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A Different View of Innovation and International Knowledge Exchange from Classroom Notes: The University of Edinburgh, 1604 – 1650

Abstract: Many classroom notes survive from one of early-modern Europe's emerging educational centers, the University of Edinburgh. Of particular interest are the early to mid-17th century classroom notes, whose form suggests a traditional scholastic educational experience. These same notes also happen to contain a remarkably detailed account of the contemporary collapse of Aristotelian cosmology. A contemporary manuscript of teaching notes for Edinburgh's lecturers has also been preserved, which contains lists of books and manuscripts to be consulted by the students. The teaching notes were produced by a group of itinerant scholars returning to Edinburgh from centers across Europe. This chapter will examine the contents of all of these classroom notes and link them to cosmopolitan scholarly communities within those centers. These fascinating handwritten notes reveal how students were constantly updated on the latest developments in scientific and natural philosophical culture within a recognizably scholastic pedagogical framework.

1 Introduction: Evidence of the New Sciences in Both Form and Content of Student Notes

The classroom notes that survive from the university of early modern Edinburgh offer a fascinating insight into the nature of some of the early modern era's most significant intellectual trends as they were then developing across Europe's educa-

Note: This article was made possible through research supported by funding received from the European Union's Horizon 2020 scheme under the MSCA Project GA n. 892528 and from the European Union Next-GenerationEU National Recovery and Resilience Plan (NRRP) mission 4 component 2, investment N. 1.2 CUP N. H73C22001360001.

 https://doi.org/10.1515/9783111452975-006

tional centers.[1] During this period, the city's academic community was an integral part of a broader international network of educationalists operating across the continent of Europe and beyond. The Edinburgh notes comprise various forms of academic note-taking, from student notebooks containing detailed accounts of lectures, to practice disputations, and the manuscript notes used by lecturers to deliver lectures.[2] The notes that survive from the early to mid-17th century represent a rich mixture of all three types. At a formal level, the notes suggest a recognizably scholastic educational experience, with lecturers examining passages from an authority text canonized within the tradition, while evaluating the validity of its arguments through the evaluation of point and counterpoint, aiming at logical resolution to any question. By the late 16th century, various developments—especially in the field of observational astronomy—began to offer less scope for exploring previously contested philosophical and metaphysical questions in this manner. The proliferation of books and commentaries on these developments within the academy was not accompanied by a change in the formal nature of the notebooks and their categorical boundaries. As this chapter will highlight, the new trends in natural philosophy increasingly rendered the traditional form and function of notebooks less suited to their purpose, and made their categorical assumptions a hindrance to pursuing the questions that required addressing.

An introduction to the very particular nature of the Edinburgh notebooks highlights the role played by a group of cosmopolitan scholars in this process within the academy. Through the notes, it is possible to see the emergence of disciplinary boundaries that acknowledged new approaches to natural philosophy that this group were exposed to in their various regional wanderings across Europe's national and confessional boundaries.

To explore all of these issues in their proper context, this chapter will begin with an overview of the curriculum as described in official sources. There will then be an account of the various types of notes from Edinburgh and how, in form, they reflect the outlines of the university's official curriculum. Following on from this will be an introduction to the content of the notes to show how students were introduced to significant developments in natural philosophy in this period within the confines of the traditional educational structures. The chapter will conclude by examining some evidence from the primary sources that reveals

1 A broad introductory overview of student notebooks from the late 16th to the early 18th centuries at Edinburgh: Shepherd (1975, especially pp. 1–18 and 344–357). For discussion on the notebooks from across Europe for the same period: Blair (2008), for Scotland in the 18th century: Eddy (2023).
2 For various forms of manuscripts created in the classroom in early modernity: Blair (2008, 39–50). A useful overview of scholarship on the classroom notebook in early modern Europe: Eddy (2016, 121–122).

emergent tensions as the traditional educational forms engage with new disciplinary challenges. Indeed, the crisis of confidence in the Aristotelian cosmological model sets the backdrop to this discussion as a whole.

2 Degree Structure at Edinburgh

An introduction to an official curriculum at Edinburgh will provide a necessary overview of the overall structure of the educational experience. It must first be noted, however, that the University of Edinburgh in this period operated under a *regenting* system. In practice, this meant that the students were taught in a circumscribed group across their four-year undergraduate degree by the same lecturer known as a regent. All of their subjects were taught one after another in sequence by the same regent. A combination of official contemporary sources provides a relatively detailed account of what these subjects were and how and in what order the regents would deliver each subject to their student groups. Between 1600 and 1628, Edinburgh town council produced Latin and English formal decrees to delineate the official degree structure and the order of academic disciplines at the university.[3] In both decrees, the council outlined how each year of the four-year degree would be overseen by each regent. In the first year, the students would take classes in logic, followed in the second year by rudimentary ethics. In the third year, logic and ethics would continue, but there would also be a broad introduction to natural philosophy (including both anatomy and Aristotle's Physics), which came at the end of the year. The fourth year would be devoted to astronomy, but with an end-of-year recapitulation of the first three years' lessons in logic, ethics, and physics.[4] The surviving published accounts of the publicly performed laureation disputations at Edinburgh from the first half of the 17th century reflect this prescribed division. The masters and students structured and delivered their set-piece theses as disputations in the following way: they began with a section headed "Theses Logicae," followed by either "Theses Ethicae," or "Theses Physicae" ("Physicae" delivered before "Ethicae" in some years), and finally always ended with "Theses Astronomicae/Sphaericae." In the same section of the official curriculum referenced above, the central authority texts for each discrete subject area were stipulated. In the students' first year, the works of both Aristotle and Ramus on logic were prescribed. The course for the next year would have Aristo-

3 Early 17th-century Latin original: Morgan (1937, 60 – 65), for English translation of 1628: Morgan (1937, 110 – 117).

4 In Latin: Morgan (1937, 60 – 62), in English: Morgan (1937, 111 – 114).

tle's *Nicomachean Ethics* as the central text. Aristotle's *Physics*, and his *De Caelo*, and Sacrobosco's *De Sphaera* would then provide the textual focus for the final two years.

