NST Part II, History and Philosophy of Science
Senior Examiner's Report 2017

Twenty-four candidates sat the HPS Pt II examination in 2017, seven fewer than sat the exam in 2016, and a long way below the numbers seen from 2011 to 2014, when around forty took the tripos. Just six Pt II papers were offered this year, a further reduction on the eight papers offered in 2015-16, itself a reduction on the ten papers offered in 2014-15.

The great majority of students (19/24) took option A (three exam papers, primary source essays and a dissertation); that said, the proportion of students (24%) choosing option B (no dissertation) is the highest since 2013. As Table 1 shows, 50% of the students received firsts. This is the highest proportion of students to receive firsts in recent years. Further investigation would be needed to determine if it is the highest ever.

Year	First	Upper Second	Lower Second	Third	Deserved Honours	Total	A	B
2017	12	11	—	1	—	24	19	5
2016	12	17	2	—	—	31	25	6
2015	12	12	1	—	—	25	20	5
2014	15	23	2	—	—	40	33	7
2013	7	29	4	—	—	40	27	13
2012	16	19	1	—	1	37	23	14
2011	11	25	3	—	—	39	28	11

Table 1. Distribution of HPS Part II marks, 2011-16

The HPS Part II Examiners also mark the papers for BBS candidates, and pass the results to the BBS Examining Board where the candidates are classed. 4 candidates sat the paper 'Early Medicine' (Minor Subject 113), and 9 candidates took the paper 'Modern Medicine and Biomedical Sciences' (Minor Subject 114). 8 of the 13 candidates achieved Upper Seconds, but there were also some strong first-class performances, and the two BBS candidates submitting dissertations did particularly well.

Eleven students completed the new Philosophy and Ethics of Medicine (PEM) BBS Minor Option (45), the successor to the now defunct History and Ethics of Medicine paper. This represented a welcome increase in numbers from the five students who took the paper in HEM's last year, but it remains well short of the larger numbers taking HEM in 2011 and 2012. Their performances are tabulated below, compared with old data from HEM performances.

Year	First	Upper Second	Lower Second	Third	Fail	Total
2017 (PEM)	4	7	0	0	0	11
2016 (HEM)	3	2	0	0	0	5
2015 (HEM)	3	7	2	0	0	12
2014 (HEM)	2	10	3	0	0	15
2013 (HEM)	7	11	2	1	1	22
2012 (HEM)	5	26	2	0	0	33
2011 (HEM)	7	18	5	1	0	32

Table 2. Distribution of PEM/HEM marks, 2011-17

Three Psychological and Behavioural Sciences Tripos (PBS) candidates also took the Modern Medicine and Biomedical Sciences Paper, and three candidates from Human,

Social and Political Sciences (HSPS) borrowed paper 6 (Ethics and Politics of Science and Technology).

Class and mark distributions
The class and mark distributions for each paper are given in Table 3. There were some quite striking differences in the numbers of candidates taking each paper, ranging from just 3 sitting Paper 1 to 22 (almost the whole cohort) sitting Paper 4. Generally speaking examiners showed willingness to use the full range of marks, and mean and median marks are in broad agreement across the six papers.

Paper	First	Upper Second	Lower Second	Third	Fail	Total	Max	Mean	Median
PS Essays (combined mark)	14	9	0	1	0	24	80	69.4	70.5
Dissertation	9	9	1	0	0	19	83	73.5	69
P1 Early Science and Medicine	1	2	0	0	0	3	71	68.7	69
P2 Sciences in Transition	3	3	1	0	0	7	76	68.3	69
P3 Science, Medicine and Empire	5	7	0	0	0	12	72	68.4	69
P4 Science, Medicine and Technology Since 1900	8	11	2	1	0	22	78	66.3	67
P5 Philosophy of Science	3	8	0	1	0	12	80	67.2	67.5
P6 Ethics and Politics of Science, Technology and Medicine	10	10	1	0	0	21	76	68.1	69

Table 3. Class distributions per paper. Previous senior examiners have listed minimum marks, but this practice has not been followed this year in consideration of individual privacy.

