1 Introduction: Self-Assertion and Its Alternatives in Ancient Scientific and Technical Writing

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Interdisciplinary Approaches to Authority and Expertise

One of the most distinctive developments in the history of science as an academic discipline within the last few decades has been a new attention to rhetoric.[1] The personas of modern scientific writing, even in their most objective and dispassionate forms, are the product of culturally specific institutional pressures and educational histories; they are shaped by culturally specific assumptions about what makes an argument authoritative, or what makes an individual or an institution trustworthy. Scientific writing seeks not only to be truthful but also to persuade, and while the two may often go hand in hand, ideas about what is convincing and deserving of attention, what carries weight, inevitably vary from decade to decade and even from discipline to discipline.

Hand-in-hand with that work on modern scientific rhetoric – though not always in close communication with it – there has been an increasing volume of publications on related issues in ancient science. A major strand of recent ancient-science scholarship has given prominence to questions about how ancient scientists represented themselves and their disciplines, and particularly how they made their writings authoritative. Geoffrey Lloyd's work has had a pioneering influence in that respect, not least his comparative research on the relations between Greek and Chinese science. A central contribution of his work has been to elucidate the competitive quality of ancient Greek and Roman scientific discourse, which was formed in a world without formal scientific or educational qualifications. That situation meant that ancient experts had to work much harder than their modern counterparts to convince their audiences and potential clients and students, by

[1] Among many other works, see Latour 1987: esp. 21–62 on the authority-claiming rhetoric of modern scientific publications; Gross 1996, heavily revised as Gross 2006; Pera 1994; Pera and Shea 1991; Ziman 1984: esp. 58–80 on communication and authority in modern science, and Ziman 2000; also Asper 2013b: 3–4 for brief reflections on the relevance of those approaches to ancient science.

rhetorical means, of their competence,[2] and so tended to reach for self-assertive and ostentatiously innovative first-person personas.[3] In that sense attention to persona and authority is perhaps an even more obvious priority for the ancient world than for modern science, given that the scientific 'I' was often so much more prominent.

There are now many publications which pay serious attention to these issues for specific texts and authors. The work of Galen, the great medical writer of the second century CE, is an obvious example. The extraordinary range of his surviving works and the prominence of his own personality in many of his writings make him an ideal candidate for viewing ancient scientific self-assertion in action. And in many respects his work is typical of ancient scientific writing more broadly. He gives a prominent role to his own persona.[4] He is consistently competitive: he regularly debunks rival practitioners and rival disciplines which do not measure up to the philosophically inspired medical knowledge he himself espouses.[5] He draws attention to his own moral virtue in ways which bring an impression of reliability.[6] He also draws attention to his remarkably wide learning. His authority rests in part on his intricate knowledge of the work of his predecessors, and his alignment of himself with that tradition, especially in his opportunistic appropriation of the writings of the Hippocratic corpus so that they come to match his own medical views.[7] At the same time he repeatedly challenges received wisdom. In some cases, he does that through a claim to personal experience and observation,[8] for example in his frequent narration of incidents

[2] E.g. Lloyd 1979: 86–98, 1987a: 50–108 and 1996b: 20–46 (although stressing here the importance of resisting over-generalisation about the agonistic quality of Greek science). See also Jouanna 1999: 75–111 on the competitive context of the Hippocratic corpus.

[3] See Lloyd 1987a: 56–78; cf. Thomas 2000: 235–47 on Herodotus; Goldhill 2002 for an account of the way in which the development of prose in classical Greece made available new models of authority, based on analytical argument, which in some respects gave new prominence to the figure of the researcher, in contrast with the language of divine inspiration traditionally applied to the poet figure.

[4] E.g. see Barton 1994b: esp. 143–7; Nutton 2009; von Staden 1997; also van der Eijk 2013, who draws attention to what he refers to as Galen's 'rhetoric of confidence'.

[5] See Barton 1994b, esp. 147–9.

[6] See Barton 1994b, esp. 145–7; Boudon-Millot 2009; cf. Fögen 2009 on similar effects in a range of Latin technical writers, e.g. 189–96 on Columella.

