Chapter 1

Greek mathematics in English: The work of Sir Thomas L. Heath (1861–1940)

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Sir Thomas Little Heath (1861–1940): readers of this volume will certainly know his name and will very probably have used his work. Most prominent among that work is Heath's English version of Euclid's *Elements*, which remains widely available both in print and online more than a century after its first publication. Dover Books has kept the text of the 1926 second edition in print in recent years (Euclid 1956, most recently reprinted in 2000), while the Green Lion Press has recently issued an English *Elements* amounting to Heath's translation without his commentary (Euclid 2002). On the web, David Joyce's popular English hypertext of the *Elements* (Euclid 1996) adopts a translation which 'is similar to Heath's edition'.[1]

In fact, over six decades Heath published English versions of several major Greek mathematical texts, as well as a monumental history of Greek mathematics:

1885: *Diophantos of Alexandria; a study in the history of Greek algebra* (second edition 1910)
1896: *Apollonius of Perga; treatise on conic sections*
1897: *The works of Archimedes, edited in modern notation*
1908: *The thirteen books of Euclid's Elements* (second edition 1926)
1912: *The Method of Archimedes*
1913: *Aristarchus of Samos, the ancient Copernicus*
1920: *Euclid in Greek, Book I*
1921: *A history of Greek mathematics* (2 volumes)
1931: *A manual of Greek mathematics*
1932: *Greek Astronomy*
1948 (published posthumously): *Mathematics in Aristotle*

Many of these continue to be used in the twenty-first century.

Heath's contemporaries rated him very highly. Darcy Wentworth Thompson (1941: 409), no mean judge of intellectual merit, ranked him 'with Gino Loria, Paul Tannery and Zeuthen, next after Heiberg', among the greatest mathematical historian/philologists of his generation, and judged him 'one of the most learned and industrious scholars of our time'. Heath was a Fellow of the Royal Society, a Fellow of the British Academy,

[1] `http://aleph0.clarku.edu/~djoyce/java/elements/aboutText.html`.

an honorary Fellow of Trinity College, Cambridge, and the holder of honorary degrees from Oxford and elsewhere. As David Eugene Smith (1936: 246) remarked, reviewing the second edition of Heath's *Elements*, its title page recorded 'honors which this and other works upon the history of mathematics have brought to the author, and with the approval of the whole scientific world'.

Heath's achievements have endured despite drastic changes in the historiography – in the construction and use of the ancient mathematical past – since his lifetime. His influence remains pervasive, since most of the texts he translated have not been rendered subsequently into English (a new English *Elements* is under way at the time of writing). Thus even now in the English-speaking world only those who read Greek fluently can easily approach the canon of Greek mathematical writing without reading at least some of Heath's work.

Yet he and his agenda have received little explicit critical attention since the obituaries which followed his death in 1940. The bibliography on Heath, indeed, consists merely of obituaries in the London *Times*, the *Proceedings of the British Academy* and the Royal Society's *Obituary Notices*, and an article in the *Dictionary of National Biography* revised for the *Oxford Dictionary of National Biography*.

This essay is a first attempt to sketch out some of the directions in which a study of Heath might proceed. It illustrates certain ways in which Heath and his achievement may be situated with respect to his circumstances and his intellectual agenda(s). It is based on Heath's published works, and the biographical notices and appreciations which appeared during his lifetime and shortly after his death. Archival research on Heath would doubtless turn up further valuable information, but a fully documented archival study of Heath's life and work would be an enormously larger project.

1.1 A self-made man

A sense of hard, disciplined work and its rewards pervades much of what we know of Thomas Heath, both in the shape of his career, the testimony of contemporaries, and his own autobiographical hints in his work and letters. These values can be seen to have shaped both his historical work and its presentation.

Thomas Heath was the son of a butcher, Samuel Heath, in Lincolnshire. His education took place first in local schools; his first schoolteacher, the Rev. Anthony Bower, was a self-educated man, a tanner's son, and perhaps an important influence (Thompson 1941: 409). Heath does not appear to have spoken of such matters in print, but it seems clear that a deliberate plan of self-education and self-improvement guided his trajectory both personally and professionally from quite early in his life. An example from his personal life: both Thomas and his brother Robert taught themselves to play the piano with what was reported to be very considerable proficiency, apparently without the benefit of tuition (Thompson 1941: 421). His widow would recall stumbling upon a surreptitious rendition of Haydn symphonies in four-hands reduction with the philosopher and President of Corpus Christi College Thomas Case: 'the conventional fiction obtained that my being a professional pianist precluded such indulgence in my hearing!' (Heath 1948: preface).

