

Sidereal Messages: Print Letters in Restoration Astronomical Writing

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Abstract: Astronomy, a paradigmatic observational discipline of early modern ‘science’, relied on epistolary communication for coordinating practitioners across the world, publishing discoveries and theories, and seeking their confirmation from other virtuosi. Epistolary form ‘travelled’ from an individual exchange between scholars, via the print publication of such letters for the benefit of a wider readership, to the framing of bespoke isagogic textbooks. This article explores the affordances of Restoration printed astronomical letters, contrasting their performance of familiarity between sender and recipient with the public nature of the communication. By reference to letters published in the *Philosophical Transactions*, individual print letters, and letter-books, including Christiaan Huygens’s *Cosmotheoros*, the article shows how each type utilizes the familiar and the formal aspects of the letter form differently. The print letter emerges as a form uniquely suited for performing individual authority and fashioning an expert community, as well as communicating expert knowledge to non-specialists.

Keywords: astronomical textbooks, astronomy, epistolary form, popular science, print letters, Restoration, scientific revolution

Many well-known early modern writers on astronomy, including Tycho Brahe, Galileo Galilei, and Christiaan Huygens, chose to publish their work through letters. In the eighteenth century, the form of the epistolary astronomical treatise was famously employed by Thomas Wright in his *Original Theory or New Hypothesis of the Universe* (1750), as well as by Johann Heinrich Lambert for his *Cosmologische Briefe über die Einrichtung des Weltbaues* (1761, translated into English in 1800) and in the textbook that inspired two generations of Romantics, John Bonnycastle’s *Introduction to Astronomy* (1st edn, 1786, 8th edn, 1822). Famously, the letter was also the medium of choice for the Royal Society’s *Philosophical Transactions*, and both within and beyond the community of virtuosi, anonymous print letters addressed astronomical questions.

This essay surveys Restoration instances of the enduring early modern connection between the print letter and astronomy. It aims to understand better the interconnections between this literary form and early modern science: which affordances¹ of the print letter were particularly suited to astronomers, and why? What made astronomy a salient object for epistolary writing? Which formal conventions affected the communication and production of astronomical knowledge, and how did astronomical subjects impact literary practice? By contrast to the interest in manuscript communication between early modern natural philosophers,² the ‘scientific’ print letter has received less attention. Manuscript letters between virtuosi were often considered fair game for publication, but their transferral to print thoroughly recontextualized them — not to mention the use of fictitious letters in print. In focusing her discussion of ‘the rhetoric of scientific correspondence’ on manuscript letters, Claire Preston suggests that the printed letter tended to

'introduce and excise certain features in the interests of shapeliness and elegant expression'.³ If we take form seriously, not only as 'a tool of knowledge', but as 'a category of ontology',⁴ then surely those introductions and excisions, and the nature of shapeliness expected here, deserve our attention. What is more, changes were not restricted to rhetoric and formal elegance: as we will see, epistolary writing was also used precisely because it afforded familiarity to the point of plainness and even bluntness.

1. *The Poetics of Epistolary Astronomical Writing in Print*

In seeking to understand the Restoration association between astronomy and epistolary writing, it is instructive to consider its eighteenth-century sequel. Wright, in his preface to the *Original Theory*, claimed that his book was made up of letters he 'ventured to give [...], at the Request of his Friends, to the Publick',⁵ suggesting that they originally circulated as familiar letters among a small coterie. And indeed, the eponymous 'Nine Familiar Letters from the Author to his Friend' occasionally characterize their correspondents, commenting on 'the agreeable Conversation of our last meeting'⁶ that initiated the exchange, appealing to their familiarity with each other's personality traits and opinions,⁷ and to their shared appreciation of poetry.⁸ There are references to letters not included in the book and to personal meetings between letters.⁹ For all their familiarity, the 'master' acknowledges a possible wider readership for his letters, speculating that 'it is much more reasonable to expect, that fifty Persons will read these Letters without perceiving the Reasonableness of them, than that five should consider them with proper Judgment'.¹⁰

Lambert, in the preface to the original German version of *Cosmologische Briefe* (consisting of twenty letters), explains that he initially envisioned the book as a successor to Fontenelle's immensely popular dialogue on the plurality of worlds. However, he concedes he found himself unable to imitate the Frenchman's wit, nor to avoid lengthy and dry discussions, for which he felt the letter was better suited than the dialogue.¹¹ He comments on the characters of his fictional correspondents, stressing their friendship and like-mindedness. The 'student' character is cast as more dynamic than the 'master', learning and acquiring the taste for sustained inquiry.¹² Further, Lambert apologizes for such 'praise and courtesies' required by the epistolary form, which he would have dispensed with if writing under his own name. He asks the reader to view these flourishes as 'rest stops' between the more tasking passages.¹³ Notably, the abridged French version (2nd edn, 1784) that James Jacque translated into English did away with the epistolary fiction, explaining in the preface that

These Letters have somewhat of the freedom of arrangement which the epistolary style admits: the different subjects are blended together, and the train of ideas break [*sic*] off abruptly; circumstances which require frequent references to what has gone before, and a degree of attention not easily commanded by the bulk of readers.¹⁴

By alleviating these shortcomings, Jacque's digest promises to 'compensate the reader for the loss he would sustain in respect of the beauties of style':¹⁵ what Lambert had apologized for including, the translator regrets to forgo.

Near the end of the eighteenth century, finally, John Bonnycastle offered as a rationale for his textbook's epistolary form that there was now a massive demand in 'every rank and order of society' for astronomical knowledge, and non-specialist readers would find the letter form particularly useful.¹⁶ Like Wright, he claims his letters originated as familiar letters 'for the private use of an individual', but since no introduction to astronomy of its sort

was available to the general reader, he 'was induced to make them public'.¹⁷ The letter form, Bonnycastle states, allows him to write in a sufficiently accessible style for a popular readership, 'to make free use of the labours of preceding Writers' without necessarily acknowledging the debt, and in particular to include 'frequent allusions to the Poets [...] intended as an agreeable relief to minds unaccustomed to the regular deduction of facts by mathematical reasoning'.¹⁸ Somewhat surprisingly, then, at the beginning of Letter I, the 'master' complains that the epistolary mode of instruction requested by their correspondent is 'less favourable to improvement' than the preferred 'personal intercourse', which is, however, rendered impossible by their 'different situations and engagements'.¹⁹ More surprisingly still, given Bonnycastle's extensive commentary on epistolary form, the pretence of correspondence is simply dropped with Letter II (which has no salutations at the opening or end) and never picked up again, not even at the end of the book.

A poetics of epistolary astronomical writing in print emerges from these authorial reflections on the genre. Foremost, the conventions of the familiar letter are evoked in the service of popularization: a demand for astronomical knowledge by non-specialist readers is claimed, and the letter form is said to afford a conversational tone and a manner of organizing 'units' of knowledge that makes it easier for these readers to follow. Authors evidently feel that the characterization of correspondents contributes to this affective quality, as does the integration of specialist knowledge without excessive discussion or documentation, and of quotations from well-known poets. These are features directly taken from the 'other' conversational form for popularizing scientific knowledge, the dialogue — most influentially, Fontenelle's *Entretiens sur la pluralité des mondes* (1686).²⁰ At the same time, and by contrast with the dialogue, the letter is said to afford more technical and sustained discussions, as well as rhetorical flourishes, both of which may either embellish or interfere with plain instruction. In dialogue — the written equivalent of a (fictional) spoken conversation — both features would have violated the conventions of formal realism; in a letter, ornament and technical detail are admissible by the fiction of less spontaneous, solitary composition.

