

*Automata, Cyborgs, and Hybrids
Bodies and Machines in Antiquity*

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Introduction

Impairment and disability in classical antiquity have formed the basis of a variety of scholarly enquiries over the course of the last two decades.¹ Increasingly, the theoretical approaches of the new academic discipline of Disability Studies are being applied to ancient material such as literary, documentary, archaeological, and bioarchaeological evidence for impairment and disability in classical antiquity as a matter of course. Yet despite this, since the lived experience of the impaired and disabled in ancient Greece and Rome is not readily described, discussed, or even depicted in detail by ancient authors or artists, it has not been a consistent focus of study.² Perhaps this is due to the fact that any attempt to access this experience requires piecing together fragmentary information drawn from the wide range of evidence previously adduced, then comparing these findings with those from neighbouring ancient civilisations (e.g. Egypt, India, China).³ It is notable that one particular aspect of the lived experience of impairment and disability in classical antiquity that has received surprisingly little attention to date, despite increasing amounts of attention having been paid to ancient technology over the last decade, is the assistive technology that could and would have been utilised by

¹ On impairment and disability in classical antiquity, see Garland 1995 (2010); Rose 2003 (2013); Breitwieser 2012; Laes, Goodey, and Rose 2013; Laes 2014; Krötzel, Mustakallio, and Kuuliala 2015; Laes 2017; Laes 2018; articles surveying the period include Kelley 2007. On impairment and disability in Judaism, Christianity, and the Bible, see Ohry and Dolev 1982; Abrams 1998; Avalos, Melcher, and Schipper 2007; Fishbane 2007; Olyan 2008. For studies on specific conditions, see for example Dasen 1993; Harris 2013; Trentin 2015.

² On attempting to reconstruct the lived experience of an impaired individual in Roman Egypt, see Draycott 2015. On impairment and disability in ancient art, see Grmek and Gourevitch 1998; also individual chapters in some of the above volumes, such as Mitchell 2013; Mitchell 2017; Trentin 2017.

³ See for example a comparison between a Roman prosthetic leg and a Chinese prosthetic leg, both dating from the third century B.C., at Draycott 2018b.

individuals with impairments that affected their physical mobility in classical antiquity.⁴

Yet from the earliest surviving classical literature, when individuals experiencing physical impairments such as lameness or the loss of a limb are attested, they are depicted utilising a variety of different types of technology to assist them in their everyday activities, and it is clear from these accounts that these technologies are envisaged as having a significant impact on their quality of life. Such individuals might create automata to act as their assistants.⁵ Such individuals might replace their lost body parts with man-made substitutes, thereby rendering themselves cyborgs.⁶ Such individuals might requisition and utilise the bodies of other humans or even animals, thereby rendering themselves hybrids.⁷ The Greek god Hephaestus is firmly situated within the history of technology by both ancient and modern commentators, and there seems to have been a strong connection between impairment and technology, and between technology and impairment, in the minds of Greeks and Romans, with impaired individuals described as undertaking technical trades and warnings issued that those who practise technical trades risk becoming impaired as a result.⁸ This chapter will examine the use of technology as a means of supplementing, augmenting, and even transforming the impaired body in ancient Greece and Rome. It will start by surveying mythological examples of impaired individuals using assistive technology and assessing the insights they can offer into the ways in which the impaired body was scrutinised, before investigating the extent to which any insights gained from these examples can be applied to real examples

⁴ To date, examinations of the use of technology for medical purposes in antiquity have concentrated on medical instruments – see the publications of Lawrence Bliquez, Ralph Jackson, and Ernst Künzl – although medical machines have been discussed in the context of the history of technology, on which see the publications of John Peter Oleson.

⁵ The English words automaton (singular) and automata (plural) are taken from the Greek word αὐτόματος, 'acting by one's own will, of oneself, and indicate a self-moving object.

⁶ The English word cyborg was coined in 1960 by Manfred E. Clynes and Nathan S. Kline, a portmanteau of 'cybernetic organism', used to denote a being with a combination of organic and biomechatronic body parts; for explication, see Clynes and Kline 1960. A cyborg might be a restorative cyborg, in which a lost body part is replaced with an equivalent, or an enhanced cyborg, in which a lost body part is replaced with a superior one. For the purposes of this chapter, I shall be considering ancient individuals who can potentially be viewed as cyborgs as restorative cyborgs rather than enhanced cyborgs.