Hard work at this stage bore fruit: Heath went up to Trinity College, Cambridge in 1879 (Venn and Venn 1922–54: part II, vol. III, p. 313; Thompson 1941: 410). As an undergraduate he predictably acquired a reputation for efficiency (Thompson 1941: 411). Neither sport nor the debating union took up his time; his only reported hobby was music. At some stage, perhaps this, he became proficient in French, German and Italian, and acquired some knowledge of other modern languages (Smith 1936: vii). Crucially, he took honours in both Classics and Mathematics. In Classics he gained first-class marks in both Parts 1 and 2 of the tripos, in 1881 and 1883; in Mathematics he sat Part 1 of the tripos in 1882 and was placed as twelfth Wrangler.

At this stage a career in scholarship could surely have been thought of, but in fact Heath entered the civil service in 1884, and would spend his professional life there for more than forty years. He was first a clerk in the Treasury. From 1913 he was joint Permanent Secretary to the Treasury, from 1919 Comptroller General of the National Debt Office. He retired in 1926, aged sixty-five. For these services he was repeatedly rewarded with civil honours, becoming a Companion of the Bath in 1903, in 1909 a Knight Commander of the Bath, and in 1916 Knight Commander of the Royal Victorian Order (Headlam et. al. 2010).

This pattern of important – if unprominent – work and visible reward obscures to some degree what seem to have been Heath's limitations as an administrator. In particular, the consensus among his obituarists was that he did not really thrive during the First World War, when admittedly unusual combinations of qualities and unusual flexibility were called for in civil servants. The move in 1919 to the position of Comptroller General, though it was not a demotion, amounted to a reduction of his responsibilities in a 'less arduous office', as Thompson has it. Even the obituarist in the *Times* (anonymous 1940) felt compelled to state that, although 'his technique was perfect', 'his mind was not, perhaps, sufficiently pliable or fertile in ideas to adapt itself' to wartime conditions.

Heath's work on Greek mathematics was done as, in his word, a 'hobby' around the edges of this full and busy life. It, too, manifested a focus on unremitting hard work, perhaps to the exclusion or at least the diminution of other qualities. In his *Diophantos* Heath (1885: v–vi) claimed that he had 'twice carefully worked out the solution of every problem from the proof-sheets'. His books on the subject total something like five thousand printed pages, in addition to which he published articles (eleven are listed in Thompson's (1941) obituary), reviews and other short pieces such as contributions to the *Encyclopedia Britannica* (articles on Pappus and on porisms) and two brief popular books written for the SPCK.

In both word and action Heath represented himself as an amateur of Greek mathematics, one who courted Euclid and others for love, not for gain: and thus perhaps as an outsider to the ranks of professional historians, with an outsider's privileges of needing to please no-one but himself and owing no reverence to the established pieties of the insider. In a letter to D.E. Smith in 1909 he called his historical work 'My favourite hobby of Greek mathematics' (see Smith 1936: xix). Since Heath had no formal training specifically in historical scholarship, there was a sense in which his historical work was that of a hobbyist, although of course his study of classics will have acquainted him with ancient history through the lens of the classical authors.

Others took up the theme of hard, besotted work. In her preface to his *Mathematics in Aristotle* (Heath 1948), Heath's widow Ada Mary Heath stated that 'His eagerness to return to this work too soon after a serious illness in 1939 was probably instrumental in hastening his end.' Thompson (1941: 423), typically, wrote of 'sixty years of unstinted and unwearied work, all done for the love of it.' Yet the danger that such an approach might lead to something less than brilliance surfaced here too: the same combination of technical perfection with a slight inflexibility to be found in Heath's civil service work. If Thompson reckoned Heath 'sound and careful to the last degree', he nevertheless noted that he had relatively little 'critical taste and gift of brevity' and lacked 'brilliant insight';

'nor does he show, or ever want to show, much imagination or speculative curiosity'. 'As a historian he was more sober than a man need always be'. The consequence for his historical work was that 'he was best as a biographer' (Thompson 1941: 413, 420, 423).

It is perhaps no surprise that a man who rose from humble origins through hard work should be found lacking in imagination or flair by some of those around him. It would be quite possible to interpret Heath's actions and words in terms of the brittleness of an acquired gentility; the less-than-perfect security of the butcher's son who became a knight. It would be equally possible to read them as Heath's deliberate self-fashioning, positioning himself as an outsider, an amateur, whose steady determination achieved without the luxury of showy brilliance.

