Richard Janko

The Future of the Classical Past

Abstract: Knowledge of the classical past is essential if humanity is to have a future, given the Hellenes' contributions to literacy and constitutional government. Much new knowledge can still be learned from scientific and technological advances. In particular, there will be many new papyri, certainly from Egypt and Herculaneum and quite possibly from the bottom of the Euxine Sea, rendered legible by advances such as the use of 'artificial intelligence' to read the interiors of rolled-up scrolls without opening them. Even such fragmentary discoveries as the Callatis papyrus, which may contain a poem by Simonides on the Persian Wars that mentions Xerxes, are capable of yielding unknown and exciting texts.

Keywords: Papyri, scrolls, artificial intelligence, Herculaneum, Euxine, Simonides, Persian Wars

As Lucretius showed in *De rerum natura* 5, technologies of increasing complexity, from the control of fire to the invention of computers, have been integral to the advance of civilization, as well to the multiplication of its problems, including the worsening of its internecine wars. We animals called humans have long since passed the stage of throwing verbal insults at each another or hurling sticks and stones, 'progressing' to firing off 'tweets' or missiles instead. Inspired by the rediscovery of the atomic physics of Democritus, technology has brought us the power not just of Prometheus' spark of fire, but of Zeus's thunderbolts themselves and worse. Thus the past will have a future only if humanity has a future. By making his *Iliad* end with Priam's ransom of his son's body from his killer Achilles, Homer shows us that true greatness means overcoming war and hatred in favour of our shared humanity: even our seemingly worst enemy may one day be our friend. Ultimately we are all mortal human beings, unable to live forever like the Homeric gods.

The forces of unreason, which we must call barbarism, lie deep in our shared human nature, as Thucydides well knew. They are unleashed by harsh necessity and human ignorance, but above all by human greed and aggression. For humanity to be able successfully to resist these forces, we will continue to depend upon the intellectual resources provided by the thinkers of the ancient Mediterranean world, and especially the contributions of the Greeks, which we all need to be a possession for ever, truly a κτῆμα εἰς αἰεί. We have heard many reasons from other speakers as to why this remains true. My own two favorites are these. The first is the conversion of the Phoenician 'syllabary without vowels' or 'alphabet without vowels' into

https://doi.org/10.1515/9783111337852-016

a true alphabet, a technology which accurately encodes human speech by representing each phoneme of natural language, including the vowels, by using a different sign for each. This invention occurred before 800 BCE. Since the earliest known alphabetic inscription, which I believe to be in Greek, has been found in Italy at Gabii near Rome, I hold that the alphabet was invented not in Greece itself but at Pithecussae on the island of Ischia near Naples in Italy, among the large community of Hellenes and Phoenicians who lived together there even before that date.[1] By making writing simple and accurate, so that anyone could use it, the invention of the alphabet enabled the transformation of oral literature into written form. It led to the development of texts of all kinds, from verses like these on Nestor's cup to sophisticated philosophical arguments in prose. Above all, the invention of the alphabet enabled easy communication between people in different places and in different times, vastly expanding human consciousness. It enabled humans to think in new, more accurate, and more permanent ways.

However, such progress need not be lasting; if just one generation fails to learn to read properly but reverts to relying on speech and images, or on soundbites and 'tweets', much rationality will be lost, just as when the clumsy literacy of the Aegean Bronze Age was lost in the catastrophic collapse of Mycenaean palatial society. In our world, this risks happening not only if civilization were to collapse from a widespread rejection of it but because people's brains are being rotted and hollowed out by the herd mentality and mob violence promoted by social media. It will be even worse if a lazy reliance on 'artificial intelligence' deprives people not only of the ability to remember anything or to read complex written arguments, but also of the ability to make and analyse such arguments, resulting in a general resort to violence in word and deed and a desire to blow everything up. One also fears the influence of 'deep fakes' on our ability to tell truth from falsehood.