⁷ The English word hybrid refers to a thing made by combining two different elements. Numerous hybrids are present in ancient Greek and Roman culture; for an overview, see Hughes 2010.

⁸ Other mythological figures such as Prometheus and Daedalus are likewise firmly situated within the history of technology.

of impaired individuals. To what extent could impaired and disabled individuals in ancient Greece and Rome attempt to utilise technology as an aid or even a cure for their conditions? And if they could, to what extent did they? At what point does technology, when used in this manner, cease to be simply assistive and in fact become regenerative?

The Greek God Hephaestus

This chapter will utilise the Greek god Hephaestus as a starting point for an examination not only of physical impairment but also assistive technology in classical antiquity. Hephaestus is the god of fire, smiths, artisans, metalworking, stonemasonry, and sculpture, yet despite this he was not often mentioned in ancient literature and appears to have been ‘not a very important god in historical times’.⁹ He is the only physically impaired Olympian deity.¹⁰ He is consistently depicted in ancient literature as being physically impaired; his legs and feet are variously described as being lame, crooked, clubfooted, and so on.¹¹ While earlier sources focus on the fact of his impairment, later sources are more concerned with its implications, particularly the way that it affects how he moves.¹² Explanations for his physical impairment vary: in some versions, he was lame and weak from birth; in others, he was injured when Zeus threw him from Mount Olympus and he crash landed on Lemnos.¹³ It is possible that the rationale for Hephaestus being born lame was that Hera, competing with Zeus, who had generated Athena, attempted to generate Hephaestus herself, contrary to the natural order.¹⁴ His physical impairment is one of his defining characteristics; two of his sons, Periphetes (also known as Korynetes) and Palaimonios, were said to have inherited it from him, which

⁹ Brennan 2016, 163; Bremmer 2010, 193.

¹⁰ Hephaestus is one impaired and disabled individual who has been frequently and comprehensively discussed by scholars. See for example Hermay and Jacquemin 1988; Malten 1912 and 1913; Delcourt 1957; Brommer 1978; on Hephaestus’ Roman counterpart Vulcan, see Capdeville 1995.

¹¹ Brennan 2016.

¹² Brennan 2016, 178–9. This is in line with the World Health Organization’s definitions of the terms ‘impairment’ and ‘disability’: ‘Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations’: www.who.int/topics/disabilities/en/ (accessed October 2018).

¹³ For Hephaestus being lame from birth, see Homer, *Iliad* 8.136, 8.267; *Homeric Hymn 3 to Pythian Apollo* 310. For Hephaestus being injured as a result of his fall from Olympus, see Homer, *Iliad* 1.568, 1.590; Valerius Flaccus, *Argonautica* 2.8.5; Pseudo-Apollodorus, *Library* 1.3, 1.19.

¹⁴ De Ciantis 2005, 185.

accords with ancient ideas about the hereditary nature of impairments in classical antiquity.¹⁵ It was through their respective impairments that their divine parentage was made clear, which was particularly useful for the latter when his paternity was contested.¹⁶ It has notable physical affects; he is described as being disproportionate, with legs slenderer than one would expect them to be considering the size of the rest of him, and he moves slowly and awkwardly, leaving him open to public mockery and humiliation.¹⁷ The most famous example of this occurs in Homer's *Iliad*, when Hephaestus, serving the other Olympian deities drinks, is compared to Zeus' cupbearer Ganymede and found wanting.¹⁸ Much hilarity ensues as a result of this juxtaposition.¹⁹

Considering Hephaestus' position and his impairment, it is not surprising, then, that he is depicted in both ancient literature and ancient art as utilising the sort of assistive technology that would have been readily accessible to those suffering from impairments that affected their physical mobility, such as the staff, the stick, the cane, or even the crutch; he is described as using a stout staff (*skēptron*) to support himself as he moves around his forge.²⁰ However, he is also depicted in ancient literature and art as utilising a variety of different types of assistive technology that would not have been readily accessible to those suffering from impairments that affected their physical mobility: he owns a pair of winged sandals and a winged chariot, and his forge is filled with self-directing technology, most notably automata in the form of a pair of maidens. Thus, Hephaestus can potentially be seen as an early example of an individual with the means to do so replacing impaired or lost body parts with man-made substitutes and thereby rendering himself a cyborg. He can also,

¹⁵ Apollonius, *Argonautica* 1.202–6, 3.217. On belief in the hereditary nature of impairment and disability in classical antiquity, see Hippocratic Corpus, *Sacred Disease* 3; Aristotle, *History of Animals* 585b, 586a; Pliny the Elder, *Natural History* 7.11.50.

