

NATURAL SCIENCES TRIPOS Part II

Wednesday 26 May 2010

9.00 to 12.00

Wesley Church, King Street

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.*

Answers must be tied up in separate bundles, marked 1, 2, 3, etc. according to the number of the question.

*Attach a completed coversheet to each bundle and complete a master coversheet listing all questions attempted. It is essential that you write your examination number and **not** your name on the coversheet and on **each** bundle.*

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Paper 1: Classical Traditions in the Sciences

SECTION A

1. “The main obstacle to comparing and contrasting ancient scientific cultures is the difficulty of generalising about any of them.” Discuss.
2. How did knowledge travel before 1600 AD?
3. Does the notion of “tradition” help or hinder historians of early science?

SECTION B

4. What role did opinions play in explanations of nature in ancient Greece and Rome?
5. Ancient Greek and Roman authors wrote about natural philosophy and/or mathematics in a variety of types of texts. Why?
6. “Ancient Greek cosmologists tended to focus on substances, Chinese ones on processes.” Discuss.
7. **Either** (a) How did institutional context affect the aims and practices of Assyrian and Babylonian scholarship?
Or (b) Does Assyrian extispicy (liver divination) belong to the history of science? Why?
8. Why did ancient Greek science matter in 9th-century Baghdad?
9. Why did the locus of astronomical observation shift from the caliphal court to the mosque after the 10th century AD?
10. **Either** (a) How were the natural philosophical and mathematical traditions in Arabic science reconciled in the “solution” of the rainbow?
Or (b) What were the most important aspects of Alhazen’s scientific legacy?
11. What was the identity of natural philosophy in medieval and early modern Europe? Does it matter?
12. Do you agree with Francis Maddison that “with the possible exception of the mechanical clock and the compass, instruments did not have practical uses in the Middle Ages”?

END OF PAPER

HISTORY AND PHILOSOPHY OF SCIENCE (2)

Natural Philosophies: Renaissance to Enlightenment

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 2: Natural Philosophies: Renaissance to Enlightenment

SECTION A

1. Was enlightenment science an imperial activity?
2. “From the secrets of nature to public knowledge.” Is this a fair characterisation of shifts in early modern natural knowledge?
3. Who was viewed as revolutionary in early modern natural philosophy, and why?

SECTION B

4. “The Antechapel where the Statue stood
Of Newton with his prism, & silent face,
The marble index of a mind for ever
Voyaging thro’ strange seas of Thought, alone.”
(William Wordsworth, *The Prelude*, 1850).

Was Newton a lone voyager?
5. Is it useful to characterise the Jesuit mission to China in the 17th and 18th centuries as an attempt to transmit western science to China?
6. **Either** (a) “The manipulations of art are like the bonds and shackles of Proteus, which reveal the ultimate strivings and struggles of matter” (Francis Bacon). On what grounds did Bacon propose that artifice could produce natural philosophical knowledge?

Or (b) “Truth is the daughter of Time” (Francis Bacon). What role did notions of progress play in Bacon’s reformation of knowledge?
7. “Astrologers write books and alchemists make gold.” Is this description accurate for the period 1500–1700?
8. **Either** (a) Who made instruments between 1550 and 1800, and for what reasons?

Or (b) What were the functions of private and public collections of natural history and scientific artefacts in early modern Europe?
9. **Either** (a) Why was natural history important to rulers and governments in the 18th century?

Or (b) How and why did 18th-century naturalists pursue natural as opposed to artificial classifications of living beings?

TURN OVER/

10. **Either** (a) Did the occult arts have a greater impact on experimental practices or on philosophical ideas?
- Or** (b) Is hermeticism the foundation of experimental philosophy?
11. Did natural philosophers participate in a republic of letters in early modern Europe?
12. **Either** (a) How was experimental expertise demonstrated in the 17th and 18th centuries?
- Or** (b) Where and how were proposed solutions to the problem of longitude trialled?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Thursday 27 May 2010

13.30 to 16.30 Wesley Church, King Street

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. “Historians of nineteenth-century science, for all their gestures to social history, continue to focus on a handful of individuals, usually men.” Is this the case? If so, does it matter?
2. “Any attempt to understand the history of nineteenth-century European science without taking the experience of empire into account is bound to fail.” Do you agree?
3. “The history of nineteenth-century science is a history of learned societies and laboratories.” Discuss.

SECTION B

4. Does the fact that Charles Darwin derived his central metaphor in the *Origin of Species* from Thomas Malthus make his book ideological rather than scientific?
5. In what ways did the novel function as a site of experimentation in the nineteenth century?
6. What did Biblical Assyria have to contribute to nineteenth-century scientific debates?
7. **Either** (a) What does the design of a scientific instrument tell historians about places and cultures of scientific activity? Use examples from the nineteenth century.
Or (b) Was the microscope an important feature of European laboratories in the nineteenth century? Why (not)?
8. “During the nineteenth century, science became more inaccessible to the public in laboratories and other specialized sites, at the same time that it became more accessible through new forms of communication, entertainment and active participation.” Discuss.
9. Why might the historical idea of a “Darwinian Revolution” in nineteenth-century life science be both mythological and misleading?
10. Nineteenth-century changes in the methods used to study race are best described as the abandonment of books in favour of bodies. Discuss.
11. **Either** (a) What role did scientific maps and mapping have as tools of empire in the nineteenth century?