A more oblique reference to the same characteristics – determination with stiffness – appeared in D.E. Smith's appreciation of Heath, published in *Osiris* in 1936. Struggling to account for Heath's achievements, Smith (1936: xvii) included the remarkable line of explanation 'In the first place Sir Thomas Heath is an Englishman'. He went on to point to his physical fitness (Heath had taken up mountaineering as another hobby) as an example of his characteristically British qualities. Elsewhere the connection between Britishness and the history of ancient mathematics was spelled out more clearly, insofar as that was possible. Reviewing Heath's Euclid in 1909 Smith (1909: 387–8) had written 'It may properly be said of Dr. Heath's latest contribution to mathematical literature ... that it is characteristically British'. That is, it was thorough: 'when the English scholar does bring out a book, it is quite as when a British general takes possession of a conquered province – there is nothing more to say.' It manifested tenacious hard work: 'no continental writer has stayed with the problem with the tenacity of purpose that characterizes a Briton when he sets to work for his task'. And it reflected the English love of Euclid: 'a work that no one but an Englishman could write in the true con amore spirit, one that appeals more to English education than to that of any other country'. To this last point we will return.

1.2 'Mathematics ... is a Greek science'

For whom was Heath writing? Several times he answered the question, and the answer was invariably, in the first place, mathematicians. In his *Apollonius* (1896: vii) he stated that he was writing for 'mathematicians'; in his *Archimedes* (1897: v) likewise that he wished 'to make the work of "the great geometer" accessible to the mathematician of to-day'. Thompson (1941: 417), too, believed Heath's books would 'bring home to the modern mathematician the magnificence of the Greek achievement'.

Why should the modern mathematician be interested? For Heath a true understanding of mathematics necessarily began with its Greek foundations: 'For the mathematician the important consideration is that the foundations of mathematics, and a great portion of its content, are Greek. ... Mathematics in short is a Greek science' (Heath 1921: v). He elaborated elsewhere (Heath 1931: 1):

> Why should we study Greek mathematics? In the first place, it is true generally that, if we would study any subject properly, we must study it as something that is alive and growing and consider it with reference to its origins and its evolution in the past. In the case of mathematics, it is the Greek contribution which it is most essential to know, for it was the Greeks who first made mathematics a science.

From the view that the essence of mathematics was its Greek foundations there closely followed a sense of the pedagogical importance of the Greek mathematical classics, above all of Euclid. The British love affair with Euclid's *Elements* was drawing to a close by Heath's time. The text had dominated school education since the eighteenth century, albeit never uncontroversially, but following the so-called Euclid debate of the later nineteenth century, the English universities had abandoned the compulsory teaching of Euclid in 1904 (Moktefi 2011). Heath's work on Greek mathematics was thus mainly carried out during a period when the dependence of English mathematics pedagogy on Greek models was undergoing rapid and in his view profoundly ill-advised change. Introducing his English Euclid in 1908, Heath expressed the hope that 'it would seem at least possible that . . . there will be a return to Euclid more or less complete [in geometrical teaching]' (Euclid 1908: vi).

In keeping with this hope, Heath also prepared – now much less well known – an edition in Greek of *Elements* Book I, a volume which he hoped would have a place in such a putative renewed pedagogical emphasis on Euclid. For Heath, direct contact with Greek geometry in its original Greek form could bring unparalleled benefits. 'If the study of Greek and Euclid be combined by reading at least part of Euclid in the original, the two elements will help each other enormously.' 'How can any person who has only had such words as theorem, problem, isosceles, parallelepiped explained to him in English apart from their derivation get any such clear idea of their significance' as one who knows them as their Greek equivalents? (Euclid 1920: v, vi).

Heath himself acknowledged in the preface to his Greek Euclid (1920: v) that it might seem to some to represent 'a wildly reactionary proceeding'. But he found some supporters, not least the faithful D.E. Smith, who hoped (1920: 266) that the volume would be widely taken up, as 'one of the few books on geometry that no teacher can afford to be without, that is indispensable in the library of any well-equipped high school . . . '.

It was not to be, and any hope Heath had of editing more material in the original Greek for these purposes was never realized. Heath's remarks about the desirability of a return to Euclid in the teaching of geometry were reprinted in the 1926 second edition of his *Elements*, yet by this time Euclid's fall from his pedagogical pedestal had become still more irrevocable.