Wright, Lambert, and Bonnycastle deem one feature of epistolary writing particularly useful: its foregrounding of the recipient alongside that of the writer. Although all three letter-books only reproduce the 'master's' half of the correspondence, the letter's credit derives from the interplay between both correspondents. The authors also appeal to a social bond between correspondents that, as Gary Schneider has shown, could be used in print letters 'to tie together individuals who never corresponded to fix them as like-minded'.²¹ In this sense, Diana G. Barnes calls the printed familiar letter 'a sociable form that speaks for the group rather than the individual, [...] provid[ing] the discourse and rhetoric to conceptualise a more inclusive vision of community', as 'print opened this discussion to the reading public'.²² In scientific print letters, the nature of the community at issue is originally limited — the *res publica literaria* is very much in the process of self-definition in the second half of the seventeenth century, and epistolary form was one medium of self-fashioning, internally as well as externally.²³ Next to differences in erudition, such as the classic master–student relationship familiar from the dialogue genre, differences of estate and relationships of patronage mattered,²⁴ as did differences of gender²⁵ and nationality.²⁶ Epistolary form mediated between the intersectional sub-stratifications of the emerging republic of letters, and it became a means for the community of virtuosi 'to fashion themselves [...] as exemplary of the courtesy and conduct required for the prosecution of collaborative investigative projects and discussions in the virtual world'.²⁷ The form of communication thus defined the nature not only of dialogue but of the community itself. This entailed a levelling of hierarchies whereby truths were 'authorized'

increasingly less through the patronage system and instead through 'self-authorising corporations, such as the Royal Society [...] bound by the proto-democratic practice of friendship and alliance of choice'.²⁸ However, and crucially, the genre also proves effective at the interface between the community and the wider public. It helped disseminate findings of the virtuosi and create, or sustain, popular interest in their pursuits.²⁹ 'Self-definition' thus involves not only an agreement on which forms should govern social relations and epistemology *within* the community of virtuosi but also an attempt to present that community and its concerns to those on its margins or outside it.

As Oded Rabinovitch has recently suggested, the seventeenth and eighteenth centuries saw great popular interest in the 'system of the world' at a time when among specialists, the cosmological debate had largely been settled. The reason for this, Rabinovitch argues, is that the system of the world emblemized the recent changes in natural philosophy in a way that could be grasped even without much technical expertise: it became 'common currency in a wider dialogue that matched specialists at the "core" in constant dialogue with an astronomical "penumbra" of interested amateurs'.³⁰ In this sense, astronomical letters are a particularly salient field of inquiry because astronomy is paradigmatic of the 'scientific revolution' at large, transforming during the seventeenth century from an abstract, mathematical practice into an empirical, observational science. The former was opaque to non-specialists, but at the same time, it was deemed immediately relevant to travellers, to commerce, medicine, theology, and empire.³¹ In spite of the introduction of much-improved telescopes by Galileo and others in the early seventeenth century, naked-eye observation continued well into the Restoration period, with Johannes Hevelius as a prominent practitioner. Either way, the exactitude of observations was a central point of astronomers' correspondence, and the instruments they used — telescopic and otherwise — were often described in detail. As Lorraine Daston points out,

By circa 1600, [...] observation had become an epistemic genre, especially among astronomers and physicians but also among jurists and philologists. [...] Characteristic of [that] emergent epistemic genre [...] was, first, an emphasis on singular events, witnessed firsthand (*autopsia*) by a named author [...]; second, a deliberate effort to separate observation from conjecture [...]; and third, the creation of virtual communities of observers dispersed over time and space, who communicated and pooled their observations in letters and publications [...].³²

All three characteristics of this new genre are central to astronomical communication in the period. And, as Adam Mosley has maintained of manuscript astronomical communication, 'letters often shaped the theories and observing strategies employed at different locations, and sometimes performed the role of *calibrating* the astronomical work carried out by different practitioners', thus linking all three characteristics identified by Daston.³³ However, the form of the *printed* astronomical letter also affords a link between the public and the private in that identifiable individuals publicly contributed to a collective enterprise: 'the possibility to publish letters or large epistolary collections [in print] offered unprecedented opportunities to deploy strategies of co-optation and exclusion at the corporate level, as well as of self-fashioning and discrediting of adversaries at the level of individual career strategies.'³⁴ This was all the more so because, perhaps foremost among the observational sciences, astronomy was closely involved in the period's political, imperial, and mercantile contests through the quest for a means of determining the longitude at sea. Individual astronomers competed for patronage, and the reception of their work could affect their funding. Hence, their published correspondence was a 'technology of the self'³⁵ aimed not only at quickly circulating discoveries, technological improvements,

and theories and offering them for scrutiny to the expert community³⁶ but also at establishing their personal priority and excellence.

As contemporaries perceived that theirs was a time of momentous change, the letter form's relationship to temporality became another key affordance. Among the functions of early modern vernacular letter writing that came to influence the emerging genre of the novel, Claudio Guillén has drawn attention to the way 'the letter provides us with the illusion of a vital present from the angle of the present, and with that of an open and perhaps unpredictable future'.³⁷ This illusion is of central importance to early modern scientific communication, within the community of virtuosi as much as between community and public.³⁸ In both cases, the present mattered: Achim Landwehr has contended that the seventeenth century saw the very 'birth of the present';³⁹ and as Thomas Wallnig has shown, letters in print became a medium for the 'temporalization of knowledge' in that they allowed registering who communicated which insights, when, and to whom.⁴⁰ Apologists for the new science expounded the difference between the past neglect of the study of nature and the present's precarious promise of improvement.⁴¹ The form of the letter — also a prime medium for the communication of news⁴² — thus spoke directly to a sense of urgency and immediacy attached to the awareness that natural philosophy and its world picture, emblemized by astronomy and the 'system of the world', were undergoing substantial transformation. That transformation also concerned the political interpretation and instrumentalization of astronomical phenomena, specifically of comets. Epistolary form allowed for a timely response to their appearance (traditionally seen as an ill omen) by reference to specific sightings, observers, and their interpretations.

The medium of print, however, clearly affected a letter's temporality. Even if a print letter derived from an original manuscript, the process of publication entailed a delay: editing, type-setting, printing, binding, distributing, and selling might improve the likelihood of a letter's survival independent of manuscript copies, but reduced the implied immediacy of communication, retaining it as more of a fiction similar to Richardson's 'writing to the moment'. This fictionalization concerns not only the temporal but also the social dimension: the print letter's reader is not its nominal addressee but is allowed to share affectively in the relationship between the original correspondents. This social and temporal complexity is part of the 'deictic organization of epistolary worlds',⁴³ which for astronomical letters includes a peculiarity regarding the spatial dimension: like other 'scientific' letters, they highlight a geographical remove between the correspondents (plus, their 'observers' in print), but this is inevitably dwarfed and effectively erased by the much greater distance between the heavenly object of observation and its observers. This is a specific affordance of the astronomical letter: it unites the correspondents through their terrestrial situatedness and their interest in the sidereal object, but it also foregrounds differences in their temporal and social positions.⁴⁴ The former is unaffected by the letter's transferral to print, the latter (potentially) heightened.