[7] See Lloyd 1988 and 1991a; cf. van der Eijk 2013; von Staden 2009; and more generally Sluiter 2013 on the use of commentary to project control over the texts of the past in rivalry with other commentators.

[8] Cf. Lloyd 1979: 126–225 for an overview of the importance of empirical research for ancient Greek science; but also Lloyd 1983: 135–49 for the point that uncritical dependence on written authority can sometimes mean that the commitment of ancient scientific authors to personal observation is relatively superficial, with particular reference to Pliny the Elder.

from his wide clinical experience and in his frequent accounts of experimentation on the bodies of animals (in some cases conducted in front of an audience, in a way which allows him to indulge in public refutation and humiliation of his poorly informed rivals). He also repeatedly draws attention to the complexity of the medical expertise which he espouses, writing at length on the various subdivisions of the art of medicine, and then in turn subdividing, in enormously complicated ways, the various subdisciplines of medical knowledge, so as to leave an impressive sense of his command over a very sophisticated body of knowledge.[9] Many other authors too have begun to be analysed for their use of these and other related techniques of self-presentation, even if there are few other authors who use them anything like so richly and forcefully as Galen.

One of our arguments in this volume, however, is that even more needs to be done to understand the connections between different bodies of expertise and different authors in their techniques of self-authorisation.[10] The word 'scientific' in our title is thus intended in the most capacious terms possible to encompass (provocatively) the whole industry of ancient knowledge ordering – including even areas like law, historiography, philosophy and generalship, which are still rarely read together with ancient writing on what we would more naturally refer to as 'scientific' or 'technical' topics (mathematics, medicine, architecture). These different fields have in the past sometimes been kept separate from each other, in part because of the anachronistic application of the idea of 'history of science' as a discrete academic discipline on to the ancient world, which never saw an absolute dividing line between 'scientific' and 'non-scientific' knowledge.[11] Ancient writers clearly thought about all of these bodies of expertise as part of a spectrum of different fields of knowledge. From Plato onwards it is commonplace to list a wide

[9] Barton 1994b: 152–66.

[10] For recent parallels, which share some of that ambition for wide coverage of many disciplines, see Asper 2007; Barton 1994b; Taub and Doody 2009. König and Whitmarsh 2007b similarly deal with a range of different knowledge-ordering authors and fields, although without the sustained focus on authority and self-definition which is our main priority in what follows; the same goes for Lehoux 2012, who offers a broad survey of the procedures and priorities that underlay ancient enquiry into the natural world in a wide range of disciplines.

[11] The alternative category of 'technical' literature or 'Fachtexte' has been used as a fruitful working category in some recent scholarship, allowing us a glimpse of precisely the kinds of cross-fertilisation between ancient intellectual disciplines that we are most interested in here: e.g., see Fögen 2005 and 2009. Nevertheless, even that category risks narrowness and anachronism if we try to circumscribe it too rigidly: e.g. see Asper 2007: 35–53 on the lack of any self-conscious generic markers for what he refers to as 'Wissenschaftstexte' (but cf. Fögen 2009: 9–66, where he argues that technical literature is distinguished at least in some respects by its use of practical, non-literary language).

range of different disciplines in comparison with each other. For example, in the opening sentence of Philostratus' *Gymnasticus* to take one of many similar examples, athletic training (the subject of Philostratus' treatise) is compared with philosophy, rhetoric, poetry, music, geometry, astronomy, generalship, medicine, painting, sculpting and piloting. But modern classical scholarship has sometimes been reluctant to take such a capacious view of the interconnection between different bodies of ancient knowledge.