¹⁶ Apollonius, *Argonautica* 1.203.

¹⁷ For Hephaestus' disproportionate physique, see Homer, *Iliad* 18.415, 20.36–7. For Hephaestus' slow and awkward gait, see Homer, *Iliad* 18.410; Homer, *Odyssey* 8.311, 8.330.

¹⁸ Homer, *Iliad* 1.584–600. In view of this, perhaps it is not surprising that Hephaestus is believed to have created twenty tripod automata that attended the banquets of the gods, and whose purpose may have been to serve the drinks in his stead; see Homer, *Iliad* 18.373–9. This connection seems to have been made in antiquity: see Philostratus, *Life of Apollonius of Tyana* 3.27.2–3, in which Apollonius travels to India and while there attends a banquet where he is served by four tripod automata and bronze humanoid automata that resemble the cupbearers Ganymede and Pelops.

¹⁹ On the public mockery and humiliation of disfigured, deformed, or impaired individuals occurring as a matter of course in classical antiquity, see Garland 1994. Yet see Halliwell 2008, 63, for the suggestion that such individuals were not necessarily automatically laughed at, and if they were laughed at, it does not necessarily follow that their differences were the reason for this laughter.

²⁰ Homer, *Iliad* 18.416.

somewhat more prosaically, potentially be seen as an individual with the means to do so requisitioning the bodies of other humans and animals to compensate for his own deficiencies and thereby rendering himself a hybrid. Finally, and most impressively, he creates automata to act as his assistants. These technologies have a clear impact upon him, his life, and his lived experience. For our purposes here, it does not necessarily matter whether the creators of these depictions intended members of their audiences to envision Hephaestus as something akin to a real-life smith, using his knowledge, skill, and experience in conjunction with his actual tools (he is usually depicted with the hammer, anvil, tongs, and bellows) and materials (metal, wood, etc.).²¹ We could see these depictions as simply ‘embellishing a kind of mystique surrounding craft activity’ and ‘[exaggerating] a kind of awe at those who make devices’.²² Certainly, it would potentially have been awe-inspiring to see someone how had been previously unable to walk without physical assistance from a family member or friend now locomoting independently thanks to the use of a staff, stick, cane, or crutch, or an extremity prosthesis, or even some sort of frame.

Ancient Assistive Technology

Cyborgs: Staffs, Sticks, Canes, and Crutches; Corrective Footwear; Extremity Prostheses

As mentioned above (p. 000), Hephaestus is originally depicted as walking with the assistance of a stout staff. The staff, walking stick, or crutch (usually ὁ σκίπων, τὸ ξύλον, or τὸ βᾶκτρον in Greek; *baculum*, *bacillum*, or *baccillum* in Latin) is the piece of assistive technology most commonly depicted in both literature and art, although examples are not commonly found in the archaeological record due to the fact that organic materials such as wood are only preserved in very wet or very dry contexts. Ancient literature particularly associates the staff with the elderly, but it could be utilised by anyone in need of support and stabilisation.²³ The staff (or walking stick, or cane, or crutch) has not been comprehensively studied.²⁴

²¹ Berryman 2009, 24–5. However, see an alternative view presented in Devecka 2013, which notes the passage of time between the archaic and the classical periods and the concomitant development of ancient Greek technology and the ancient Greek understanding of mechanics.

²² Berryman 2009, 25.

²³ For the staff as one of the standard attributes of old age, see Emery 1999, 23; Cokayne 2003, 54; for physical weakness of the elderly generally, see Cokayne 2003, 53–6.

²⁴ See Loebel and Nunn 1997 for a cursory overview; for a more detailed study, see Draycott (in preparation). For studies of the iconography, see Couvret 1994; Brule 2006.