The printed letter book was less immediate still, but it could harness the temporal, spatial, and social dimensions to demonstrate the importance of an individual node in a network spanning space, time, and social strata.⁴⁵ For Tycho Brahe's *Epistolae astronomicae* (1596), the print publication of manuscript letters has been shown to constitute a means of self-fashioning,⁴⁶ and a similar case can be observed in the remarkable collection of letters of 'illustrious and famous men', gathered over the course of many years, to the 'most noble, respected and learned' Johann Hevelius, containing praise for his astronomical works.⁴⁷ Publications like these illustrate how the manuscript letter is printed for the purpose of vindicating its recipient and subject. Especially given that many of Hevelius's correspondents were still alive when his collection was published, such an enterprise is

testament to the habit of 'unilateral' publication. Correspondents would expect their writings to travel beyond the original recipients to their respective networks through manuscript copies of their letters, actively flagging confidential letters or passages as such. In this sense, the *Philosophical Transactions* were a labour-saving device for their first publisher Henry Oldenburg, who could simply print letters he would otherwise have passed on in individual copies to his vast correspondence network.

The early modern 'scientific' manuscript letter, then, was already a semi-public form that, nonetheless and by convention, exploited the fiction of confidential candidness and intimacy between the two ostensible correspondents.⁴⁸ Critical comments on the work of others might be framed as 'off-the-record' and more fiercely worded than civility demanded in public — affording the opportunity for a public slating without nominally violating the rules of decorum. This conventional ambiguity is captured, to a degree, in the differentiation between the 'familiar' and the 'formal' letter, the latter of which occupies 'rhetorical ground between the strictly private and the public'.⁴⁹ The multi-dimensional complexity of the early modern astronomical print letter's generic matrix is apparent from this brief discussion. It remains to explore how the various affordances and potentials of the form were actualized and strategically employed in practice.

2. Restoration Epistolary Astronomical Writing in Print

English astronomical letters in print appearing during the Restoration period fall into three broad categories: the individually printed letter; the letter appearing in individual collections, by either a single astronomer or various; and the letters collected in the *Philosophical Transactions*. The uses of epistolary form differ in each.

The period's best-known group of scientific epistolary writings in print is, of course, the *Philosophical Transactions*. In the words of their creator, Henry Oldenburg, they aimed to represent, to the Royal Society, 'that many Minds and Hands are in many places industriously employed',⁵⁰ facilitating the de-centralisation of knowledge that was at the heart of its programme. To that purpose, Oldenburg wrote, 'there is nothing more necessary [...] than the communicating to such, as apply their Studies and Endeavours that way, such things as are discovered or put in practise by others.'⁵¹ The early *Philosophical Transactions* were nothing if not a forum for epistolary exchange, and most contributors sent 'letters which were thinly disguised papers. They began "Dear Sir" or its equivalent, and ended "yours," but otherwise made little concession to the epistolary style'.⁵² Still, the form seemed to imply sufficient mutual respect and obligation between correspondents that it was worthwhile upholding: in 1666, Oldenburg reminded his readers that membership in that community was predicated on personal virtue as much as expertise, expressing his hope that 'our Ingenious Correspondents have examin'd all circumstances of their communicated Relations, with all the care and diligence necessary to be used in such Collections'.⁵³ The form of the scientific or erudite letter entails a special obligation to diligence, and consequently, writers of this type of letter produce not only knowledge about their subject but also about themselves as virtuosi and members of a courteous and like-minded community.⁵⁴

Between 1665 and 1700, some two hundred items treat of astronomical subjects in the *Philosophical Transactions*, ranging in form from introductions by the editor through letters by astronomers and others, sometimes accompanied by illustrations and tables of observational data, to book reviews. Out of these two hundred, some eighty resemble letters —

either because they are called thus (or ‘extracts’, ‘parts’, or ‘abstracts’ of letters) or because they employ generic markers such as the address to an individual (or, in some cases, a community), the use of second person pronouns in the text body, and a valedictory formula followed by the author’s name. Many of these are titled ‘observations’, some ‘accounts’, and in exceptional cases, ‘communications’, ‘sentiments’, and ‘proposals’. Their topics range from ephemerides (predictions of the trajectories of comets and planetary satellites) through observations of ‘new’ heavenly bodies and the behaviour of the known, such as eclipses and sunspots, to reflections on the distance of the fixed stars from earth and, increasingly, means of determining the longitude at sea. Most are in English or Latin (as Oldenburg moved from translating his correspondence for the *Philosophical Transactions* to including original versions). Authors are almost always identified, offering them a means for ‘making a name for themselves’ but also staking their reputation on the reliability of their data.

Many correspondents of the *Philosophical Transactions* ask the international community of readers, or indeed individual readers — rather than the nominal addressee, the publisher, or the Royal Society — for observational data to supply their own. The letter format, programmatically free from rhetorical flourishes, enabled the timely and poignant exchange of information between distant locations and observatories; and for astronomical measurements, both distance and instrumentation could be decisive. Thus, John Flamsteed wrote in 1673, before he was named Astronomer Royal, lamenting the inadequacy of Tycho’s charts of the fixed stars: ‘It would be a task deserving of the pains and accuracy of the Learned *Cassini*, and of all others that have good Observatories and Instruments, to endeavour the Restoring of the Fix’t Stars [...]’.⁵⁵ At a point when they were not personally acquainted, Flamsteed uses the ‘forum’ of the *Philosophical Transactions* for contacting Cassini in a ‘cold-call letter’ and directing the international community towards what he feels they should be doing. Authors also ask readers for feedback on their theories and confirmation or contradictions to their ephemerides, and they announce forthcoming publications, perhaps with a view to claiming priority publicly.⁵⁶

The individuals involved in the correspondence self-consciously act as nodes in a larger network, and the collected letters create a textual web of their own.⁵⁷ In 1676, for instance, a Latin letter to Oldenburg (addressed by name) from Cassini comparing Flamsteed’s observations of an eclipse with his own is followed immediately by a letter from Cassini to Flamsteed, referring back to the letter to Oldenburg and expressing hope that their data may be reconciled. A third letter follows, again from Cassini to Oldenburg, on another subject but charging Oldenburg to pass on the information to ‘Flamstedio nostro’; finally, the volume prints Flamsteed’s reply to all three letters.⁵⁸ In spite of its belated print publication, this arrangement creates a sense of temporal urgency and of community — the implication of printing the exchange is that it is of relevance to the readers (not least, as a model of how to produce insight collectively) and that the correspondents invite the readers’ contributions. If Oldenburg is seen to represent the Royal Society, then the combination of letters to him and Flamsteed suggests Cassini’s eagerness to communicate with the freshly appointed Astronomer Royal on both an institutional and a personal level — the fact that Cassini represented the Royal Observatory at Paris lends more weight to the proceedings still, and of course, both Cassini and Flamsteed were also individually renowned astronomers. The *Philosophical Transactions* then are testament to the multiple ties established, through correspondents in various capacities, at a crucial point in the institutionalization of astronomy in Britain and Europe.