The second great innovation that we owe to the Hellenes is the development of mechanisms for diffusing political and judicial power and preventing its excessive concentration in the hands of a small group or a single person, whatever may be their merits or their crimes. We do not need all the practices of radical Athenian democracy in order to avoid letting a single man centralize power in his own hands, but one mechanism really overdue for revival is ostracism. The lack of such mechanisms, or their failure, has been the greatest barrier to human flourishing, turning world history into a long and dismal parade of despots.

The diversity of constitutions in the city-states of ancient Hellas, as studied by Aristotle, ranging from states like Sparta reliant on their enslaved neighbours to supply labour, to states with increasing levels of equality before the law and with

1 See Janko 2015 (= Janko 2017).

trial by jury, and their resultant and very divergent histories, are essential knowledge for humankind. We must also be aware of the all too easy reversion of the Hellenistic world to government by kings, and the violent transformation of the fairly democratic Roman Republic into an autocracy that may have at first been enlightened but soon ceased to be so. This pattern continued, to the detriment of republics, for fifteen hundred years. The slide back toward tyranny evident in the last hundred years, and especially in the last decade with its increasing risks to the survival of civilization and of the entire planet, should serve to remind us that freedom from dictatorial leaders must be fought for by every generation, as it was here in Athens twenty-five centuries ago. Human freedom will only continue if humans are taught, and inspired by, the history of that struggle and others like it, and learn from history the many ways in which our societies can be made to work better than by being ruled by self-serving demagogues exploiting an ignorant public, or by hate-mongering fraudsters and ultra-nationalist criminals.

But here I wish to focus on what the modern fruits of ancient science can teach us about Hellenic and Roman thought and technology. It is commonly thought that classical scholars are ploughing old fields that will yield no new discoveries, and that all we can do to keep our field fresh and relevant to the wider public is to reinterpret it in terms of the ever-changing world of the present and indeed of that world's reception of antiquity. This is far from true; international cooperation in sharing the fruits of scientific advance continues to add much to our knowledge. Classical studies have long been in the forefront of this effort. For instance, methods developed for cryptography in World War II were essential for Michael Ventris' extraordinary decipherment of the Linear B tablets, with no access to a bilingual inscription, as the earliest form of Greek.[2] During that time, classicists like my teacher John Chadwick worked alongside mathematicians like Alan Turing to develop and use new methods for code-breaking like computers.

In the distant days when a digital file was still a stack of punch-cards or a reel of paper tape, and you had to submit a job in the evening, let it run overnight, and pick up the printout from the laboratory in the morning, classicists were already using computers to shed new light on our old texts. We were the true pioneers in digital humanities, long before that term had ever been dreamed of. David Packard and Marianne Moore founded the Thesaurus Linguae Graecae data-base of ancient Greek texts in 1972. Well before the TLG had become available on just a few purpose-built Ibycus computers, a Scottish clergyman interested in the statistical stylometry of the letters of St Paul, the Reverend A.Q. Morton, had already created the first

2 See Chadwick 1968; Robinson 2002.

machine-readable texts of Homer and Hesiod.[3] With the help of Dr Chadwick and Dr John Dawson at the wonderful Literary and Linguistic Computing Centre at Cambridge,[4] he kindly let me use his texts to create the first key-word-in-context concordance to all of early Greek epic in 1977.[5] For their help I will always be profoundly grateful. Computerized analysis of that body of data formed the basis of what was then the expected conclusion: statistical analysis of the frequency of archaic elements in the epic language showed that Homer's poems reached a fixed form that is earlier, by a considerable margin, than Hesiod's or the Homeric Hymns, and that the *Iliad* is prior to the *Odyssey*.[6] It is odd that a widespread belief in the inversion of this sequence, as advocated by the great Oxonian philologist Martin West,[7] and the parallel insistence by Gregory Nagy that the poems only acquired fixed form far later[8] (a reversion to the theories of Friedrich Augustus Wolf), have thrown Homeric scholarship into a deep and regrettable confusion from which it has yet to recover. Medievalist friends, who have successfully applied similar statistical methods to achieve a consensus over the relative linguistic dating of poetic corpora in Old English and Old Norse,[9] have urged me to be more polemical in combating the near-consensus among Homerists that my statistical methods have proved precisely nothing.[10] But I continue to believe that truth will win out in the end just because it is simple and irrefutable, however many obscurantist arguments are

3 For his remarkable life and achievements see https://www.theguardian.com/books/2019/feb/05/the-rev-andrew-q-morton-obituary (accessed 8 Oct. 2023).

