

## Natural Science Tripos Part II, History and Philosophy of Science

### Senior Examiner's Report 2020

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Examination: Coursework: Two primary source essays (3,000 words, 20%) and one dissertation (12,000 words, 20%; Option A only).  
Open-book examinations: 6 papers offered, with candidates writing two (Option A) or three (Option B).

Numbers: 29 HPS, 5 BBS113, 5 BBS114, 10 BBS107, 3 Classics, 3 History SS11, 2 HSPS, 2 PBS, 26 Phil IB

#### Examiner's meetings

- Preliminary examiners meetings were held to set papers on 12 February and to prepare for the final examinations on 13 May. The Final Examiner's Meeting was held on 9 June. All examiners were present at these meetings, but not the assessors. The final examiners' meeting was also attended by the external examiner.
- At the Final Meeting each candidate was considered. High, low and borderline candidates were discussed. Those candidates falling on the First/Upper Second border were scrutinised particularly closely

## Report

Thirty candidates sat the HPS Part II examinations in 2019-20, considerably up from the preceding year (13) and back to the level of previous years (28 in 2017-18, 24 in 2016-17, 31 in 2015-16), though not back to the level of c. 40 in 2011–14. Like last year, six Part II papers were offered. Only one student chose Option B, writing four papers and primary sources, while the rest (28) chose Option A, writing three papers, primary source essays and a dissertation. The class was also unusually successful with 62% achieving firsts.

Year	First	Upper second	Lower Second	Third	Deserved Honours	Total	A	B
2020	14	15	1	–	–	30	29	1
2019	8	5	–	–	–	13	10	3
2018	16	10	2	–	–	28	19	9
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	–	1	40	27	13
2012	16	19	1	–	–	37	23	14
2011	11	25	3	–	–	39	28	11

Table 1: Distribution of HPS Part II marks, 2011-20

The HPS Part II Examiners also mark the papers for BBS candidates and pass the marks on to the BBS Board where the candidates are classed. Four candidates sat the paper ‘Early Medicine’ (Minor Subject 113), and five candidates took the paper ‘Modern Medicine and Biomedical Sciences’ (Minor Subject 114). No student received a first on BBS 113, and one a 2.2; while on BBS 114, two students received a clear first, and three a 2.1.

Ten students completed “Philosophy and Ethics of Medicine” (BBS Minor Subject 107). Four of these students received firsts, the rest a 1. The one dissertation written by one of these BBS students received a very strong first. Table 2 shows that class performances are comparable with previous years. Student numbers remain lower in comparison to the heydays of the History and Ethics of Medicine paper it succeeded (33 in 2012).

Year	First	Upper second	Lower Second	Third	Fail	Total
2020 (PEM)	4	6	–	–	–	10
2019 (PEM)	2	8	1	–	–	11
2018 (PEM)	2	6	–	–	–	8
2017 (PEM)	4	7	–	–	–	11
2016 (HEM)	3	2	–	–	–	5
2015 (HEM)	3	7	2	–	–	12
2014 (HEM)	2	10	3	–	–	15
2013 (HEM)	7	11	2	1	1	22
2012 (HEM)	5	26	2	–	–	33
2011 (HEM)	7	18	5	–	–	30

Table 2. Distribution of HEM/PEM marks 2011-20

Three Classics students borrowed the Early History of Science, Medicine and Technology Paper, one receiving a First, the other two a 2.1. Two HSPS students sat Epistemology and Metaphysics of Science, both receiving a low 2.1, and two PBS students took Philosophy and Scientific Practice, receiving Firsts. We also examined Philosophy IB students on Epistemology and Metaphysics of Science this year for the first time. This option attracted 26 students. 14 of these received a First, 11 a 2.1, and 1 a 2.2.

