NATURAL SCIENCES TRIPOS Part II

Saturday 30 May 2009 9.00 to 12.00 Examination Halls, New Museums Site

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HISTORY AND PHILOSOPHY OF SCIENCE (1)

Classical Traditions in the Sciences

Before you begin read these instructions carefully:

Students taking **History and Philosophy of Science** *or* **Classics** *should answer* ***four*** *questions: answer* ***one*** *question chosen from* ***Section A*** *and* ***three*** *questions chosen from* ***Section B****.*

Begin each answer on a separate sheet.

Write legibly and on only **one** *side of the paper.*

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Paper 1: Classical Traditions in the Sciences

SECTION A

1. How far is the modern concept of science a distraction in the interpretation of ancient and pre-modern investigations?

2. How useful is it to conceptualise the history of ancient and pre-modern learning in terms of traditions?

3. Which was more important to the creation of knowledge before 1600—individuals, or institutions?

SECTION B

4. 'Greek science was purely speculative'. Discuss, using examples from at least three genres of ancient writing.

5. Homer and Hesiod were often cited by ancient natural philosophers. Why?

6. How did Mesopotamian scholarship adapt to the loss of indigenous rule in the mid-first millennium BC?

7. 'Greek science was for public discussion, while Mesopotamian scholars valued secrecy'. Discuss.

8. How would you account for the divergences in the aims, methods and results of those who studied the heavens in ancient Greece and China?

9. Tertullian asked 'What does Athens have to do with Jerusalem?' What role or roles did the various Christian sects give to Greek knowledge, and why?

10. **Either** (a) Describe and account for Arabic responses to the ancient Greek sciences.

    Or (b) 'The coming of Islam marked a radical break in Middle Eastern scientific ideas and practices'. Discuss.

11. What do shifting patterns of patronage reveal about the changing status of science in the Islamic Middle East?

12. **Either** (a) 'The word *instrument* has a variety of meanings, all clustered around the notion of tool or device. When we modify it to *scientific instrument*, we mean a device used to investigate nature qualitatively or quantitatively.' Discuss with reference to the period before 1650.

    Or (b) 'No medieval instrument was of much use to any practical profession except that of teaching astronomy.' Discuss.

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Wednesday 27 May 2009 9.00 to 12.00 Senate House

HISTORY AND PHILOSOPHY OF SCIENCE (2)

Natural Philosophies: Renaissance to Enlightenment

Before you begin read these instructions carefully:

*Answer **four** questions: answer **one** question chosen from **Section A** and **three** questions chosen from **Section B**.*

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Paper 2: Natural Philosophies: Renaissance to Enlightenment

SECTION A

1. The discovery of new knowledge or the recovery of old knowledge: which was more significant in early modern Europe?

2. Who practised natural philosophy and natural history in the eighteenth century?

3. What is to be learnt by considering the places where knowledge was investigated between 1550 and 1800?

SECTION B

4. Explain changes in collecting practices between 1550 and 1800.

5. **Either** (a) Why did Francis Bacon argue that government was a natural-philosophical concern?

   Or (b) What is the role of experimentation in Francis Bacon's method?

6. What powers did an occult philosopher have that a natural philosopher did not, and why?

7. 'The sciences themselves which have had better intelligence and confederacy with the imagination of man than with his reason, are three in number: astrology, natural magic and alchemy; of which sciences nevertheless the ends or pretences are noble' (Francis Bacon). Explain why Bacon's contemporaries would have agreed with his evaluation of the occult sciences.

8. **Either** (a) What material resources did early modern experimenters use to convince their audiences?

   Or (b) How did early modern instrument makers promote their instruments?

9. 'With the most exact care and diligence to the rectifying the tables of the motions of the heavens, and the places of the fixed stars, so as to find out the so-much-desired longitude of places for the perfecting the art of navigation' (Charles II, Royal Warrant for the founding of Greenwich Observatory, 1675). Was navigation 'perfected' at astronomical observatories?

10. The Kangxi Emperor has been criticised for failing to introduce Western science into China. How far is this criticism justified?

11. **Either** (a) What were Linnaeus' proposals for the reform of botany? How far did they succeed?

