

Select Bibliography

My aim is to select in each area a few writings which I think will be of particular use to readers. More extensive references will be found in the footnotes. Cross-references within the bibliography refer to the numbered entries.

General History

Presocratics

1. W.K.C. Guthrie, *A History of Greek Philosophy*, vols 1 and 2, Cambridge 1962 and 1965.
See also for a more philosophical treatment
2. Jonathan Barnes, *The Presocratic Philosophers*, 2 vols, London 1979, with translations, revised as one vol., 1982, and two shorter classics with translations:
3. G.S. Kirk and J.E. Raven, *The Presocratic Philosophers*, Cambridge 1962, currently being revised by G.S. Kirk and Malcolm Schofield;
4. John Burnet, *Early Greek Philosophy*, London 1892, 4th edition 1930.

Plato

A general account of Plato, with summaries of his dialogues, is offered by

5. A.E. Taylor, *Plato*, London 1949.
For Plato's *Timaeus* and *Parmenides* there are translations with commentary by
6. F.M. Cornford, *Plato's Cosmology*, London 1937,
7. F.M. Cornford, *Plato and Parmenides*, London 1939,
and for the *Timaeus* there is a commentary by
8. A.E. Taylor, *A Commentary on Plato's Timaeus*, Oxford 1928.
Much contemporary discussion centres round
9. Gregory Vlastos, *Platonic Studies*, Princeton 1973, 2nd ed. 1982.

Aristotle

The best introduction to Aristotle as a whole, despite subsequent modifications to his account of Aristotle's development, is probably

10. Werner Jaeger, *Aristotle, Fundamentals of the History of his Development*, translated from the German of 1923 by Richard Robinson, Oxford 1934, 2nd ed. 1948.
An introduction to Aristotle as philosopher is supplied by
11. J.L. Ackrill, *Aristotle the Philosopher*, Oxford 1981.
The fullest summary of Aristotle's doctrines is
12. W.D. Ross, *Aristotle, A Complete Exposition of his Works and Thought*.

An extensive reading guide is included in

13. Jonathan Barnes, Malcolm Schofield, Richard Sorabji, *Articles on Aristotle*, 4 vols. London 1975-9.

For Aristotle's *Physics*, there is a commentary with introduction and summaries by

14. W.D. Ross, *Aristotle's Physics, a Revised Text with Introduction and Commentary*, Oxford 1936.

Hellenistic and post-Hellenistic period

On Diodorus Cronus' initiation of many of the themes of Hellenistic philosophy, see the important article by

15. David Sedley, 'Diodorus Cronus and Hellenistic philosophy', *Proceedings of the Cambridge Philological Society* 203 (n.s. 23), 1977, 74-120,
and see his 19-page account of the main figures of the Hellenistic period:
16. David Sedley, 'The Protagonists', in Malcolm Schofield, Myles Burnyeat, Jonathan Barnes, eds, *Doubt and Dogmatism*, Oxford 1980, 1-19.

The Hellenistic period is surveyed by

17. A.A. Long, *Hellenistic Philosophy*, London 1974,
and the following period by another volume in the same series,
18. John Dillon, *The Middle Platonists*, London 1977.

For the Stoics, there is a stimulating interpretation of their science, with some translations, in

19. Shmuel Sambursky, *Physics of the Stoics*, London 1959,
and there are highly informative footnotes concerning Plutarch's attack on the Stoics in Harold Cherniss'
20. Plutarch's *Moralia*, Loeb, vol. 13, parts 1 and 2.
The Stoic Emperor, Marcus Aurelius, is treated by
21. P.A. Brunt, 'Marcus Aurelius in his Meditations', *Journal of Roman Studies* 74, 1974, 1-20.

Epicurus' atomism is handled in the section on 'Ancient Greek atomism', below, pp. 446-7. On the Neopythagoreans, see

22. Holger Thesleff, *An Introduction to the Pythagorean Writings of the Hellenistic Period*, Abo 1961.

For Philo, the Jew of the first century A.D., see

23. H.A. Wolfson, *Philo*, vols 1 and 2, Cambridge Mass. 1947.
Work has now started on the *Cambridge History of Hellenistic Philosophy*, edited by Jonathan Barnes, Myles Burnyeat and A.A. Long, and on a Cambridge collection of translations, with discussion, for the Hellenistic periods, edited by A.A. Long and D. Sedley.

Early Neoplatonism and Christianity

An introduction to Plotinus is supplied by

24. John M. Rist, *Plotinus: the Road to Reality*, Cambridge 1967.

For the Church Fathers, a standard reference book is

25. Berthold Altaner, *Patrologie*, 8th ed., ed. Alfred Stuiber, Freiburg im Breisgau 1978; English translation of 5th ed. by Hilda C. Graef, London 1960.

For Origen's *On First Principles*, there is a very useful commentary by

26. Henri Crouzel and Manlio Simonetti, *Origène, traité de principes, Sources Chrétiennes*, vols 252-3, 268-9, Paris 1978-80.

The brothers Basil of Caesarea and Gregory of Nyssa will be listed under 'Treatments of Time', but for Basil's Platonist sources, see

27. John M. Rist, 'Basil's "Neoplatonism": its background and nature', in Paul Fedwick, ed., *Basil of Caesarea: Christian, Humanist, Ascetic*, Toronto, 1981, 137-220.

Relations between Pagans and Christians in this period are the subject of

28. John M. Rist (27),
 29. E.R. Dodds, *Pagan and Christian in an Age of Anxiety*, Cambridge 1965,
 30. A. Momigliano, ed., *The Conflict Between Paganism and Christianity in the Fourth Century*, Oxford 1963.

Augustine

There is an excellent biography by

31. Peter Brown, *Augustine of Hippo, a Biography*, London 1967.

See also the useful notes to the text and French translation of the *Confessions* by R.P.A. Solignac in

32. *Oeuvres de Saint Augustin*, Bibliothèque Augustinienne, vol. 14, *Les Confessions, Livres VIII-XIII*, Paris 1962.

On Augustine's access to Greek texts, see

33. P. Courcelle, *Late Latin Writers and Their Greek Sources*, Cambridge Mass. 1969, ch. 4, translated from the French of 1948,

and on the versions of the Bible available to him:

34. Frederick G. Kenyon, *The Text of the Greek Bible*, London 1936, 3rd ed. revised by A.W. Adams, London 1975.

For Augustine's relations to the Neoplatonists, see:

35. P. Henry, *Plotin et l'occident*, Louvain 1934,

36. P. Henry, *La Vision d'Ostie*, Paris 1938,

37. P. Courcelle, *Recherches sur les Confessions de Saint Augustin*, Paris 1968,

38. P. Hadot, 'Citations de Porphyre chez Augustin', *Revue des Études Augustiniennes* 6, 1960, 205-44,

39. John-J. O'Meara 'Augustine and Neoplatonism', *Recherches Augustiniennes* 1 (supplement to *Revue des Études Augustiniennes*), 1958, 91-111,

40. John-J. O'Meara, *The Young Augustine*, London 1954,

41. R.J. O'Connell, *St Augustine's Early Theory of Man, A.D. 386-391*, Cambridge Mass. 1968,

42. R.J. O'Connell, *St Augustine's Confessions, the Odyssey of Soul*, Cambridge Mass. 1969,

43. R.J. O'Connell, 'Augustine's rejection of the fall of the soul', *Augustinian Studies* 4, 1973, 1-32.

On Augustine's ideas there is a book in preparation by Henry Chadwick.

Late Neoplatonism and Christianity

For late Neoplatonism, see

44. R.T. Wallis, *Neoplatonism*, London 1972,

45. Shmuel Sambursky, *The Physical World of Late Antiquity*, London 1962, and two associated collections:

- 46a. Shmuel Sambursky and Shlomo Pines, *The Concept of Time in Late Neoplatonism*, Jerusalem 1971,

- 46b. Shmuel Sambursky, *The Concept of Place in Late Neoplatonism*, Jerusalem 1982.

Iamblichus is discussed in English by

46. John Dillon, *Iamblichi Chalcidensis in Platonis Dialogos Commentariorum Fragmenta*, Leiden, 1973,

and in French by

47. Bent Dalsgaard Larsen, *Jamblique de Chalcis, exégète et philosophe*, Aarhus 1972.
For Proclus, see

48. L.J. Rosán, *The Philosophy of Proclus*, New York 1949.

The late Alexandrian Neoplatonists are discussed by

49. P. Merlan, 'Ammonius Hermiae, Zacharias Scholasticus and Boethius', *Greek, Roman and Byzantine Studies* 9, 1968, 192-203,

50. L.G. Westerink, *Anonymous Prolegomena to Platonic Philosophy*, Amsterdam 1962, X-XXV,

51. H.D. Saffrey, 'Le Chrétien Jean Philopon et la survivance de l'école d'Alexandrie au VIe siècle', *Revue des Études Grecques* 47, 1954, 396-410,

52. Gérard Verbeke, 'Some later Neoplatonic views on divine creation and the eternity of the world', in Dominic O'Meara, ed., *Neoplatonism and Christian Thought*, State University of New York, 1981, 45-53, 241-4.