The juxtaposition between many kinds of expertise within this volume will, we hope, bring to light some surprising points of contact between texts which are usually kept separate from each other. The same challenges of self-representation and the same self-authorising gestures outlined above for Galen recur over and over for other disciplines as they are discussed within other chapters later in the volume.[12] Michael Trapp's chapter in this volume demonstrates the importance of many of these same techniques of self-authorisation for the philosophical culture of the Roman Empire, in which Galen participated: he emphasises among other things the importance of rivalry between philosophers, and between philosophers and others, the value of moral self-presentation (also discussed at length by Nicolas Wiater for Dionysius of Halicarnassus), the value of technical mastery, and the importance of alignment with philosophical tradition. Jill Harries makes many of the same points for legal expertise, showing how the jurists of the Roman Empire buttressed their own authority, in rivalry with other strands of the legal profession, by emphasising their educational accomplishments, and by representing themselves as intellectual descendants of earlier legal experts.[13] For Vitruvius too, intellectual tradition is crucial, although he takes a rather different approach, as Daniel Harris-McCoy shows: Vitruvius appropriates a host of earlier authorities, but tends not to name them, foregrounding instead his own sole and comprehensive control over the whole discipline of architecture. Geoffrey Lloyd, in his closing chapter, shows how widespread many of these same approaches are – and especially the appropriation of canonical authority – in the scientific writing of other ancient cultures too.

At the same time, we hope that this juxtaposition will also help to make clearer some of the differences, the things which make individual disciplines

[12] For one pioneering attempt to sketch out the contours of a 'grammar of scientific discourse', in other words to map out the range of different possibilities and conventions for scientific argument and scientific self-presentation, across a wide range of different genres of knowledge-ordering, see van der Eijk 1997.

[13] Cf. Eshleman 2012 on the construction of intellectual genealogies as a technique of self-authorisation in both pagan and early Christian culture.

(and even individual texts, bearing in mind the perils of over-generalisation in any study of ancient science)[14] distinctive and unusual in relation to wider trends of 'scientific' self-assertion. For example, Reviel Netz makes clear the oddity, by modern standards, of ancient conceptions of mathematical authority, which is not borrowed by other disciplines.

Not only that, but an interdisciplinary approach to scientific authority also needs to pay attention to recent scholarship on personas in ancient literary writing (and perhaps also vice versa).[15] It is striking, for example, that one important recent volume on precisely that topic – de Jong, Nünlist and Bowie 2004 – sticks very closely to canonical texts, with prose literature represented by historiography, philosophy, oratory, biography and the novel, but with no chapters at all on scientific, technical or miscellanistic writing in ancient Greek literature. Clearly, there are differences between literary verse and scientific prose in their techniques of persona construction, but we should surely think of them more as two ends of a spectrum, with a surprising amount of cross-fertilisation, rather than entirely different genres.[16] For example, the ancient scientific preface has its own conventions and motifs which are reused and varied in ways which are just as complex and sophisticated as anything we find in ancient verse prefaces, and which in some cases even borrow from them.[17]

Finally, we will see in at least some of what follows that an interdisciplinary approach to ancient intellectual authority needs to pay attention to the way in which ancient scientific writing borrows from and in turn even influences ideas about social and political authority in ancient culture. Some of the chapters below look back in passing to classical Greek culture, but the majority focus on Late Republican/Hellenistic texts and especially on the Roman imperial period. That is a deliberate choice. Our hypothesis is that the experimentation and cross-fertilisation in techniques of self-authorisation that we are interested in is at its richest and most variable in the globalised intellectual culture of the Roman Empire, i.e. in the vast corpus of knowledge-ordering writing that survives from the late Republic, in the first century BCE, through to the beginnings of what we refer to as 'late antiquity', in the fourth century CE. This is also where we can see most clearly the intersection between knowledge-ordering and politics. It is fairly clear that the models of intersection between science and empire which have

[14] See Lloyd 1996b: 4–5 and *passim*. [15] See Asper 2013b: 3 for the same point.
[16] Roby 2016, on ekphrasis of mechanical objects in ancient scientific and technical writing, makes that point vividly.
[17] See König 2009 on Galen's inventive reshaping of the standard prefatory claim to have written in response to the request of a friend.

been developed so fruitfully for modern European history cannot be transferred straightforwardly to the ancient world. It is much harder for classical culture to find examples of scientific investigation and knowledge-ordering writing which is actively enabled by or in the service of political power,[18] or to find evidence for ancient science and other kinds of expertise embedded within the politically charged struggles between rival institutions and rival groups within the life of ancient cities.[19] The key factor once again is the lack of any sustained institutionalisation of ancient expertise:[20] the dominant pose in ancient knowledge-ordering writing is of the intellectual as free agent, working within an imagined virtual community of experts, willing perhaps to dedicate his work to a powerful patron, but without following the agenda of any professional or political body (whereas for us, certainly in modern English usage, the word 'expert' is standardly used for knowledge in the service of political or legal judgements:[21] 'expert witness', 'expert report', 'expert opinion').