### Class and mark distributions

The class and mark distributions for each assessment element, including each of the papers, are given in Table 3. The number of candidates sitting each paper ranged from five in Papers 1 to 13 and 18 people in Papers 3 and 6 respectively. Examiners showed a willingness to use the full range of marks, however performances were relatively even, with many good and very good performances but only few outstanding scripts. Mean and median marks across the six papers are in broad agreement. Most importantly, these show no marked disagreement in comparison to last year's results (Mean P1: 69.6, P2: 70.5, P3: 68.11, P4: 69.3, P5: 71, P6: 68). P1 and P3 show a slightly low mean result, but P1 had only 5 students, and the mean in P3 is skewed by an outlier.

Element	First	Upper second	Lower Second	Third	Fail	Total	Max	Med	Mean
Primary Source Essays	15	15	–	–	–	30	78	69.25	68.8
Dissertation	14	10	1	–	–	24	80	71	70.3
P1 Early Medicine	1	4	–	–	–	5	72	65	66.2
P2 Science & Empire	3	4	–	–	–	7	73	69	68.9
P3 Modern Medicine	3	9	–	1	–	13	76	67	65.6
P4 Phil. Scient. Practice	7	4	–	–	–	11	76	71	70.6
P5 Epistem. Metaph. Sc	5	5	–	–	–	10	75	69.5	68.8
P6 Ethics & Politics STM	6	11	1	–	–	18	77	67.5	68.1

Table 3: Distribution of HPS Part II marks per element of assessment. Note: Classics, PBS, HSPS and Philosophy students are not represented. The total numbers for dissertations and essays are lower than one should expect in normal years, since students were allowed to drop an element of their choice.

Considering class distributions by gender, male candidates performed slightly better than women. The mean for memn was 69.2, that for women 68.3. As Table 4 shows, numbers were very even with two more women than men (16/14) taking HPS Part II.

Year	First		Upper second		Lower Second		Total		Total candidates
	M	F	M	F	M	F	M	F	
2020	7	6	7	9	–	1	14	16	30
2019	3	5	4	1	–	–	7	6	13
2018	8	8	4	6	1	1	13	15	28
2017	3	9	4	7	–	–	7	17	24
2016	5	7	8	9	1	1	14	17	31
2015	4	8	6	6	1	–	11	14	25
2014	7	8	10	13	1	1	18	22	40
2013	6	1	12	17	1	3	19	21	40

Table 4: Distribution of HPS Part II class marks by gender.

### Examining practice

In accordance with customary practice the examination questions were set in Lent term following consultation with lecturers, supervisors and paper managers. The External Examiner Simon Werrett provided valuable feedback on all of the questions, and efforts were made to ensure both that exam questions were properly supported by supervisions and lectures while encouraging independence of thought by not closely mirroring questions answered in supervisions and lectures.

Marks and comments for individual papers were entered into pre-circulated spreadsheets, enabling the ready analysis of data and its collation for final classification. All elements of the examination were blind double-marked with examiners meeting to agree on final marks. 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 high and low performances, sample middle-of-class performances, and review marks across borderlines for primary source essays and dissertations as well as unseen examinations in cases where the agreed mark fell into a lower class. They were given access to all scripts and thus also had a chance to consider overall performance of candidates with a view on uneven performance and anomalies.

There were a number of changes to examinations in 2019-20.

- To mitigate the consequences of industrial action, for each paper, students were given a choice of three more questions (15 instead of 12).
- More dramatically, due to the Covid-19 pandemic, examinations were moved from unseen written exams to open-book exams with online release of papers and submission of scripts within a set timeframe of 24h.
- For the same two reasons, Part II students were also allowed to drop one element of their assessment in order to compensate for lost teaching and Covid-19 related contingencies that may have wrecked research plans. Of 30 students, 5 chose to drop their dissertation, while 25 dropped one of their exam papers.
- To further mitigate the adverse circumstances, the University introduced a “safety net” stipulating that “no graduating undergraduate student will receive a class lower than the class which they were awarded in their second-year exams.” We did not have to apply this to any candidate.

Open book online examinations worked absolutely smoothly, with no technical difficulties or complaints from students. Conflicting information about whether the time students spent online for each paper was limited to 3 hours, and whether that limit would be

monitored, caused some confusion among students. It was clarified quickly, though, that no such time limit was placed on students, nor enforced in any way.