3 Types and Nature of Student Notes

For the period this study covers, circa 1604–1650, three recognizably different types of classroom notes will be the focus. Firstly, there are student dictates; that is, notes taken down by students while regents were delivering lectures. The dictates can be further sub-divided into those that deal with a specific text and those that deal with a broader subject. Then there are student disputation exercises; that is, notes taken down to help with the preparation of oral disputations that were both formal requirements for summative assessment and were latterly reused for public performance at laureation ceremonies (see above). Finally, there are lecturers' notes, which are a surviving corpus of notes used by various different regents as lecturing material across the entire period under examination. In relation to the first type of notes, Ann Blair's work on student notebooks from early modern Europe have emphasized several different ways in which students recorded the lectures they attended. A sharp division has been made between manuscript books of messy, in-person notes taken at the time of lectures ("Mitschriften") and notes edited and polished afterwards ("Rein- or Nachschriften"), often for reuse by other students.[5] At Edinburgh University, the lectures were delivered in a way that allowed them to be written down neatly and with a degree of detail. This dictation practice in Scotland was termed "dyteing."[6] As a consequence, the Edinburgh notes are extremely detailed and, for the most part, neatly taken down. In all of the early 17th-century dictates from Edinburgh discussed below, each individual undergraduate writes down their own name, the regent, and the date and time of day of each lecture. They seem to be the sort of notation from the early modern period that has been characterized as "clean copies of notes taken under dictation."[7]

The balance of emphasis between the educational value of detailed, dictated lectures and the disputations was a bone of contention in the 17th century. Various educational commissions strove to place less value on detailed lectures and dictation, and more on critical evaluation by students during study groups and dis-

5 Blair (2008, 39–40).
6 Shepherd (1975, 24–25).
7 Blair (2008, 49).

putations.[8] Christine Shepherd in her excellent study of philosophy and science in 17th-century Edinburgh characterized the various administrative moves to place less importance upon detailed lectures and their note-taking as attempts to stop the practice of "extremely slow and tedious" lectures delivered at dictation speed.[9] However, the detailed dictation notes of the student notebooks are not necessarily evidence of a particularly static, ponderous, and lifeless lecture. It should be noted that, from the late 16th century, those dealing with educational reform at Edinburgh University saw the balanced mix of this specific method of instruction (listening 'in presence' to their teachers' words followed by summary disputations), especially in content-rich subjects, as something that was needed to bear "fruit" in an educational context.[10] The pedagogical advantages of a student following the lectures of a qualified master, who was responsible for the construction of the lecture, was clear: it allowed the student to gain a mastery of a complex subject through punctilious repetition of a master's words on the written page. At the universities of Edinburgh and Paris in the medieval and early modern periods, the importance of maintaining the connection between the masters themselves and the students during this process was affirmed by statute, when it was forbidden for anyone but the regent to deliver the lecture.[11] There is abundant evidence of those involved in educational reform in this period possessing and championing the ability to recall from memory long, detailed argumentation in Latin and engage with the same in an intellectually responsive and discursive manner. An example of such a case was a speech written and delivered by Alexander King, a signatory to the document mentioned above that outlined what benefits such an education could bring. He delivered this controversial oration in Latin in 1581 for his public entrance exam to the bar, which was taken down verbatim by a member of the audience at Edinburgh.[12] Not long after this, the prominent Scottish educational reformer Andrew Melville delivered an extended political discourse in Latin before King James VI and Queen Anne in Edinburgh in 1589.[13] These types of content-heavy public speeches and debates in Latin played a prominent role in educated public discourse in the late 16th century and early 17th century. Another

8 Shepherd (1975, 24–25 and passim).

9 Shepherd (1975, 5).

10 Dickinson (1926, 209). On this group of educational reformers at Edinburgh: McOmish (forthcoming).

11 For Paris: Blair (2008, 45–46), for the University of Edinburgh's similar decree forbidding anyone but the master from giving the lecture from his notes: Morgan (1937, 121).

12 For the general circumstances of the speech: Ford (2008, xlv–liii); educational and rhetorical significance: pp. xlvii–xlvii and lii. The full speech in Latin and English: pp. 323–350.

13 Reid (2020) and Harrison (2022).

particularly noteworthy example was conducted by the masters and lecturers at Edinburgh who are the focus of this chapter. Replicating the public disputations of the university, the lecturers debated in Latin before King James and his English court at Stirling in 1617.[14] King James and the Lord Advocate in the fashion of disputants then questioned the masters *ex tempore* on their discourses. As can be seen, a certain element of dynamism and studied spontaneity accompanied even the most detailed and extended lectures in this period, especially amongst the ranks of this educated class. The detail and size of the notebooks, therefore, reflect an important aspect of the traditional scholastic educational experience: mastery through repetition and memorization.[15]

4 Formative and Summative Disputations

From the different types of classroom notes for Edinburgh—dictation, disputation, and lecturers' notes—it is an examination of the first two that reveals the extent to which the notebooks formally reflect the educational structures prescribed by the official decrees. This is much more immediately apparent from the practice notes for the student disputations than from the dictated lectures due to their relatively more compact form. It is with them that we shall now begin. The official documents state that recapitulation sessions in the form of study groups and disputations would follow formal lectures, prescribing how this would be delivered: there should be lectures followed by disputations (formative and summative), to be conducted in the case of lectures in the morning and recapitulation sessions in the afternoon and at the weekends.[16] Some students wrote their practice exercise disputations into the notebooks that also contained their lecture dictation. The notebook accounts of the disputations are long-form versions of the actual disputations the students delivered upon graduation. This can be discerned by cross-referencing the student notebooks and the published accounts of the laureation disputation delivered by the students at graduation. In 1620, George Livingstone graduated from the 1616–1620 class under the regent William King.[17] Livingston's notebook survives and provides notes for the years 1619–1620.[18] The published graduate dispu-

14 Adamson (1618).

15 Eddy (2023, 269–323 especially) provides an insightful study on the later evolution of the curriculum's role at Edinburgh in organizing and systematizing knowledge in the specific context of note keeping in the early enlightenment.

16 Morgan (1937, 111–114 and 118–119). Shepherd (1975, 24).

17 Graduation list: King (1620).

18 Contained in Edinburgh University Library: "Notes of George Livingstone," shelf mark: Dc.10.37.

tations for that year (indeed for any year) do not stipulate the specific sections of the disputations which students read out publicly on stage. Thanks to Livingstone's notebook, for example, it is possible to see that he practiced for the "Theses Logicae."[19] His practice notations in his notebook contain all of the "Theses Logicae" verbatim that were published in 1620, albeit in a slightly different order.[20] Indeed, his practice disputations actually contain 25 separate theses, instead of the 23 that were published. Livingstone's practice disputations are neat, clean notes that reflect exactly what the regent would present from the students in terms of their oral delivery at the public laureation ceremonies. Thanks to the survival of the notes from William Adair in the class of the regent Alexander Hepburn (who was himself a student of William King from the 1620–1624 class), we have less polished evidence of a more organic process of the composition of the disputations.[21] In these notes, most of Adair's fellow undergraduates from Hepburn's class take turns learning sections of each thesis across all subjects (logic, ethics, and physics) from the first three years of their degree. As prescribed in the college order, they also practice with students from the year above and the year below. Adair writes down the names of each undergraduate under the section of the thesis allotted to them. From the year above Adair, John Hope, son of Lord Advocate Thomas Hope, takes part, and from the year below Adair, the future royalist army commander and court favorite Ellis Leighton, who was also younger brother of the future principal of the university, Robert Leighton. It is not possible to cross-reference Adair's notes with published versions to see if they reflect the public performance. No graduate theses survive from any undergraduate group for nearly a decade after Alexander Hepburn's and William King's joint 1628–1632 class.[22] However, Adair's disputation exercises are spread across the two volumes of his notes and are comparable to the detailed theses of Livingstone. The volume of the practice notes and the punctilious repetition of their detail highlight the importance placed upon the students' ability to record large tracts of detailed and challenging text. The combination of the disputations in long form and the detailed dictates may account for the fact that the notebooks from this period are considerably longer than the notes that survive from the later part of the 17th century.[23]