Heath's views on the interest of Greek mathematics to the modern mathematician, as on the vital importance of Euclid in the modern classroom, sprang from his ideas about the nature of mathematics. Mathematics was for Heath a single unchanging thing, not essentially different in classical Greece and in Victorian and Edwardian Britain. 'Elementary geometry is Euclid, however much the editors of text-books may try to obscure the fact' (Euclid 1920: v). Smith, reviewing the second edition of Heath's *Elements*, characteristically went further (Smith 1927: 248): 'no teacher of geometry can afford to be ignorant of the spirit of Euclid, since it is this spirit which constitutes the essence of all demonstrative geometry'.

Naturally such a position on the nature, the philosophy, of mathematics, had consequences for Heath's handling of ancient mathematics and for his detailed textual practices. Like other scholars of his and the next few generations, Heath was interested – at least up to a point – in the notion of 'geometrical algebra': the idea that what Euclid and other Greeks expressed in geometrical language was in essence equivalent to certain algebraic statements and operations. The implication, taken in its most extreme form, was that Greek mathematics could legitimately be translated into algebra without the loss of anything important: that the essence of mathematical ideas was independent of the technical language, the symbolism, or even the conceptual language in which it was expressed. Chapters in the present volume by Leo Corry and Martina Schneider deal with the controversial history of 'geometrical algebra'.

In fact Heath's own practices as an editor and translator varied. Introducing his *Apollonius* (1896: viii–ix), Heath argued at some length for the necessity of modern notation to render the material comprehensible: his text was by his own admission (ix), 'so entirely remodelled by the aid of accepted modern notation as to be thoroughly readable by any competent mathematician'. This book illustrates more than any other Heath's belief that such matters as the detailed arrangement of material, its division into separate theorems, and of course its notation could be separated from essentials such as mathematical completeness, accuracy and coherence: that a text could be 'Apollonius and nothing but Apollonius' (ix) despite being 'entirely remodelled'.

In his *Archimedes* the following year, Heath was a little more cautious, introducing less compression (and presumably rearrangement) and less notational change (Archimedes 1897: vii–viii). Introducing the text, he was careful to leave open such questions as whether the Greek geometer 'really' performed integrations (v–vi); although in his later edition of Archimedes' 'Method' (1912: 9) he would claim without apology or explanation that 'Archimedes' argument establishes' a line of modern notation involving two integrals. But once again Heath's 'perfectly faithful reproduction of the treatises' (Archimedes 1897: viii) incorporated obtruded subheadings, modern-style fractions and even, often, algebraic notation within the main text. In fact only certain passages, selected for what Heath judged their historical importance, were translated literally, the remainder being given in modern notation and phrasing. Fidelity was to the original mathematical thought as Heath understood it, not to what he evidently regarded as the accidents of its presentation.

Even Heath's choice of titles is revealing. His edition of Diophantos (1895) bore the subtitle 'a study in the history of Greek algebra'; his account of the work of Aristarchus of Samos (Heath 1913) called him 'the ancient Copernicus'; both reflect Heath's willingness to see ancient achievements as equivalent in their essence to those of more recent writers. Such claims were made explicit time after time, and in his astronomical works Heath became particularly fond of expanding on how (Heath 1932: lv) 'The Copernican hypothesis was actually anticipated by Aristarchus of Samos'.

Yet Heath had his limits. Particularly when he turned to Euclid (1908), he was keen to treat the text with respect: with more respect, indeed, than he considered due to other ancient mathematical writers. In striking contrast with his Apollonius, rewritten explicitly for the sake of accessibility, he promised to present (vii) 'the real Euclid as distinct from any revised or rewritten version which will serve for schoolboys or engineers'. Unlike certain other Euclidean translators of his period (such as Thaer, editor of Euclid in German in 1933–7), and unlike English predecessors as early as Isaac Barrow (1655), Heath refrained from introducing algebraic notation into the Euclidean text itself, even if his notes relied heavily on the translation of Euclidean ideas into algebraic language.

Possibly the change reflected increasing caution or deeper reflection on the issues involved. Certainly Heath's Euclid (1908: 372–4) contained a brief discussion of 'geometrical algebra', where he set out some of the issues as he saw them.

> The algebraical method has been preferred to Euclid's by some English editors; but it should not find favour with those who wish to preserve the essen-

> tial features of Greek geometry as presented by its greatest exponents, or to appreciate their point of view (373–4).