4 Now subsumed into Cambridge Digital Humanities (https://www.cdh.cam.ac.uk/, accessed 13 June 2024), its illustrious history seems never to have been written.

5 All I had to input was the fragments of Hesiod and the Epic Cycle. This concordance was never published, as it was in transliteration and had no accents, but I deposited a bound copy of it in the Classics Faculty Library in Cambridge. It was invaluable to me in writing *The Iliad: A Commentary. IV. Books 13–16* (Cambridge 1993).

6 Janko 1984. For additional results of this approach see Janko 1979; 1993; 2012. Milman Parry concluded that Homer dictated both his epics much as we have them, as he stated most clearly in Parry 1971, 451; West's objections (2000) are simply not cogent. In favour of their origin as oral dictated texts see now Ready 2019, and Lane Fox 2023, 118–28.

7 For West's original claim that the *Theogony* 'may well be the oldest Greek poem we have' see West 1966, 46. For his last views on the genesis of the Homeric poems see West 2011, with the judicious review by Ford 2012.

8 See, among many similar works, Nagy 1996. I showed why Nagy's approach is unsatisfactory in my review of this book in Janko 1998, and forbear to repeat myself. For many of the same criticisms see West 2001, and Čolaković 2019, 12–14.

9 Cf. for instance Gade 2001; Neidorf 2014, particularly the chapters by T. Bredehof, R.D. Fulk, and M. Hartman; Sapp 2022.

10 I thank particularly M.M. Males, who invited me to give a keynote address to a conference in Oslo on the linguistic dating of poetic corpora in these fields.

raised against it. Even before social media, abetted by artificial 'intelligence', enabled some people to bury truth under mountains of falsehood, it would have been a sad waste of my remaining years and abilities to try to correct the record by interminably rebutting the infinite variety of illogicalities that several Homerists have dreamed up on this topic.

Recent progress in another technology that computers have made possible, namely digital imaging and high-resolution scanning, is contributing yet more to our knowledge of the ancient world. Hellenistic astronomers like Hipparchus of Samos had made extraordinary advances in understanding the solar system. Archimedes had already applied to its complex motions the latest skills in engineering.[11] He or a successor created the first analogue computer, a unique mechanism that was found by divers on the sea-bed off the coast of Antikythera in 1901.[12] But it was only through advances in X-ray imaging that we learned that neither Charles Babbage nor Alan Turing were the first to invent computers. The historians of science Derek de Solla Price, and recently Tony Freeth and others,[13] have used digital X-ray tomography of the industrial, not the less precise medical variety, to see into the encrusted interior of the mechanism, revealing that its gears were machined to an accuracy that was only attained again during World War II. High-resolution surface scanning has revealed that the user-manual engraved on its surface used the Corinthian (and therefore Syracusan) month-names, which links it to Archimedes.[14]

Progress in the digital imaging of texts largely came about from NASA's efforts to map distant planets, so remote from the sun that hardly any light reaches them. Image enhancement has recently been used to discover the writing lying under palimpsests, yielding new texts by the comic poet Menander,[15] the orator Hyperides,[16] the scientist Archimedes,[17] the philosopher Porphyry,[18] and most recently part of book 23 of the *Orphic Rhapsodies* in a codex at St Catharine's Monastery on Mount Sinai.[19]