Considering class distributions by gender, men and women candidates performed comparably. As Table 4 shows, considerably more women than men (17 compared with 7) took HPS Part II, and a higher fraction of women received firsts than men (9/17 compared with 3/7). The overall mean mark for women was lower than that for the men (67.98 compared with 69.2), but the disparity is removed if the women's average is calculated without the single third-class mark.

	Firsts		Upper Seconds		Lower Seconds		Total		Total candidates
	M	F	M	F	M	F	M	F	
2017	3	9	4	7	0	0	7	17	24
2016	5	7	8	9	1	1	14	17	31
2015	4	8	6	6	1	0	11	14	25
2014	7	8	10	13	1	1	18	22	40
2013	6	1	12	17	1	3	19	21	40
2012	8	8	8 or 9	11 or 12	0 or 1	0 or 1	20	17	37

Table 4. Distribution of class marks by gender. Note: the 2012 Senior Examiner's Report does not record gender data for Upper Seconds and Lower Seconds.

Examining practice

As has been the case for some time, examination questions were set during Lent Term, following consultation with supervisors, lecturers and paper managers. The External Examiner—Rachel Cooper, serving in her first year—also provided valuable feedback on all of the questions. In response to last year's senior examiner's report, a renewed effort was made to ensure that, on the one hand, exam questions were not word-for-word repeats of questions widely answered in supervisions, while on the other hand making sure that questions were properly supported by supervisions and lectures. This year papers featured 9 Section B questions (one more than in previous years) and 3 Section A questions.

Marks for individual papers were entered into pre-circulated spreadsheets, allowing easier analysis of data and collation for final classification. All elements of the course were blind double-marked, and examiners met to agree on final marks. In all cases this year agreement was reached without difficulty, meaning that the external examiner was not overly burdened. The external examiner was asked to verify that the agreement reached was reasonable in cases where there were significant divergences in original marks. The external examiner was also asked to review a range of marks across boundaries and in the middle of class ranges for all of the exam papers and for the primary sources and dissertations. Finally, the external examiner also looked at the overall marks of individual candidates who sat on class boundaries, and at the overall marks of candidates who appeared to have single marks that were anomalously low.

The examiners noted that it would be possible and desirable, especially in the case of primary sources taken by large numbers of students, to check on the relative calibration of different examining pairs by comparing average marks for each primary source prior to the final examiners' meeting.

The examinations themselves generally went very smoothly, and no significant problems were reported with either the conduct of exams or the collection of scripts. The increasing number of single papers on offer, shared in various combinations with a variety of other triposes, opens up several possibilities for confusion, delayed reporting and other mishaps. In the end all went smoothly, but a future senior examiner may wish to develop a more standardised set of procedures for reporting marks to BBS, PBS and HSPS triposes. There was a further confusion this year concerning a history candidate who was mistakenly enrolled in the wrong HPS examination, but colleagues from History and HPS found a suitable solution to this problem. More generally the examiners acted with great efficiency, as did David Thompson, Tamara Hug and the external examiner.

Comments on performance
Dissertations

As mentioned above, the majority of students chose to write a dissertation. The overall performances of students taking the two options (dissertation versus four examination papers) were more or less identical: Option A students got an average of 68.4, compared with 68.5 for the Option B students. That said, the average dissertation mark was 73.5, considerably higher than the overall final mark average of 68.4. So while students taking dissertations did not perform any better on average than those taking Option B, there is some evidence that choosing the dissertation may have boosted the mark of the Option A students.

Primary Source Essays
Table 3 above gives general information about primary source performance, table 5 below breaks down performance by source.

	Firsts	*Upper Seconds*	*Lower Seconds*	*Total Candidates*
World Conservation Strategy	3	2	0	5
Doha Declaration	1	2	0	3
DSM-5	5	6	0	12
Duhem	3	1	0	5
Science and Print in Colonial India	5	4	0	9
Board of Longitude	3	2	0	5
Nilsson's Photograph	3	5	1	9

Table 5. Primary Source Essay Distributions

The DSM-5 source was the most popular, the Doha Declaration the least so, but a decent number of students chose each of the sources. Performance in general was very strong indeed, with very few marks below the Upper Second threshold, an overall average mark (69.4) in excess of the average mark for exam papers, and several essays scoring into the high 70s or low 80s. In some cases (for example, the Duhem source) there were missed opportunities for detailed exegetical work. While strong, the approaches taken in the context of, for example, the DSM source tended to be more uniform than the varied approaches taken to (e.g.) the Nilsson source. As usual, the very best essays offered perspectives that were both fresh and tightly focused.