The much-discussed epistolary conflict between Adrien Auzout and Johannes Hevelius conducted in the early volumes of the *Philosophical Transactions* (1665/66) concerned

contradictory observational data on a comet collected by both men, and the Society was called upon to determine whose data was to be trusted. As Steven Shapin puts it, this entailed both ‘a dispute about *things*’ — astronomical facts — and ‘a dispute about *people*, their virtues and capacities’: ‘Whose testimony might be trusted to constitute others’ stock of factual knowledge?’ Shapin concludes:

The proceedings did not [...] *alternate* between knowledge of people and knowledge of things. Rather, knowledge of people was constitutively used to make and unmake knowledge of things. There was no point at which participants could help themselves to a pure form of ‘thing-knowledge’ since [...] schemes of plausibility are built up through prior decisions about who, and in what connections, counts as a trustworthy source.⁵⁹

This bears repeating, because as a form, the scientific letter negotiates the very same mutuality between ‘what’ is reported and ‘who’ reports it. If ‘people knowledge’ and ‘thing knowledge’ are mutually constitutive, the letter is where this mutual constitution manifests: the reported facts are vouched for by the author in a space that is self-consciously private *and* public, predicated on a public, scholarly reputation that rests on his private, moral integrity. By including a letter in the *Philosophical Transactions*, Oldenburg bestowed on it the stamp of approval and of obligation to the professed values of care and diligence. Conversely, the Royal Society benefitted from the association of renowned individuals, expanding the network in a mutual exchange of credit. At a time before the scientific paper had developed as a genre — as it would in the pages of the eighteenth-century *Philosophical Transactions*⁶⁰ — the combination of the public and the private afforded by the letter form was uniquely suited to the Restoration conception of science. In terms of ‘thing-knowledge’, the letter affords the use of shorthand or brevity — contributors often stress that they will not explain everything, because they assume an expert audience — establishing a strong connectivity through shared knowledge but at the same time clearly delimiting their network against outsiders.

The relatively formal tone of letters in the *Philosophical Transactions* is not surprising for twenty-first century readers in the context of scientific publication. By contrast with Restoration practice in the other two groups of astronomical letters in print, however, it is more remarkable. As Adrian Johns has pointed out, the *Philosophical Transactions* struggled to maintain their identity when individual letters on scientific topics appeared in print format and design replicating the periodical’s appearance: ‘For virtuosi depending so absolutely on the veracity of the *Transactions*, the implication was rather terrifying. This journal was the guardian of credit; but who would — who *could* — guard the guardian?’⁶¹ Exploring the nature of the difference between scientific letters in the journal and outside it helps understand this terror.

Out of the large number of individual astronomical print letters appearing in England and on the continent, in Latin and the vernacular, two examples must suffice.⁶² *The blazing star; or, A discourse of comets* purports, in its title, to be ‘a letter from J.B. to T.C. concerning the late comet seen on Sunday, December the 11, 1664, at Ibbesley in Hantshire [i.e., Ibsley in Hampshire] and since at London and Westminster and divers other places of this kingdom’. This letter opens *in medias res* in a highly familiar fashion, stating enigmatically that the addressee’s ‘commands in Sir I.D. the Lady E. and Mr. S. affairs, have been observed’ by the dutiful sender.⁶³ The following rambling patchwork of quotations and anecdotes, too, is recounted from a highly individual perspective: persons and places are anonymized, but familiarity is assumed throughout. Thus, the narrative of the comet’s first sighting commences:

Honest I.S. was going to N. Market, about one of the clock the last Thursday morning; and observing (as you know he is curious that way above his condition) the situation of the Stars in *Taurus*, was surprized with a sudden glaring and light, which obliged him and his companions to alight and view the strange thing more narrowly [...].⁶⁴

The account is non-technical and focused on the comet's public interpretation, which entails the characterization of individuals and collectives: I.S. is 'confounded [...] with the rude Gang' in his company, 'who within six hours after filled the Town with the most horrid apprehensions that mortals could be possessed with'.⁶⁵ The author goes on to relate a sermon preached by 'Dr. T.' in response to these public fears, discussing comets from antiquity to the present, illustrating how they might equally have boded well or ill. Each example is short and to the point, but there are some forty of them — rendering the passage an unlikely, and comically disproportionate, account of a sermon, let alone of an alleged impromptu letter. The narrative freely interweaves the sermon and the author's own voice, as well as learned quotations from classical and modern authors and tables on astrological correspondences.⁶⁶ However, the letter then switches from a critique of astrology to a relatively detailed description of astronomical observation, again providing local detail and constructing an addressee familiar with the circumstances, hence establishing the sense of a community of mutual trust:

This Discourse raised such expectations concerning this strange thing, that we were resolved to sit up upon *Sunday* Night, and send for the Learned and Ingenious *T. F.* with his Instruments; with whom about one of the Clock, after incomperable discourses out of *Tycho Brahe* concerning the Comet of the last Age, I went out to your beloved Lodge, which lyeth you know most happily for it [...].⁶⁷

Adding to the generic mixture, this is followed by a dissertation on the nature and origin of comets, the colour and shape of the present one, its position and movement among the planets, and its supposed period of visibility. The author quotes classical and modern authorities, from Aristotle to Gassendi, and then concludes, surprisingly, with a 'political reading' of the comet foretelling that the new government 'shall remain fixed and unmoveable',⁶⁸ which seems to fly in the face of his earlier rejection of comets as omens. The letter's valediction again locates it firmly in a concrete setting, as the author claims to have written until three in the morning, when he was called out to observe the comet again, and it stresses the material nature of the letter in the author's apology that he 'dare not correct' the manuscript, 'since it is already so blotted, that you can hardly read it'.⁶⁹ Clearly, the pamphlet thus makes use of conventions familiar from other burgeoning genres of 'scientific' writing, the experiential report and observation. However, in its construction of individuals — albeit unnamed — and of local as well as astronomical detail, its idiosyncratic voice and the pervasive humour mixed with pompous seriousness, it foregrounds the conventions of the familiar letter to offer an accessible epitome of astronomical information, intended to correct popular ignorance and the non-specialist interpretation of heavenly phenomena.

A different balance between the familiar and the formal is struck in a defence by Thomas Burnet of his *Theory of the Earth* (1681, new edn 1697), published anonymously in 1699.⁷⁰ This is a review of John Keill's (lengthy and critical) reply to Burnet,⁷¹ offering refutations of Keill's criticism by means of a familiar letter. It is much more technical than the letter on the comet of 1664, discussing, for instance, Keill's opinions on the angle of Earth's axis relative to the Sun's and on the shape of the Earth. The letter form allows Burnet to counter — anonymously, referring to himself throughout in the third person as 'the Theorist'⁷² — the charges against his work in a 'private' fashion, submitting his

retorts to ‘the Examiner’ not in his own voice but in that of a neutral observer. Ironically, Burnet attacks, among other things, Keill’s familiar style as inappropriate among gentlemen — at the same time, the letter form permits him smug gibes without breaking decorum; it is ostensibly private but at the same time, in print, usefully public. Burnet also quotes from a letter he claims to have received, including a diagram ostensibly drawn up by his correspondent. This ‘letter within a letter’ attests to the anonymous author’s membership in the republic of letters and thus to his credit as a reviewer of Keill’s.⁷³ Both of these individually printed letters, then, are anonymous and exploit the affordances of the familiar letter to present a serious argument in a captivating manner that is accessible, at least to an extent, to the non-specialist.