In the late 1990s a team at Brigham Young University led by Steve and Susan Booras applied multi-spectral digital imaging to the carbonized library of eight hundred scrolls from Herculaneum containing philosophical texts, in which black ink

11 Cic. *Rep*. 1. 21–2.
12 de Solla Price 1959; Jones 2017.
13 Freeth et al. 2021.
14 Iversen 2017.
15 D'Aiuto 2003, esp. 266–283 with plates 13–14.
16 Carey et al. 2008.
17 Netz, Noel, and Wilson 2011.
18 Chiaradonna, Rashed, Sedley, and Tchernetska 2013.
19 Rossetto 2021; D'Alessio 2022.

lies on blackened papyrus, making the papyri almost illegible to the human eye. However, in the infra-red spectrum the ink is readily visible. They imaged the entire collection in Naples in 1999.[20] The existence of these images has revolutionized the study of the five hundred or so Herculaneum scrolls that were opened manually in the eighteenth and nineteenth centuries. Such images enable these texts to be properly read away from Naples and edited, often for the first time. They also permit us, when combined with advanced mathematical techniques,[21] to reconstruct some of these ancient books almost in their entirety. The first work to be reconstructed was Philodemus' *On Music* IV,[22] shortly followed by the first part of Philodemus' *On Piety*.[23] I have myself reconstructed four books of Philodemus' *On Poems*, one of them containing 222 columns of text.[24] A refinement of such techniques, hyperspectral imaging, has even enabled Kilian Fleischer to read more accurately Philodemus' *History of the Academy*, where the author himself had added to his original draft further passages on the back of the papyrus-roll (this sheds an interesting light on how ancient books were written).[25]

Many further discoveries await us from Herculaneum. Almost three hundred or so Herculaneum scrolls or parts of them still remain unopened from the original discoveries of 1752–4. Several teams are working to detect the ink on the interiors of such rolled-up papyri by using X-ray phase-contrast scans from a particle-accelerator or synchrotron.[26] Brent Seales of the University of Kentucky was the first to read the interior of a leather scroll excavated at a synagogue in En Gedi in Israel in 1971, by flattening it out digitally; it turned out to contain the start of *Leviticus* in Hebrew.[27] But the ink in this scroll contains iron, which is easier to reveal with X-rays, whereas most ancient scrolls have carbon-based ink made from soot and gum arabic with only small traces of metallic elements such as lead (Pb). At a conference at the J. Paul Getty Museum in California in 2019, Seales showed that he could train a computer by machine-learning to recognize visible carbon-based ink in Herculaneum papyri that have already been opened.[28] Seales and his team have now been able to resume their work, which the pandemic interrupted, and have obtained X-ray phase-contrast scans of the highest possible resolution of all the rolled-

20 Booras and Seely 1999, 95–100.
21 Essler 2008.
22 Delattre 1989; 2007.
23 Obbink 1996. Sadly, this work remains unfinished.
24 Janko 2000; 2010; 2020.
25 Fleischer 2022, 52–61; 2023.
26 Fleischer 2022, 63–71.
27 Seales et al. 2016.
28 Janko, Blank, Seales, and Lapatin 2019.

up papyri in Paris. In March 2023 a prize was announced, the 'Vesuvius Challenge', for the first person to use 'artificial intelligence' to recognize legible text within the interior of unopened rolls.[29] At the time of writing[30] it is clear that the prize will be won, since we have already been able to decipher scans of the interior of *P.Herc.Paris.* 4, which may well contain one of the other books of Philodemus' *On music*.[31] This new technology opens the way to recovering over the next few years many scores of texts from the Villa of the Papyri at Herculaneum, which will be better preserved than the existing corpus and will contain many hitherto unknown works.