However, even a cursory glance at the scattered ancient literary and material evidence for it indicates that it was possible for a considerable amount of thought to go into the creation of one. Theophrastus recommended mallow (*Malva sylvestris*) as a good material for a staff because the plant could grow to great heights quickly and was strong and recommended bay (*Laurus nobilis*) specifically for the creation of walking sticks for the elderly because it was relatively lightweight.²⁵ However, there are references to other materials being utilised; various other types of wood such as olive and fig, as well as other materials such as ivory, whalebone, and gold. There are references to plain ones and elaborately decorated ones. While someone might be fortunate enough to find a piece of wood just the right size and shape, or someone with a basic knowledge of carpentry could carve their own, there are indications that there could be much more to the process of creating a staff than that.²⁶ The author of the Hippocratic treatise *Joints* views the provision of a crutch as part of the physician's duty of care to their patient and recommends a variety of different types of crutch, the specific type of crutch recommended depending on the condition diagnosed and the treatment prescribed. Judging by the explanation and justification given at the outset, this seems to be something of a departure from common practice:

One might say that such matters [i.e. processes of rehabilitation] are outside the healing art. Why, forsooth, trouble one's mind further about cases which have become incurable? **This is far from the right attitude. The investigation of these matters too belongs to the same science; it is impossible to separate them from one another.** In curable cases we must contrive ways to prevent their becoming incurable, studying the best means for hindering their advance to incurability; while one must study incurable cases so as to avoid doing harm by useless efforts.²⁷

So, for the author of *Joints*, at least, the crutch and how it would affect the patient is viewed as an integral part of the treatment. For untreated dislocations that had occurred *in utero* or in early childhood, one might use one or two crutches.²⁸ The difference in the quality of life for those who

²⁵ Theophrastus, *Enquiry into Plants* 1.3.2, 5.7.7.

²⁶ See Theocritus, *Idyll* 9.23–4 for an example of a natural staff given as a gift and reckoned as fine as any produced by an artisan. See Acton 2014, 200, for carpentry at home in Classical Athens.

²⁷ Hippocratic Corpus, *Joints* 58 (trans. E. T. Withington): φαίη μὲν οὖν ἂν τις, ἔξω ἰητρικῆς τὰ τοιαῦτα εἶναι· τί γὰρ δῆθεν δεῖ περὶ τῶν ἤδη ἀνηκέστων γεγονότων ἔτι προσσυνίεναι; πολλοῦ δὲ δὲ οὕτως ἔχειν· τῆς γὰρ αὐτῆς γνώμης καὶ ταῦτα συνίεναι· οὐ γὰρ οἶόν τε ἀπαλλοτριωθῆναι ἀπ' ἀλλήλων. δεῖ μὲν γὰρ ἐς τὰ ἀκεστά μηχανάσθαι, ὅπως μὴ ἀνήκεστα ἔσται, συνίεντα ὅπη ἂν μάλιστα κωλυτέα ἐς τὸ ἀνήκεστον ἔλθειν· δεῖ δὲ τὰ ἀνήκεστα συνίεναι, ὡς μὴ μάτην λυμαίνηται.

²⁸ Hippocratic Corpus, *Joints* 53.

utilise one crutch or two compared to those who do not is made clear, to the point where we can interpret this as an example of the physician expressing sympathy for their patient and dismay at their quality of life:

In the case of adults, their mode of walking has been described; but when this accident occurs in those who are very young, for the most part they lack energy to keep the body up, but **they crawl about [miserably] on the sound leg, supporting themselves with the hand on the sound side on the ground.** Some even among those to whom this accident happens when adult lack the energy to walk standing up; but when persons are afflicted by this accident in early childhood and are properly trained, they use the sound leg to stand up on, but carry a crutch under the armpit on that side, and some of them under both arms. As for the injured leg, they keep it off the ground, and do so the more easily, because in them the injured leg is smaller; but their sound leg is as strong as if both were sound.²⁹

For dislocations that occurred in adulthood and were not successfully reduced, leading to one leg being significantly shorter than the other, they could use a long crutch if they were capable of walking erect but either could not or did not want to place their foot on the ground, or a shorter crutch if they could or wanted to place their foot on the ground.³⁰ The author of *Instruments of Reduction* likewise made recommendations regarding the use of mobility aids, similar but not identical to those of the author of *Joints*, stating that a crutch should be short rather than long, since if it were long the user would not use the foot.³¹