TURN OVER/

Or (b) Is “Humboldtian science” a useful concept for historians?

12. Why was the word “scientist” so rarely used in Britain until the very end of the nineteenth century?

END OF PAPER

HISTORY AND PHILOSOPHY OF SCIENCE (4)

Metaphysics, Epistemology and the Sciences

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Paper 4: Metaphysics, Epistemology and the Sciences

SECTION A

1. Are there any good arguments for scientific realism?
2. Is there a scientific method?
3. “Scientists would be better at science if they knew more philosophy.” Do you agree?

SECTION B

4. Is there a non-circular justification for induction? Should we be worried if there isn't?
5. How does probability theory contribute to understanding confirmation in science?
6. Do explanations do anything more than make what was surprising seem more familiar?
7. Is the nomic necessitation theory of laws just a new name for the problem it is meant to solve?
8. Critically assess the selected effects account of biological functions.
9. **Either** (a) “Evolutionary theory is no more relevant to ethics than is particle physics.” Discuss
Or (b) “Adaptationism and Intelligent Design theory share the same fate: neither counts as science, or both do.” Discuss.
10. What's puzzling about the role of observation in the double-slit experiment?
11. Can a scientific realist be a mathematical nominalist?
12. “The categories of negligence are never closed” (Lord MacMillan in *Donaghue v Stevenson*, 1932). Can the same be said of categories in science?

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Monday 31 May 2010

9.00 to 12.00

Senate House

HISTORY AND PHILOSOPHY OF SCIENCE (5)

Science in Society

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 5: Science in Society

SECTION A

1. Who controls science?
2. “Any technology sufficiently advanced is indistinguishable from magic.” Discuss.
3. What are the advantages and disadvantages of the metaphor of “construction” for the sociology of scientific knowledge?

SECTION B

4. Should the same types of cause be cited to explain true and false beliefs?
5. Do numbers have a social life?
6. “What people choose to count and measure reveals what they want to control.” Discuss.
7. “Reproductive technologies have all been controversial in essentially the same ways.” Discuss.
8. What considerations might have led a nineteenth-century woman to accept the presence of a man-midwife at the birth of her child?
9. Is “popular science” a useful analytical category?
10. What makes a scientific or medical report newsworthy?
11. **Either** (a) “Gender matters to science, but the gender of scientists doesn’t.” Discuss.

Or (b) Mary Somerville wrote, “I have perseverance and intelligence but no genius, that spark from heaven is not granted to the sex.” Why are there so few women in the history of science?
12. Should the use of genetic information attract special ethical concern?

END OF PAPER

HISTORY AND PHILOSOPHY OF SCIENCE (6)

History and Philosophy of Mind

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 6: History and Philosophy of Mind

SECTION A

1. “The mind is not a thing.” Discuss.
2. Can the mind fall ill?
3. Was the body more important than the mind in the development of psychological thinking?

SECTION B

4. Does survival sometimes matter more than identity?
5. Strange Sam laughs and smiles when he is tortured, and winces and yells when he is tickled. When does Strange Sam feel pain?
6. “Scepticism about the external world is ridiculous, but scepticism about other minds is reasonable.” Discuss.
7. **Either** (a) In what sense, if any, are thoughts relations to what they represent?
Or (b) “If intentionality is real, it must really be something else.” Discuss.
8. **Either** (a) “In the twenty first century, we should acknowledge that physicalism is obviously true; the arguments against it are philosophers’ toys.” Discuss.
Or (b) Is there a tenable version of non-reductive physicalism?
9. Was the idea of normal development central to psychological thinking in Britain after 1869?
10. From a historical view point, what are the main differences between the concepts of “delusion” and “hallucination”?
11. **Either** (a) “[T]here are no indications of reality in the unconscious, so that one cannot distinguish between truth and fiction that has been cathected with affect” (Sigmund Freud, 1897). What were the implications of this discovery?
Or (b) Why was psychoanalysis so influential?
12. **Either** (a) “The cure for all ills is: (a) indiscriminate sexual intercourse; (b) autobiography” (W.H. Auden, *Psychology and Art To-Day*, 1935). Discuss.
Or (b) What was the significance of psychoanalysis when viewed against the broad history of feminism?

END OF PAPER

HISTORY AND PHILOSOPHY OF SCIENCE (7)

Medicine from Antiquity to 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 Enlightenment

SECTION A

1. “There was little to choose between those who treated diseases as natural and those who treated them as caused by supernatural powers.” Discuss in relation to the period before 1750.
2. Was medicine an experimental science before 1700?
3. How, if at all, did experiences of illness and healing change from Antiquity to the Enlightenment?