And yet despite all of those caveats, it is clear that changing habits of scientific self-presentation in the Roman Empire were often responses to political developments. Katharina Volk, for example, shows in her chapter how divinatory expertise became a valuable and highly contested commodity among the Late Republican senatorial elite in Rome, who used it in some cases to further their political goals. Michael Trapp examines the idea that philosophical authority could stand in opposition to political power (although he cautions against overstating the oppositional character of philosophical expertise per se). The encounter between knowledge-ordering expert and the political world was often envisaged specifically as an encounter with the emperor. Emperors – usually as dedicatees in prefaces – were repeatedly used as powerful images against whom expert writers could measure up their own control over their material, as well as showing their expertise in the service of politics: Vitruvius is an obvious example.[22] Nor was it only the image of the emperor that ancient scientific writers borrowed: Johannes Wietzke shows in his chapter how the language of benefaction, which was so familiar to the inhabitants of the Greek cities of the

[18] Cf. König and Whitmarsh 2007a: esp. 4–6; Woolf 2011: 59–88.

[19] For recent accounts of the capital cities of early modern Europe as contexts for institutionalised scientific activity and scientific rivalry, see Harkness 2007 and Rabier 2007a.

[20] However, see Cuomo 2007b for exceptions, drawing among other things on evidence for ancient guilds.

[21] See Rabier 2007b: 1–2.

[22] E.g. on Vitruvius, see A. König 2009 and McEwen 2003; on Frontinus see Fögen 2009: 278–85; and A. König 2007.

east in the imperial period, gave expert writers a powerful image to use in describing their own achievements.

Self-Effacing, Anti-Competitive and Anti-Expert Authority

The image of ancient experts basing their authority on competitive self-promotion is thus an important one for this volume. As we have already seen, Geoffrey Lloyd's work has shaped our understanding of the importance of that phenomenon for ancient scientific culture. He has also, however, made crucial contributions to our understanding of the way in which that model needs to be qualified and nuanced. He has shown, for example, how frequently ancient authors chose to assert their own authority precisely by avoiding prominent uses of the first person, so as to stress their own objectivity and their own distance from excessively rhetorical modes of self-presentation (sometimes a difficult thing to achieve, given that the claim to speak the truth was itself a recognised technique of rhetorical persuasion).[23] He has also shown how Galen, like others, stresses his own suspicion of excessive *philotimia* (competitiveness) by directing that accusation instead against his rivals, and by foregrounding his own conformity with the work of his predecessors (although that rhetorical pose is of course not incompatible with innovation).[24] And he has pointed to the way in which we see a move towards more tradition-centred models of scientific discourse in the Hellenistic and Roman worlds, and a shift (albeit not an entirely uniform one) away from some of the more aggressively innovative and self-promoting techniques of self-advertisement which were so widespread within the classical Greece of the fifth and fourth centuries BCE.[25]

Many of the chapters in this volume extend those insights further, showing how the avoidance of rivalry,[26] along with various other kinds of

[23] See Lloyd 1996b: 74–92, esp. 90–2.

[24] See Barton 1994b: 150; Lloyd 1991a: 400, esp. n. 8. Cf. König 2005: 254–300 on the way in which Galen's attack on the incompetence and competitiveness of athletic trainers allows him to articulate the moderate quality of his own indulgence in rivalry; König 2009: 50–8 on Galen's pose of reluctant self-promoter, publishing his work only at the repeated request of friends, in *On the Order of My Own Books* and elsewhere; König 2011: 185–7 on the alternation of an intrusive authorial persona with more dispassionate, self-effacing language in Galen's *On the Natural Faculties*.