19 Livingstone (1619, Dc.10.37, f. 165r–f. 166v).

20 E. g., published Thesis 2 is Thesis 9 in Livingstone, Thesis 3 is Thesis 8 in Livingstone and so on. Only Thesis 1 is the same in both.

21 Unpaginated, but the theses are contained in the first six foliated pages of volume 1 and in the first four foliated pages of volume 2: Adair (1632–1635, Acc. 483).

22 Hepburn (1632). Hepburn took the class to graduation after William King left his position as regent in 1631: Craufurd (1808, 119–120).

23 Length first noted by: Shepherd (1975, 9).

Turning to the structure of the disputations, the practice disputations reflect the division of three disciplinary emphases stipulated in the official decrees. This can be witnessed in practice disputations covering a span of over 30 years. William Drummond's 1604–1605 practice disputations contain "theses physicae," Adair's from 1632–1635 contain "theses logicae," "theses ethicae" and "theses physicae," and Livingstone's from 1619–1620 contain "theses logicae."[24] As discussed above, the practice disputations are later used in the formal laureation ceremonies and published accounts thereof. The main difference between the structure of the notebook disputations and the published version is that there usually is a fourfold division of disciplines in the published versions, which in order are: logic, ethics, physics, and astronomy. There is a slight variation in the published theses on these subjects, with metaphysics appearing occasionally as an additional disciplinary category and astronomy being disputed under the heading of spherical studies.[25] However, on the whole, over the entire period from the start to the middle of the 17th century, this is the formula. Giovanni Gellera draws attention to this basic formula and its variations in his work on the published graduate disputations from across Scotland's four universities, providing a particularly comprehensive overview of the structure and the content of the theses.[26] Gellera also noted that Edinburgh was the first to publish graduate theses and that "the practice of publishing graduation theses gradually led to more complex and longer theses (in Edinburgh especially in the 1610s and 1620s) but did not bear consequences in the curriculum being taught."[27] The relationship between the size and content of the published theses and their relationship to the content of the disputations and dictates in the notebooks will be discussed below. For the moment, suffice it to note that the increasing size of the published theses is reflected in the disputation exercises in the student notes. With regard to the structure of published notes from Edinburgh, each disputation exercise is introduced by a central thesis, which is then followed by a series of appendices that in turn affirm and reject its truth via authority or observation. Due to the relative brevity in relation to the exhaustive lectures from which they derive, each thesis and its appendices offer pointed statements that summarize longer form arguments. For example, in the "Theses Astronomicae" for the graduating class of regent William King in 1612–1616, the

24 Drummond (1604–1605, MSS 2053–62, f. 24r–f. 27r), Livingstone (1619, Dc.10.37, f. 165r–f. 166v), Adair (1633–1645, Acc. 483, vol. 1, f. 2r–f. 8v; vol. 2, f. 1r–f. 4v).

25 E.g., William king's disputations span nearly 20 years and Metaphysical theses appear only in 1620.

26 Formal structure: Gellera (2012, 16–17). Gellera provides an edition of the "Theses Physicae" from regent James Reid's 1626 class: pp. 230–236.

27 Gellera (2012, 217).

students introduce the proposition that the path and mean motion of the Sun, Mercury, and Venus is shared (ecliptic).[28] Appendix 1 offers some observational data to affirm this statement; whereas Appendix 2 highlights that there are some who disagree with this but they are wrong. The thesis then ends with the statement that a key difference between Mercury and Venus is the intensity of the light emitted by the latter. The published form of the disputation is then: thesis, appendix, counter-appendix, and so on. This is the standard form also found in the practice disputations across all of the notebooks from 1604 up until 1635.[29]

5 Student Dictates

The formal arrangement of the dictates (i. e., the rendering of the lectures found in the notebooks) is where the detail of their engagement with traditional scholastic educational culture can be most fully appreciated. The dictates show that the lectures were structured and delivered in the manner of stereotypical commentaries on Aristotle: the summary introduction of a text, a consequent stress-test evaluation of key points, arguments for and against each proposition, and a summative attempt at synthesis.[30] This can be seen in all of the surviving student notebooks where the lecturer's *prolegomena* and *proemia* set out the propositions at the start of each series of lectures on specific texts; and the lecture then follows the pattern as outlined above. With regard to disciplines and subject matter, the notebooks of William Adair for the 1632–36 class suggest that the lectures across the four-year undergraduate degree followed the curriculum outlined by the university statutes in the early 17th-century documents.[31] His notes present a relatively comprehensive account of his first three years. In first year, Adair's regent Alexander Hepburn delivered lectures on Greek prose composition, dialectic (formal rhetoric therein) and also basic logic in the Aristotelian tradition.[32] In the second year, Hepburn gave lectures on logic and rhetoric. He also developed the students' aptitude in Greek by having them comment upon Porphyry in Greek, but he also read Porphyry as a supplement for students' study of the *Topica* and *Prior Analytics* of Aristotle. In third year, Hepburn lectured on *Posterior Analytics*, and then *Ethics* before

28 For an edition of these astronomical disputations with English translation and original Latin and Greek text: McOmish (2022). The above thesis may be found at pp. 186–187 and pp. 197–198.
29 Drummond (1604, MSS 2053–62) to Adair (1635, Acc. 483).
30 For this as a basic pattern for theses in this period generally: Shepherd (1975, 9).
31 On William Adair, see Brock (2018, 2024). Adair did not complete his full 4-year degree. He seems to have left the university at the start of year 4 (see below).
32 Adair (1632–1633, Acc. 483, f. 1–30).

moving onto lectures on the physical sciences, specifically on Aristotle's *Physica.* Adair's lecture notes for the first three years conforms to the level of detail in the other notebook accounts of lectures from George Livingstone onwards. Unfortunately, the sections on what would have constituted the beginning of Adair's fourth year have been ripped out (some 80 pages in total). So a full set of lectures across all four years is wanting in his case.