The differences in Heath's handling of different ancient authors should also be referred to the different slants Heiberg and other editors had placed upon them: Euclid as lucid and comprehensible; Archimedes as precise but difficult; Apollonius as rebarbative in the extreme. Reviel Netz (2012) has recently shown that with respect to Archimedes in particular (and the finding can surely be broadly extended to other authors), some work of what might be called unintended modernization was already performed by Heiberg, such as in the presentation of diagrams and the decision of which portions of the text to consider authoritative. 'Very likely, this editorial policy reveals, therefore, a certain image of mathematical *genius*. Heiberg could well make his Euclid transparent and accessible; Archimedes had to be difficult' (Netz 2012: 202–3).

1.3 To 'understand the Greek genius fully'

But Heath was not only writing for mathematicians, and his writings did not only embody mathematical agendas. Indeed, 'Heath's interest in meeting the needs of cultured readers is manifest in all his works' (Smith 1936: xv). A much quoted line from his *History of Greek Mathematics* – 'if one would understand the Greek genius fully, it would be a good plan to begin with their geometry' (Heath 1921: vi) – tells of his concern to write also for classical scholars, and indeed for cultured readers generally.

Heath's strategy for facilitating the attention of cultured people to the Greek mathematical classics included presenting them – or at least Euclid – in ways which made them look like works of classic literature. His Euclid followed in its layout the conventions then current for the presentation of canonical texts whether ancient or modern: it looked and felt like a work of great literature, with its combination of philological apparatus and explanatory commentary on pages which from a distance could have been those of Aeschylus or for that matter Jane Austen. Smith, too, (1936: xi) believed that Heath's notes to Euclid should help to make 'of elementary geometry something truly humanistic', noting that they 'tell the story of geometry . . . over a period of more than two thousand years.'

To make the works of Euclid and others into works of classical literature which any cultured person could (and should) read and learn from was only part of the agenda. More important was to embed them within a history that even the less scholarly could read and engage with.

In the *History of Greek Mathematics* Heath had in mind (Heath 1931: v)

> the requirements, on the one hand, of the classical scholar who might look for light on the interpretation of passages of mathematical content in Greek authors which came his way, and, on the other hand, of the expert mathematician who might wish so far to assimilate the whole argument of a particular treatise, say of Archimedes, as to be able, on occasion arising, to apply the same method to a different problem.

Thompson judged it a book 'for every scholar'. In the briefer *Manual of Greek Mathematics*, derived from the *History*, Heath set out the same historical sweep for a different class of reader: 'the general reader who has not lost interest in the studies of his youth' and wished to know something of the history behind Euclid and his *Elements* in particular (Heath 1931: v). In two still shorter works of just sixty pages each (Heath 1920a, 1920b), Heath discussed the achievements of Aristarchus (once again 'the Copernicus of Antiquity') and of Archimedes for a more general audience still, comprising readers of the SPCK series 'Pioneers of Progress: Men of Science'. These were accessible narrative accounts of their subjects' lives and works, with algebra and calculation kept to a reasonable minimum and introduced towards the end of each book, though by no means suppressed altogether. They were Heath's most 'popular' productions; nevertheless they were aimed at a reader who was not uncomfortable with a certain amount of mathematics.

The history all of these works provided was of a very particular kind, determined by Heath's own assumptions about the nature of mathematics and by the nature of the materials available to him. Heath's was a period in which a number of scholars trained in classical philology turned their attention to ancient mathematics: Carl Anton Bretschneider (1808–1878); George Johnston Allmann (1824–1904); Hieronymus Georg Zeuthen (1839–1920); Paul Tannery (1843–1904); Johan Ludvig Heiberg (1854–1928); Gino Loria (1862–1954), to name only a selection. The philological apparatus provided by such scholars and made available to English readers by Heath may have done much to make the mathematical classics works of classical literature. It also supported – in part, determined – Heath's distinctive way of doing history. The characteristic methodological feature was the combination of historical and philological reconstruction. The evidence for Greek mathematics was and is patchy and problematic, and for the period before Euclid it is very scanty indeed. In a sense what Heath did was to apply a philological cast of mind to mathematical reconstruction. Mathematical argument, being logical, should in Heath's view be reconstructible from minimal evidence, and that minimum could often be provided by the philological evidence of the few surviving fragments of Greek mathematics before Euclid.

The resulting history was very much a product of its methodological assumptions, characterized by logical development and meticulously reconstructed proofs. The chain of reasoners was unbroken from Thales to Diophantus, and what Heath constructed might be characterized today as a history of the contents of Greek theoretical mathematics. That the forms, the practices, or indeed the circumstances might have changed was not part of Heath's project.