A third group of astronomical letters in print is encountered in the letter-book. It occupies a middle ground between the familiar and formal, as well as between didactic and expert communication. On the level of the individual letter included in such a book, one instructive example is the inclusion, in Thomas Salusbury’s 1661 *Mathematical Collections and Translations*, of Paolo Antonio Foscarini’s controversial ‘Epistle [...] Concerning The Pythagorean and Copernican Opinion of The Mobility of the Earth’ and Galileo’s famous letter to the Grand Duchess of Tuscany, Christina. Both were written in 1615 and offered in English translation in Salusbury’s compendium. Foscarini’s letter is addressed to the Head of the Carmelite Order, Sebastiano Fantoni, and like Galileo’s letter (which it may have been intended to support), the choice of addressee signalled that the authors were well connected and prepared to defend their work, but also aware of the need for prominent endorsement. Hence, beyond the addressees’ elevated social rank and their status as non-specialists in astronomical matters, their function was nominal. Galileo suggested a much wider circle of readers when he offered as a reason for writing that ‘I have thought it necessary for my justification before the World (of whose judgment in matters of Religion and Reputation I ought to make great esteem)’.⁷⁴ Foscarini’s letter employs a tone between knowledgeable divines in its discussion of theological objections to Copernicus and Pythagoras. The level of astronomical expertise required of the reader is not very high, and the letter — in a familiar tone — is presented as a kind of abstract to a more specialized work, ‘to wit, a Volume of *Cosmography*, which I am in hand with, and which I am daily busie about, that it may come forth in company with my *Compendium of the Liberal Arts*, which I have already finished’.⁷⁵ This advertisement suggests that the letter was written for the public rather than its nominal addressee, and intended to float ideas the author was considering for his larger book on the subject. It appeals to Foscarini’s personal motive, ‘out of my very great love towards the Sciences, and my ardent desire to see the encrease and perfection of them’.⁷⁶ That the letter — ordered to be destroyed by the Inquisition — should end up in a collection such as this constitutes a process of canonization. Thus, Salusbury, in publishing both letters in English translation, self-consciously stressed that making them available in print was a sign of national distinction, expressing ‘hope that the English will be more hospitable, on the account of that Principle which induceth them to be civil to (I say not to dote on) Strangers’ and contrasting the letters’ fortunes in Italy, where ‘though they have been with all veneration valued, read and applauded by the Iudicious, yet they were with much detestations persecuted, suppressed and exploded by the Superstitious’.⁷⁷ The very publication of these letters thus suggested that Protestant England was more congenial to scientific discourse than Catholic Italy.

A quite different function of the letter-book form is foregrounded in Christiaan Huygens’s posthumously published Latin epistolary *Cosmotheoros*, finished in 1695 and printed in 1698, translated into English in the same year as *The Celestial Worlds*

Discover'd.⁷⁸ This book is framed as a letter to Huygens's older brother, secretary to King William in Holland and Christiaan's frequent collaborator in producing telescopes. The intimacy between author and addressee, purposefully opened up to the public, invites the reader to side with the correspondents against their critics (whom Huygens identifies in a lengthy sequence at the beginning).⁷⁹ In order to heighten that intimacy, Huygens intersperses familiar comments defining the addressee through objects he owns, such as the following:

Perhaps when *Saturn* comes into the Northern Signs, and is at a good height from the Horizon [...] you may happen to make some new Discoveries, good Brother, if you would make use of your two Telescopes of 170 and 210 Foot long; the longest, and the best I believe now in the World.⁸⁰

In general, however, the tone is impersonal throughout: Huygens does not imagine a conversation with his brother, but rather with a well-informed reader. The author performs his own expertise and involvement with the expert community in off-hand comments such as these about recent telescopic discoveries:

The *Jovial* [moons] we owe to *Galilæo*, 'tis well known: and any one may imagine he was in no small rapture at the discovery. The outermost but one, and brightest of *Saturn's*, it chanc'd to be my lot, with a Telescope not above 12 foot long, to have the first sight of in the year 1655. The rest we may thank the industrious *Cassini* for, who used the Glasses of *Jos. Campanus's* Work, first of 36, and afterwards of as many above 100 [i.e., 136] foot long. He has often, and particularly in the year 1672, shew'd me the third and fifth. The first and second he gave me notice of by Letters in the year 1684 [...].⁸¹

Huygens includes technical detail on instruments and attests to his personal correspondence with the protagonists of the field, stressing that he deems their letters as good as observing the described phenomena himself. In doing so, he claims for himself expert knowledge as well as excellent connections, both of which extend over time and bolster his authority (much like Hevelius, in the letter-book referenced above). At the same time, he offers a concept of collaborative science: in Daniel Špelda's astute analysis, *Cosmotheoros* posits natural philosophy as 'a long-term historical project patiently shared in by a collective of cooperating individuals who pass on the results of their work. Knowledge gains historical continuity and at the same time expands among contemporaries.'⁸² Epistolary communication clearly emblemizes these ideals of natural philosophy.

The remarkable faith in this form also informs Huygens's own style when he comments on the poverty of visual representation:

[...] it will be worth while to set before you at once, in a clearer and more plain Method than hitherto, the Magnificence and Fabrick of the Solar System. Which we can't possibly do in so small a Space as one of our Leaves will but admit of, because the Bodies of the Planets are so prodigiously small in comparison of their Orbs. But what is wanting in Figure [i.e., in the illustration following the statement] shall be made up in Words.⁸³

This bespeaks a remarkable confidence in the ability of words to match even the sublime object of astronomy, while simultaneously highlighting the material nature of the letter/book by reference to the paper it is written on. In a book such as Huygens's — a discussion of the planets and the nature of life on them, as well as the fixed stars beyond the solar system — epistolary form has a similar function to the frame or *Rückenfigur* in Romantic painting. It 'contains' the sublime object in a firmly human, and verbal, context, reassuring the reader by literally 'grounding' them in the mundane: words, matter,

and interpersonal relations. As Maurice Blanchot said of Gagarin's radio transmission from space in 1961:

It is [...] necessary, up there, for the man from the Outside to speak, and to speak continually, not only to reassure us and to inform us, but because he has no other link with the old place than that unceasing word, which [...] says, to whoever is unable to understand it, only some insignificant commonplace, but also says this to him who listens more carefully; that the truth is nomadic.⁸⁴

In the face of immensity, Blanchot avers, we speak to reassure ourselves about our relevance, and to remind ourselves that it is our shared humanity that ultimately matters. A similar effect is at work in the hybrid, familiar-formal letter to report on the plurality of worlds: as he speculates about the inhabitants of these worlds, Huygens stresses that they are — must be — like us.⁸⁵ Blanchot's Gagarin enters empty space while Huygens's space is teeming with life, but both feel that the human must be avowed. Huygens's letter form achieves this. He reminisces that, while he has not had 'an opportunity of observing the Heavens' with his brother's huge telescopes,

[...] yet I am satisfied of their [*sc.*, the telescopes'] Goodness by our trial of them one night, in reading a Letter at a vast distance by the help of a Light. I cannot but think of those times with pleasure, and of our diverting labour in polishing and preparing such Glasses, in inventing new Methods and Engines, and always pushing forward to still greater and greater things.⁸⁶

In the lofty context of the book, this personal memory of two brothers' shared joy and excitement is like the material letter seen at a distance in the dark: it attests to the value of the ordinary in the pursuit of great things. In *Cosmotheoros*, for all its general formality, the familiar shines through and frames the discourse, bestowing a similar function to the letter form at large. It is not difficult to imagine that the eighteenth-century authors of epistolary introductions to astronomy took inspiration from Huygens in framing their sublime object in this mundane, familiar form.