Fortunately, the other notebooks supplement our understanding of the structure of the lectures on natural philosophy and astronomy, which constituted the subject matter of the final undergraduate year. The notes of student Alexander Henryson in the 1610–1614 class of regent James Reid, the notes of student George Livingstone mentioned above from the 1616–1620 class of regent William King, and the notes of student Alexander Pringle from the 1640–1644 class of regent Alexander Hepburn provide a coherent, representative picture; not to mention a useful sample with an expansive temporal range across the period. For autumn to winter of the 1613 academic session, James Reid gave lectures on Aristotle's *De Caelo.*[33] Reid's lectures covered all of the books of *De Caelo* and not simply the two books prescribed by the university statutes. The rest of the academic year's lectures on astronomy were presented as lectures on all of the books of Johannes De Sacrobosco's *De Sphaera.*[34] Reid finished with lectures on Aristotle's *De Anima.* Here, the prescribed texts and structure of the lectures conform completely to the stipulations of the official university decrees. Henryson's notes present a detailed insight into most of the sections of the undergraduate course which are missing from the Adair lectures. Whatever is missing from Reid is to be found in the lectures of William King written down by George Livingstone for the 1618–1619 academic year. Livingstone's notebook begins with studies on the physical sciences from the end of third year and continue through to the end of fourth. King presented lectures on books one to five of Aristotle's *Physica*, which his pupil George Livingstone noted down neatly and in detail, and which was then followed by a series of lectures on anatomy that were explicitly stipulated in the university statutes for the third year.[35] In fourth year, he began, like Reid, in November with lectures on *De Caelo* (f. 72r–f. 90v) and ended with a commentary on that text in late December. Like Reid, he then taught Sacrobosco (f. 90v–f. 123r) across all books. He finished with lectures on *De Ortu et Interitu, De Meteoris*, and finally *De Anima.* These are the main outlines of the lectures of natural philosophy undertaken by students from the end of their third year and through all of their fourth

33 Henryson (1613–1614, Adv.MS.5.2.3, f. 97r–f. 110v).

34 Henryson (1613–1614, Adv.MS.5.2.3, f. 111r–f. 171v).

35 *Physica:* Livingstone (1619–1620, Dc.10.37, f. 27v–f. 67r). Anatomy: Livingstone (1619–1620, Dc.10.37, f. 68r–f. 71r). Statutes on anatomy: Morgan (1937, 113).

year. In form and structure, they faithfully follow the rubric set out in the university statues. As can be seen from the above discussion, the formal nature of the practice disputations follows the structure of the lectures. The disputation exercises represent, in sum, a distillation of the main lecture form and of the official statutes. The survival of the published disputations and the survival of the manuscript lecture notes allow us to ascertain with certainty that the published disputations reflect almost exactly the form and nature of the lectures and their formative and summative disputational assessments.

6 Lecturer Notes

We shall now turn to the last of the Edinburgh classroom notes that remain extant, which are the lecturer notes. Unlike the student dictates or the disputations, these notes are quite unusual and cannot be easily categorized. From at least 1612 onwards, a group of educationalists who had worked across Europe and had returned to Edinburgh began a process of significant reform at the city's university.[36] A collection of books, manuscripts, and instruments related to these reforms survive within the various archives of the University of Edinburgh, the National Library of Scotland, and Scotland's national museums. To varying degrees, these objects played a significant role in the educational experience of the students and regents during the period under examination here. One manuscript above all others provides concrete evidence of the infiltration of this group's intellectual milieu into the learning experience. The manuscript contains notes that were used, in effect, as a pedagogical corpus (160.000 words long) of discrete discussions on specific subjects relating broadly to cosmology. The primary author of these notes was the regent William King's uncle, Adam King.[37] Adam King's patron, Alexander Seton, the Lord Chancellor, authorized its use in education, and King's friend Patrick Sands, the principal of the University of Edinburgh, wrote a preface to the corpus. Its generic form and production context stretch back a generation before the corpus' completion to the time when Adam King was professor of mathematics and philosophy at the University of Paris from 1581 until 1595.[38] Adam's brother Alexander King is also a key figure here. As mentioned above, he was also involved

36 For these reforms, especially in relation to the establishment of the Chair of Mathematics at the university: McOmish (forthcoming).

37 The notes are contained in the special collections department of the University of Edinburgh, shelf mark Dk.7.29. Henceforth they will be referenced by this shelf mark. For an introduction to Adam King: McOmish (forthcoming), Durkan (2000).

38 Time in Paris: McOmish (forthcoming).

in educational reform in Edinburgh in this period. Before this, he was a political follower of the Duke of Lennox, Esmé Stuart; and it was in that capacity that he delivered his aforementioned controversial oration. Alexander King had been advised against giving that speech, but through Lennox's protection he felt safe to proceed.[39] Soon after the speech in 1582, the Duke of Lennox fell from power in Edinburgh and fled to Paris with Alexander Livingston, the future Earl of Linlithgow.[40] It was while in Paris with Lennox that Livingston "loaned" Jean Eduoard Du Monin, Adam King's colleague and collaborator at the University of Paris, the personal copy of the then unpublished cosmological poem *De Sphaera* by writer and educationalist George Buchanan.[41] Du Monin produced a French language version of the poem, which was in essence a versified commentary on its assumptions, and published it soon afterwards.[42] At the same time, King began to produce his own reworking of the poem in the same manner as Du Monin, with poetic paraphrasing and versified commentary on the key assumptions of Buchanan's text.[43] King would later write in 1616 to Charles, the then Prince of Wales and the future King Charles I, that Buchanan's own copy had too "come into his hand … many years before."[44] His description of the physical state of the manuscript is identical to Du Monin's description of the same.[45] This was the context of activities of Du Monin and King in relation to Buchanan's text in the 1580s. The nature of their engagement with the text shows that they both conceived of it as a pedagogical tool. They both quote a line or two largely verbatim and then make original contributions in response to the sentiment contained in the lines.[46] King and Du Monin were both actively interested in cometary theory, the possibility of many worlds and universes, and held to the belief of using their knowledge to present a representative picture of the nature of the universe.[47] Dk.7.29, the corpus of notes King wrote on his return to Edinburgh, is a large, massively expanded version of his and Du Monin's early attempts to honey the pedagogical cup for those wishing to understand the structure of the universe. The corpus presents itself as a generic com-

39 Cotton MS Caligula C.6 (British Library). Whole letter reprinted in Robertson (1824, 353–354).
40 In London en route to Paris, they had an audience with Queen Elizabeth: Boyd (1910, 251).
41 For Du Monin's access to the text through Livingston: Du Monin (1583, f. 206); for Du Monin and Adam King composing poetry together in 1586: Hamilton (1586).
42 Du Monin's poem was a paraphrase of Buchanan's poem interlaced with scientific commentary: Schmidt (1936, 274).
43 "Genethliacon Jesu Christi": McOmish (2020).
44 Dk.7.29, f.iii verso.
45 Du Monin (1583, f. 206).
46 For Du Monin: Schmidt (1936, 274). A detailed account of the process in relation to King: McOmish (2020).
47 Barbier-Mueller (2004, 322–323), so too Ridgely (1963, 150 and 161).

mentary in the scholastic tradition, with Buchanan's poem as the lemma, but one which is in effect working as structural support for a discussion that goes far beyond its scope; and the ken of its author.

