute beginning?
3. The Science of Creation. History of astronomy. Einstein's general theory of relativity. The universe as an object of scientific study. The expansion of the universe. Hubble's law. Theories of the origin of the universe. The big bang and steady state theories. Lemaitre and the primeval atom. Continuous creation. The oscillating universe. The first three minutes. The microwave background radiation. The origin of the elements. The singularity of the universe. The anthropic principle.
4. Chaos theory. Does it mean that the world is indeterminate?

### Reading List

J.D. Barrow and F.J. Tipler, *The Anthropic Cosmological Principle*. Oxford, 1986.

W.L. Craig and Q. Smith, *Theism, Atheism and Big Bang Cosmology*. Oxford, 1993.

W.B. Drees, *Beyond the Big Bang. Quantum Cosmologies and God*. Open Court, 1990.

F. Dyson, *Scientific American* 225.25. 1971.

I. Gleick, *Chaos*. Pergamon, 1987.

S.L. Jaki, *Science and Creation*. Scottish Academic Press, 1976.

S.L. Jaki, *God and the Cosmologists*. Scottish Academic Press, 1989.

C. Kaiser, *Creation and the History of Science*. Marshall Pickering, 1991.

L. Lederman, *The God Particle*. Bantam Press, 1993.

H.G. Pagels, *The Cosmic Code: Quantum Physics and the Language of Nature*. Michael Joseph, 1982.

R.J. Russell, N. Murphy and C.I. Isham (Eds). *Quantum Cosmology and the Laws of Nature*. Vatican Observatory, 1993.

W. Newton-Smith, *The Structure of Time*. Routledge and Kegan Paul, 1980.

D.O'Connor, and F. Oakley, *Creation: The Impact of an Idea*. Charles Scribners', 1969.

W.M. Richardson and W.J. Wildman, *Religion and Science: History, Method, Dialogue*. Routledge, 1996.

D. Sciama, *Modern Cosmology*. Cambridge, 1971.

H. van Till, *The Fourth Day*. Eerdmans, 1989.

S. Weinberg, *The First Three Minutes*. Deutsch, 1977.

### Questions

1. Is the universe eternal or does it have a beginning and an end?
2. What does it mean to create out of nothing?
3. Is the universe necessary or contingent? How is this related to our belief in God and what are the implications for science?
4. What is the evidence for the expansion of the universe?
5. Describe the big bang theory and evaluate the evidence in its favour.
6. Why are the Steady State and oscillating universe theories no longer considered plausible?
7. Discuss the evidence in favour of an inflationary universe.
8. What is the Anthropic Principle, and does it lead to any scientific or theological conclusions that can be tested?
9. What is meant by chaos? Does it imply that the world is indeterminate, or just unpredictable?

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## Lesson 8: Science in Nazi Germany and Soviet Russia

The relation between science and theology can be seen from a new angle by examining what happens to science when an alien ideology is imposed on society. There are two examples of this in the present century and both show, in different ways, that science is strangled.

1. Nazi Germany. The superiority of Aryan science and the expulsion of the Jews. Lenard and Stark, Planck and von Lane. Heisenberg and the German attempt to make an atomic bomb.
2. Soviet Russia. Marx, Engels and Lenin on science. Science based on dialectical materialism. Stalin and Bukharin. Condemnation of relativity and the theory of molecular bonding. The destruction of genetics by Lysenko. Bernal on the direction of science by the State and Polanyi on the freedom of science.

### Reading List

J.R. Baker, *Science and the Planned State*. Allen and Unwin, 1945.

J.D. Bernal, *The Social Function of Science*. Routledge, 1939.

J. Bernstein, *Hitler's Uranium Club: The Secret Recordings at Farm Hall*. American Institute of Physics Press, 1995.

Alan Bullock, *Hitler: a Study in Tyranny*. Pelican.

D.C. Cassidy, *Uncertainty: The Life and Science of Werner Heisenberg*. Freeman, 1992.

S.A. Goudsmidt, *Alsos*. American Institute of Physics Press, 1995.

Max Heilbron, *The Dilemmas of an Upright Man: Max Planck*. University of California Press, 1987.

K. Hentschel (Ed), *Physics and National Socialism: An Anthology of Primary Sources*. Birkhauser, 1996.

J. Huxley, *Soviet Genetics and World Science: Lysenko and the Meaning of Heredity*. Chatto and Windus, 1949.

K. Mendelssohn, *The World of Walter Nernst: The Rise and Fall of German Science*. Macmillan, 1973.

Z.A. Medvedev, *The Medvedev Papers*. Macmillan, 1971.

H.J. Muller, "The Destruction of Soviet Genetics". Readings in "Russian Civilisation". 709. University of Chicago Press, 1964.

M. Polanyi, "Personal Knowledge". Routledge and Kegan Paul, 1958.

### Questions

1. What happened to German science during the Nazi era?
2. How did the German scientists meet the challenge of Nazism?
3. What were the views of Engels and Lenin on science?
4. How was the work of scientists in the Soviet Union affected by the philosophy of Marx-Leninism?
5. What happened to genetics in Soviet Russia?
6. How was the work of Kapitzka and Landau affected by the Soviet state?
7. Should science be directed to solve the immediate needs of society?

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### General Reading List

The reading list provides a general introduction to the subject, but it is not necessary to read all the books listed. For an initial overview, the three books by S.L. Jaki listed below are particularly recommended.

The Old and New Testaments

A.C. Crombie, *Styles of Scientific Thinking in the European Tradition*. Duckworth, 1994.

J. de Bivot de la Saudee (Ed), *God, Man and the Universe*. Burns Oates, 1954.

E.J. Dijksterhuis, *The Mechanisation of the World Picture*. Oxford, 1961.

D.C. Goodman (Ed), *Science and Religious Belief 1600-1900*. Open University, 1973.

C. Dawson, *Progress and Religion*. Sheed and Ward 1929.

S.L. Jaki, *The Relevance of Physics*. Chicago, 1966.

S.L. Jaki, *The Road of Science and the Ways to God*. Chicago, 1978.

S.L. Jaki, *Science and Creation*. Scottish Academic Press, 1974.

J.M. Templeton and R.L. Herrmann, *Is God the Only Reality?* Continuum, 1994.

A.N. Whitehead, *Science and the Modern World*. Cambridge, 1925.

W.P.D. Wightman, *The Growth of Scientific Ideas*. Yale, 1951.