For Hierocles and a slightly earlier period of the Alexandrian School, see

53. Ilsetraut Hadot, *Le Problème du néoplatonisme Alexandrin: Hiéroclès et Simplicius*, Paris 1978.

For the late Athenian Neoplatonists and the controversy on how far Justinian suppressed their activities, see

54. Alan Cameron, 'The last days of the Academy at Athens', *Proceedings of the Cambridge Philological Society* 195, n.s. 15, 1969, 7-29,

55. Alison Frantz, 'Pagan philosophers in Christian Athens', *Proceedings of the American Philosophical Society* 119, 1975, 29-38.

Some earlier interpretations are reported and commented on in

56. John Whittaker, *God, Time, Being, Two Studies*, *Symbolae Osloenses*, supp. vol. 23, 1971, 1-66, esp. 19-20.

For the Platonist school in Athens and the extent to which there were schools in Greek antiquity, see the pioneering work of

57. John P. Lynch, *Aristotle's School, a Study of a Greek Educational Institution*, Berkeley and Los Angeles 1972, complemented by

58. John Glucker, *Antiochus and the Late Academy*, *Hypomnemata* 56, Göttingen 1978,

59. John Dillon (18).

See also the earlier

60. Ingemar Düring, *Aristotle in the Ancient Biographical Tradition*, Göteborg 1957.

There is an account of the late Athenian Neoplatonist Damascius in

61. L.G. Westerink, *The Greek Commentators on Plato's Phaedo*, vol. 2, and of Simplicius in

61a. Ilsetraut Hadot (53).

Philoponus

There is a selection of Philoponus' work in German translation, with a survey by

62. W. Böhm, *Johannes Philoponus, Ausgewählte Schriften*, Munich 1967.

For Philoponus' original contributions to physics, see below, p. 440, and e.g.

63. S. Sambursky 'John Philoponus' in C.C. Gillispie, ed., *Dictionary of Scientific Biography*, vol. 7, New York 1973, 134-9,

64. S. Sambursky, *The Physical World of Late Antiquity*, London 1962,

65. S. Sambursky, 'Philoponus' interpretation of Aristotle's Theory of Light', *Osiris* 13, 1958, 114-26,

66. M. Wolff, *Fallgesetz und Massebegriff: Zwei wissenschaftshistorische Untersuchungen zur Kosmologie des Johannes Philoponus*, Berlin 1971,

67. M. Wolff, *Geschichte der Impetustheorie*, Frankfurt 1978,
68. Robert B. Todd, 'Some concepts in physical theory in John Philoponus' Aristotelian commentaries', *Archiv für Begriffsgeschichte* 24 1980, 151-70.
- On the general character of Philoponus' thought, and on his allegiances, see
69. H.D. Saffrey (51),
70. Étienne Evrard, 'Les convictions religieuses de Jean Philopon et la date de son commentaire aux *Météorologiques*', *Académie Royale de Belgique, Bulletin de la Classe des Lettres*, 39, 1953, 299-357,
71. Étienne Evrard, 'Jean Philopon, son *Commentaire sur Nicomaque* et ses rapports avec Ammonius', *Revue des Études Grecques* 78, 1965, 592-8.
72. L.G. Westerink, 'Deux commentaires sur Nicomaque: Asclépius et Jean Philopon', *Revue des Études Grecques*, 77, 1964, 526-35.
73. H.J. Blumenthal, 'John Philoponus and Stephanus of Alexandria: two Christian commentators on Aristotle?', in Dominic O'Meara, ed., *Neoplatonism and Christian Thought*, State University of New York 1981, 54-63, 244-6.
- There is a magisterial article on Philoponus' influence on Islam and Judaism by
74. H.A. Davidson, 'John Philoponus as a source of mediaeval Islamic and Jewish proofs of creation', *Journal of the American Oriental Society*, 85, 1965, 318-27.
- I am currently editing a collection of papers on Philoponus, to be published by Duckworth in 1985.

Boethius

75. Henry Chadwick, *Boethius, the Consolations of Music, Logic, Theology and Philosophy*, Oxford 1981,
76. P. Courcelle, *La Consolation de philosophie dans la tradition littéraire: antécédents et postérité de Boèce*, Paris 1967,
77. P. Courcelle (33), ch. 6,
78. L. Minio-Paluello, 'Boethius', *Encyclopaedia Britannica*, 1968,
79. James Shiel, 'Boethius' commentaries on Aristotle', *Medieval and Renaissance Studies* 4, 1958, 217-44,
80. J. Gruber, *Kommentar zu Boethius De Consolatione Philosophiae*, Berlin 1978.

Islam

For Islamic thought, see

81. H.A. Wolfson, *The Philosophy of the Kalam*, Cambridge Mass. 1976,
82. Maimonides, *Guide for the Perplexed*, Part 1, chs 73-6, translated by M. Friedländer, 2nd ed., London 1904, and by S. Pines, Chicago 1963,
83. S. van den Bergh, *Averroes' Tahāfut al-Tahāfut* (incorporating Ghazālī's *Tahāfut al-Falāsifa*), translated with introduction and notes, 2 vols, London 1969.
- Arabic versions of some Greek texts are made available in French by
84. A. Badawi, *La Transmission de la philosophie Grecque au monde Arabe*, Paris 1968.

Treatments of time

Plato

85. G.E.L. Owen, 'Plato and Parmenides on the timeless present', *The Monist* 50, 1966, 317-40 (repr. in Alexander P.D. Mourelatos, ed., *The Pre-Socratics*, Garden City, N.Y. 1974),
86. Gregory Vlastos, 'The disorderly motion in the *Timaeus*', and 'Creation in the *Timaeus*: is it a fiction?', both in R.E. Allen, ed., *Studies in Plato's Metaphysics*, London 1965, the first reprinted from *Classical Quarterly* 1939, the second from

Philosophical Review 1964,

87. Colin Strang and K.W. Mills, two symposium articles, 'Plato and the Instant', *Proceedings of the Aristotelian Society*, supp. vol. 48, 1974, 63-96.

Aristotle

88. P.F. Conen, *Die Zeittheorie des Aristoteles*, Munich 1964,
 89. G.E.L. Owen, 'Aristotle on time', in Peter Machamer and Robert Turnbull, eds., *Motion and Time, Space and Matter: Interrelations in the History and Philosophy of Science*, Ohio State University 1976, repr. in Jonathan Barnes, Malcolm Schofield, Richard Sorabji, eds., *Articles on Aristotle*, vol. 3, London 1979,
 90. Julia Annas, 'Aristotle, number and time', *Philosophical Quarterly* 25, 1975, 97-113,
 91. Jaakko Hintikka, *Time and Necessity*, Oxford 1973.

Peripatetics

92. Pamela Huby, 'An excerpt from Boethus of Sidon's commentary on the *Categories*?' *Classical Quarterly* 31, 1981, 398-409.
 93. Robert Sharples, in collaboration with F.W. Zimmermann, 'Alexander of Aphrodisias, *On Time*', *Phronesis* 1982.

Stoics

94. V. Goldschmidt, *Le Système stoïcien et l'idée de temps*, Paris 1953.

Epicurus

Epicurus' theory of time is known from his summary in the *Letter to Herodotus*, from Sextus and from Lucretius, and, more recently from the charred and fragmentary papyrus 1413 recovered from the volcanic ash at Herculaneum. This has been edited by Cantarella, with an introduction and notes by Arrighetti, and there is an article on it by Barigazzi:

95. R. Cantarella and G. Arrighetti, 'Il libro "Sul Tempo" (P. Herc. 1413) dell'opera di Epicuro "Sulla Natura"', *Cronache Ercolanesi* 2, 1972, 5-46,
 96. A. Barigazzi, 'Il concetto del tempo nella fisica atomistica', *Epicurea in memoriam H. Bignone*, Genova 1959.

Followers of Karl Marx may be interested in his dissertation of 1840-1 on Democritus and Epicurus, which contains a few pages on Epicurus' treatment of time:

97. Karl Marx, *Differenz der demokritischen und epikureischen Naturphilosophie in Allgemeinen*, translated in Norman D. Livergood, *Activity in Marx's Philosophy*, The Hague 1967, 57-109, see pp. 96-100, and again in Karl Marx and Friedrich Engels, *Collected Works*, an English edition in 50 vols, vol. 1, Moscow, London, New York, 1975, 25-107.