    Or (b) What did eighteenth-century natural historians mean by 'generation' and why did the topic attract so much interest?

12. **Either** (a) ‘All revolutionary advances in science may consist less of sudden and dramatic revelations than a series of transformations, of which the revolutionary significance may not be seen (except afterwards, by historians) until the last great step’ (I. Bernard Cohen). Did Isaac Newton take the last great step of the Scientific Revolution?

Or (b) Should Joseph Banks be celebrated as a great hero of Enlightenment science?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Thursday 28 May 2009 13.30 to 16.30 Examination Halls, New Museums Site

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HISTORY AND PHILOSOPHY OF SCIENCE (3)

Science, Industry and Empire

Before you begin read these instructions carefully:

*Answer **four** questions: answer **one** question chosen from **Section A** and **three** questions chosen from **Section B**.*

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Paper 3: Science, Industry and Empire

SECTION A

1. ‘There can be no general history of nineteenth-century science, but only particular histories of the sciences of various nations’. Discuss

2. Was a secular worldview implicit in the nineteenth-century natural sciences?

3. How did the places where scientific knowledge was produced change during the nineteenth century?

SECTION B

4. Did late-eighteenth and early-nineteenth century European geology destroy the possibility that the Book of Genesis could be read as a history of the Earth?

5. Were natural historical disciplines such as zoology, botany, stratigraphy and anthropology more likely than the physical sciences to have been shaped by an engagement with empire?

6. Are ‘colonial science’ and ‘imperial science’ necessarily the same thing?

7. ‘The differences between the various kinds of nineteenth-century laboratory mattered more than the similarities’. Discuss.

8. How did education and entertainment co-exist in Victorian museums and exhibitions?

9. **Either** (a): Did Charles Darwin’s theory of evolution by natural selection owe most to his reading of William Paley, Thomas Malthus or Charles Lyell?

   Or (b) By 1900, to what extent did scientific theories of evolution challenge the ideas expressed in Charles Darwin’s published works?

10. How was scientific experimentation represented in nineteenth-century novels?

11. Nineteenth-century Biblical archaeology: imperial adventure or empirical science?

12. **Either** (a) ‘There is in the negro that assemblage of evidence which would induce an unbiased observer to make the European and negro distinct species’ (James Hunt, 1863). How representative was this view of broader scientific attitudes towards race in the nineteenth century?

    Or (b) How were the methods of studying race affected by shifting definitions of race during the nineteenth century?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Thursday 28 May 2009 9.00 to 12.00 Senate House

HISTORY AND PHILOSOPHY OF SCIENCE (4)

Metaphysics, Epistemology and the Sciences

Before you begin read these instructions carefully:

*Students should answer **four** questions: answer **one** question chosen from **Section A** and **three** questions chosen from **Section B**.*

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Paper 4: Metaphysics, Epistemology and the Sciences

SECTION A

1. Is there any significant difference between scientific knowledge and everyday knowledge?

2. In what sense, if any, does science make progress?

3. Do different sciences need different philosophies of science?

SECTION B

4. Can induction be justified inductively?

5. Sketch the Bayesian treatment of Goodman's new riddle of induction. Does it work?

6. Do explanations have the form of arguments? If not, then what form do they have?

7. **Either** (a) Suppose you had a Book of All Knowledge, containing all information about actual, particular matters of fact. Would it be possible to deduce the laws of nature from that information?

   Or (b) What is the most serious problem for counterfactual accounts of causation? Does it have a solution?

8. **Either** (a) What is the tautology problem? Is it a problem?

   Or (b) What, if anything, can evolutionary theory contribute to our understanding of ethics?

9. What is superposition?

10. What is gained by talking of paradigms rather than theories, experiments or research programmes?

11. What role does Quinean confirmational holism play in the indispensability argument?

12. 'Although we could say that cats *might turn out* to be demons, of a certain species, given that cats are in fact animals, any cat-like being which is not an animal, in the actual world or in a counterfactual one, is not a cat' (Saul Kripke). Discuss.