Due to the contingencies of scheduling 24-hour online examinations, examination dates were spread out more this year, with exam scripts for paper 5 with the highest number of students only available a week ahead of the Final Examiner’s meeting. A preliminary examiners’ meeting was therefore scheduled to agree marks for the remaining papers ahead of the final examiners’ board.

Apart from this, the administration of examinations went very smoothly with no significant problems reported in their conduct. It is important to keep track of the increasing number of single papers on offer, shared in various combinations with other triposes, and in one cases (History Specified subject 11) assessed by another department. Communication from and with other departments was good, however, and oversight possible by keeping all relevant documentation ready at hand on a shared drive. More generally the examiners acted with great efficiency and we thank Tamara Hug, David Thompson and the external examiner for their excellent work.

## Comments on performance

### *Dissertations*

As in previous years the majority of students chose to write a dissertation, and as Table 3 shows, the dissertation was one of the most successful components of the course. The one student who chose Option B students (without a dissertation) received a 71, performing slightly better than the average of 68.7. However, the marks of most of those writing dissertations was improved by their dissertation mark, even if there were three cases in this year in which the dissertation result lowered the overall mark. It is notable also, that only 5 students chose to drop their dissertation, indicating that independent work is attractive to our students. The Frances Willmoth Prize for excellence in the dissertation was shared by two students this year, bot receiving an 80 for outstanding work.

### *Primary Source Essays*

Performances on the Primary Source Essays were generally even, ranging from good Firsts to Lower Seconds (see Table 3). With exception of students who wrote on Stradanus, the number of firsts roughly equalled the number of 2.1s and 2.2s combined. The spread of marks was wider than last year, from 77 to 53, with two students stretching both ends of this spectrum in their individual results. Lower grades tended to be for essays not focusing enough on the source. Most sources were taken by 5 to 7 students while 13 wrote on Paul Ehrlich and the Population bomb and 21 on the Cancer Drugs Fund (see Table 5).

	First	Upper second	Lower Second	Third	Total
Stradanus	1	3	1	–	5
Boas	4	2	1	–	7
Reichenbach	4	3	–	–	7
Ehrlich	8	5	–	–	13
Stanford	5	1	1	–	7
Cancer Drugs	11	6	4	–	21

Table 5: Primary Source Essay Distributions

### *Open-book examinations*

It is notable that in all papers, some questions proved particularly popular. In part, this can be explained by students avoiding questions relating to material whose teaching was affected by industrial action. For the following remarks on performance on each individual paper, keep in mind that numbers are low, so numbers have little statistical significance.

#### Paper 1

There was good engagement with the course as a whole. In Section A, Q2 on how the discovery of America changed science, was left unanswered, whereas Q3 about the significance of Galen received significantly better results than Q1 on the role of images. In section B, Q4, 10, and 15 were left unanswered. There was no marked preference for the remaining questions, and answers evidenced some difficulty in relating historiography in a structured manner to historical material. The best achieving answers showed good integration of historiography with material and awareness of non-Western settings and their influence on Europe.

#### Paper 2

In section A, Q2 on diffusionist models was clearly the most popular, with only one student answering Q1 on calculability and none answering Q3 on the presumed shift from physics to biology in the twentieth century. Engagement across Section B was good, with only one question, Q10 on the role of the brewing industry, not receiving an answer. Q11 on how anthropologists challenged understandings of "universal economic man" was particularly popular, and received some excellent answers, indicating that students like questions that allow them to develop some critical edge. It is also notable that particularly good results were achieved on questions relating to science in east Asia.

#### Paper 3

The average of this paper was comparatively low, but this was mainly due to a very low mark received by one candidate who did not answer all questions. Q1 in section A about what kind of science plays the largest role in modern medicine was clearly the most popular, but candidates struggled with the terms of the question. Q7 about laboratory technologies, Q8 about penicillin and cancer, Q12 about sickle cell anaemia and Q13 about international health in Section B proved popular as well, with the remainder receiving few answers only, and Q14 about genetics none at all. Good answers impressed in particular in terms of the clear grasp they demonstrated over detailed historical knowledge.