Other spin-offs from such technologies provide new information too. In 2014, I was kindly allowed to study the Derveni papyrus in the Archaeological Museum of Thessaloniki. The Derveni papyrus, so important for the fifth-century enlightenment and the religious reaction against it later in the fifth century, is not only carbonized, like the Herculaneum papyri, but mounted under glass, which they are not. Its fragments, separated mechanically by Anton Fackelmann in 1962, are almost illegible in ordinary light. The glass means that 'conventional' photographs, taken with a microscope such as papyrologists normally use, are plagued by terrible reflections. Even multispectral images done by a team from Brigham Young University have turned out to be relatively unhelpful.[32]

While I gazed in despair at the blackened fragments, an archaeologist who was working at the next desk in the laboratory, Demosthenes Kechagias, offered to help. He was using a digital USB microscope to study and photograph textiles recovered from a tomb of the sixth century BCE, and kindly lent it to me. At first the reflections proved to be just as bad, but eventually I found that, if I brought the head of the microscope down to the level of the glass, the reflections retreat to the edge of the image, leaving an area in the middle without them. Tiny microphotographs can be stitched together to make images far superior to those that we had before. My first 5,000 images of the papyrus have enabled a much better reconstruction of the heavily damaged opening columns. A second set of 5,000 images in the infra-red spectrum enabled for the first time the reading of many letters that had not been read in visible light.[33]

Three other Greek papyri are as old as, or older than, the Derveni papyrus: the late fifth-century *P. Daphne* 1, containing lyric poetry;[34] fragments of a scroll from

29 https://scrollprize.org/ (accessed 13 June 2024).

30 1 Nov. 2023.

31 Nicolardi and Parsons 2024.

32 I thank Roger MacFarlane of Brigham Young University for allowing me access to the complete set of MSI images that were made in 2007. Cf. MacFarlane and Mastro 2019.

33 Janko 2022, with colour plates 1–5, 12.

34 Pöhlmann and West 2012; Alexopoulou and Karamanou 2014.

the tomb of Philip II of Macedon at Vergina in Pieria, which is resisting multiple efforts on my part to read more than a few letters of it;[35] and a third from Mangalia in Romania, ancient Callatis. Since none of these was carbonized, they are extant only as tiny pieces.

The survival of fragments of the Callatis papyrus is particularly miraculous. Found as a complete roll in a Macedonian-style tomb in 1959, it disintegrated upon exposure to damp and air, and was said to have disappeared completely. In fact its remnants had been taken to Moscow for conservation, and were tracked down and returned to Romania in 2010. When I tried to photograph its 224 tiny fragments with ordinary light I could see hardly any ink; only with digital infrared microphotography did writing appear. The hand dates from the later fourth century BCE. Although only detached words survive, there are enough to show that this roll contained a poem in Doric dialect about the Persian Empire, and mentioning Xerxes (or Artoxerxes, i.e. Artaxerxes).[36] Unfortunately its metre is not determined. The *Persica* of Choerilus of Samos was an epic in the same mixture of dialects, based on Ionic, that was used by Homer; hence this is excluded.[37] Recently, however, Ewen Bowie suggested to me that it might be by Simonides, who, according to the *Suda*, wrote a poem in Doric dialect on the reigns of Cambyses and Darius, on 'Xerxes' sea-battle', on the battle at Artemisium in elegiacs (it is not clear whether this refers to one poem or two), and on the battle of Salamis in lyric,[38] which would have been in Doric dialect. Alternatively, the papyrus could contain the lost beginning of Timotheus' *Persians*.

35 Janko 2018, 195–197.

36 Janko et al. 2021.

37 Cf. Choerilus frr. 1–2, 5–12 *PEG* (Bernabé) = frr. 316–30 *SH* (Lloyd-Jones and Parsons). Frr. dub. 21–24 *PEG* (= adesp. epic. frr. 904–5, 937 *SH*) are also in Ionic; whether fr. dub. 25 (= adesp. epic. fr. 950 *SH*) also is (*P. Genav.* inv. 326, 5th cent. CE) is unclear. Parts of a hexameter epic, which is of uncertain date and origin but in Doric dialect, about a battle involving a warlike son of Pharnaces survive in *P. Oxy.* 2524, which was copied in the third century CE. Pharnaces' son Artabazus, leader of the Parthians and Chorasmians in 480 (Hdt. 7. 66), stood high in Xerxes' esteem (Hdt. 8. 126, 9. 41) but fled after the battle of Plataea (Hdt. 9. 89). This text, assigned to Choerilus (*PEG* frr. dub. 13–20 Bernabé = *SH* anon. frr. 928–35 Lloyd-Jones and Parsons), could in fact be by Simonides.