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Wednesday 27 May 2009 9.00 to 12.00 Senate House

HISTORY AND PHILOSOPHY OF SCIENCE (5)

Science and Technology Studies

Before you begin read these instructions carefully:

*Answer **four** questions: answer **one** question chosen from **Section A** and **three** questions chosen from **Section B**.*

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Paper 5: Science and Technology Studies

SECTION A

1. What constitutes scientific expertise?

2. Does society shape technology or vice versa?

3. Science and technology are human activities. How, if at all, should this affect our attitude to scientific knowledge and technological achievements?

SECTION B

4. What role should 'reality' play in sociological explanations of scientific knowledge?

5. 'Scientific facts are like trains, they do not work off their rails.' Discuss the relationship between scientific knowledge and technology.

6. **Either** (a) Is there an important ethical distinction between medical treatment and enhancement?

   Or (b) Critically assess Boorse's theory of disease.

7. Does mathematics have a social geography?

8. Can anthropology make a useful contribution to the debate over mathematical Platonism?

9. **Either** (a) 'Science journalism is always either bad science or bad journalism.' Discuss.

   Or (b) 'The scientific paper in its orthodox form does embody a totally mistaken conception, even a travesty, of the nature of scientific thought' (P. Medawar). Discuss in relation to the conventions of science communication.

10. 'Designers of reproductive technologies have always treated women like animals.' Assess this claim.

11. 'The oral contraceptive pill initiated a reproductive revolution in which women could for the first time control their fertility.' Evaluate the evidence for and against this claim.

12. Which kinds of facts, if any, can support the claim that we should preserve the rainforests?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Friday 29 May 2009 9.00 to 12.00 Wesley Church, King Street

HISTORY AND PHILOSOPHY OF SCIENCE (6)

History and Philosophy of Mind

Before you begin read these instructions carefully:

*Answer **four** questions: answer **one** question chosen from **Section A** and **three** questions chosen from **Section B**.*

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Paper 6: History and Philosophy of Mind

SECTION A

1. How useful have science fiction scenarios been for understanding the mind?

2. What problems does studying the mind raise which studying the liver does not raise?

3. Should the sciences of the mind be evaluated more by what they do (their practices) than by what they say (their ideas)?

SECTION B

4. Is it any more puzzling that mental events have causal powers than that physical ones do?

5. Were you ever a foetus?

6. Do the functional similarities between a notebook and biological memory show that a fluently-deployed notebook is part of your mind?

7. Did the 1960s anti-psychiatry movement have any important consequences for current psychiatry?

8. Why was Freud regarded as an ally of liberal sexual reformism in the early twentieth century but by the late twentieth century had become 'beyond question the strongest individual counterrevolutionary force in the ideology of sexual politics' (Kate Millett, 1970)?

9. 'Whatever Freud's increasingly contested stature as a scientist, doctor or cultural critic, his greatest achievement was as the entrepreneur who started the therapy industry'. Discuss.

10. What would your computer need to do to convince you it was conscious?

11. 'Representation implies the possibility of misrepresentation, so any theory of representation must also explain misrepresentation'. Discuss.

12. How important was statistics to British psychology from 1869 on?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Monday 1 June 2009 13.30 to 16.30 Wesley Church, King Street

HISTORY AND PHILOSOPHY OF SCIENCE (7)

Medicine from Antiquity to the Enlightenment

Before you begin read these instructions carefully:

Students taking **History and Philosophy of Science** *should answer* ***four*** *questions: answer* ***one*** *question chosen from* ***Section A*** *and* ***three*** *questions chosen from* ***Section B****.*

Students taking **Biological and Biomedical Sciences** *should answer a total of* ***three*** *questions, all of them chosen from* ***Section B****. Do not answer any questions from* ***Section A****.*

Begin each answer on a separate sheet.

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Paper 7: Medicine from Antiquity to the Enlightenment

SECTION A

1. Is the history of medicine before 1750 best understood as a history of diseases, practitioners or patients?

2. How much do we know about women as both medical practitioners and patients between Antiquity and the Enlightenment?

3. Explain the greatest changes and the greatest continuities in medicine from Antiquity to the Enlightenment.

SECTION B

4. How can we know what Mesopotamian medical practitioners actually did?

5. Did ancient Greek medical treatments work?

6. Was there a conflict between 'Hippocratic' and 'temple' medicine in the Greek world?

7. 'Anatomical dissection contributed nothing to medical knowledge'. Assess whether this statement accurately applies to Greco-Roman antiquity and/or Renaissance Europe.