The regents' use of Dk.7.29 for lectures and disputations shows that a disproportionate interpretative focus upon the forms and structures of the evidence from universities can significantly distort our understanding of what was actually happening in the classroom. The university statues, their prescribed subjects and set-text lists, and the continued employment of the traditional "Aristotelian" framework of content delivery suggest that the practice of natural philosophy in the early to middle 17th century "was still a matter of comparing the statements of different authorities and arriving at the truth by means of argument."[48] It is through a consideration of the interrelation between all of the different types of notes for Edinburgh and Adam King's work in Dk.7.29 that we see how problematic such a conclusion is. Within King's corpus, a remarkably detailed account of the contemporary collapse of Aristotelian cosmology survives. It contains lists of books and manuscripts to be consulted by the students. Most importantly for this study, it allows us to unpack all of the compressed material we have seen in both the disputations and, indeed, the dictates that are hidden from view. The "Theses Astronomicae" from 1616 on Venus and Mercury, discussed above, provides an introductory flavor of the extent to which the lecture notes have been transformed when they are subjected to pedagogical prescriptions laid out in the university decrees. Firstly, it must be stated that the text as it appears in the thesis, appendix 1, appendix 2 and appendix 3 is all derived verbatim from Dk.7.29.[49] What seems like a relatively anodyne discussion about the relative positions of the Sun, Venus, and Mercury is part of a much more pointed discussion in Dk.7.29, which is an extended exploration of the hypotheses of Johannes Kepler, Nicolas Copernicus, Francesco Maurolico, Ptolemy and others on the relative positions of the planets. The conclusion that King encourages the students to follow is that Venus is indeed farther from the Sun than Mercury, and closer to Earth. The main argument, however, is not simply about their relative positions as evidenced by solid observational data. It is that the planets revolve around the Sun.[50] King was aware that in Edinburgh, as in the rest of Europe, there were significant implications for theology and pre-Newtonian, avowedly Aristotelian notions of gravity and motion with such a conclusion. King advised the students that one way out of such a problem would be to accept the geoheliocentric system, or the so-called Tychonic system (a term King

48 Shepherd (1980, 73).
49 Dk.7.29, f. 42v.
50 Dk.7.29, f. 42v.

does not use). Regardless, King's central point was that the evidence showed that with "great probability" the planets revolved around the sun. Before leaving this final point about the Tychonic system, it should be briefly noted that calling the system 'Tychonic' in this context is unsatisfactory. There were three key figures in the broader network of educationists of which King and the Edinburgh reformers were part: Paul Wittich, John Craig, and Duncan Liddel. As Robert Westman and Owen Gingerich have demonstrated, Wittich played a significant part in the evolution of this system, which was itself part of the broader debate on comets among a network of scholars that included the Edinburgh circle.[51] John Craig was Wittich's pupil and Liddel in turn was John Craig's. Brahe would later accuse Liddel of appropriating his system without acknowledgement and then teaching it to others.[52] It is an interesting footnote to scholarly discussion on the 'Tychonic' nature of the system that it should be favorably presented in formal education at Edinburgh at this time. As has been shown in recent studies on the Chair of Mathematics at Edinburgh, Duncan Liddel was intimately involved in educational reform with the King brothers and the broader Edinburgh network at exactly the time that Dk.7.29 was being written.[53]

7 The Notes and the Curriculum

It is now necessary to emphasize the extent to which Dk.7.29 is found throughout all of the classroom notes, that is, within the dictates, the student disputation exercises, and their public renderings in the *Theses Philosophicae.* All three areas provide insight into differing aspects of its educational influence hidden from view. Firstly, with regards to the dictates, the nature of its presence as recorded in the lecture hall highlights the extent to which the central authority text of "Aristotelian" or scholastic commentary, and its implied framework as used by the regents, operated as an ancillary mechanism or heuristic map that facilitated the process of exploration of new ideas beyond the edges of the central text and its traditional scope. Richard Oosterhoff produced a timely study in 2015, defining as he did the evolution of the authority text in this context, specifically—in his case—to the *De Sphaera* of Sacrobosco.[54] Edinburgh's classroom notes corroborate Oosterhoff's general point regarding the increasingly "skeletal" role which a commen-

51 For the general scholarship on Wittich's role: Gingerich and Westman (1988, 5–19); p. 16 for the Edinburgh group.
52 Omodeo (2016, 68–72).
53 McOmish (forthcoming).
54 Oosterhoff (2015).

tary's authority text played. This can be seen most starkly in a set of student notes that not only introduce lectures as a commentary on Sacrobosco, but are also actually appended to a published edition of the said text. In 1643–44, the student Alexander Pringle recorded his notebook dictates on *Sphaera* in the manner prescribed by the university statutes.[55] The lectures on Aristotle's *De Caelo* ended in the other notes of Alexander Henryson (1613) and George Livingstone (1619) in December and their lectures on Sacrobosco began in late December. Thus it was for Alexander Pringle, who records that "a most fulsome commentary was given by the master Alexander Hepburn and copied down by me his pupil Alexander Pringle on the morning of 20th December in the year of our Lord 1643."[56] Like the other notes stretching back over a generation, the Sacrobosco lectures proceeded over two months until mid-February. In his introduction to Sacrobosco's views on habitable and uninhabitable zones, Hepburn updates the students' understanding of certain zones of the globe that were previously thought to be uninhabitable by the ancient and medieval writers. He begins by saying that navigators/explorers of the current age (*posterioris aetatis navigatores*) have traveled all the way up to 81 degrees latitude (calculating latitude from declination/celestial altitude) and found many and great islands (*multas magnasque insulas*), namely *Pharras, Frislandia, Islandia*, and the vast peninsula of *Scania*, and its many regions of Norway, Sweden, and Finland. In the next two pages, Pringle recounts Hepburn's overview of all the other new discoveries that have been made by cosmographers and cartographers in the last 100 years.[57] This section of the lectures is in its entirety taken from Dk.7.29. Here is the passage that opens the section that Hepburn reuses:

