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Structures and strategies in ancient Greek and Roman technical writing: An Introduction

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ABSTRACT

Most of our knowledge of Greek and Roman scientific practice and its place in ancient culture is derived from our study of ancient texts. In the last few decades, this written evidence—ancient technical or specialist literature—has begun to be studied using tools of literary analysis to help answer questions about, for instance, how these works were composed, their authors' intentions and the expectations of their readers.

This introduction to *Structures and strategies in ancient Greek and Roman technical writing* provides an overview of recent scholarship in the area, and the difficulty in pinning down what 'technical/specialist literature' might mean in an ancient context, since Greek and Roman authors communicated scientific knowledge using a wide variety of styles and forms of text (e.g. poetry, dialogues, letters).

An outline of the three sections is provided: *Form as a mirror of method*, in which Sabine Föllinger and Alexander Mueller explore ways in which the structures of texts by Aristotle and Plutarch may reflect methodological concerns; *Authors and their implied readers*, with contributions by Oliver Stoll, David Creese, Boris Dunsch and Paula Olmos, which examines what ancient texts can tell us about the place of technical knowledge in antiquity; *Science and the uses of poetry*, with articles by Jochen Althoff, Michael Coxhead and Laurence Totelin, and a new English translation of the *Aetna* poem by Harry Hine, which explores the (to us) unexpected roles of poetry in ancient scientific culture.

When confronted with the term 'literature', one thinks in the first place of Shakespeare, Goethe, of lyric poetry and drama. One is unlikely to think of instructions for farmers, of medical literature, mathematical papers and biological treatises. The consideration of texts that impart knowledge was for a long time the poor relation of modern literary studies, as the term 'literature' was associated with a certain aesthetic shaping of a text which is not typically a central concern for authors of modern specialist and technical works. 'Literature' can be a very normative term, as it may entail an appraisal of aesthetic quality. This changed in the field of modern languages and literature in the 1960s and '70s with the turn towards texts that do not belong to 'high-level literature': 'commercial literature' in all its facets became interesting (see, for example, Belke, 1973; Schlieben-Lange & Kreuzer, 1983). By comparison, in classical studies, there had traditionally been a more intensive engagement with specialist writings, as it was recognised that authors of ancient specialist literature also made aesthetic demands on their texts, although admittedly these texts were mainly studied from the perspective of the history of ideas or the history of disciplines.

Specialist/technical writing only emerged from this shadowy existence in literary research when scholars began to examine the texts using criteria which could be applied to other literature. A pioneering work in this respect was *Das systematische Lehrbuch. Ein Beitrag zur Geschichte der Wissenschaften in der Antike* by Manfred Fuhrmann in 1960. But only in the past twenty years or

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so has active research in this area been undertaken, offering new and fruitful approaches (see, for example, van der Eijk, 1997; Fögen, 2005).

A general turn towards a closer consideration of the language used to impart knowledge was important in encouraging research into specialist/technical writing. Crucial too was the realisation that understanding the way in which knowledge is acquired and transmitted is a prerequisite for understanding how a culture operates (Luhmann, 1990). This insight has led to a further examination of the processes of acquiring and transmitting knowledge in other disciplines, such as sociology. Nowadays, the production and reception of knowledge, as well as its sociological dimensions, have been, and continue to be, integrated into the study of texts of specialist literature (cf. Doody, 2010). In this context, questions about the organisation of knowledge and the imparting of knowledge, which in Antiquity encompassed a large number of literary genres, are at the centre of scholars' attention see, for example, work by Wolfgang Kullmann and his school (Asper, 2007; Föllinger, 1993, 2005, 2011; Kullmann & Althoff, 1993; Kullmann, Althoff, & Asper, 1998; Lengen, 2002).

The connection between texts' linguistic and literary modes of expression and their socio-cultural context has also been a focus of interest (cf. Horster and Reitz, 2003); new insights have been gained, in particular, into the intention and readership of the *Hippocratic Corpus* (van der Eijk, 1997), Aristotelian writings (Lengen, 2002) and mathematical literature (Asper, 2007; Netz, 2009), and also into the study of specialist language and terminology (Fögen, 2003; Wenskus, 1998).