Hephaestus is frequently depicted in ancient works of art as wearing winged shoes. These depictions usually but not always occur in conjunction with him assisting with the birth of Athena, and so in this context the winged shoes could be interpreted as lending him speed, making the normally slow god as swift as Hermes and Perseus who are generally endowed with those attributes, something very necessary in such an extreme situation. Considering the emphasis placed upon Hephaestus' slow and uneven gait in ancient literature, in increasing Hephaestus'

²⁹ Hippocratic Corpus, *Joints* 52 (trans. E. T. Withington): τοῖσι μὲν οὖν τετελειωμένοισιν εἴρηται οἷη τις ἡ ὀδοπορία γίνεται· οἷσι δ' ἂν νηπίοισιν ἐοῦσιν ἢ συμφορῆ αὐτῆ γένηται, οἱ μὲν πλείστοι καταβλακεύουσι τὴν διόρθωσιν τοῦ σώματος, ἀλλὰ [κακῶς] εἰλέονται ἐπὶ τὸ ὑγιὲς σκέλος, τῇ χειρὶ πρὸς τὴν γῆν ἀπειριδόμενοι τῇ κατὰ τὸ ὑγιὲς σκέλος. καταβλακεύουσι δὲ ἔτι οἱ ἐς ὀρθὸν ὀδοπορίην καὶ οἷσιν ἂν τετελειωμένοισι αὐτῆ ἢ συμφορῆ γένηται. ὁπόσοι δ' ἂν νήπιοι ἔοντες ταύτῃ τῇ συμφορῇ χρῆσάμενοι ὀρθῶς παιδαγωγηθῶσι, τῶ μὲν ὑγιεῖ σκέλει χρέονται ἐς ὀρθόν, ὑπὸ δὲ τὴν μασχάλην τὴν κατὰ τὸ ὑγιὲς σκέλος σκίπωνα περιφέρουσι, μετεξέτεροι δὲ καὶ ὑπ' ἀμφοτέρας τὰς χεῖρας· τὸ δὲ σιναρὸν σκέλος μετέωρον ἔχουσι, καὶ τοσοῦτω ῥῆτους εἰσίν, ὅσῳ ἂν αὐτοῖσιν ἔλασσον τὸ σκέλος τὸ σιναρὸν ᾗ.

³⁰ Hippocratic Corpus, *Joints* 58. ³¹ Hippocratic Corpus, *Instruments of Reduction* 23.

speed, the winged shoes can be viewed as akin to corrective footwear. Since Hephaestus is described as making shoes for the gods, it could have been intended that he made them.³² The winged shoes have a counterpart in the corrective footwear that was recommended for the treatment of congenital conditions such as clubfoot, *Talipes equinovarus*.³³ The author of *Joints* advised treatment as early as possible, dressing and bandaging the foot in a very particular way and then adding a sole made from a firm substance such as stiff leather or lead.³⁴ It is recognised that there will be variations in the condition and that the dressings and bandages should be likewise varied.³⁵ If the manual adjustment, dressing, and bandaging are not sufficient, one can go a step further and utilise corrective footwear. The author refers to contemporary styles of footwear:

A leaden shoe shaped as the Chian boots used to be might be made, and fastened on outside the dressing; but this is quite unnecessary if the manual adjustment, the dressing with bandages, and the contrivance for drawing up are properly done. This then is the treatment, and there is no need for incision, cautery, or complicated methods; for such cases yield to treatment more rapidly than one would think. Still, time is required for complete success, till the part has acquired growth in its proper position. When the time has come for footwear, the most suitable are the so-called 'mud-shoes', for this kind of boot yields least to the foot; indeed, the foot rather yields to it. The Cretan form of footwear is also suitable.³⁶

The treatment recommended here is notable because it is neither surgical nor mechanical. Potentially, a treatment such as this – which admittedly might initially cause the patient a degree of discomfort but which they would hopefully grow accustomed to over the extended period of time during which they were undertaking it – was considered preferable to

³² For Hephaestus as a shoemaker, see Hyginus, *Fables* 166.