[25] E.g. Lloyd 1987a: 104–8.

[26] Cf. König 2010: esp. 279–83 for more extensive discussion of the way in which the stereotypes of competitiveness and winning at all costs need to be qualified for both the athletic and intellectual culture of the ancient world; Tarrant 2003 for discussion of the way in which the sophists appropriate athletic language to describe intellectual competitiveness, and 355–8 on

self-deprecation, constitute one very prominent strand in the knowledge-ordering culture of the Roman Empire in particular. I want to look in turn at two (closely interrelated) strands: first, self-effacement; second, resistance to narrow professional affiliation.

Of course, self-effacement could carry authority in itself, just as it does for us in the objective, dispassionate language of much modern scientific discourse. Different authors and even different disciplines made use of that kind of pose to varying degrees.[27] In ancient mathematics in particular the author is very often absent: mathematical authority is founded not on rhetorical self-presentation, but on logical demonstration to a degree which is unusual in ancient science,[28] and mathematical authors tend to take the avoidance of competitiveness further than their counterparts in other fields, as Johannes Wietzke shows in Chapter 15 below (although he also stresses that claims about collaboration in ancient mathematical writing tend to be relatively superficial). The self-effacement we characteristically find in dialogue is of a different type, but in its own way equally authoritative: there the author's position is concealed beneath the range of views which are in dialogue with each other, and responsibility is transferred at least in part to the reader, who is led to find his or her own solution in partnership with the author, as Katharina Volk shows in discussing the difficulty of extracting clear messages from the dialogue form of Cicero's *De divinatione*. The same goes for many exempla texts, which present collections of anecdotes without necessarily guiding us about how to read them: here again this kind

the way in which Plato and Socrates view that model of sophistic competitiveness with suspicion, overlaying it with the ideals of cooperative excellence. For related discussion outside the field of scientific and technical writing, see among many others Scodel 2008 on Homer; Graziosi 2001 on anti-competitive pressures in ancient wisdom literature; Hesk 2007 on Aristophanes' comical exploration of the problems of excessively combative rhetorical practices within fifth-century Athenian political culture; Crowther 1992 and 2000 on boasts about second-place finishes and drawn contests among athletes, which challenge the still widespread winning-is-everything model of Greek sport; Brown 1978: 38–9 on avoidance of naked competitiveness in the elite culture of the Roman world generally.

27 See König 2011: 180–7 for broad reflections on self-effacement in ancient scientific and technical writing in the ancient world. For other work on the range of different possibilities for first-person usage, with reference to various degrees of prominence or self-effacement and their implications for authorial authority, see von Staden 1994, whose methodology is followed in adapted form by Hine 2009 and Nutton 2009; van der Eijk 1997: esp. 115–20 and 2005: esp. 40 on the alternation between rhetoric of confidence and rhetoric of modesty in scientific and philosophical writing; also Clarke 1997: esp. 94–8 for debate over the appropriate degree of explicit self-characterisation in ancient geographical and historiographical writing, with special reference to Strabo; Goldhill 2002: 28 on the hesitancy of Herodotus' pronouncements as a ploy which in itself enhances his authority and expertise.

28 Cf. Lloyd and Sivin 2002: 132–3.

of self-effacement does not seem to have been incompatible with authority, as Alice König shows for Frontinus' *Strategemata*.

Important also is the fact that authority in ancient knowledge-ordering writing is often envisaged as a two-way process: it is rarely a simple matter of top-down assertion. Nicolas Wiater makes that point for ancient historiographical writing, especially for the *Roman Antiquities* of Dionysius of Halicarnassus, emphasising the importance of the author's ongoing relationship with his readers. Daryn Lehoux shows how Galen's authority in his anecdotes of encounters with rival experts often relies on the presence of witnesses, who in many cases are themselves his addressees, as a way of papering over possible weaknesses.