Modern scholarship often subsumes works of different form and function, such as the didactic poem, dialogue, treatise, manual, *eisagogē*, aphorism and commentary, under the term 'specialist/technical literature', however 'specialist/technical literature' was not, as such, the subject matter of ancient genre theory (cf. Föllinger, 2011). For this reason, the designation 'genre' when applied to specialist/technical literature can present difficulties (cf. Taub, 2008a). The modern definition that specialist literature comprises 'literature linked to an institution or discipline' is only correct for a portion of the ancient works concerned. Furthermore, the modern expectation of the use of the medium of prose for specialist/technical work excludes the genre of the didactic poem that was so important for antiquity (see, for example, Effe, 1977; Toohey, 1996; Volk, 2002). The idea that specialist literature cultivates a sober, fact-oriented style of representation also does not apply for all the works of ancient specialist literature.

On the other hand, the 'transmission of knowledge' does represent a useful criterion for defining specialist/technical literature in antiquity. From the point of view of authorial intention, specialist literature can be defined as a type of text that seeks primarily to inform and instruct a certain circle of readers (Ax, 2005, p. 119). Admittedly, an exact distinction between a narrower and a wider circle of readers cannot always be determined (Föllinger, 2005). For this reason, the modern differentiation (Belke, 1973; Friedrich, 1997, p. 559; Schlieben-Lange & Kreuzer, 1983, p. 9) between specialist/technical literature as writing characterised by a high degree of specialisation and non-fiction literature as being aimed at a wider audience is problematic for dealing with ancient works. The boundaries can be blurred, especially because the authors of ancient specialist texts can pursue a number of goals simultaneously, such as promotion of their subject, self-presentation, making their mark and having moral influence, together with the aim of conveying specialist information (Fögen, 2003; Meissner, 1999, pp. 34–37; Taub & Doody, 2009). Here, we have gathered together a range of articles which engage closely with the structures and strategies used in shaping ancient Greek and Roman technical texts, with the aim of showing a sample of the diversity of the forms and functions those works could embody.

1. Form as a mirror of method

In this section, contributors explore the ways in which form may act not only as an arbitrary or conventional choice of expression, but can also allow us to see more clearly the ways in which ancient authors used writing strategies as part of their thinking and research. Artur Schopenhauer in his famous *Kleine philosophische Schriften* (*KPS*) described Aristotle as having done his thinking with his 'quill in hand', resulting in what seems to some readers to be a somewhat haphazard style of presentation. The first author here, Sabine Föllinger, argues against Schopenhauer's characterisation, and sees instead an Aristotle whose writing is an integral part of his investigative processes. For Aristotle, writing provides a means of ordering his thinking and his explanations, and allows us insight into his own internal dialectical method. Examining a somewhat parallel case, Alexander Mueller argues that Plutarch uses the form of dialogue not for didactic or rhetorical motives but for methodological reasons. The dialogue form mirrors the practice of syllogistic/dialectical reasoning; the dialogue the *E at Delphi* presents this method as the surest way of discovering truth not only in mathematics and other sciences but also in religion. Furthermore, and significantly for Plutarch, the dialogical method presents propositional knowledge.

2. Authors and their implied readers

In the following section, contributors focus on the potential interactions and interrelations of authors and their implied readers, as indicated by various elements or features of the text itself. Oliver Stoll considers Xenophon's *Hipparchikos*, where we can glimpse the response of an author to the context in which his text might be put to practical use. Here, Xenophon proffers *hypomnemata* (*aides mémoire*) for potential readers from the Athenian political class, whom he hopes to teach that leadership requires specialist knowledge rather simply an elevated position in society. Specialist knowledge is also considered by David Creese, who explores the use of technical names and concepts in non-specialist contexts, looking at two particular instances where there is ambiguity surrounding authorial intent and expectations of readers' knowledge. Looking at one example from Philo of Alexandria and another from Plutarch, Creese shows that an author can make rhetorical use of specialist knowledge for different non-specialist aims.