³³ On congenital deformities of the legs and feet, see Roberts and Manchester 2010, 57–9; for an example of clubfoot that was left untreated from a Romano-British cemetery, see Roberts, Knusel, and Race 2004. The modern incidence of *Talipes equinovarus* is 1 in 800 to 1,000 births; it is more common in males and runs in families. See above, p. 000, for the theory that impairment and disability were inherited. For depictions in ancient art, see Grmek and Gourevitch 1998, 151f., 282–287; Ziskowski 2012.

³⁴ Hippocratic Corpus, *Joints* 62. For commentary, see Michler 1963.

³⁵ Hippocratic Corpus, *Joints* 62; see also Hippocratic Corpus, *Instruments of Reduction* 32.

³⁶ Hippocratic Corpus, *Joints* 62 (trans. E. T. Withington): οἷον αἱ Χῖαι [κρηπίδες] ῥυθμὸν εἶχον· ἀλλ' οὐδὲν αὐτοῦ δεῖ, ἢν τις ὀρθῶς μὲν τῆσι χερσὶ διορθῶσῃ, ὀρθῶς δὲ τοῖσιν ὀθονίοισιν ἐπιδέῃ, ὀρθῶς δὲ καὶ τὰς ἀναλήψιας ποιοῖτο. ἡ μὲν οὖν ἵησις αὐτῆ, καὶ οὔτε τομῆς οὔτε καύσιος οὐδὲν δεῖ, οὔτ' ἄλλης ποικιλίης· θάσσον γὰρ ἐνακούει τὰ τοιαῦτα τῆς ἡτρείης ἢ ὡς ἂν τις οἴοιτο. προσνικᾶν μέντοι χρὴ τῷ χρόνῳ, ἕως ἂν αὐξηθῇ τὸ σῶμα ἐν τοῖσι δίκαιοισι σχήμασιν. ὅταν δὲ ἐς ὑποδήματος λόγον ἦ, ἀρβύλαι ἐπιτηδεῖόταται αἱ πηλοπατίδες καλεόμεναι· τοῦτο γὰρ ὑποδημάτων ἥκιστα κρατεῖται ὑπὸ τοῦ ποδός, ἀλλὰ κρατεῖ ἄλλων· ἐπιτήδειος δὲ καὶ ὁ Κρητικὸς τρόπος τῶν ὑποδημάτων.

a surgical or mechanical intervention which would definitely cause the patient both a high degree of pain during and immediately after the procedure and an albeit (hopefully) decreasing degree of discomfort over the extended period of time during which they were recovering and rehabilitating from it. This minimally invasive approach is not surprising, considering the author's criticism of those who attempt to cure incurable conditions such as hunchback with unnecessary surgical and mechanical interventions, in part out of a desire to perform in front of an audience of rubberneckers, elsewhere in the text.³⁷

According to Erotian, a Chian boot was a woman's boot, and according to Galen, a Cretan boot reached halfway up the leg, so in both cases the foot would benefit from a considerable amount of support from the ankle and lower leg.³⁸ There are several ancient literary references to individuals with impaired feet utilising corrective footwear. The first is a music master named Damonidas, who lost a pair of boots that were specially made for his impaired feet and, depending upon how you interpret his response, either rather generously or rather snidely prayed that they might fit the feet of the thief.³⁹ The second is a musician named Dorion, who lost his specially made shoe at a party, which led him to curse the thief that the shoe might come to fit him or, potentially, her.⁴⁰ It is probable that corrective footwear was made by a shoemaker but one working according under the supervision of, or at least according to instructions given by, a physician. Several examples of corrective footwear have been found amongst the 4,000 shoes dating to between the first and fourth centuries CE that have been excavated from the site of the Roman fort at Vindolanda.⁴¹ To correct an over-supinated or over-pronated gait, it would appear that the shoemaker attached a metal bar to the sole of the shoe on the side of the foot that required extra support at the point at which the shoe was originally made.⁴² To provide additional support to a particular part of the foot, clusters of hobnails were somewhat randomly inserted into the corresponding part of the sole, but this time not necessarily at the point at which the shoe was originally made and, considering the lack of finesse with which this was done, probably not by the shoemaker.⁴³

One step beyond employing corrective footwear as a means of treating an impaired foot is employing an extremity prosthesis as a means of

³⁷ Hippocratic Corpus, *Joints* 42.