3. Conclusion

While the letters published in the *Philosophical Transactions* were clearly influential, they are by no means representative of Restoration epistolary astronomical writing at large. One reason behind the adoption, in popular print, of the form might be the wider public's association of epistolary writing with the new science: by perusing astronomical letters, even the non-specialist could feel like partaking of specialist discourse, not only in subject but in form, too. Cissie Fairchilds uses the term 'populuxe' to describe 'cheap copies of aristocratic luxury items' in vogue with the working-class public in eighteenth-century Paris.⁸⁷ Paul Yachnin has insightfully applied this concept to the practice of Elizabethan playgoing, whereby commoners would enjoy, at the playhouse, 'an afternoon of ersatz courtly recreation' and 'play at being their social "betters"'.⁸⁸ Likewise, epistolary writing is attractive to the non-specialist, among other things, because of its association with virtuoso communication. In this way, the form — associated with civil discourse between members of the republic of letters — offered an interface between the erudite community and a wider public. 'Familiar' epistolary writing offered brief and non-technical epitomes useful for non-specialist readers looking to gain a basic understanding of the subject, but also for savants seeking to lodge their priority quickly in advance of more substantial publication.

The role of character in epistolary writing is ambivalent, as we have seen: in the scientific letter or a book like Huygens's, the claim to authority would derive, in large part, from the social bonds between the author and their correspondent, which guaranteed 'truthful' communication. Given the semi-public nature of letters, authors were aware of staking their reputation on their statements; their continued membership in the republic of letters was predicated on their upholding the rules of discourse. In such cases, characterization — brief and one-dimensional as it may be — serves to stress the social and learned background of the author, even when they are unnamed (as in the case of Burnet's and J.B.'s letters). That characterization was usually one-dimensional illustrates that, first, the *object* of communication was privileged over the communicating subjects and, second, that the taste for complex characters that was to shape the eighteenth-century novel was not yet fully developed.⁸⁹ On the other hand, the ineluctable — however limited — presence of both figures, author and recipient, in epistolary writing serves as a human framing for the remote, abstract, and sublime object of astronomy in particular.

The conversational tone permitted by the familiar letter, its freedom of organization, and the casting of the author as an eyewitness likewise all draw on, and foreground, affectivity. The connection between epistolarity and temporality — the form's association with the 'temporalization of knowledge' and with news, both affording urgency — also lends itself particularly to a subject that was seen as paradigmatic of an upheaval in the world picture and to the explanation of phenomena of supposedly immediate relevance, such as comets. Spatial distance between correspondents, also inscribed in the form, is minimized through particularizing descriptions of spaces supposedly familiar to both parties, such as the observatories in J.B.'s letter and Huygens's *Cosmotheoros*. Again, the appeal to a shared experience of place localizes and 'grounds' knowledge. The remote object of observation tends to level terrestrial distances, except where they are crucial for coordinating observations. In all of these senses, the print letter on astronomical subjects — with its particularization of time, space, and social identities and bonds — must be seen as part of the development towards eighteenth-century conventions of 'realistic' representation. Its varied use in the articulation of knowledge, authority, and selfhood is powerful testament to the interdependencies between early modern science and literary form.

NOTES

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The term affordance is used in design theory 'to describe the potential uses or actions latent in materials and designs' and applied to literary form in Caroline Levine, *Forms. Whole, Rhythm, Hierarchy, Network* (Princeton: University of Princeton Press, 2015), here p. 6.

2. Excluded here, for reasons of space, are the ubiquitous dedicatory letters seeking patronage and 'letters to the reader' seeking approbation, both staples of printed works of natural philosophy of the period. Epistolary communication between seventeenth-century scholars is examined, for instance, in Gábor Almási, 'Humanistic Letter-Writing', *EGO European History Online* <<http://ieg-ego.eu/en/threads/european-networks/intellectual-and-academic-networks/gabor-almasi-humanistic-letter-writing>> [accessed 16 February 2021]; Jordan Avramov, 'Letter Writing and the Management of Scientific Controversy: The Correspondence of Henry Oldenburg (1661–1677)', in *Self-Presentation and Social Identification: The Rhetoric and Pragmatics of Letter Writing in Early*

Modern Times, ed. by Toon van Houdt and others (Leuven: Leuven University Press, 2002), pp. 337–63; Maurizio Gotti, ‘Scientific Interaction Within Henry Oldenburg’s Letter Network’, *Journal of Early Modern Studies*, 3 (2014), 151–71; David A. Kronick, ‘The Commerce of Letters: Networks and “Invisible Colleges” in Seventeenth- and Eighteenth-Century Europe’, *The Library Quarterly*, 71.1 (2001), 28–43; Nancy G. Siraisi, *Communities of Learned Experience: Epistolary Medicine in the Renaissance* (Baltimore: Johns Hopkins University Press, 2013); as well as references in the following.

3. Claire Preston, *The Poetics of Scientific Investigation in Seventeenth-Century England* (Oxford: Oxford University Press, 2015), p. 163n.17.

4. Henry S. Turner, ‘Lessons from Literature for the Historian of Science (and Vice Versa): Reflections on “Form”’, *Isis*, 101.3 (2010), 578–89 (p. 584).

5. Thomas Wright, *An Original Theory or New Hypothesis of the Universe: Founded Upon the Laws of Nature, and Solving by Mathematical Principles the General Phaenomena of the Visible Creation, and Particularly the Via Lactea* (London, 1750), p. iii.

6. Wright, *Theory*, p. 1.

7. E.g., Wright, *Theory*, pp. 9, 37, 58.

8. Wright, *Theory*, p. 26.

9. E.g., Wright, *Theory*, pp. 1, 27, 60, 67.

10. Wright, *Theory*, p. 78.

11. Johann H. Lambert, *Cosmologische Briefe über die Einrichtung des Weltbaues* (Augsburg, 1761), pp. xxv–xxvi.

12. Lambert, *Briefe*, pp. xxvi–xxvii.

13. Lambert, *Briefe*, p. xxvii.

14. Johann H. Lambert, *The System of the World* (London, 1800), n.p. This is a direct translation of the French preface in Johann H. Lambert, *Système du monde* (Paris, Geneva, 1784).

15. Lambert, *System*, n.p.

16. John Bonnycastle, *An Introduction to Astronomy: In a Series of Letters, From a Preceptor to His Pupil. In Which the Most Useful and Interesting Parts of the Science Are Clearly and Familiarly Explained* (London, 1786), p. iii.

17. Bonnycastle, *Introduction*, p. iii.

18. Bonnycastle, *Introduction*, pp. v–vi.

19. Bonnycastle, *Introduction*, pp. 1–2.

20. On the dialogue in early modern science, see, for instance, Stephen Clucas, ‘Galileo, Bruno and the Rhetoric of Dialogue in Seventeenth-Century Natural Philosophy’, *History of Science*, 46.4 (2008), 405–29.

21. Gary Schneider, *Print Letters in Seventeenth-Century England: Politics, Religion, and News Culture* (New York: Routledge, 2018), pp. 7–8.

22. Diana G. Barnes, *Epistolary Community in Print, 1580–1664* (Farnham: Ashgate, 2013), p. 1.

23. See Preston, *Poetics*, p. 162.

24. See Pietro D. Omodeo, ‘Asymmetries of Symbolic Capital in Seventeenth-Century Scientific Transactions: Placentinus’s Cometary Correspondence With Hevelius and Lubieniecki’, in *The Institutionalization of Science in Early Modern Europe*, ed. by Mordechai Feingold and Giulia Giannini (Leiden: Brill, 2020), pp. 52–79, and Adam Mosley, Nicholas Jardine, and Karin Tybjerg, ‘Epistolary Culture, Editorial Practices, and the Propriety of Tycho’s Astronomical Letters’, *Journal for the History of Astronomy*, 34.4 (2003), 421–51.