SECTION B

4. Who wrote about medicine in ancient Mesopotamia, and why?
5. **Either** (a) “Greek doctors were more concerned with etiquette than with morality.” Discuss.
Or (b) “The perception of dissection as cruel, irrelevant and unnecessary helps to explain the decline of Alexandrian anatomy.” Discuss.
6. **Either** (a) Discuss how different types of Greek healers exploited the ambivalence of such terms as *katharsis* (“purification”, “purgation”) and *pharmaka* (drugs, poisons, spells).
Or (b) What do we mean by “early Byzantine medicine”, and what reasons are there for distinguishing it from Classical Greek/Hellenistic medicine?
7. “Women’s health was women’s business.” Does this apply equally to medicine in Classical Antiquity and early modern Europe?
8. **Either** (a) How different were the roles of the physician and the priest in medieval Europe?
Or (b) Was Charles Singer mistaken in characterising Anglo-Saxon medicine as “irrational”?
9. **Either** (a) How did understandings of the body shape attitudes towards healing in medieval Europe?
Or (b) Were lepers outcasts in the Middle Ages?
10. Why did printed books have such limited impact on medicine from 1450 to 1640?

TURN OVER/

11. **Either** (a) Describe the early modern medical marketplace from an early modern patient's point of view.
- Or** (b) Which changed medicine more, the plague or the discovery of the new world?
12. What was the secret to a long and healthy life in early modern Europe?

END OF PAPER

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. “Modern medical science has not taken a unified approach to the body in health and disease. It has rather taken a heterogeneous collection of often frankly contradictory approaches that it sometimes suits medics to pretend are united by some inner logic.” Discuss.
2. “It does not much matter where diagnoses are determined; what matters is that they are correct.” Assess this claim for medicine since 1750.
3. How has the power of physicians and of patients to influence a diagnosis changed since 1750?

SECTION B

4. “If the ‘clinical gaze’ was really the crucial invention of the Paris Hospital, it makes no sense that the stethoscope became its emblematic instrument.” Discuss.
5. According to Victorian public health reformers, did poverty cause disease, or disease cause poverty? Why did they argue as they did?
6. **Either** (a) Was there a “bacteriological revolution” in late nineteenth-century medicine?
Or (b) How and why did English “ague” become tropical “malaria”?
7. Who benefited more from nineteenth-century innovations in surgical technique—surgeons or their patients?
8. How did the making of penicillin as an effective antibiotic differ from the earlier introduction of insulin as a therapy for diabetes?
9. **Either** (a) Why did late twentieth-century debates over cancer treatment become part of a critique of Western biomedicine? How effective was this critique in changing patients’ experiences?
Or (b) Who has benefited most from the regulations controlling the use of human beings in medical experiments that have been introduced since World War II?
10. “Psychiatry may aspire to be an ordinary medical specialty but can never be because it has been from its inception, and continues to be, determined by the narrow constraints of the law, by the vagaries of State power and by the desire of the psychiatrist to exert moral mastery over the patient.” Assess this claim.

TURN OVER/

11. Why did hospital birth become “normal birth” in twentieth-century Britain?
12. “The world didn’t have to eliminate poverty in order to eliminate smallpox—and we don’t have to eliminate poverty before we reduce malaria. We do need to produce and deliver a vaccine—and the vaccine will save lives, improve health and reduce poverty” (Bill Gates to the World Health Assembly in 2005). Discuss in relation to postwar approaches to global health.

END OF PAPER

NATURAL SCIENCES TRIPOS Part II

Thursday 27 May 2010

9.00 to 12.00

Senate House

HISTORY AND PHILOSOPHY OF SCIENCE (9)

Images of the Sciences

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Paper 9: Images of the Sciences

SECTION A

1. To what extent can philosophies of the sciences be regarded as ideologies?
2. How have practitioners of the sciences used history?
3. Can the pursuit of science ever be entirely pure and disinterested?

SECTION B

4. **Either** (a) Is Locke's distinction between real and nominal essence defensible?

Or (b) Does Berkeley succeed in his attempt to refute "skepticism, atheism and irreligion"?
5. Did Hume believe in the existence of external objects?
6. **Either** (a) How did Kant justify induction?

Or (b) "There will never be a Newton of the grass blade" (Immanuel Kant). Discuss.
7. How and why did the logical positivists seek to purge science of metaphysics?
8. How far are historians of science entitled to use concepts and knowledge not possessed by those whose activities they study?
9. In what senses, if any, do the sciences evolve?
10. The history of the sciences, according to both Bachelard and Foucault, has the form of a series of discontinuities. Evaluate this view of revolutions in the sciences.
11. Does the historian of science need to study the history of other disciplines? Discuss with reference to the work of Hélène Metzger and Alexandre Koyré
12. **Either** (a) Photography is like "an artificial retina placed by Daguerre at the disposal of physicists" (Jean Baptiste Biot, 1839). Discuss.

Or (b) Is photography an art or a science?

END OF PAPER