Pseudo-Archytas

98. T.A. Szlezák, *Pseudo-Archytas über die Kategorien*, Berlin 1972.

Philo

99. John Whittaker (56), second study, pp. 33-66.

Plotinus

100. W. Beierwaltes, *Plotin über Ewigkeit und Zeit*, Frankfurt 1967 (text of *Enneads* 3.7, with German translation, introduction and commentary).

Basil of Caesarea and Gregory of Nyssa

101. J.F. Callahan, 'Gregory of Nyssa and the psychological view of time', *Atti del XII Congresso Internazionale di Filosofia*, vol. 11, Florence 1960,
 102. J.F. Callahan, 'Basil of Caesarea, a new source for St. Augustine's theory of time', *Harvard Studies in Classical Philology* 63, 1958, 437-54.
 103. J.F. Callahan, 'Greek Philosophy and the Cappadocian cosmology', *Dumbarton Oaks Papers* 12, 1958, 31-57.

Augustine

104. R.P.A. Solignac (32), notes to *Confessions* Books XI and XII,
 105. P. Agaësse and R.P.A. Solignac, notes 20 and 21 to *de Genesi ad Litteram*, pp. 645-68 of *Oeuvres de Saint Augustin*, Bibliothèque Augustinienne, vol. 48, Paris 1972.
 106. J.F. Callahan (101-3),
 107. J.F. Callahan, *Four Views of Time in Ancient Philosophy*, Cambridge 1948,
 108. E.P. Meijering, *Augustin über Schöpfung, Ewigkeit, Zeit*, Leiden 1980,
 109. J.L. Morrison, 'Augustine's two theories of time', *New Scholasticism* 1971, 600-10.
 A work much quoted, but to be read with caution, is
 110. Jean Guitton, *Le Temps et l'éternité chez Plotin et Saint Augustin*, Paris 1959.

Late Neoplatonists

111. Shmuel Sambursky and Shlomo Pines (46a).
 Iamblichus:
 112. Philippe Hoffmann, 'Jamblique exégète du Pythagoricien Archytas: trois originalités d'une doctrine du temps', *Les Études Philosophiques* 1980, 307-23.
 Proclus:
 113. W. O'Neill, 'Time and eternity in Proclus', *Phronesis* 7, 1962, 161-5.
 Damascius:
 114. Marie-Claire Galperine, 'Le temps intégral selon Damascius', *Les Études Philosophiques* 1980, 325-41.
 Simplicius:
 115. H. Meyer, *Das Corollarium de Tempore des Simplikios und die Aporien des Aristoteles zur Zeit*, Meisenheim am Glan 1969,
 116. E. Sonderegger, *Simplikios zur Zeit*, *Hypomnemata* vol. 70, Göttingen 1982.

General

- A panoramic history of cosmological theory, which has much to say on ancient theories of time, but which has been subject to subsequent correction, is
 117. Pierre Duhem, *Le Système du monde*, vol. 1, repr. Paris 1954; vol. 2 repr. Paris 1974 (1st ed. Paris 1913-17).

Leibniz

118. H.G. Alexander, ed., *The Leibniz-Clarke Correspondence*, translated Manchester 1956.

Twentieth-century physics of time

119. M. Čapek, *The Philosophical Impact of Contemporary Physics*, Princeton 1961,
 120. G.J. Whitrow, *The Natural Philosophy of Time*, 2nd ed. Oxford 1980,
 121. H. Stein, 'On Einstein-Minkowski space-time', *Journal of Philosophy* 65, 1968, 5-23

A very elementary book on the Special Theory of Relativity is

122. James A. Coleman, *Relativity for the Layman*, New York 1954, revised Harmondsworth 1969.

Recent philosophical treatments

There is a large number of recent philosophical treatments, of which the following are representative:

123. W.H. Newton-Smith, *The Structure of Time*, London 1980,
 124. J.R. Lucas, *A Treatise on Time and Space*, London 1973,
 125. R. Swinburne, *Space and Time*, London 1968.

For philosophical treatments of particular aspects of time, see below, but on the distinction between static and flowing time, it is worth drawing attention to

126. Richard Gale, *The Language of Time*, London 1968.

Time and determinism

Ancient treatments of this subject are discussed in

- 126a. Richard Sorabji, *Necessity, Cause and Blame*, London 1980, chs 5, 6, 7, 8, and an extensive literature is cited there.

Is time real?

For the paradoxes in Aristotle *Phys.* 4.10, see:

127. Fred D. Miller, 'Aristotle on the reality of time', *Archiv für Geschichte der Philosophie* 56, 1974, 132-55,
 128. Norman Kretzmann, 'Aristotle on the instant of change', *Proceedings of the Aristotelian Society*, supp. vol. 50, 1976, 91-114.

For the Stoic view on the unreality of time, see:

129. A.A. Long, 'Language and thought in Stoicism' in his anthology *Problems in Stoicism*, London 1971.

Augustine's discussion is summarised in

130. J.F. Callahan, *Four Views of Time* (107),
 and late Neoplatonist discussions are translated, with an introduction, in the work of
 131. S. Sambursky and S. Pines (111).

The most notable modern denial of the reality of time is that by

132. J.M.E. McTaggart, 'The unreality of time', *Mind* n.s. 17, 1908, 457-74, revised in his *The Nature of Existence*, London 1927, vol. 2, ch. 3.

I have discussed the ancient arguments in

133. Richard Sorabji, 'Is time real? Responses to an unaging paradox', *Proceedings of the British Academy*, forthcoming.

Time, change and flow

On whether time requires change, see

134. Leibniz in H.G. Alexander, ed., *The Leibniz-Clarke Correspondence* (118),
 135. Sydney Shoemaker, 'Time without change', *Journal of Philosophy* 66, 1969, 363-81.

The idea that time flows is clarified by McTaggart's distinction between A-series and B-series in

136. J.M.E. McTaggart (132).

Time-words expressing flow have been analysed in terms of the word 'this' by

137. Bertrand Russell, 'The experience of time', *Monist* 25, 1915, 212-33,

138. Hans Reichenbach, *Elements of Symbolic Logic*, New York 1948, §§50-1, and in terms of the notion of 'direct reference' in work in preparation by David Kaplan, privately circulated under the title 'Demonstratives', in March 1977. The idea that such words can be replaced by time-words not expressing flow is resisted by

139. Richard Gale (126), ch. 4,

140. Richard Gale, 'Tensed statements' *Philosophical Quarterly* 12, 1962, 53-9,

141. Arthur Prior, 'Thank goodness that's over', *Philosophy* 34, 1959, 17,

142. P.F. Strawson, *Individuals*, London 1959, ch. 1.

The replaceability of flowing words and of other 'token-reflexives' in certain restricted contexts is argued by

143. H.-N. Castaneda, 'Omniscience and indexical reference', *Journal of Philosophy* 64, 1967, 203-10,

144. Steven E. Boër and William G. Lycan, 'Who, me?', *Philosophical Review* 89, 1980, 427-66.

Tenses express flow, but they were not incorporated into modern formal logic until the work of

145. Arthur Prior, *Time and Modality*, Oxford 1957,

146. Arthur Prior, *Past, Present and Future*, Oxford 1967,

147. Arthur Prior, *Papers on Time and Tense*, Oxford 1968.

There have been heavy attacks on the idea of flowing time, of which the most vitriolic is that of

148. D.C. Williams, 'The myth of passage', *Journal of Philosophy* 48, 1951, 457-72, and a more sophisticated one that of

149. D.H. Mellor, *Real Time*, Cambridge 1981.

A distinction between flowing and static time was made in antiquity by Iamblichus in passages translated, with an introduction in

150. S. Sambursky and S. Pines (46a).

It has been detected, mistakenly I believe, in Aristotle. See the articles by

151. Fred D. Miller (127),

152. Norman Kretzmann (128).

For Aristotle's commitment to *tensed* discourse, see

153. Jaakko Hintikka, *Time and Necessity* (91), chs 4 and 5.

Timelessness and changelessness

The idea that *truth* is timeless is controversial. Although talking of tenseless propositions, Storrs McCall denies that their truth is timeless in

154. Storrs McCall, 'Temporal flux', *American Philosophical Quarterly* 3, 1966, 270-81.

But the timelessness of truth is asserted by

155. W.V.O. Quine, *Word and Object*, Cambridge Mass. 1960, esp. 194,

156. Nelson Goodman, *The Structure of Appearance*, Cambridge Mass. 1951, ch. 11.

This controversy is affected by the one catalogued above (139-44), as to whether time-words expressing flow can be replaced.