Unseen papers

Comments follow on individual exam papers:

Paper 1
The three students who sat this exam performed well overall, and some gave remarkably ingenious answers to individual questions, showcasing a good knowledge of the secondary literature, and of the major issues of the historiography. It is difficult to say more on the responses to the individual questions because only three students took this paper. Question 9 was highly popular with the students, and elicited thoughtful answers about the potential sources of social historians of medicine. Questions 10 and 11 were also popular, and the answers contained cogent analyses of exchanges of medical and scientific knowledge, and of the medical marketplace. The lack of responses to Questions 2 and 5-8 is probably statistical noise, and cannot be interpreted in such a small sample.

Paper 2
Students taking Paper 2 showed a robust performance overall. The best of them exhibited a remarkable breadth of knowledge, while less successful papers sometimes failed to connect and synthesise the different strands of literature discussed. Remarkably, almost all students opted to answer Question 2 (on travel), only one student answered Question 3 (on changes to natural philosophy) and none responded to Question 1 (on the effect of natural theology). Responses to Question 2 ranged from

the excellent to the satisfactory, with some students not having enough time to properly complete their answers. Question 5 on occultism was also highly popular, and elicited highly cogent explanations of its importance for early modern science. Question 11 was also popular, and the best students answering it showed a good awareness of the Linnaeus-Buffon controversy, and made good use of Sloan's seminal work in the area. The other Questions received less than three responses each, Questions 7, 9, 10 and 12 received one answer only.

Paper 3
Only one person answered questions 2, 8, and 10; no one answered question 12 (on physics and the senses); questions 4 (on hospitals and laboratories as sources of knowledge) and 9 (Humboldtian science) were very popular.

A common issue with question 1 (on gender, class and careers) was that candidates tended to focus their discussion on gender and medicine, but often neglected issues of class and science (and tended to read "gender" as "women"). In answering question 3 candidates tended to focus on the spread of Western science without mentioning the agency of indigenous populations in non-Western places. With question 4, candidates had a good handle on the Paris Clinic and germ theory, but discussing/comparing the hospital and laboratory in a way that made sense was more difficult; they occasionally struggled with defining "knowledge production." Many candidates writing on question 5 did not pay close attention to the question's specific focus on *why Victorians believed* religion and science were at war, instead immediately focusing on a description of debates over evolution. Question 9, on Humboldtian science, was generally well handled but people struggled to connect the placement of Humboldt within Romanticism to other aspects of "Humboldtian science." Question 11, on science and progress, encompassed a nice variety of strong responses.

Paper 4

Overall, this paper was handled well by the 22 candidates who sat it. Question 1 (on the political nature of science and medicine after WWII) was much the most popular Section A question (14 answers compared with 4 each for questions 2 and 3). It produced a broad range of responses, but few took the time to consider carefully the various meanings of 'political', while many focused on a small set of not always particularly important cases. Responses to question 6 (on nuclear weapons), the most popular Section B question (17 answers), tended to cover the main points in a rather formulaic way, perhaps because the question reproduced half of a supervision question. Responses to question 4 ('How, and with what effects, did the work of laboratory scientists make its way outside the laboratory in the period 1900-1945'), the next most popular (12), revealed a lack of clarity in the question, which was rather large for Section B. Question 8 (11 answers, on social control) elicited some fine answers, though again, candidates found it hard to cover the full scope. Question 9 (10 answers, on clinical trials and agency) was also well answered, but several candidates strangely took unethical conduct as their only example of physicians' judgment. Answers to question 10 (6 answers, on public health and the cold war) were in many ways excellent, but also highly standardized.