25. See, among many others, Paula Findlen, ‘Ideas in the Mind: Gender and Knowledge in the Seventeenth Century’, *Hypatia*, 17.1 (2002), 183–96; Linda C. Mitchell, ‘Entertainment and Instruction: Women’s Roles in the English Epistolary Tradition’, *Huntington Library Quarterly*,

66.3/4 (2003), 331–47; David Norbrook, 'Women, the Republic of Letters, and the Public Sphere in the Mid-Seventeenth Century', *Criticism*, 46.2 (2004), 223–40; Sandra Plastina, 'Letters on Natural Philosophy and New Science: Camilla Erculiani (Padua 1584) and Margherita Sarrocchi (Rome 1612)', in *Women, Philosophy and Science: Italy and Early Modern Europe*, ed. by Sabrina Ebbersmeyer and Gianni Paganini (Cham: Springer Nature, 2020), pp. 55–80.

26. Cf. Felix Sprang, "'Trite and Fruitless Rhapsodies"? The Rise of a New Genre in the Light of National Identity: Vernacular Science Writing in Early Modern England', *Anglia*, 124.3 (2006), 449–73; Elizabeth Yale, *Sociable Knowledge: Natural History and the Nation in Early Modern Britain* (Philadelphia: University of Pennsylvania Press, 2016).

27. Preston, *Poetics*, p. 173.

28. Barnes, *Epistolary Community*, p. 180; cf. Mario Biagioli, 'Etiquette, Interdependence, and Sociability in Seventeenth-Century Science', *Critical Inquiry*, 22.2 (1996), 193–238 (pp. 208–10), as well as the introduction to this special issue.

29. On the letter as a 'bridge genre', Rachael Scarborough King, *Writing to the World: Letters and the Origins of Modern Print Genres* (Baltimore: Johns Hopkins University Press, 2018).

30. Oded Rabinovitch, 'The "System of the World" and the Scientific Culture of Early Modern France', *Notes and Records of the Royal Society of London*, (2023, ahead of print), 2.

31. Pietro D. Omodeo, 'Utilitas Astronomiae in the Renaissance: The Rhetoric and Epistemology of Astronomy', in *The Structures of Practical Knowledge*, ed. by Matteo Valleriani (Cham: Springer, 2017), 307–31.

32. Lorraine Daston, 'The Empire of Observation, 1600–1800', in *Histories of Scientific Observation*, ed. by Lorraine Daston and Elizabeth Lunbeck (Chicago: University of Chicago Press, 2011), pp. 81–115 (p. 81).

33. Adam Mosley, *Bearing the Heavens: Tycho Brahe and the Astronomical Community of the Late Sixteenth Century* (Cambridge: Cambridge University Press, 2007), p. 32. See also *Communicating Observations in Early Modern Letters (1500–1675): Epistolography and Epistemology in the Age of the Scientific Revolution*, ed. by Dirk van Miert (London: Warburg Institute, 2013).

34. Omodeo, 'Asymmetries', p. 54.

35. James Daybell, *The Material Letter in Early Modern England: Manuscript Letters and the Culture and Practices of Letter-Writing, 1512–1635* (Basingstoke: Palgrave Macmillan, 2012), p. 233.

36. See Mosley, *Bearing*, pp. 113–14.

37. Claudio Guillén, 'Notes Toward the Study of the Renaissance Letter', in *Renaissance Genres: Essays on Theory, History and Interpretation*, ed. by Barbara K. Lewalski (Cambridge, Mass.: Harvard University Press, 1986), pp. 70–101 (pp. 99–100).

38. David S. Lux and Harold J. Cook, 'Closed Circles or Open Networks? Communicating at a Distance During the Scientific Revolution', *History of Science*, 36.2 (1998), 179–211 (p. 201).

39. Achim Landwehr, *Geburt der Gegenwart: Eine Geschichte der Zeit im 17. Jahrhundert* (Frankfurt a.M.: Fischer, 2014).

40. Thomas Wallnig, 'Gelehrtenbriefe', in *Handbuch Brief: Von der Frühen Neuzeit bis zur Gegenwart*, ed. by Marie I. Matthews-Schlinzig and others (Berlin, Boston: de Gruyter, 2020), pp. 471–83 (p. 479).

41. Florian Klaeger, 'Nach der verlorenen Zeit: Chronofrenz und Verzeitung in Thomas Sprats *History of the Royal Society* (1667)', in *Zeiten bezeichnen / Labelling times: Frühneuzeitliche Epochenbegriffe: Europäische Geschichte und globale Gegenwart / The Early Modern – European Past and Global Now*, ed. by Andreas Mahler and Cornel Zwielerlein (Göttingen: Herzog August Bibliothek, 2023), pp. 251–266.

42. Schneider, *Print Letters*; David Randall, 'Epistolary Rhetoric, the Newspaper, and the Public Sphere', *Past and Present*, 198.1 (2008), 3–32.