On whether *universals* are timeless, see

157. David Armstrong, *Universals and Scientific Realism*, vol. 1, Cambridge 1978, ch. 7.

There are special problems connected with the idea that God has timeless or changeless *knowledge*. At least his timeless knowledge would not restrict our

freedom in the way that *foreknowledge* would. That his foreknowledge would is explained by

158. Nelson Pike, 'Divine omniscience', *Philosophical Review* 74, 1965, 27-46,
 159. Nelson Pike, *God and Timelessness*, London 1970,
 160. J.R. Lucas, *The Freedom of the Will*, Oxford 1970, ch. 14,
 161. Gary Iseminger, 'Foreknowledge and necessity: *Summa Theologiae* Ia, 14, 13, 2',
Midwest Studies in Philosophy vol. 1, eds, Peter A. French, Theodore E. Uehling
 jr., Howard K. Wettstein, Morris Minnesota 1976, 5-25,
 162. Richard Sorabji (126a), 112-13.

That God's timeless knowledge would not in the same way restrict our freedom was not yet recognised by Augustine, for whom see

163. J. van Gerven, 'Liberté humaine et prescience divine d'après S. Augustin', *Revue Philosophique de Louvain* 55, 1957, 317-30,
 but it was by Boethius. See
 164. P.T.M. Huber, *Die Vereinbarkeit von göttlicher Vorsehung und menschlicher Freiheit in der Consolatio Philosophiae des Boethius*, diss. Zurich 1976,
 165. Robert Sharples, 'Alexander of Aphrodisias, *De Fato*: some parallels', *Classical Quarterly* 28, 1978, 243-66.

But if God's knowledge is either timeless or changeless, can he know truths which depend on the flow of time? This was already discussed by Augustine, Ammonius and Ghazālī, on the last of whom see

166. S. van den Bergh (83), vol. 2, pp. 151 and 155-6.
 There is further discussion of the question in
 167. Nelson Pike, *God and Timelessness* (159), ch. 5,
 168. Arthur Prior, 'The formalities of omniscience', *Philosophy* 1962, repr. in ch. 3 of
 his *Papers on Time and Tense* (147),
 169. Norman Kretzmann, 'Omniscience and immutability', *Journal of Philosophy* 63,
 1966, 409-21,
 170. H.-N. Castaneda, 'Omniscience and indexical reference' (143),
 171. Nicholas Wolterstorff, 'God everlasting', in Orlebeke and Smedes, eds, *God and the Good*, Grand Rapids, Michigan 1975,
 172. Eleonore Stump and Norman Kretzmann, 'Eternity', *Journal of Philosophy* 78,
 1981, 429-58.

For some ancient and mediaeval views on whether and how God is omniscient, see

173. R.T. Wallis, 'Divine omniscience in Plotinus, Proclus and Aquinas', in H.J. Blumenthal and R.A. Markus, eds, *Neoplatonism and Early Christian Thought*, Essays in honour of A.H. Armstrong, London 1981.

The question how a changeless being can be an *agent* is discussed by

174. Nelson Pike, *God and Timelessness* (159),
 while Origen's solution is explained by
 175. Eleonore Stump, 'Petitionary prayer', *American Philosophical Quarterly* 16, 1979,
 81-91.

A further problem is whether *power* can be changeless or timeless seeing that it appears to be diminished, as the flow of time makes things irrevocable. This is discussed by

176. William J. Courtenay, 'John of Mirecourt and Gregory of Rimini on whether God can undo the past', *Recherches de Théologie Ancienne et Médiévale*, 39, 1972,
 224-56 and 40, 1973, 147-74,
 177. A.J.P. Kenny, *The God of the Philosophers*, Oxford 1979, ch. 8,
 178. Peter Geach, *Providence and Evil*, Cambridge 1977, 18-19,
 179. Peter Geach, *Truth, Love and Immortality*, Berkeley and Los Angeles 1979, 102,
 180. E. Bevan, *Symbolism and Belief*, London 1938, 98.

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In Parmenides:

181. G.E.L. Owen (85),
 182. L. Taran, *Parmenides*, Princeton 1965, 175-88,
 183. Malcolm Schofield, 'Did Parmenides discover eternity?' *Archiv für Geschichte der Philosophie* 52, 1970, 113-35,
 184. Jonathan Barnes, *The Presocratic Philosophers*, London 1979, vol. 1, 190-4.
 185. John Whittaker (56), first study, pp. 1-32.

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186. John Whittaker, 'The "eternity" of the Platonic Forms', *Phronesis* 13, 1968, 131-44.

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187. W. von Leyden, 'Time, number and eternity in Plato and Aristotle', *Philosophical Quarterly* 14, 1964, 35-52.

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188. John Whittaker (56), second study, pp. 33-66,
 189. H.A. Wolfson, *Philo* (23).

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190. John Whittaker, 'Ammonius on the Delphic E', *Classical Quarterly*, n.s. 19, 1969, 185-92.

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191. Henry-Charles Puech in *Eranos Jahrbuch* 20, 1951, translated as 'Gnosis and time', in Joseph Campbell, ed., *Man and Time, Papers from Eranos Yearbooks*, vol. 3, London 1958, 38-84.

Plotinus:

192. W. Beierwaltes (100),
 193. A.H. Armstrong, 'Eternity, life and movement in Plotinus' accounts of *nous*', *Le Néoplatonisme* (Report of the International Conference held at Royamont, 9-13 June 1969), Paris 1971, 67-74.

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194. H. von Balthasar, *Presence et pensée*, Paris 1942, 1-10.

Boethius:

195. William Kneale, 'Time and eternity in theology', *Proceedings of the Aristotelian Society* 61, 1960-1, 87-108,
 196. Eleonore Stump and Norman Kretzmann (172).

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197. R.W. Jelf, *Grounds for Laying Before the Council of King's College, London, Certain Statements Contained in a Recent Publication Entitled 'Theological Essays, by the Rev. F.D. Maurice, M.A., Professor of Divinity in King's College'* (a set of nine letters by Jelf and Maurice), 2nd ed., Oxford and London 1953,
 198. F.D. Maurice, *The Word 'Eternal' and the Punishment of the Wicked* (a final letter), Cambridge 1853.

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199. Martha Kneale, 'Eternity and sempiternity', *Proceedings of the Aristotelian Society* 69, 1968-9, 223-38.

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200. Hans Lewy, *Sobria Ebrietas*, Giessen 1929.
 201. David Winston, *Philo of Alexandria, The Contemplative Life, The Giants and Selections*, London 1981, 21-34.

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202. R. Arnou, *Le Désir de Dieu dans la philosophie de Plotin*, Paris 1921,

203. A.H. Armstrong, 'Elements in the thought of Plotinus at variance with classical intellectualism', *Journal of Hellenic Studies* 93, 1973, 13-22.

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Gregory of Nyssa:

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 205. Jean Danielou, introduction to *Grégoire de Nysse, La Vie de Moïse*, Sources Chrétiennes, Paris 1955.

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206. Arthur Lovejoy, *The Great Chain of Being*, Cambridge Mass. 1936, ch. 9,
 207. John Passmore, *The Perfectibility of Man*, London 1970, ch. 3.

For Augustine, see

208. Peter Brown (31),
 209. P. Henry (35 and 36),
 210. P. Courcelle (37),
 211. P. Hadot (38),
 212. P. Agaësse and R.P.A. Solignac, notes on *de Genesi ad Litteram XII*, in *Oeuvres de Saint Augustin*, Bibliothèque Augustinienne, vol. 49, Paris 1972,
 213. John Burnaby, *Amor Dei: A Study of the Religion of St. Augustine*, London, 1938.

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214. C. Butler, *Western Mysticism*, 2nd ed. London 1926,
 215. C. Baumgartner, in Marcel Viller, ed., *Dictionnaire de spiritualité*, II 2, Paris 1950, cols. 2171-2194,
 216. R.C. Zaehner, *Mysticism Sacred and Profane*, Oxford 1957,
 217. E.R. Dodds (29)

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218. A.C. Lloyd, 'Non-discursive thought – an enigma of Greek philosophy', *Proceedings of the Aristotelian Society* 70, 1969-70, 261-75.

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219. Gail Fine, 'Knowledge and logos in the *Theaetetus*', *Philosophical Review*, 88, 1979, 366-97,
 220. Julia Annas, *An Introduction to Plato's Republic*, Oxford 1981, 280-4.

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221. E. Berti, 'The intellection of indivisibles according to Aristotle *De Anima* III 6', in G.E.L. Owen and G.E.R. Lloyd, eds., *Aristotle on Mind and the Senses*, *Proceedings of the Seventh Symposium Aristotelicum*, Cambridge 1978.

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222. Richard Sorabji, 'Myths about non-propositional thought', in Malcolm Schofield and Martha Nussbaum, eds, *Language and Logos, Studies presented to G.E.L. Owen*, Cambridge 1982.