In some cases, we even find imperial authors opting not just for self-effacement, but for various kinds of self-deprecation or self-doubt designed precisely as authorising gestures. The most extreme examples of authorial self-abasement are in later Christian authors, for whom humility, which is equated with piety, is a necessary starting point for religious authority.[29] For an extreme example, one might look at the *Letters* of Ignatius of Antioch to a series of different congregations in Asia Minor (usually dated to the reign of Trajan, although some scholars take it to be a late second-century forgery). Ignatius is vehement in his enforcement of orthodox doctrine: he repeatedly denounces heresy and those who spread it: 'For some carry about the name of Jesus Christ with terrible deceit, while at the same time doing things that are unworthy of God. You must flee from these people as from wild beasts. For they are mad dogs, who bite secretly. You must guard against them, as people who are hard to cure' (Ignatius, *Ephesians* 7.1). And yet at the same time he is also (following the example of Paul) intensely self-abasing: 'But I am ashamed to be spoken of as one of them [i.e. as one of the Syrian bishops]; for I am not worthy, being the least of them, and born out of due time; but I have found mercy to be someone, if I should reach God' (Ignatius, *Romans* 9.2).[30]

Scientific and technical self-deprecation is usually much more muted, but it is nevertheless widespread. It may be explained partly by the convention that self-praise was more acceptable and more effective if it included a degree of self-criticism. Plutarch makes that point memorably in his work *On Self-Praise* 543f: 'some choose not to introduce praise of themselves in an entirely glittering and undiluted form, but instead throw in certain slips

[29] See Krueger 2004.

[30] This passage closely echoes 1 Cor 15.8–9. On the influence of Pauline models of authority over Ignatius, see Lindemann 2005; Mitchell 2006: esp. 35–6 on this passage; Reis 2005; Smith 2011.

and failures and minor faults, and so guard against offensiveness and disapproval . . . '. Scientific self-deprecation may be motivated in some cases by the same principle. It is often also intended to show that the author is fully aware of the complexity and difficulty of his subject: in that sense acknowledgement of the ultimate inadequacy or incompleteness of the author's attempt at the subject under discussion may paradoxically enhance his authority.[31] For example, Ralph Rosen makes that point for Galen's emphasis on the impossibility of adequate knowledge of the soul, in his work *On the Construction of Fetuses* (although he also stresses that this is in itself a means of attacking Galen's rivals, whose failure to acknowledge the limitations and problems of human knowledge is a sign of over-confidence and incompetence).[32]

Second: linked with that ambivalence about competitive self-promotion and foregrounding of the self is a tendency to be wary about identifying too readily with narrow, clearly definable areas of expert knowledge. It is surprisingly common to find members of the ancient elite laying claim to intellectual authority while at the same time espousing a rather hesitant or stand-offish relationship with certain kinds of expertise. In some cases, that involves the avoidance of technical language: Reviel Netz discusses in Chapter 16 the surprising absence of specialist mathematical argumentation, which we might expect to be an authority-enhancing feature, in non-mathematical treatises. In other cases, it involves the deliberate avoidance of any close link with practical skills.

That latter effect is partly a response to the deep-rooted assumption, which had its origins in classical Athenian culture if not before, that some kinds of skill – particularly skills which were manual or which were primarily concerned with earning money – were not admirable.[33] There was a range of possible responses to that problem. One common response was to go out of one's way to dissociate oneself from these inferior kinds of expertise, for example by presenting one's own skills as complex and sophisticated, in the manner outlined above for Galen. In some cases, that involved drawing an explicit contrast between high-status and low-status

[31] See Lloyd 1987b; van der Eijk 1997: 120.

[32] Cf. Harris-McCoy 2013 for the way in which Artemidorus' manual of dream-interpretation, the *Oneirocritica*, combines an aspiration to exhaustiveness with an awareness of the impossibility of covering all that needs to be covered: that helps to advertise both the sophistication of the art of dream interpretation, and his own sensitivity to local cultural difference, which is one of the factors which increases the range of possible dreams.

[33] See (among many others) Cuomo 2007b: 7–40 for exhaustive discussion of the range of different opinions about *technê* in classical Athenian culture, esp. 9 for the widespread distinction between *technê* and banausic or base *technê* (e.g. at Aristotle, *Politics* 1258b26–35 and 1337b8–18); also Whitney 1990: 23–55.