> At posterioris aetatis navigationes, ultra eos terminos ad 81 altitudinis gradum evagatae, multas magnasque insulas, Farras, Frislandiam, Islandiam, Greinlandiam, atque adeo vastam illam Schondiae peninsulam plurimis et vastissimis Norvegiae, Suediae, Finlandiae, Finmarchiae et Lappiae regionibus incoli; et ultra 72 latitudinis gradum porrigi deprehenderunt.
>
> [Yet the explorers of our age, having wandered to the limits of 81 degrees latitude, saw that many great islands, Faroes, Frisland, Iceland, Greenland stretched out beyond 72 degrees, and that the vast peninsula of Scandanavia was populated with the multiple and most expansive regions of Norway, Sweden, Finland, Finnmark, and Lapland.][58]

The only thing that has changed from the original to Hepburn's rendering is the presentation of *regionibus* in King to *regiones* in Hepburn. This is because Hepburn

55 Pringle (1643–1644, DK.5.5(2)).

56 Pringle (1643–1644, DK.5.5(2), f. 1r).

57 In overview, without the mention of specific authors' names: Pringle (1643–1644, DK.5.5(2), f. 35v–36r.)

58 Dk.7.29, f. 84v–85r.

changed the main verb of the clause necessitating a direct object. The original passage in King's notes is furnished with citations of where the regent could supply his class with further reading. King suggest Gerald Mercator and, unsurprisingly, given his own connections to the University of Paris, Guillame Postel, the former Royal Professor at the University until his death in 1581 when King was in Paris at the university.[59]

In the same manner, according to Pringle's notes, Hepburn's lectures on cosmic risings and settings are presented as a commentary to Sacrobosco chapter three "De Ortu et Occasu." Pringle records the opening to Hepburn's lecture thus:

> all of astronomy may reasonably be dissolved into two parts. One deals with hypotheses on planets and orbits, the other on consideration of the causes of what is observed. The former was undertaken by the author in the first two books, the latter he thus pursues in the remaining two to explain what can be discerned of first motion, such as in this chapter the rising and setting of stars and constellations, their ascension and descending, the inequalities of days and nights, the differing measurements of shadows, in the fourth [are] eclipses.[60]

Mutatis mutandis, Hepburn's lecture is taken from the King corpus:

> Universa Astronomia duabus potissimum partibus absoluitur; una orbium et circulorum hypotheses constituit: altera ex his φαινομένων causas deducit. Illam qua ad sphaerae cognitionem sufficere vibebatur; tribus prioribus libris **poeta noster** complexus est: hanc duobus reliquis ita persequi instituit; ut quae primi motus φαινομένα constitutis hypothesibus dependent, explicet: qualia sunt siderum et signorum ortus et occasus, dierum et noctium inaequalis varietas, umbrarum dispares mensurae: quae huic **quarto libro** materia proposita est: et eclipsium rationem, quae in **quintum librum** reservantur.[61]

I do not offer a separate translation for the passage for King's text because Hepburn's text above is identical except for two minor changes. Here the *poeta* (Buchanan) has been replaced with "author" (Sacrobosco) in Hepburn; whereas book five on the eclipses in King is chapter four in Hepburn, as it is in Sacrobosco. In a set of lectures lasting nearly a full semester, which are explicitly stated to be a commentary on Sacrobosco; and indeed is appended to that very book, the words are taken from the King corpus, whose point of reference is a different text. In this instance, there is a degree of overlap between Buchanan and Sacrobosco, one that allows this sort of interchange of commentaries.[62]

59 Dk.7.29, f. 85r.

60 Pringle (1643–1644, DK.5.5(2), f. 36r).

61 Dk.7.29, f. 93r.

62 On the influence of Sacrobosco upon Buchanan: McOmish (2018, 164–165).

Evidence of the lectures engaging directly with the King corpus, but in a less obviously convergent way, can be seen a full generation before the above example in the student notes of George Livingstone. From January 24 to 26, William King delivered a series of lectures on Sacrobosco and the "division of climes" across the world. Livingstone noted the regent's words thus: "just as geographers have identified zones from the variety of primary qualities, climes from the variety of longest days and other visible signs, so they have noted three discrete locations from a similarity of visible signs and a change of shared phenomena."[63] Again, this a verbatim section taken from the King corpus:

> Ut zonas ex primarum qualitatum, climata ex maximorum dierum, aliorumque φαινομένων varietate: sic ex similium φαινομένων communione, et parium mutatione Geographi tres situs differentias in terrae globo annotarunt.[64]

Like Hepburn's lecture from nearly a quarter of a century later, William King is using a part of Dk.7.29 where Adam King is directly engaging with one of his French contemporaries. In this instance, Adam King is using Robert Balfour's commentary and translation of Cleomedes' *Meteora* to explain the division of the world into specific climes by Cleomedes.[65] Like the other discussion on Postel, the authority text is a prop for broader discussion on new understanding. Here, however, the deficiencies of Sacrobosco as a point of reference necessitate a more significant formal departure from Sacrobosco. These lectures are taken from a section of Dk.7.29 that is in essence an extended engagement with another text, with a more satisfactory explanatory framework, being that of Cleomedes.

8 The Pedagogical Evolution of the Commentary Tradition

This type of engagement with older texts, and indeed the commentary tradition as a whole, can easily be understood as part of the humanist tradition. Here updated editions of older texts are subjected to broader and more detailed critical analysis in light of the proliferation of new studies and of newer editions and translations of classical texts.[66] Yet due to Adam King's own background and the background of

63 Livingstone (1619–1620, Dc.10.37, f. 102r).
64 Dk.7.29, f. 109v.
65 Balfour (1605).
66 For an overview of the evolution of the tradition in a humanist and early modern context: Enenkel and Nellen (2013).

those who contributed to the construction of the text both directly and indirectly, this characterization is insufficient. As discussed above, King and his fellow Parisian professor of mathematics and philosophy Du Monin made recourse to literary genres in order to explore pressing questions in natural philosophy a generation before King finally produced his large manuscript commentary.[67] Du Monin's philosophical and stylistic approach had distinctively idiosyncratic features. His poetry was "technical," "quibbling," "scholarly," characteristics which moved Ronsard to claim he had destroyed poetry.[68] The nature of his engagement with the French tradition of the cosmic journey also betrayed a tendency toward the scientific and technical at the expense of the poetical traditions of those who had preceded him in the genre.[69] The King corpus is an extension of this generic field. It aims at truth by exploring the validity of multiple perspectives in an increasingly non-esoteric way. Moreover, the King corpus reflects a methodological disposition that King acquired in Paris. In 1597, King signed the *album amicorum* of Johann Van Reigersberg, the Dutch scholar. In this album, he used the title that he last held at Paris before leaving just over a year before: Petrus Ramus Professor of Mathematics.[70] In his will outlining the qualities the chair that bore his name, Ramus stated that the holder must be well-versed in Latin and Greek, know geometry, arithmetic, optics and mechanics.[71] Although King praises the central text as a beautiful artistic artifact and useful mnemonic device for recognizing celestial phenomena, its most basic function is as a mechanism (the skeletal frame referred to above) to encourage observational astronomy, avoid unprovable philosophical assumptions, and augment students' knowledge.