8. **Either** (a) Compare and contrast responses to leprosy and the plague in the Middle Ages.

   Or (b) To what extent was access to medieval healthcare determined by social and economic factors?

9. In medieval Europe, doctors healed the body and clerics healed the soul. Is this an accurate summary?

10. To what extent were changes in medical communication between 1375 and 1640 driven by technological innovations?

11. **Either** (a) Were changes in medicine in early modern Europe patient or practitioner led?

    Or (b) Was there a medical revolution in early modern Europe?

12. 'The whole have no need of a physician, but that they are sick' (Matthew 9:12). How would an early modern author of a treatise on diet explain this well-known passage from the Bible to his readers?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Monday 1 June 2009 9.00 to 12.00 Senate House

HISTORY AND PHILOSOPHY OF SCIENCE (8)

Modern Medicine and Biomedical Sciences

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Paper 8: Modern Medicine and Biomedical Sciences

SECTION A

1. How has the modern medical profession used science?

2. 'Medical technologies are frozen social relations'. Assess this claim for nineteenth- and twentieth-century medicine.

3. In what ways can modern medicine be said to have changed human bodies?

SECTION B

4. How and why did diagnosis of 'T.B.' in the late nineteenth century differ from that of 'consumption' in the late eighteenth century?

5. How did nineteenth-century surgeons make a place for themselves in the medical profession? How was this place gendered?

6. 'See much'. In what ways, and to what extent, did the visual gain importance in nineteenth-century medicine?

7. **Either** (a) To what extent was the National Health Service the result of popular demand?

   Or (b) How was the making of molecules into agents and targets of therapeutics bound up with the reorganization of medicine in the mid-twentieth century?

8. 'Psychiatry has always aspired to be like other branches of medicine, offering accurate diagnosis and effective treatment, but has usually ended up as a form of restraint – moral, legal, mechanical or chemical'. Discuss.

9. In what ways was the hospitalization and associated medicalization of British birth challenged, and how successful were these challenges?

10. **Either** (a) 'Cancer was Western biomedicine's Vietnam'. Assess this claim.

    Or (b) 'The medical establishment has become a major threat to health' (Ivan Illich). Contextualize this claim.

11. Account for the introduction into modern international sport of **either** gender tests **or** doping tests.

12. How do the principles and actions of medical humanitarian organizations compare with other approaches to global healthcare?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Saturday 30 May 2009 9.00 to 12.00 Examination Halls, New Museums Site

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HISTORY AND PHILOSOPHY OF SCIENCE (9)

Images of the Sciences

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Paper 9: Images of the Sciences

SECTION A

1. How have images of science been shaped by politics?

2. How has the philosophy of science responded to developments in the sciences?

3. How have practitioners of the sciences used the histories of their sciences?

SECTION B

4. 'The medium is the message' (Marshall McLuhan, 1964). Do you agree?

5. **Either** (a) Why does Locke distinguish between real and nominal essence, and is he right to do so?

   Or (b) Is Hume a sceptic or a realist concerning causation?

6. **Either** (a) Is Kant's account of space defeated by the discovery of non-Euclidean geometries?

   Or (b) Discuss Kant's account of the roles laws play in our knowledge of nature.

7. Contrast the views on the aims of science of **either** William Whewell and John Stuart Mill **or** Ernst Mach and Pierre Duhem.

8. How did logical positivism differ from earlier forms of empiricism?

9. **Either** (a) Is the history of science the history of errors? Discuss in relation to the work of Bachelard and/or Foucault.

   Or (b) Did natural philosophers see the world differently from modern scientists? Discuss with reference to the work of one or more of the following: Metzger, Koyré, Bachelard.

10. Are evolutionary metaphors useful for illustrating the nature of scientific progress?

11. Compare and assess the accounts of scientific discovery offered by social interest theory and actor network theory.

12. What difficulties do historians of science face in providing large-scale accounts of the development of the sciences?

END OF PAPER