Heath did not altogether avoid occasional glances at the 'practical utility' of Greek mathematics, (Heath 1931: 1), nor at its value as a propaedeutic: 'I am convinced that there is no subject which, if properly presented, is better calculated than the fundamentals of geometry to make the schoolboy (or the grown man) think' (Euclid 1920: viii). But his real aim in respect of non-mathematical readers was to improve and promote the study of the 'Greek genius'. Thus (Heath 1931: 2; cf. Heath 1920b: 2)

> the Greek genius for mathematics was simply one aspect of their genius for philosophy in general. Their philosophy and their mathematics both arose out of the instinct of the race, their insatiable curiosity, their passion for 'inquiry', and a love of knowledge for its own sake which the Greek possessed in a greater degree than any other people of antiquity.

As a result, Heath believed, (Euclid 1920: v) 'Generation after generation of men and women will still have to go to school to the Greeks for the things in which they are our masters; and for this purpose they must continue to learn Greek.' Hence Heath's Euclid in Greek, and hence both the importance and the validity of using mathematics as a route to the study and appreciation of the ancient civilizations.

1.4 Conclusion: A 'body of doctrine'

Heath's work on the classics of Greek mathematics can be read in a number of contexts. This brief paper has suggested that we can usefully consider Heath's status as self-educated amateur or outsider to the profession of ancient mathematics; his views about the nature of mathematics and his determination to make ancient mathematics relevant to mathematicians of his own day; and his pedagogical agenda and his desire to promote the study of Greece and Greek in a time of what he felt was educational decline. A final thought may show one way these disparate contexts can be related to one another.

'The body of doctrine contained in the recent textbooks of elementary geometry does not ... show any substantial differences from that set forth in the Elements' (Euclid 1908: v).

Heath's view of Greek geometry was an exalted one, and it occasionally broke forth in such passages as these, where the language hinted at something literally sacred about the texts and the 'body of doctrine' they set forth. In 1920, as mentioned above, Heath contributed two volumes to a series produced by the Society for Promoting Christian Knowledge, on Archimedes and on Aristarchus. Just what the SPCK believed these volumes could do to promote specifically Christian knowledge I have not discovered, but there seems little doubt that for Heath setting forth faithfully the body of ancient geometry was in part a sacred duty for those on whom it fell. For the Greek origins were so sound that 'in the centuries which have since elapsed, there has been no need to reconstruct, still less to reject as unsound, any essential part of their doctrine' (Heath 1931: 1). The task of the scholar was to re-present, not to replace, and indeed those who attempted to replace Euclid with new textbooks of their own devising came in for Heath's very sharp censure. Commenting on the pedagogical wasteland he found in modern geometry, Heath remarked that 'Euclid can never at any time be more than apparently in abeyance; he is immortal' (Euclid 1920: v).

This is not easy to reconcile with the effort Heath himself expended to interpret and in some cases to rewrite the Greek texts. We can perhaps understand his project rather better if we see it in terms of transmission and exegesis. The essential ideas, the 'body of doctrine' were to be handed on faithfully and unchanged, any lapse or failure being a serious matter. Commentary, even voluminous commentary, was legitimate if it served the purpose of helping readers to understand that body of doctrine. Rephrasing and restructuring, too, could be justified as long as 'the real Euclid' – the ideas, not the accidents of presentation – remained unchanged.

D.E. Smith seems to have concurred. Reviewing Heath's Greek Euclid for the *American Mathematical Monthly* (Smith 1920: 264) he wrote that Heath's was 'like a voice from another sphere'. He expanded (266): 'to the teacher of elementary geometry ... these notes will seem like the words of one having authority and not of those of the educational scribes and Pharisees.' The review was reprinted in the *Classical Weekly*, and the passage was quoted in his appreciation of Heath for *Osiris* (Smith 1936). If Euclid's geometry here became the law of Moses, Heath became metaphorically its true interpreter, the Christ.

Several factors indubitably contributed to the distinctive character of Sir Thomas L. Heath's work on the history of mathematics, and to its longevity. Possibly a sense that the transmission and faithful interpretation of the Greek mathematical heritage was literally a sacred duty underlay the different agendas he seems to have brought to the task. Whatever his agendas and idiosyncrasies, Heath was a remarkable man, exceptionally well-equipped in intellect and character to undertake the colossal labours of editing, translating and commenting to which he devoted much of his life. It is hoped that this brief survey will simulate further and deeper work on one of the most prominent features of the landscape in mathematical historiography.

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