In the same year King began his work on educational reform at Edinburgh, his immediate successor as the Petrus Ramus Professor of Mathematics in Paris, David Sinclair, began to develop his work on Copernicus, which he had embarked upon in 1596.[72] That year, David Sinclair, his colleague Thomas Seget, and Adam King were in Edinburgh together under the protection of the Seton family during a ser-

67 Du Monin (1583). King's poetry produced at the same time, from the same source (Buchanan's MS), and covering the same topics: McOmish (2020).

68 Lecointe (2010, 271, note 4 and 281).

69 Ridgely (1963, 149–150 especially, but passim).

70 Van Reigersberg (1597, BPL 2702, f. 45r) for King's entry.

71 Waddington (1855, 326–328).

72 He was employed by Adam King's former colleague John Fraser at the University of Paris, where he became Petrus Ramus Professor: Pantin (2006, passim). For Sinclair's work on Copernicus starting in 1596: Lerner (2000, 61–62). Sinclair's arrival in Paris: Dempster (1627, 595). Overview of his surviving work: Durkan (2002, 113–114).

ies of Calvinist purges of Scottish political and academic life.[73] Whereas King used Buchanan to introduce students to Copernicus, Kepler, and Galileo, by 1607 Sinclair had begun to comment directly upon the contemporary texts. Sinclair's lectures on Copernicus' *De Revolutionibus* represent the first evidence from this time that this text was formally taught at Paris. Sinclair's words on Copernicus from the years 1607 to 1608 survive thanks to the dictates taken down by a student by the name of R. Grocques. Sinclair called his lectures a commentary on the "sphere" of Copernicus and the form and content of the text bear striking similarities to the form and content of King's work.[74] Both works emerged in the context of the general cosmological crises of the late 16th century and early 17th century; and Copernicus, Buchanan and even Sacrobosco serve to introduce the pressing problems of comets and the slow demise of the old Aristotelian cosmological model.[75] The nature and use of both texts highlight the increasing pressures that the scholastic educational tradition of commentary lectures were subject to in this period. When understood within this timeframe, King's work in Dk.7.29 is part of an evolving tradition that stretches back to his early Parisian days and continued into the time of his successor David Sinclair.

9 Published Disputations

King's manuscript functioned in this way as a pedagogical tool in order to develop discussion beyond the confines of the old scholastic framework for lecturers at Edinburgh from the beginning to the middle of the 17th century. It was especially important in an astronomical and cosmological context. Yet, as the attentive reader will have noticed, unlike the disciplinary areas of logic, ethics, and general physics, there has been no mention made as yet of practice disputations with regard to astronomy and cosmology. This is due to the absence of specifically astronomical the-

73 Sinclair was the master to the children of Robert Seton, Earl of Winton from at least 1596 until 1599: NRS CH2/185 and Seton (1896, 214). Seget was also employed by Robert Seton in the same capacity: NRS CH2/185 and Seton (1896, 213). Both men were arraigned before the presbytery for nonconformity to the reformed faith. Adam King returned to Edinburgh in 1595 and was arraigned in 1596 by the Edinburgh presbytery for nearly a year for not subscribing to the articles of the reformed faith: NRS CH2/121/2, from December 1595 to September 1596. King would later thank the brother of Robert Seton, Alexander Seton, Earl of Dunfermline, for his "constant support": Dk.7.29, a letter prefacing poetic corpus dedicated by King to Seton and appended as separate manuscript at back.

74 It is likely that Sinclair produced a 1612 teaching edition with selected passages from Copernicus acting as *lemmata* for students: Lerner (2000).

75 McOmish (forthcoming).

ses in the practice disputations for the notebooks discussed above—even in those which are solely notes for astronomical lectures like Pringle's. Given how detailed the student notebooks are, with the dictation of all subjects, names and dates; and with practice disputations in the same way, this may seem strange. However, again it seems to reflect the general stipulation of the university decrees on the degree structure. It is repeated throughout the official documents that, across all years, logic, ethics, and physics were to be debated. There is no specific mention of astronomy. There is evidence, though, that the conclusions that were suggested to the students in the natural philosophical sections of the King corpus bled into all other sections of the notes and subjects as the cosmological implications of those views began to undermine the philosophical and metaphysical assumptions of the other subjects. A noteworthy example of this is the discussion of the rejection of the doctrine of the solid celestial spheres found in the King corpus and the cascading influence that the discussion had across the other scholastic categories of the disputations across two generations.[76] Regardless, there are no practice astronomical disputations in notebooks. However, given the close relationship between the notebook disputations and the published versions discussed above, and the close relationship between formal assessment and the disputations in general, highlighting the quantitative indebtedness of the published astronomical disputations to the King corpus helps to fill the gap in this sphere of student experience. The published disputations of the astronomical theses from William King's first class at the beginning of the 17th century until the last produced by Alexander Hepburn's class in 1632 represent by far the most detailed and extensive of all the surviving theses from across the whole of the 17th century. The astronomical theses for these classes are in their totality edited sections of the lecturer notes. Each thesis, each appendix, and each conclusion is a faithful and verbatim replication of the lecture notes Adam King wrote explicitly for use in the classroom.[77] The quantitative reliance of the published disputations upon the King corpus of lecturer notes has been established in two foundational studies on the astronomical theses from the early 17th century onwards, which also includes the theses of the regent Andrew Young (1601–1623), who was William King's teacher at the start of the century.[78]

Young's use of the lecturer notes highlight a significant methodological shift within the classroom context. For Young and his students, Dk.7.29 provided a template for how to measure and observe astronomical phenomena. The published

76 A full account of this process is found at: McOmish (2023).

77 Alexander Seton, the Lord Chancellor endorsed its use for education and likewise Patrick Sands, senior academic and future principal of the university: Dk.7.29, f. iv–v.