38 *Suda* σ 49, γέγραπται αὐτῷ Δωρίδι διαλέκτῳ ἡ Καμβύσου καὶ Δαρείου βασιλεία καὶ Ξέρξου ναυμαχία, καὶ ἡ ἐπ' Ἀρτεμισίῳ ναυμαχία δι' ἐλεγείας· ἡ δ' ἐν Σαλαμῖνι μελικῶς. This is obviously different from his elegiac poem on the battle of Plataea (*P. Oxy.* 3965), which is in Ionic dialect (cf. Boedeker/Sider 2001).

In one respect, the content of the Callatis roll is less important than its existence: for its discovery confirms that, just as Xenophon states in his *Anabasis*,[39] by 400 BCE books packed in wooden boxes were a major part of trade between the rest of the Greek world and the settlements around the Euxine. A joint project between the University of Southampton and the Bulgarians has been exploring the bed of the Black Sea for the remains of ancient shipping. Within a few months of its initiation in 2016, the Black Sea Maritime Archaeology Project had located and imaged with three-dimensional photogrammetry no fewer than forty-one wrecks off the Bulgarian coast, such as the perfectly preserved wreck of a Greek merchant-ship of a type depicted on Attic vases of the fifth century BCE.[40] When, during prehistory, postglacial sea levels rose enough for salt water to flow through the Bosporus into the Black Sea, the heavier brine sank below the fresh water of what had been the greatest fresh-water lake in the world, and this water therefore lost its oxygen. These anoxic waters contain no marine life at all below depths of about 140 metres, and have to be explored by robots. Such conditions preserve shipwrecks far better there than anywhere else in the oceans. Among the cargoes that we may hope to be perfectly preserved should be boxes of books such as Xenophon records.[41]

There are thus three places in the world where we may hope to recover substantially more of the lost books of antiquity. The first is Egypt, where the dry climate has already yielded so many papyri. The second is Herculaneum, where more excavations at the Villa of the Papyri are urgently needed before Vesuvius erupts again and covers the site with lava for the third time in the last two thousand years. The third place is the shipwrecks on the bottom of the Black Sea. There will be papyrus-rolls and Byzantine manuscripts on parchment down there too, for us to rescue and read if humankind chooses; we will find the means if we seek them. There is so much more to discover, if only the barbarians amongst us do not blow up the world first.

39 ἐνταῦθα ηὑρίσκοντο πολλαὶ μὲν κλῖναι, πολλὰ δὲ κιβώτια, πολλαὶ δὲ βίβλοι γεγραμμέναι, καὶ τἆλλα πολλὰ ὅσα ἐν ξυλίνοις τεύχεσι ναύκληροι ἄγουσιν (*Anabasis* 7.5.14, describing the cargoes of shipwrecks at Salmydessus that he saw in 400 BCE).

40 BBC News, 20 Oct. 2018; Pappas 2018.

41 Cf. Janko et al. 2021, 72–3 with references.

Bibliography

Alexopoulou, A.A./I. Karamanou (2014), 'The Papyrus from the "Musician's Tomb" in Daphne', *Greek and Roman Musical Studies* 2, 23–49.

Boedeker, D./D. Sider (eds.) (2001), *The New Simonides*, Oxford.

Booras, S.W./D.R. Seely (1999), 'Multispectral imaging of the Herculaneum Papyri', *Cronache Ercolanesi* 29, 95–100.

Carey, C. et al. (2008), 'Fragments of Hyperides' *Against Diondas* from the Archimedes Palimpsest', *Zeitschrift für Papyrologie und Epigraphik* 165, 1–19.