On Aristotle's theory of thinking, see

223. Richard Norman, 'Aristotle's Philosopher-God', *Phronesis* 14, 63-74, repr. in *Articles on Aristotle* (13), vol. 4, 1979,
 224. G.E.M. Anscombe, in G.E.M. Anscombe and P.T. Geach, *Three Philosophers*, Oxford 1961, 60,
 225. Richard Sorabji, *Aristotle on Memory*, London 1972, 6-8,
 226. Richard Sorabji, *Necessity, Cause and Blame* (126a), 217-19,
 227. Richard Sorabji (222),
 228. A.C. Lloyd, *Form and Universal in Aristotle*, Liverpool 1981, 6-24.

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229. P. Hadot, 'Apophatisme et théologie négative', in his *Exercices spirituels et philosophie antique*, Paris 1981.

For Augustine, see

230. V. Lossky, 'Les éléments de "Théologie négative" dans la pensée de saint Augustin', *Augustinus Magister I*, Paris 1954, 575-81.

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231. David Winston (201),

232. Jean Danielou (205).

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Fear of death

233. John Donnelly, ed., *Language, Metaphysics and Death*, New York 1978, is an anthology which reprints *inter alia*:

234. Thomas Nagel, 'Death', which appears also in his *Mortal Questions* Cambridge 1979, and in James Rachels, ed., *Moral Problems*, New York 1971, and which is a revised version of what appears in *Nous* 4, 1979, 73-80,

235. Bernard Williams, 'The Makropoulos case: reflections on the tedium of immortality', from his *Problems of the Self*, Cambridge 1973, 82-100,

236. John J. Clarke, 'Mysticism and the paradox of survival', from *International Philosophical Quarterly* 11, 1971, 165-79.

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237. R. Hoven, *Stoïcisme et les Stoïciens face au problème de l'au delà*, Paris 1971.

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Nearly all the later Greek philosophical schools purported to show the way to tranquillity, in one or another of several different forms. Some of their conceptions are usefully summarised in

238. Robert C. Gregg, *Consolation Philosophy*, Cambridge Mass. 1975.

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239. Myles Burnyeat, 'Can the sceptic live his scepticism?', in M. Schofield, M. Burnyeat, J. Barnes, eds., *Doubt and Dogmatism*, Oxford 1980.

Some Neoplatonist views are explained in

240. Ilsetraut Hadot, *Le Problème du néoplatonisme Alexandrin: Hiéroclès et Simplicius* (53), 150-61.

Endless recurrence of worlds

For ancient treatments, see

241. Pierre Duhem (117), vol. 1, repr. Paris 1954, 65-85; 164-9; 275-96; vol. 2, repr. Paris 1974, 298-9; 447-53,

242. Milic Čapek, 'Eternal return', in P. Edwards, ed., *Encyclopaedia of Philosophy*, New York 1967,

243. J. Mansfeld, 'Providence and the destruction of the universe in early Stoic thought', in M.J. Vermaseren, ed., *Studies in Hellenistic Religions*, Leiden 1979,

244. Mircea Eliade, *The Myth of Eternal Return*, translated from the French of 1949, New York 1954.

On the argument that God cannot know an infinite number of creatures, but only a finite number of recycled ones, see

245. R.T. Wallis (173).

Nietzsche, and the appropriate attitude to endless recurrence, are discussed by

246. Ivan Soll, 'Reflections on recurrence', in Robert Solomon, ed., *Nietzsche: A*

Collection of Critical Essays, Garden City New York 1973,

247. Alexander Nehamas, 'The eternal recurrence', *Philosophical Review* 89, 1980, 331-56.

For modern controversy, see

248. Milic Čapek, 'The theory of eternal recurrence in modern Philosophy of Science, with special reference to C.S. Peirce', *Journal of Philosophy* 57, 1960, 289-96,
 249. Bas van Fraassen, 'Čapek on eternal recurrence', *Journal of Philosophy* 57, 1960, 371-5.

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There were arguments for reincarnation of souls analogous to those for the recurrence of worlds, which insisted on the recycling of a finite number of souls, in order to avoid the existence of an infinite number.

250. R.T. Wallis (173), 77 and 94.
 251. E.R. Dodds, edition of Proclus' *Elements of Theology*, Oxford 1933, 304-5.
 Avicenna's defence of an infinity of souls is clearly explained by
 252. H.A. Davidson (74), 380,
 and is also the subject of
 253. Michael Marmura, 'Avicenna and the problem of the infinite number of souls', *Medieval Studies* 22, 1960, 232-9.

Circular time

The idea that not only events, but even time itself, comes round in a circle has been propounded in modern physics by

254. Kurt Gödel, 'A remark about the relationship between Relativity Theory and Idealistic philosophy', in P.A. Schilpp, ed., *Albert Einstein, Philosopher-Scientist*, New York 1951, 555-62, discussed in
 255. Richard Sorabji, *Necessity, Cause and Blame* (126a), 115-19.

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Its presence or absence in antiquity

The seminal article denying idealism in antiquity is by

256. Myles Burnyeat, 'Idealism and Greek Philosophy: what Descartes saw and Berkeley missed', *Philosophical Review* 91, 1982, 3-40.

On the other side, see the three extracts from

257. Gregory of Nyssa, translated in Chapter 18.

The individual as a unique bundle of qualities

258. A.C. Lloyd, 'Neoplatonic logic and Aristotelian logic', *Phronesis* 1, 1955-6, 158-9,
 259. A.C. Lloyd, *Form and Universal in Aristotle* (228), 67-8.

Matter in Aristotle and Plotinus

Aristotle:

260. Malcolm Schofield, 'Metaph Z 3: some suggestions', *Phronesis* 17, 1972, 97-101.

Plotinus:

261. John M. Rist, 'Plotinus on matter and evil', *Phronesis* 6, 1961, 154-66,
 262. John M. Rist, *Plotinus: the Road to Reality*, (24), ch. 9.

History of treatments of creation

Parmenides

263. G.E.L. Owen (85).

Plato

264. Gregory Vlastos (86),
 265. M. Baltes, *Die Weltentstehung des platonischen Timaios nach den antiken Interpreten*, 2 vols, Leiden, 1976.

Is Aristotle's God a creator?

266. R. Jolivet, 'Aristote et Saint Thomas' or 'La notion de création', in *Essai sur les rapports entre la pensée Grecque et la pensée Chrétienne*, Paris 1955.

On Aristotle's view in his early work *De Philosophia*:

267. J. Pépin, *Théologie cosmique et théologie Chrétienne (Ambroise Exam. 1. 1, 1-4)*, Paris 1964, 475-8.

On the interpretations of Aristotle by late Neoplatonists:

268. Gérard Verbeke (52),
 269. H.D. Saffrey (51),
 270. Étienne Evrard (70).

Aristotle's 'De Philosophia' and Stoic and Epicurean responses

271. J. Pépin (267),
 272. M. Baltes (265),
 273. J. Mansfeld (243),
 274. A.D. Nock, introduction and commentary to Sallustius *De Diis et Mundo*, Cambridge 1926,
 275. B. Effe, *Studien zur Kosmologie und Theologie der aristotelischen Schrift über die Philosophie*, Munich 1970,
 276. E. Bignone, *L'Aristotele perduto e la formazione filosofica di Epicuro*, Florence 1936, chs 9 and 10.

Philo

277. H.A. Wolfson *Philo* (23) vol. 1, 300-12.

Augustine

278. J. de Blic, 'Platonisme et Christianisme dans la conception Augustinienne du Dieu Créateur' *Recherches de science religieuse*, Paris 1940, 172-90,
 279. J de Blic, 'Les arguments de Saint Augustin contre l'éternité du monde', *Mélanges de science religieuse*, vol. 3, Lille 1945, 33-44,
 280. E.P. Meijering (108),
 and, again with caution,
 281. Jean Guitton (110)

Neoplatonists

282. Sallustius *De Diis et Mundo*, translated by A.D. Nock (274).
 Proclus' attack on Christian views of creation, as summarised by Philoponus, is available in the English translation by

283. Thomas Taylor, *The Fragments that Remain of the Lost Writings of Proclus, Surnamed the Platonic Successor*, London 1825.