78 McOmish (2022) and (2023).

theses of Young highlight both the use of Dk.7.29 and how it inspired students to use their private classes for observational astronomy. Young edits Dk.7.29 so as to include new material from his class's private astronomical observations. This type of editing process of the King lecture notes for publication also draws attention to some of the negative pressures to which the students and regents were responding. There is a significant divergence between the educational experience in the "private schools" and the educational experience presented to the general public in many of the published theses. As seen above, particularly charged cosmological debates on the orbits of the planets (Venus and Mercury) found in Dk.7.29 are presented in a relatively anodyne manner in the published theses. Two further examples of this process demonstrate how the public context of the graduation disputations altered its contents. They make evident how invaluable these notes are for our understanding of what was happening in education beyond the façade. The astronomical theses for the graduating class of 1612–1616 class show that the students debated the significance of the comet that had appeared in the sky in 1577.[79] The students' allocated task of "debating" this thesis began thus:

> Through clear and compelling proof, many astronomers of great reputation have concluded that the comet, which was visible for almost three months in the year 1577, remained consistently above the Moon in the region of ether, as evidenced by its motion being slower than lunar motion, by the line from the celestial equator which it traced with its own motion, and its lesser angular divergence from the Moon's, which was often scarcely perceptible.[80]

As mentioned above, all of the astronomical theses in this period are taken from the lecturer notes.[81] It is interesting to note here that the students defend this proposition with two religious appendices. Appendix 1 states that sacred literature supports the notion of celestial mutability. Appendix 2 quotes from the Bible (Psalm 101) to support the general concept of divine change. This represents a significant manipulation of the source text. The section in the lecturer notes from which the title thesis is taken verbatim provides a detailed overview of the proofs for the celestial change the comets appearance and disappearance represented. Supporting evidence (reference and citation) is afforded by Johannes Kepler, Michael Maestlin, Tycho Brahe, Cornelius Gemma and many others. This is omitted in the public disputation. In its place, there is a passage from a completely different

79 King (1616, thesis 7). For a translation of the 1616 astronomical theses: Mcomish (2022, 192–193).
80 King (1616, thesis 7): "*Cometam a. d. 1577 tribus fere mensibus conspicuam, ex uniformi eius motu tardiore Lunari, ex ductu maximi circuli quem motu proprio designavit, ex Parallaxi minore Lunari, et interdum vix sensili: plerique magni nominis astronomi in aetheris regione Luna superiori constitisse evidenti et firma demonstratione collegerunt.*"
81 This section: Dk.7.29, f. 39v–40r.

section of the lecturer notes in which Adam King rejects Buchanan's contention about ancient sources having rejected the notion of celestial mutability. In addition to various pagan and esoteric ideas from antiquity, King then furnishes the two examples from scripture to show that this is not even true within the strict confines of Christian literature.[82] Here the audience have clearly influenced the academic presentation of the students' learning.

Another example of such willful manipulation of the notes can be found in the astronomical theses dealing with astrology. In thesis 9 of the 1616 astronomical theses, the students introduce the topic of judicial astrology and its philosophical implications. The students debate the idea that such astrological conjecture robs humans of free will and agency. It is then presented in the first appendix as a potentially pervasive and negative influence upon human affairs. In the next and final appendix the students condemn it completely:

> We condemn astrologers of this type, disreputable through their pseudo-occupation, whom, having been condemned by the statutes of the laws, it is justified to punish; unless they partake moderately, and confine themselves within the limits prescribed for a technique which is supported by conjecture only.[83]

The thesis and its two appendices are extracts from a section of Dk.7.29 where there is an extended discussion on the nature of celestial influence.[84] The point of reference for King's work is a statement from Buchanan's poem that the astrologer plays upon the stupidity of the common people. Despite the seemingly hostile attitude towards astrology from the section of the commentary that the students reuse, in reality this section represents a nuanced introduction for the students to the subject of astrology. King draws back from an outright condemnation of astrology and states that it actually does no harm (*nec iniuria*) should practitioners acknowledge it as conjecture. In his commentary, he encourages students to follow this up and read Ptolemy, *Apotelesmatum* lib. 1, cap. 2. In Dk.7.29, in the passage immediately following the text found at appendix 2 of the published theses, where the students condemn astrology, King quotes Ficino, *In Plotinum* 2.3.7, and suggests that stars simply contribute to the production of effects, and are not the determiners of fate: "Ficino rightly reckons that 'stars neither affect everything nor, when they do affect, do they condition everything; they also indicate many things

82 Dk.7.29, f. 61r.

83 King (1616, thesis 9): "*Damnamus huiusmodi astrologos tanquam professione infames, legum constitutionibus damnatos, supplicio affici aequum est: nisi sobrie sapiant, et artis, quae solis coniecturis innixa est, iustis finibus sese contineant.*"

84 Dk.7.29, f. 113v–114r.

in which they played no role themselves.'"[85] King goes on to explain that certain astrologers have money and achieved notoriety from preying on the fears and credulity of people by providing detailed prognostications concerning the minutia of their individual lives. These type of people, King asserts, have been condemned by skeptics and theologians alike.[86] The thesis and appendices shown above have been edited in such a way as to provide an unequivocal condemnation of astrology and align the students with that condemnation ("we" instead of "they" in Dk.7.29). In reality, the lecture notes, whose passages and opinions are found throughout the detailed records, practice disputations, and in every astronomical thesis, presents the students with a nuanced overview of the advantages of the "craft"; and also a set of norms and rules to understand, so that they do not fall foul of either state or religious sanction on the matter. Without any cross-reference between disputations and the manuscript commentary, this nuanced understanding of astrology in the classroom would be lost.

10 Conclusion: Intellectual Changes beyond the Form

The mass of student and classroom notes from Edinburgh in this period allow us to look beyond local considerations: like religious mores with their strident and dominant voice, or traditional educational practices, with their recognizable outlines. Once inside the private classroom, many of the trends, ideas, philosophical positions, scientific experimentation that would be expected of educationalists working at a tertiary level in this period would come to the fore. Yes, the classroom notes reflect local and Europe-wide educational practices, which had been the backbone of the educational experience from the medieval period onwards. However, in Edinburgh's case, when due consideration is given to the details of the teaching notes and the student notebooks we can discern the aggregate product of the educational and intellectual experiences of a group of itinerant scholars who returned to Edinburgh in the early 17th century from centers across Europe. Cross-references between all of these fascinating handwritten notes reveal how students were constantly being kept abreast of the latest developments in 17th-cen-

85 Dk.7.29, f. 114r: "*Ficinus vere colligit, stellas neque omnia facere, neque ubi agunt, omnia peragere: multa etiam significare, quae ipsae non agant: non omnia inquam facere, ne mala faciant; vel Deus non provideat, vel sit iniustus, stellaeque sint iniustae.*"

86 Dk.7.29, f. 114r: "*tam ex academia et lycaeo philosophi, quam in religione Christiana theologi damnant… astrologos tanquam professione infames, legum constitutionibus damnatos…*"

tury scientific culture, albeit within a recognizably scholastic pedagogical framework. Moreover, they provide an invaluable insight into how changes in disciplinary boundaries were being created and how those changes were explored within the private schools.

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