Chadwick, J. (1968), *The Decipherment of Linear B*, 2nd ed., Cambridge.

Chiaradonna, R./M. Rashed/D. Sedley/N. Tchernetska (2013), 'A rediscovered *Categories* commentary', in: *Oxford Studies in Ancient Philosophy* 44, 129–194.

Čolaković, Z. (2019), 'Avdo Međedović's post-traditional epics and their relevance to Homeric studies', *JHS* 139, 1–48.

D'Aiuto, F. (2003), 'Graeca in codici orientali della Biblioteca Vaticana (con i resti di un manoscritto tardoantico delle commedie di Menandro)', in: L. Perria (ed.), *Tra Oriente e Occidente. Scritture e libri greci fra le regioni orientali di Bisanzio e l'Italia*, Rome, 227–296.

D'Alessio, G.B. (2022), 'On the New Fragments of the Orphic Rhapsodies', *ZPE* 222, 17–36.

Delattre, D. (1989), 'Philodème, *De la musique*: livre IV, colonnnes 40* à 109*', *Cronache Ercolanesi* 19, 49–143.

Delattre, D. (2007), *Philodème de Gadara,* De la musique, Paris.

Essler, H. (2008), 'Rekonstruktion von Papyrusrollen auf mathematischer Grundlage', *CErc* 38, 273–307.

Fleischer, K. (2022), *Die Papyri Herculaneums im digitalen Zeitalter,* Berlin/Boston, 52–61.

Fleischer, K. (2023), *Philodem,* Geschichte der Akademie, Leiden/Boston.

Ford, A. (2012), Review of West (2011), in: *BMCR* 2012.08.09.

Freeth, T. et al. (2021), 'A Model of the Cosmos in the ancient Greek Antikythera Mechanism', in: *Scientific Reports* 11.5821.

Gade, K.E. (2001), 'The Dating and Attributions of Verses in the Skald Sagas', in: R. Poole (ed.), *Skaldsagas,* Berlin/New York, 50–74.

Iversen, P.A. (2017), 'The Calendar on the Antikythera Mechanism and the Corinthian Family of Calendars', in: *Hesperia* 86 (1), 129–203.

Janko, R. (1979), 'The use of πρός, προτί and ποτί in Homer', in: *Glotta* 57, 24–29.

Janko, R. (1984), *Homer, Hesiod and the Hymns: Diachronic Development in Epic Diction,* Cambridge.

Janko, R. (1993), *The Iliad: A Commentary. IV. Books 13–16,* Cambridge.

Janko, R. (1998), Review of Nagy 1996, *JHS* 118, 206–207.

Janko, R. (2000, 2003[2]), *Philodemus* On Poems *Book 1*, Oxford.

Janko, R. (2010, 2020[2]), *Philodemus* On Poems *Book 3–4*, Oxford.

Janko, R. (2012), 'πρῶτόν τε καὶ ὕστατον αἰὲν ἀείδειν: relative chronology and the literary history of the Greek epos', in: Ø. Andersen/D. Haug (eds.), *Relative Chronology and the Literary History of the Early Greek Epos,* Cambridge, 20–43.

Janko, R. (2015), 'From Gabii and Gordion to Eretria and Methone: the Rise of the Greek Alphabet', *BICS* 58, 1–32 (= 'Methone and the early history of the Greek alphabet', in: J. Strauss Clay/I. Malkin/Y.Z. Tzifopoulos (eds.), *Panhellenes at Methone:* graphê *in Late Geometric and Protoarchaic Methone, Macedonia (ca. 700 BCE)*, Berlin/Boston 2017, 135–164).

Janko, R. (2018), 'Papyri from the Great Tumulus at Vergina, Macedonia', *Zeitschrift für Papyrologie und Epigraphik* 205, 195–206.