Paper 5

The strongest answers tended to give detailed responses, using plenty of supporting

examples from scientific practice; conversely, the weaker answers often turned to platitudes unsupported by detail. Question 5, on personalised medicine, was answered by only one student. Questions were sometimes read in overly narrow ways: for example, question 6 ('In what sense, if any, has science made progress through reduction?') frequently attracted answers that showed the ways in which science had managed to make progress without reduction, without also considering whether reduction had sometimes aided progress. Question 7 (on truth as an explanation for success) was answered by several students. The best responses drew in detail on the work of specific authors, rather than relying on general unattributed considerations.

Paper 6

Only one person answered question 2 (on evidence-based medicine) and the vast majority chose to answer question 3 (on the ideal of value freedom) in Section A; questions 8 (on technological determinism) and 10 (on intellectual property) were most popular in Section B, while very few wrote on questions 9 (relativism) or 11 (China under Mao).

A common issue with responses to Question 3 - by far the most popular Section A question - was that candidates tended to focus discussion on summarizing the work of Douglas and Longino without considering the historical nature of the question, i.e. whether the ideal has been important for science. In Section B, candidates often assumed that question 4, on the function of consent in medical contexts, was asking specifically about *informed* consent (in fact the question asked about consent simpliciter); moreover, many interpreted "medical contexts" somewhat narrowly to refer simply to research and not therapeutic settings. Responses to question 5, on rationing limited health care resources, were generally competent, although many were somewhat unclear on the technical details of the QALY (quality-adjusted life year); the same went for discussions of rational choice theory in responses to question 5. Although question 8 was relatively popular, candidates struggled to define technological determinism clearly, and while many were keen to involve Winner's discussion of the politics of artefacts, they had difficulty integrating this into particular debates on technological determinism. Question 10, on intellectual property protection, reflected a good diversity of approaches and responses; candidates also generally seemed to have a good grasp of the course material in responding to question 12. Very few candidates responded to question 11, and the responses to this question revealed a strange tension between answers to other questions - which generally argued for the course material describing the value-laden nature of all science - and this one, in which many argued that political concerns inevitably violated the objective, truth-making character of science. This tension was not penalised, but it was curious to observe, and suggested that students may not be reflecting on the course in a holistic way.

BBS Philosophy and Ethics of Medicine

Performance on this paper was generally strong. Responses to the questions were rather clumped, with no one answering question 3 (on measurement in clinical research) or 6 (on unanticipated effects of quantification), and several strong answers to question 4 (on the reliability of clinical research). In some cases answers to questions were overly narrow: for example, many answers to question 7 went into detail on theories of whether the foetus is a person, while saying little or nothing

about why personhood might matter in this context. More generally, the best answers focused on specific examples and engaged in detail with the literature, considering and responding to objections to the positions defended.

BBS 113

Overall, students sitting this exam performed well. Some students offered highly original responses, while less successful ones exhibited good knowledge of particular issues but did not always connect them in sufficient detail. Since only four students sat this exam, it is difficult to provide details analyses of each question without breaching confidentiality. All in all, Question 8 on the role of print was highly popular, and resulted in some thoughtful considerations on how medical knowledge diversified in the centuries after Gutenberg. The lack of response to some other questions is probably due to statistical noise.

BBS 114

There were some excellent—well-informed and persuasively argued—answers and many creditable performances among the 12 candidates who sat this paper. Those who performed less well paid too little attention to the specific questions asked and a few struggled to give accurate accounts. Of the most popular questions 6 (8 candidates) and especially 1 (7) discriminated better than 2 (7) and 7 (5), which might perhaps have done more to push candidates to go beyond prepared material.

Summary of recommendations
1) Examiners need to be wary of the potential confusions caused by reporting marks for several papers, often configured in different ways, with different rubrics, for different triposes all working to different deadlines. Standard modes of reporting marks, and early agreement on deadlines, will reduce these risks.
2) Examiners should continue their efforts to set questions that have the potential to be answered well given the content of lectures and supervisions, but which do not simply repeat the wording of supervision questions.
3) Some basic statistical analysis of primary source marks prior to the examiners' meeting would help to confirm calibration of different pairs of examiners.
4) The practice of circulating formatted mark books prior to the unseen examinations is again recommended.
5) Students sitting the exams should again be encouraged to look at the precise wording of exam questions, and address all elements of the question.

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2nd October 2017