#### Paper 4

Students achieved the best average on this paper (70.6). In section A, Q3 on objectivity was very popular, but the other two questions received answers as well. While two questions in Section B remained unanswered – Q7 on biological function and Q10 on disease screening programmes – the rest of the questions were answered evenly, showing broad engagement of students across the paper. Students achieved notably lower marks on Section A questions. Best answers demonstrated ability to deal with complex arguments and debates with sustained analytic rigor.

#### Paper 5

In section A, Q1 about progress and Q3 about scientific truth received an equal number of answers, but Q2 on whether philosophers need to attend to details of how scientists work none. Answers to Section B were distributed evenly, with all questions being answered,

showing excellent engagement across the paper. Marks from Section A were slightly lower than from Section B, and while candidates showed familiarity with broad and diverse range of philosophical positions, they had difficulties making connections relevant to question.

#### Paper 6

This paper had the highest number of students (18), and marks were evenly distributed, with most marks falling with the range from 65 to 75. All questions received answers in a very even distribution. Many good answers showed a tendency to summarize only, but there were quite a few excellent answers demonstrating trenchant critical skills.

#### BBS 113 (Early Medicine)

Four out of 15 questions were not answered (Q2, Q4, Q10 and Q15), but the rest received equal attention by candidates. Answers tended to be descriptive and wide ranging, resulting in four 2.1s and one low First. This paper was borrowed by History students (Special Subject 11), but examiners of this report to the History examinations board.

#### BBS 114 (Modern Medicine and Biomedical Science)

Again, four out of 15 questions remained unanswered (Q2, 8, 9, 15). Students performed well on this paper, with two Firsts and three 2.1s ranging between 64 and 75. Answers showed excellent knowledge and good grasp of historiographic frameworks.

#### BBS 107 (Philosophy and Ethics of Medicine)

Performance on this paper was good (see table 2). Like Paper 6, answers were evenly distributed over questions and marks ranged across high 2.1s and low Firsts.

#### Single Paper Options

3 Classics, 2 PBS, and 2 HSPS students borrowed Paper 1, 4 and 5 respectively. Classics and PBS students achieved well, within the range of HPS students, while the two HSPS students received low 2.1s. In addition, for the first time, 26 Philosophy IB students borrowed Paper 5. In accordance with common practice in Philosophy, these papers were single-marked, with the second assessor moderating marks only. Performance was slightly better than that of HPS Students, with an average mark of 69.3 and a median of 70.5 (cf. Table 3).

### Summary of Recommendations

1. College Directors of Studies, Examiners and Administrators need to be clear about the relations between different single papers and core Part II papers, with Examiners noting also their different marking responsibilities (for History Special Subject 11) and diverse reporting responsibilities for BBS, PBS and HSPS single paper options. Good communication and record keeping is key to avoid delays in reporting.
2. We recommend the continued use of formatted mark books stored on a shared drive to simplify the communication of markers comments and collation of marks.
3. Should online open-book examinations be used again, examiners should keep in mind that the scheduling of examinations may result in a large number of scripts having to be marked shortly before the final examiners' meeting.
4. Basic statistical analysis of marks prior to examiners' meetings will help to confirm calibration of different pairs of examiners.
5. Examiners should continue to consider overlap between questions within and across papers, and endeavour to set questions that encourage independent approaches on

the basis of course materials rather than closely repeating supervision topics and lecture contents.

6. It needs to be communicated more clearly that students need to engage with the source in primary source essays.
7. Students have clear preferences in answering Section A questions, and results from some papers show that lesser performance. Paper managers, lecturers and supervisors might consider relations between specific lectures and course themes throughout the course, and the Department should continue to provide an examination revision supervision for this purpose in Easter term.
8. Performances on BBS and other single-option papers suggests the value of focusing these students on how to think and write historically and philosophically. They might also benefit pedagogically from working with a common supervisor throughout the course
9. Candidates are advised to address all elements of what are usually carefully worded questions.