Boethius

284. P. Merlan (49),
285. P. Courcelle, *Late Latin Writers* (33), ch. 6.

Philoponus

286. W. Wieland, 'Die Ewigkeit der Welt', in *Die Gegenwart der Griechen im neueren Denken* (H.-G. Gadamer Festschrift), Tübingen 1960,
287. H.A. Davidson (74),
288. H.A. Wolfson (81), 410-23; 452-5,
289. S. Sambursky, 'Note on John Philoponus' rejection of the infinite', in S.M. Stern, Albert Hourani, Vivian Brown, eds, *Islamic Philosophy and the Classical Tradition*, Essays Presented to Richard Walzer, Oxford 1972, 351-3,
290. S. Pines, 'An Arabic summary of a lost work of John Philoponus', *Israel Oriental Studies* 2, 1972, 350-2,
291. Joel L. Kraemer, 'A lost passage from Philoponus' *Contra Aristotelem* in Arabic translation', *Journal of the American Oriental Society* 85, 1965, 318-27,
292. W.L. Craig, *The Kalam Cosmological Argument*, London 1979.
293. Robert B. Todd (68).
294. Gérard Verbeke (52).
295. Michael Wolff, *Fallgesetz und Massebegriff*, Berlin 1971.
296. Richard Sorabji, 'Infinity and the Creation', lecture published by the Publications Office, King's College, London.

A translation of the fragments of Philoponus' *contra Aristotelem* and a translation of his *de Aeternitate Mundi* are to be published by Duckworth.

Islamic and Jewish treatments

297. H.A. Davidson (74),
298. S. van den Bergh's translation, with commentary, of Averroes and Ghazālī (83),
299. Maimonides (82), Part 2, chs 13-25.
299a. G.A. Lucchetta, 'Razi a confronto con la fisica antica', *Museum Patavinum* 1, 1983, 7-43, esp. 24-32.
For Avicenna, see below, 316-18.

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300. Cyril Vollert, L.H. Kendzierski, P.M. Byrne, eds, *St. Thomas Aquinas, Siger of Brabant, St. Bonaventure, On the Eternity of the World*, Milwaukee Wisconsin, 1964, translations with introductions,
301. F. van Steenberghen, 'La controverse sur l'éternité du monde au XIIIe siècle', *Academie Royale de Belgique, Bulletin de la Classe des Lettres et des Sciences Morales et Politiques*, series 5, vol. 58, 1972, 267-87.

Modern physics on the beginning of the universe

- There are many popular books, for example,
302. Steven Weinberg, *The First Three Minutes*, London 1977.

Particular aspects of treatments of creation

Creation out of nothing

Early Jewish thought down to Philo:

303. H.A. Wolfson *Philo* (23), vol. 1, 300-12,
 304. Robert M. Grant, *Miracle and Natural Law in Graeco-Roman and Early Christian Thought*, Amsterdam 1952, ch. 10, 'Creation',
 305. David Winston, 'The *Book of Wisdom's* theory of cosmogony', *History of Religions* 11, 1971-2, 185-202,
 306. Gerhard May, *Schöpfung aus dem Nichts*, Stuttgart 1980, 1-21.

The Church Fathers:

307. Gerhard May (306),
 308. H.A. Wolfson, 'The meaning of *ex nihilo* in the Church Fathers, Arabic and Hebrew Philosophy and St. Thomas', in *Medieval Studies in Honor of Jeremiah D.M. Ford*, Cambridge Mass. 1948, 355-70,
 309. H.A. Wolfson, 'The identification of *ex nihilo* with emanation in Gregory of Nyssa', *Harvard Theological Review* 63, 1970, 53-60.

On the Neoplatonist denial that creation requires pre-existing matter, see

310. I. Hadot (53), 86-9.

For the distinction 'from God' and 'from nothing', see besides H.A. Wolfson (309).

311. John M. Rist (27), 167.

For Parmenides, see

312. G.E.L. Owen (85).

For Aristotle's acknowledgment of the creation of forms out of nothing:

313. Robert Heinaman, 'Aristotle's tenth aporia', *Archiv für Geschichte der Philosophie* 61, 1979, 249-70,
 314. A.C. Lloyd (228), 25-6.

For early Islamic views on creation out of nothing, see

315. H.A. Wolfson (81), 355-72.

On Avicenna, and his influence on Christian views, see

316. E. Gilson, 'Notes pour l'histoire de la cause efficiente', *Archives d'Histoire Doctrinale et Littéraire du Moyen Age* 1962 (published 1963) 7-31,
 317. A.-M. Goichon, *La Distinction de l'essence et de l'existence d'après Ibn Sīnā*, Paris 1937,
 318. Gérard Verbeke, introduction to Avicenna, *Liber de Philosophia prima*, ed. S. van Riet, Leiden 1980, in the series Avicenna Latinus, pp. 19-36, 'La notion de causalité'.

Averroes gives a survey of his predecessors' views on creation out of nothing, taking in the Islamic theologians, along with Farabi and Avicenna:

319. Averroes, Commentary on Aristotle's *Metaphysics* Lambda, ad 1070a27-30, ed. Bouyges pp. 1491-1505, translated into English by C.F. Genequand, *Ibn Rushd's Commentary on Aristotle's Metaphysics Book Lam*, Bodleian Library MS. D.Phil. c. 2407, pp. 178-90.

Farabi and Avicenna gained their interpretation of Aristotle's views from the wrongly ascribed Arabic epitome of Plotinus:

320. *The Theology of Aristotle*, translated from Arabic into English in Henry and Schwyzer's edition of Plotinus.

Christian and Jewish departures from the view that the universe had a beginning

On the Old Testament:

321. H.A. Wolfson *Philo* (23), vol. 1, 300-2,
 322. R.M. Grant (304),
 323. David Winston (305),

324. Gerhard May (306), 1-7,
Synesius and Elias:
325. G. Verbeke (52),
326. W. Wieland (286).
Boethius:
327. P. Merlan (49)
328. P. Courcelle (33), ch. 6.
On the thirteenth century:
329. Cyril Vollert, L.H. Kendzierski, P.M. Byrne (300),
330. F. van Steenberghen (301).
For later Jewish thought up to Gersonides and Spinoza:
331. H.A. Wolfson, *Philo* (23), vol. 1, 323,
332. H.A. Wolfson, 'The Platonic, Aristotelian and Stoic theories of creation in Hallevi and Maimonides', in *Essays Presented to J.M. Hertz*, London 1942, 427-42,
333. H.A. Wolfson, *The Philosophy of Spinoza*, Cambridge Mass. 1934, vol. 1, ch. 10, 'Duration, Time and Eternity'.
Schleiermacher:
334. F.D.E. Schleiermacher, *The Christian Faith* §§36-41,
335. Nelson Pike (159), 108-10.

The 'why not sooner?' argument

336. G.E.L. Owen (85),
337. Augustine *Confessions* XI. 13 and 30; *City of God* XI. 5-6; *de Genesi contra Manichaeos* I.2.3,
338. Leibniz (118), esp. 5th Letter, §56.

The 'changeless will' argument

339. Eleonore Stump, 'Petitionary prayer' (175),
340. Eleonore Stump and Norman Kretzmann (172).

'Idleness' arguments

341. B. Effe (275), 23-31.

The creation of an intelligible world

342. Jean Pépin, 'Recherches sur le sens et les origines de l'expression *caelum caeli* dans le livre XII des *Confessions* de S. Augustin', *Bulletin du Cange* 23, 1953, 185-274, repr., with additions, in his *Ex Platonicorum Persona*, Amsterdam 1977,
343. R.P.A. Solignac (32), 592-8, and with P. Agaësse (105), 586-8,
344. J. de Blic (278).

The role of the creator's will for Christians and Neoplatonists

345. I. Hadot (53), 90-2,
346. J. Pépin (267), 502-6,
347. John M. Rist, (24), ch. 6,
348. John M. Rist, *Human Value*, Leiden 1982, ch. 8, 'Plotinus',
349. E.R. Dodds, edition of Proclus, *Elements of Theology*, Oxford 1933, note to proposition 174,
350. A.H. Armstrong, 'Elements in the thought of Plotinus at variance with classical intellectualism' (203),

351. C. Tresmontant, *La Métaphysique du Christianisme et la naissance de la philosophie Chrétienne*, Paris 1961, 190-4.

'Infinity' arguments

See 286-296 above, and 391-401 below.

'Changeless cause' and 'delayed effect' arguments

See 361-367 below.

Principles of causality

History

There is a general history by

352. William Wallace, *Causality and Scientific Explanation*, 2 vols, Ann Arbor 1972.

For Plato, see

353. Gregory Vlastos, 'Reasons and causes in the *Phaedo*', *Philosophical Review* 78, 1969, 291-325, repr, in his *Platonic Studies* (9),
 354. Julia Annas, 'Aristotle on inefficient causes', *Philosophical Quarterly* 32, 1982,
 355. Richard Sorabji (126a), 59; 206-8.

Aristotle:

356. Richard Sorabji (126a), chs 1-3,
 357. Julia Annas (354).

Stoics:

358. Michael Frede, 'The original notion of cause', in Malcolm Schofield, Myles Burnyeat, Jonathan Barnes, eds, *Doubt and Dogmatism*, Oxford 1980,
 359. Richard Sorabji, 'Causation, laws and necessity', *ibid.*, is a version of *Necessity, Cause and Blame*, chs 3 and 4.