Given the gamut of technical and specialist handbooks on multifarious subjects, ranging from astronomy and music to rhetoric, horticulture, and cooking, the present absence of ancient Greek and Roman nautical handbooks seems surprising. In "*Arte rates reguntur*: Nautical Handbooks in Antiquity?", Boris Dunsch argues that such handbooks did exist in antiquity in some form, likely having been written during the period of the Hellenistic boom in technical texts, but disappearing at some later point, perhaps around the third or fourth century CE. This disappearance could be due to a number of factors, suggesting that the tastes and needs of the audience(s) for nautical *technai* were changing. Considering the audiences for specific works, the next author, Paula Olmos, argues that the encyclopedic works of Macrobius and Martianus Capella should not be regarded as somewhat sub-standard scientific works, but were intended by the authors to be used as part of the informal education of young men in rhetoric, offering them material that could be incorporated into their rhetorical practice for use in public life.

3. Science and the uses of poetry

From a modern perspective, one of the puzzling aspects of ancient specialist literature is the prevalence of poetry in what

we regard as scientific or technical texts. In some cases, the entire work is itself a poem; in others, prose authors quote poetry for a variety of reasons, sometimes offering their own poems in the context of a larger prose work. For example, Lucretius famously offers natural philosophical ideas in the form of hexameter verse; the author of the Letter to Ptolemy, ascribed to Eratosthenes, closes the epistle with an elegant epigram (Taub, 2008a, 2008b). The different uses to which poetry could be put are explored in the final section here.

The ways in which a similar idea might be expressed in poetry and prose are examined in Jochen Althoff's paper, 'Presocratic discourse in poetry and prose: the case of Empedocles and Anaxagoras', which sets two short fragments in dialogue with each other. Although at first it might seem as though there is a simple division between Empedocles' opaque and allusive hexameters and Anaxagoras' sober prose, when we look in detail at the language used by the two authors, a more complex picture emerges. There is no simple antithesis between prose style and hexametric poetry; the words and stylistic devices an author chooses are constitutive of the thought he expresses. Michael Coxhead examines the ways in which a quotation from the poet Antiphon is used in the preface to the earliest surviving Greek text on mechanics, the Pseudo-Aristotelian *Mechanical Problems*. A close reading of the quotation in the context of the Aristotelian Corpus allows us to see the ways in which poetry could be used for persuasive purposes in a technical text. Coxhead further suggests that poetry and mechanics could be seen to have a homologous relationship, based in part on the recognition of both as 'productive arts' (*poiētikai technai*). The use made of Antiphon by the pseudonymous writer of the *Mechanical Problems* has a role in situating his work in relation to the Aristotelian tradition.

In her contribution, 'And to end on a poetic note: Galen's authorial strategies in the pharmacological books', Laurence Totelin examines Galen's authorial strategies in his two pharmacological treatises devoted to compound remedies: *Composition of Medicines according to Types* and *Composition of Medicines according to Places*. In particular, she examines his borrowing of the first person pronoun and other phrases from the sources he used, arguing this borrowing offers a form of re-enactment, providing a method of gaining experience (*peira*) and helping to guarantee the efficacy of the remedies. In this way, Galen's authorial persona is very different from that of the modern author, for example, as defined by the literary theorist Roland Barthes.

The final contribution is an ancient Latin poem, *Aetna,* in a new translation by Harry Hine. This poem, by an unknown author usually referred to as the *Aetna* poet, explains the volcano, and is the only free-standing work explaining volcanic activity that survives from antiquity. The surviving Latin text of the poem is corrupt, and it is sometimes very difficult to reconstruct the original meaning. Hine provides the first English translation of the text established by F. R. D. Goodyear in the 1960s, which is now considered the standard. We are especially pleased that this ancient text on a scientific subject, composed by an anonymous poet, is made newly accessible here.

Collectively, the contributions here make a case for the ways in which a close examination of the structures and strategies of ancient technical writings can illuminate the place of scientific activity in ancient Greco-Roman culture, while suggesting new insights into the meanings these texts can offer.

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