43. Susan M. Fitzmaurice, *The Familiar Letter in Early Modern English: A Pragmatic Approach* (Amsterdam: John Benjamins, 2002), p. 38.
44. Language, too, reminds readers of a potential further differentiation between terrestrial observers, divided by vernaculars or united by a *lingua franca*. In any case, the heavenly objects were best described in the universal language of mathematics, as Galileo had put it. The vernacular letter, however, was primarily aimed at a readership unskilled in that language, if not in Latin.
45. Omodeo, 'Asymmetries'. The idea of publishing a collection of one's own correspondence was introduced by Lipsius; see Jan Papy, 'Letters', in *The Oxford Handbook of Neo-Latin*, ed. by Sarah Knight and Stefan Tilg (Oxford: Oxford University Press, 2015), pp. 167–82 (p. 178).
46. Mosley/Jardine/Tybjerg, 'Epistolary Culture'.
47. Johannes Hevelius, *Excerpta Ex Literis Illustrum, Et Clarissimorum Virorum, Ad Nobilissimum, Ampliss. Et Consultiss. Dn. Johannem Hevelium Cons. Gedanensem perscriptis [...]*, ed. by Johann E. Olhoff (Gdansk, 1683).
48. For an example, see Candice Delisle, 'The Letter: Private Text or Public Place? The Mattioli-Gesner Controversy About the *aconitum primum*', *Gesnerus*, 61.3–4 (2004), 161–76.
49. Amy Elizabeth Smith, 'Naming the Un-"Familiar": Formal Letters and Travel Narratives in Late Seventeenth- and Eighteenth-Century Britain', *Review of English Studies*, 54.214 (2003), 178–202.
50. [Henry Oldenburg], 'Epistle Dedicatory', *Philosophical Transactions of the Royal Society of London*, 1.1 (1665), n.p.
51. [Henry Oldenburg], 'The Introduction', *Philosophical Transactions*, 1.1 (1665), 1–2 (p. 1).
52. Marie Boas Hall, 'The Royal Society's Role in the Diffusion of Information in the Seventeenth Century', *Notes and Records of the Royal Society of London*, 29.2 (1975), 173–92 (p. 186).
53. [Henry Oldenburg], 'A Preface to the Third Year of These Tracts', *Philosophical Transactions*, 2.23 (1666), 409–15 (p. 409).
54. See, for example, Dwight Atkinson, *Scientific Discourse in Sociohistorical Context: The Philosophical Transactions of the Royal Society of London, 1675–1975* (Mahwah, NJ: Erlbaum, 1999); Marie Boas Hall, *Henry Oldenburg: Shaping the Royal Society* (Oxford: Oxford University Press, 2002); Barnes, *Epistolary Community*; Ellen Valle, *A Collective Intelligence: The Life Sciences in the Royal Society as a Scientific Discourse Community, 1665–1965* (Turku: University of Turku, 1999); J. Ereck Jarvis, 'Thomas Sprat's 'Mixt Assembly': Association and Authority in *The History of the Royal Society*', *Restoration: Studies in English Literary Culture, 1660–1700*, 37.2 (2013), 55–77.
55. John Flamsteed, 'An extract of Mr. Flamsteeds letter of April, 19. 1673. containing some more accurate observations of his own, about Jupiter's transits near some fixed star; useful for determining the inclination of that planet to the ecliptique', *Philosophical Transactions*, 8.94 (1673), 6033–36 (p. 6033).
56. On this practice in manuscript letters, see Mario Biagioli, 'From Ciphers to Confidentiality: Secrecy, Openness and Priority in Science', *The British Journal for the History of Science* 45.2 (2012), 213–33.
57. Lindsay O'Neill, *The Opened Letter: Networking in the Early Modern British World* (Philadelphia: University of Pennsylvania Press, 2014).
58. Jean D. Cassini, 'An Extract of a Latin Letter of Signor Cassini, Containing Both His Considerations Upon Mr. Flamsteed's Account of the Lunar Eclipse of Decem. 21. 1675, and His Own Observations of the Same Eclipse', 'Another Letter From the Same to Mr. Flamsteed, Upon the Same Arguments', 'A Copy of a Third Letter Written by Signior Cassini, Touching an Occultation of a Fixt Star by the Moon, Observ'd by the Same', *Philosophical Transactions*, 11.123 (1676), 561–65; John Flamsteed, 'Mr. Flamsteeds Answer to the Former Three Letters, Containing Also Some Celestial Observations', *Philosophical Transactions*, 11.123 (1676), 565–66.

59. Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: University of Chicago Press, 1994), p. 287.

60. See Atkinson, *Scientific Discourse*.

61. Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1998), p. 514. For reasons of space, I cannot address parodies of scientific letters in periodicals such as the *Athenian Mercury*. See Jaroslaw Jasenowski's forthcoming monograph on truth effects in Restoration periodicals.

62. The print output on comets alone is immense (albeit not restricted to epistolary form). See Sara Schechner Genuth, *Comets, Popular Culture, and the Birth of Modern Cosmology* (Princeton: Princeton University Press, 1997), and, on German-language publications, Anna Jerratsch, *Der frühneuzeitliche Kometendiskurs im Spiegel deutschsprachiger Flugschriften* (Stuttgart: Franz Steiner Verlag, 2020).

63. J. B., *The Blazing Star, or, a Discourse of Comets, Their Natures and Effects in a Letter From J.B. to T.C. [...]* (London, 1665), p. 1.

64. B., *Star*, p. 2.

65. B., *Star*, pp. 2–3.

66. B., *Star*, p. 25.

67. B., *Star*, p. 29.

68. B., *Star*, p. 44.

69. B., *Star*, p. 47.

70. [Thomas Burnet], *Reflections Upon the Theory of the Earth, Occasion'd by a Late Examination of It. In a Letter to a Friend* (London, 1699).

71. John Keill, *An Examination of Dr. Burnet's Theory of the Earth Together with Some Remarks on Mr. Whiston's New Theory of the Earth* (Oxford, 1698).

72. For a more sustained reflection on the use of anonymity in Restoration print letters, see the contribution by Helen Berry in this issue.

73. For a similar instance of the (public) communication by (private) letter between astronomers to refute positions of 'third' others, see Shapin, *Social History*, pp. 266–91.

74. Galileo Galilei, 'The Ancient and Modern Doctrine of Holy Fathers, and Iudicious Divines, Concerning the Rash Citation of the Testimony of Sacred Scripture [...] Written, Some Years Since, to Gratifie the Most Serene Christina Lotharinga, Arch-Dutchess of Tuscany', in *Mathematical Collections and Translations*, ed. by Thomas Salusbury (London, 1661), I, 425–60 (p. 430).

75. Paolo A. Foscarini, 'An Epistle [...] Concerning the Pythagorean and Copernican Opinion of the Mobility of the Earth, and Stability of the Sun, and of the New Systeme or Constitution of the World [...]', in Salusbury, *Collections*, I, 471–503 (p. 473).

76. Foscarini, 'Epistle', p. 477.

77. Salusbury, *Collections*, I, sig. *2r.

78. Christiaan Huygens, *The Celestial Worlds Discover'd, or, Conjectures Concerning the Inhabitants, Plants and Productions of the Worlds in the Planets Written in Latin by Christianus Huygens, and Inscrib'd to His Brother, Constantine Huygens* (London, 1698).

79. Notably, Huygens objects to Fontenelle's popular dialogue on the plurality of worlds, not least because he aims at differentiating specialist discourse from popular dissemination. Frédérique Aït-Touati has perceptively traced the differences in their poetics of knowledge that inform Huygens's opposition in *Fictions of the Cosmos: Science and Literature in the Seventeenth Century*, trans. by Susan Emanuel (Chicago: University of Chicago Press, 2011), pp. 95–129. She relates Huygens's technique of a 'geometric travel narrative through the Planetary' to his construction of 'a heliocentric and nonhierarchical system' (p. 126) without, surprisingly, commenting on the epistolary form of the narrative.

80. Huygens, *Worlds*, p. 114.

81. Huygens, *Worlds*, p. 113. Huygens refers to Guiseppe Campani, Italian optician and astronomer.

82. Daniel Špelda, 'Huygens' Stargazing Scientists: The Idea of Science in *Cosmotheoros*', *History of European Ideas*, 44.8 (2018), 1111–26 (p. 1126).

83. Huygens, *Worlds*, pp. 138–39.

84. Maurice Blanchot, 'The Conquest of Space', in *The Blanchot Reader*, ed. by Michael Holland (Oxford: Blackwell, 1995), pp. 269–71 (p. 271).

85. See Hania Siebenpfeiffer, 'Imagination of the Extra-terrestrial "Other" in Early Modern Literature', in *Writing the Heavens: Celestial Observation in Medieval and Early Modern Literature*, ed. by Aura Heydenreich and others (Berlin, Boston: de Gruyter, 2024), forthcoming.

86. Huygens, *Worlds*, p. 115.

87. Cissie Fairchilds, 'The Production and Marketing of Populuxe Goods in Eighteenth-Century Paris', in *Consumption and the World of Goods*, ed. by Roy Porter and John Brewer (Abingdon: Routledge, 1993), pp. 228–48 (p. 228).

88. Anthony B. Dawson and Paul E. Yachnin, *The Culture of Playgoing in Shakespeare's England: A Collaborative Debate* (Cambridge: Cambridge University Press, 2001), p. 41.

89. For a discussion of this development, see Gerd Bayer, *Novel Horizons. The Genre Making of Restoration Fiction* (Manchester: Manchester University Press, 2016), pp. 170–88.

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