Sceptics:

360. Jonathan Barnes, 'Ancient skepticism and causation', in Myles Burnyeat, ed., *The Skeptical Tradition*, University of California Press, forthcoming.

Can there be a changeless cause of a change? Or do changes require triggering events?

361. Aristotle, *Phys.* 8.1, 251a8-b10; 8.7, 260a26-261a26; *GC* 2.10, 336a14-b17,
 362. Ghazālī, *Tahāfut al-Falāsifa*, ap. Averroem *Tahāfut al-Tahāfut* (Bouyges), pp. 11-12, translated by S. van den Bergh (83), 5-6,
 363. Thomas Aquinas, *Summa Theologiae* 1, q.46, a.1, objection (6).

Causation across a temporal gap: can a sufficient cause delay its effect?

364. Ghazālī (362),
 365. Thomas Aquinas (363),
 366. Sydney Shoemaker (135),
 367. W.H. Newton-Smith (123), 33-8, 'Duration causality'.

The idea that a cause must be like, or greater than its effect

368. A.C. Lloyd, 'The principle that the cause is greater than the effect', *Phronesis* 21, 1976, 146-56.

Must causes do something?

369. Michael Frede (358),
 370. Jonathan Barnes (360),
 371. Julia Annas (354).

Do causes involve events?

372. Donald Davidson, 'Causal Relations', *Journal of Philosophy* 64, 1967, 691-703,
 373. Jonathan Barnes (360).

Beginningless, changeless, eventless causes in Neoplatonism

374. J. Pépin (267), 279-80,
 375. M. Baltes (265), 163-6,
 375a. Walter Böhm (62), 44-50.

Creation as not implying a beginning

376. Taurus, translated in John Dillon (18), 242-4.

Restrictions on causal power*Ancient scepticism on causes*

377. Jonathan Barnes (360).

Origins of occasionalism

Occasionalism, although influenced by earlier ideas, starts in the Islamic period.

378. H.A. Wolfson (81), 518-600,
 379. Majid Fakhry, *Islamic Occasionalism*, London 1958,
 380. Ghazālī (362), 17th Discussion (Bouyges) pp. 517-42, translated by S. van den Bergh (83), pp. 316-33, with comments,
 381. Maimonides (82) 1.73, sixth proposition,
 382. William J. Courtenay, 'The critique on natural causality in the Mutakallimun and nominalism', *Harvard Theological Review* 66, 1973, 77-94,
 383. L.E. Goodman, 'Did al-Ghazālī deny causality?', *Studia Islamica*, 47, 1978, 83-120,
 384. F.W. Zimmermann, review of J. van Ess, *Anfänge muslimischer Theologie*, in preparation.

The best known European exponent is

385. Malebranche, *Entretiens sur la métaphysique*, 7th Dialogue.

Neoplatonist restrictions on causal and creative power

386. E.R. Dodds (349), notes to propositions 56-7, 75, 80.

Augustine's reservation of creative power for God

387. E. Gilson, *The Christian Philosophy of St. Augustine*, London 1961,
 388. J. de Blic (278),
 389. Jean Guitton (110).

For Augustine's use of the idea of seminal reasons in this context, see

390. P. Agaësse and R.P.A. Solignac (105), 653-68.

Problems of the infinite

The alleged impossibility of an infinite past

Philoponus' arguments and their preservation in Islamic Philosophy are covered by entries 286-296. Modern supporters of Philoponus' side are:

391. Richard Bentley, Sixth of the *Boyle Sermons* 1692, in Bentley's *Works*, vol. 3, ed. Alexander Dyce, London 1838,
 392. G.J. Whitrow, *The Natural Philosophy of Time*, 1961, 2nd ed. Oxford, 1980, 27-33,
 393. G.J. Whitrow, 'On the impossibility of an infinite past', *British Journal for the Philosophy of Science* 29, 1978, 39-45,
 394. Pamela Huby, 'Kant or Cantor? That the universe, if real, must be finite in both space and time', *Philosophy* 46, 1971, 121-3, and 48, 1973, 186-7,
 395. W.L. Craig, *The Kalam Cosmological Argument*, London 1979, esp. 83-7; 97-9,
 396. W.L. Craig, 'Whitrow and Popper on the impossibility of an infinite past', *British Journal for the Philosophy of Science* 30, 1979, 165-70.

Bertrand Russell's paradox of Tristram Shandy is given in

397. Bertrand Russell, 'Mathematics and the metaphysicians' in *Mysticism and Logic*, London 1917 (p. 70 of the 1963 edition), revised from an article written in 1901 and published in *The International Monthly*,
 398. Bertrand Russell, *Principles of Mathematics* 1903, 2nd ed., London 1937, 358-9
 Bonaventure's use of Philoponus' arguments is described, although without acknowledgment of Philoponus, in
 399. E. Gilson, *La Philosophie de Saint Bonaventure*, Paris 1924, 184-8.

Fourteenth-century efforts to analyse the senses in which infinities can, and the senses in which they cannot, exceed each other are explained in

400. John E. Murdoch, 'Mathesis in Philosophiam Scholasticam introducta: the rise and development of the application of mathematics in fourteenth-century Philosophy and Theology', *Arts Libéraux et Philosophie au Moyen Age*, Actes du Quatrième Congrès de Philosophie Médiévale, Paris 1969, 222-3,
 401. John E. Murdoch, 'The "equality" of infinities in the Middle Ages' *Actes du XIe Congrès International d'Histoire des Sciences*, Warsaw-Cracow 1968, vol. 3, 171-4.

For Avicenna, an infinite past implied a present infinity of surviving souls. His handling of this problem is dealt with above, 252-253.

Zeno's paradoxes

402. Gregory Vlastos, 'Zeno of Elea', in P. Edwards, ed., *Encyclopaedia of Philosophy*, New York 1967, gives an overview.
 403. David Furley, *Two Studies in the Greek Atomists*, Princeton 1967, Study One, ch. 5, considers those paradoxes which are relevant to the development of atomism.
 There are two non-historical books, the first considering the paradoxes from the point of view of modern philosophy, the second from the point of view of modern science:
 404. Wesley C. Salmon, ed., *Zeno's Paradoxes*, Indianapolis and New York 1970, a collection of articles,
 405. Adolf Grünbaum, *Modern Science and Zeno's Paradoxes*, Middletown Connecticut, 1967.

For the paradox of the half-distances, and its companion, 'Achilles and the tortoise', see especially

406. Gregory Vlastos, 'Zeno's Race Course', *Journal of the History of Philosophy* 4, 1966, 95-108,
 407. Max Black, 'Achilles and the tortoise', *Analysis* 11, 1950-1, 91-101, reprinted in his *Problems of Analysis*, London 1954,
 408. Max Black, 'Is Achilles still running?', *Problems of Analysis*, London 1954, both

reprinted in Wesley Salmon, ed. (404),

409. James Thomson, 'Tasks and super-tasks', *Analysis* 15, 1954-5, 1-13,
 410. Paul Benacerraf, 'Tasks, super-tasks and the modern Eleatics', *Journal of Philosophy* 59, 1962, 765-84, both reprinted in Wesley Salmon, ed. (404), with a further reply by Thomson.

For the paradox of the flying arrow, see especially

411. G.E.L. Owen, 'Zeno and the mathematicians', *Proceedings of the Aristotelian Society* 58, 1957-8, 199-222,
 412. Jonathan Lear, 'A note on Zeno's arrow', *Phronesis* 26, 1981, 91-104.

For the paradox of the moving rows, see especially

413. David Furley (403).

The paradox of the half-distances gave rise to more fireworks in the fourteenth-century philosopher, Richard Kilvington:

414. Norman Kretzmann, 'Continuity, contrariety, contradiction and change', in Norman Kretzmann, ed., *Infinity and Continuity in Ancient and Mediaeval Thought*, Ithaca N.Y. 1982, 270-96.

Atomism

Ancient Greek atomism

General:

415. Kurd Lasswitz, *Geschichte der Atomistik*, Hamburg and Leipzig 1890, a general history, starting with the Greeks,
 416. Norman Kretzmann, ed. (414), covering antiquity and the middle ages,
 417. David Furley (403), Study One.