Janko, R. (2020), *Philodemus* On Poems *Book 2*, Oxford.
Janko, R. (2022), 'The Derveni Papyrus, Columns 41–7 (formerly I–VII): a Proekdosis from Digital Microscopy', in: G.W. Most (ed.), *Studies on the Derveni Papyrus II,* Oxford, 3–57.
Janko, R./D. Blank/B. Seales/K. Lapatin (2019), 'Reading the Herculaneum Papyri: Yesterday, Today, and Tomorrow', https://www.youtube.com/watch?v=g-7-Xg75CCI, (accessed 13 June 2024), (J. Paul Getty Museum, 25 Nov. 2019).
Janko, R. et al. (2021), 'Excavating and Conserving Europe's Oldest Books: a Papyrus from Mangalia on the Black Sea (*P. Callatis* 1)', *American Journal of Archaeology* 125 (1), 65–89.
Jones, A. (2017), *A Portable Cosmos: Revealing the Antikythera Mechanism, Scientific Wonder of the Ancient World*, Oxford.
Lane Fox, R. (2023), *Homer and his* Iliad, New York.
MacFarlane, R.T./G. Del Mastro (2019), 'Problems pertaining to the Restoration, Conservation, and Reproduction of the Derveni Papyrus', in: M.A. Santamaria, *The Derveni Papyrus: Unearthing Ancient Mysteries*, Leiden/Boston, 7–18.
Nagy, G. (1996), *Poetry as Performance: Homer and Beyond,* Cambridge.
Neidorf, L. (ed.) (2014), *The Dating of Beowulf: A Reassessment,* Cambridge.
Netz, R./W. Noel/N. Wilson (eds.) (2011), *The Archimedes Palimpsest*, Cambridge.
Nicolardi, F./S. Parsons (2024), 'Revealing Text from a Still-rolled Herculaneum Papyrus Scroll', *ZPE* 229, 1–13.
Obbink, D. (1996), *Philodemus* On Piety *Part 1,* Oxford.
Pappas, S. (2018), 'World's Oldest Intact Shipwreck Found at the Bottom of the Black Sea', *Live Science* 23 Oct. 2018 (https://www.livescience.com/63899-oldest-intact-shipwreck-found.html, accessed 13 June 2024).
Parry, M. (1971), *The Making of Homeric Verse,* ed. A. Parry, Oxford.
Pöhlmann, E./M.L. West (2012), 'The Oldest Greek Papyrus and Writing Tablets: Fifth-century Documents from the 'Tomb of the Musician' in Attica', in: *ZPE* 180, 1–16.
Ready, J. (2019), *Orality, Textuality, and the Homeric Epics: An Interdisciplinary Study of Oral Texts, Dictated Texts, and Wild Texts,* Oxford.
Robinson, A. (2002), *The Man who Deciphered Linear B: The Story of Michael Ventris*, New York.
Rossetto, G. (2021), 'Fragments from the Orphic Rhapsodies? Hitherto Unknown Hexameters in the Palimpsest Sin. ar. NF 66', in: *ZPE* 219, 34–60.
Sapp, C.D. (2022), *Dating the Old Norse Poetic Edda: a Multifactorial Analysis of Linguistic Features*, Studies in Germanic Linguistics 5, Amsterdam.
Seales, W.B. et al. (2016), 'From damage to discovery via virtual unwrapping: Reading the scroll from En-Gedi', in: *Science Advances* 2, e1601247.
de Solla Price, D. (1959), 'An Ancient Greek Computer', in: *Scientific American* 200 (6), 60–67.
West, M.L. (1966), *Hesiod: Theogony,* Oxford.
West, M.L. (2000), 'The Gardens of Alcinous and the Oral Dictated Text Theory', in: *Acta Antiqua Academiae Hungaricae* 40, 479–488.
West, M.L. (2001), 'West on Nagy and Nardelli on West', *BMCR* 2001.09.06.
West, M.L. (2011), *The Making of the* Iliad*: Disquisition and Analytical Commentary*, Oxford.