A view now generally rejected as baseless, but for a long time influential, was that of Tannery, that atomism was already the subject of attack in Zeno's paradoxes:

418. Paul Tannery, *Pour l'histoire de la science Hellène*, Paris 1887.

This view is rejected, for example by Furley (403) ch. 3, and Owen (411). There was a highly original study of Democritus and other atomists, followed by the fullest collection yet of Democritus' fragments, in

419. Salomon Y. Luria, 'Die Infinitesimaltheorie der antiken Atomisten', in *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik*, Abt. B, Studien Band II, Heft 2, 1932-3, pp. 106-85,

420. Salomon Y. Luria, *Democritea*, Leningrad 1970 (edited in Russian).

The interpretation of Democritus in the former is resisted by Furley (403), 97-9 and 103. On whether Plato accepted time-atoms, there is a symposium discussion in

421. Colin Strang and K.W. Mills, 'Plato and the instant', *Proceedings of the Aristotelian Society*, supp. vol. 48, 1974, 63-96.

The most comprehensive discussion of atomism in Plato's Academy, one which looks for Academic influence in many quarters, is in

422. H.-J. Krämer, *Platonismus und hellenistische Philosophie*, Berlin 1971.

The atomism of Diodorus Cronus is discussed in

423. David Sedley (15),
 424. Nicholas Denyer, 'The atomism of Diodorus Cronus', *Prudentia* (Auckland), 13, 1981, 33-45.

For Epicurus' atomism, see

425. Jürgen Mau, 'Über die Zuweisung zweier Epikur-Fragmente', *Philologus* 99, 1955, 93-111,
 426. Jürgen Mau, *Zum Problem des Infinitesimalen bei den antiken Atomisten*, Berlin 1954,
 427. David Furley (403), Study One, chs 8, 9, 10, 11,
 428. David Sedley, 'Epicurus and the mathematicians of Cyzicus', *Cronache Ercolanesi*

- 6, 1976, 23-54,
 429. David Konstan, 'Problems in Epicurean Physics', *Isis* 70, 1979, 394-418.
 Fragments of Epicurus' follower, Demetrius of Laconia, are assembled in
 430. V. de Falco, *L'epicureo Demetrio Lacone*, Naples 1923,
 431. Enzo Puglia, 'Nuove letture nei P. Herc. 1012 e 1786 (Demetrii Laconis opera incerta)', *Cronache Ercolanesi* 10, 1980, 25-53,
 with further discussion in
 431a. Enzo Puglia, 'La filologia degli epicurei', *Cronache Ercolanesi* 12, 1982, esp. 28-9.

Islamic atomism

The classic work is

432. S. Pines, *Beiträge zur islamischen Atomenlehre*, Berlin 1936.
 See also
 433. H.A. Wolfson (81), 466-517,
 434. J. van Ess, *Theology and Science: the case of Abū Ishāq an-Nazzām*, Second Annual United Arab Emirates Lecture in Islamic Studies, University of Michigan, Ann Arbor, 1978 (19pp.),
 435. D.B. MacDonald, 'Continuous re-creation and atomic time in Muslim scholastic Theology', *Isis* 9, 1927, 326-44,
 436. Maimonides (82) 1.73.

Fourteenth-century atomism

437. Annaliese Maier, *Die Vorläufer Galileis in 14 Jahrhundert*, vol. 1, Rome 1949, 155-215,
 438. V.B. Zoubov, 'Walter Catton, Gerard d'Odon et Nicolas Bonet', *Physis* 1, 1959, 261-78,
 439. John Murdoch (400),
 440. John Murdoch, 'Superposition, congruence and continuity in the middle ages', *Mélanges Alexandre Koyré*, vol. 1, Paris 1964, 416-41,
 441. John Murdoch, 'Naissance et développement de l'atomisme au bas moyen-âge latin', in *La Science de la Nature: Théories et Pratiques*, Cahiers d'Études Médiévales 2, Paris 1974, 11-32.

Newton's atomism

For Newton's atomism and its background, see

442. Ted McGuire, *Philosophical Themes in Newton's Earlier Thought*, forthcoming, Dordrecht 1983.

Space- and time-atoms in twentieth-century physics

443. M. Čapek (119), 230-41,
 444. G.J. Whitrow (120), 200-5; 280-3,
 445. David Bohm, *Wholeness and the Implicate Order*, London 1980, 91-105,
 446. J.A. Wheeler, 'Superspace and the nature of quantum geometrical dynamics', in C.M. De Witt and J.A. Wheeler, eds., *Battelle rencontres 1967*, 242,
 447. M.L.G. Redhead, 'Wave-particle duality', *British Journal for the Philosophy of Science* 28, 1977, 72,
 448. V.S. Zidell, 'Some problems bearing on the concept of space-time quanta', *Physical Review D*, 23, 1981, 1221-6.

Infinitely divisible 'leaps' of motion and time

The Greek and Islamic texts are discussed by

449. S. Sambursky in S. Sambursky and S. Pines (111), 18-21,
 450. J. van Ess (434),
 451. H.A. Wolfson (81), 514-17,
 452. A. Nader, *Le Système philosophique des Mu'tazila*, Beyrouth 1956, 155-8; 182-7,
 453. Otto Pretzl, 'Die frühislamische Atomenlehre', *Der Islam* 19, 1931, 117-30.

The continuum: stopping and starting

My earlier discussion was

454. Richard Sorabji, 'Aristotle on the instant of change', *Proceedings of the Aristotelian Society* supp. vol. 50, 1976, 69-89, repr. with revisions in *AA*. vol. 3 (13).

A solution to the philosophical problem is proposed by

455. Brian Medlin, 'The origin of motion', *Mind* 72, 1963, 155-75.

There are relevant discussions of Aristotle on motion at an instant in

456. G.E.L. Owen (411),
 457. Sarah Waterlow, 'Instants of motion in Aristotle's *Physics* VI', forthcoming, *Archiv für Geschichte der Philosophie* 1983

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458. C.L. Hamblin, 'Instants and intervals', in J.T. Fraser, F.C. Haber, G.H. Müller, eds, *The Study of Time*, Berlin 1972, 327.

For mediaeval contributions to the problem see

459. Curtis Wilson, *William Heytesbury*, Madison Wisconsin 1956,
 460. Norman Kretzmann, 'Incipit/desinit', in P. Machamer and R. Turnbull, eds, *Motion and Time, Space and Matter: Interrelations in the History of Philosophy and Science*, Columbus Ohio 1976,
 461. Simo Knuuttila and Anja Inkeri Lehtinen, 'Change and contradiction: a fourteenth-century controversy', *Synthese* 40, 1979, 189-207,
 462. Walter Burley, *De primo et ultimo instanti*, ed. Herman and Charlotte Shapiro.

For the problem of reversing direction, see

463. A. Koyré, *Études d'histoire de la pensée philosophique*, Paris 1961, 63,
 464. H.A. Wolfson, *Crescas' Critique of Aristotle*, Cambridge Mass. 1929, 623-5,
 465. William A. Wallace, 'Galileo and Scholastic theories of impetus', in A. Maierù and A. Paravicini Bagliani (eds) *Studi sul XIV secolo in memoria di Anneliese Maier*, Rome 1981, 278.

The contributions of Brentano and Mendelssohn are discussed by

466. Roderick Chisholm, 'Beginnings and endings', in Peter van Inwagen, ed., *Time and Cause: Essays presented to Richard Taylor*, Dordrecht 1980.

Possibility

Discussions of possibility proved relevant in two contexts: (i) the idea that time, as something countable, will not exist where there is no possibility of counting, (ii) the idea that matter does not have a possibility, in Plato's fashion, of first being disorganised for an infinite time, and then being organised for an infinite time.

Aristotle de Caelo 1.12 on possibility

467. Jaakko Hintikka, *Time and Necessity*, Oxford 1973, ch. 5, 'Aristotle on the realisation of possibilities in time', revised from 'Necessity, universality and time in Aristotle', *Ajatus* 20, 1957, 65-90, which is reprinted in *Articles on Aristotle* (13), vol. 3,

468. C.J.F. Williams, 'Aristotle and corruptibility', *Religious Studies* 1, 1965, 95-107 and 203-13,
 469. Richard Sorabji (126a), ch. 8,
 470. Sarah Waterlow, *Passage and Possibility: a Study of Aristotle's Modal Concepts*, esp. ch. 4,
 471. Lindsay Judson, forthcoming in *Oxford Studies in Ancient Philosophy* 1, 1983.

See also

472. Suzanne Mansion, *Le Jugement d'existence chez Aristote*, Louvain 1946, 2nd ed., 1976.

Ancient disputes on possibility

473. Robert Sharples, *Alexander of Aphrodisias on Fate*, London 1983,
 474. Robert Sharples, 'An ancient dialogue on possibility: Alexander of Aphrodisias, *Quaestio* 1.4', *Archiv für Geschichte der Philosophie* 64, 1982, 23-38,
 475. Robert Sharples, 'Alexander of Aphrodisias, *Quaestiones* on possibility', with translations, forthcoming in two instalments, *Bulletin of the Institute of Classical Studies*, London 1982-3,
 476. Richard Sorabji, (126a), chs. 4, 6 and 8.