³⁸ Withington 1928, 351, n. 1, n. 2 referring to Erotian, *Hippocratic Lexicon* and Galen, *Commentary on Hippocrates' On Joints*.

³⁹ Plutarch, *Moralia* 18d. ⁴⁰ Athenaeus, *Dinner Sophists* 8.338a. ⁴¹ Greene 2019.

⁴² See for example Vindolanda L-1992-3745. ⁴³ See for example Vindolanda L-1988-2118.

replacing a lost foot, and doing so would potentially inspire a considerable amount of awe. There is ancient literary, archaeological, and bioarchaeological evidence for the use of extremity prostheses in the form of toes, feet, and legs in antiquity.⁴⁴ The earliest mention of a prosthesis in classical literature that can be classed as historical and attributed to a genuine historical figure, rather than a mythological one, is the wooden foot of Hegesistratus of Elis, which dates to the early fifth century BCE.⁴⁵ Hegesistratus, the most distinguished soothsayer from amongst the Telliads, a Greek clan renowned for their knowledge of prophecy, was captured and imprisoned by the Spartans. However, in an attempt to avoid torture and execution at Spartan hands, he managed to amputate enough of his foot to enable him to remove his shackles, then broke through the wall of his cell and escaped. Once his wound healed, he acquired a wooden foot and continued to work against the Spartans, actions which led to his subsequent recapture and execution after the battle of Plataea.⁴⁶ There are two prosthetic great toes from Egypt that have been dated to the first half of the first millennium BCE that support the essentials of this story; both prostheses exhibit wear on the base, indicating that they were worn during life and utilised as assistive technology; experimental archaeological reconstruction and experimentation has proved that both are quite comfortable to wear either with or without sandals.⁴⁷

Much more elaborate and impressive than the Egyptian prosthetic toes is the famous 'Capua Limb', a prosthetic right leg recovered from a tomb in Capua that can be dated to approximately 300 BCE. It is one of the oldest-known functional prosthetic limbs in the world. It was originally made from wood and bronze, consisting of a wooden core covered in bronze sheeting worn in conjunction with a leather and bronze belt to hold it in place and, assuming that the prosthesis could be securely fastened at the thigh and the waist, to facilitate a limited amount of movement in conjunction with a crutch. Other finds recovered from the tomb were a bronze urn and some locally produced red-figure pottery, and judging by these and the materials used in the limb's construction, it was likely worn by a high-status individual, or at the very least, a wealthy one, perhaps a veteran of the Second Samnite War (327–304 BCE) or even a retired gladiator. Capua is noted in ancient literature as a city of considerable

⁴⁴ See Bliquez 1996; Draycott 2018a.

⁴⁵ Herodotus, *Histories* 9.37; some details of this episode are also included in Plutarch, *On Brotherly Love* 3.1.

⁴⁶ Herodotus, *Histories* 9.38. For discussion of Hegesistratus, see Dillery 2005. ⁴⁷ Finch 2018.

wealth and luxury and is particularly feted for its bronze, so it would have been the perfect setting for an individual to wear such an item.

It is not until Late Antiquity and the early Middle Ages that we see more archaeological and bioarchaeological evidence for the use of extremity prostheses from sites in northern Europe. A skeleton of a man missing a foot and bearing in its place a prosthesis comprising a leather pouch with a wooden sole attached to it by iron nails has been excavated at Bonaduz in Switzerland and dated to between the fifth and seventh centuries CE. The pouch was filled with hay and moss, presumably intended to cushion the stump but possibly also to soak up pus from the wound, since there is bioarchaeological evidence of minimal healing having taken place and, in any case, the individual lived for a maximum of two years after the amputation. It is debatable whether this prosthesis was functional in the sense of allowing the wearer to walk around, since there seems to have been no means of attaching it to the ankle. A skeleton of a man aged thirty-five to fifty years old missing his lower left leg and bearing a wood and metal prosthesis in its place has recently been excavated from a Frankish settlement at Hemmaberg in southern Austria and dated to the sixth century CE. Bioarchaeological evidence of osteoarthritis in the knees and shoulders indicates that he used the prosthesis in conjunction with a crutch. A skeleton of a man aged fifty-seven to sixty-three missing his lower left leg below the knee and bearing the remains of a wood and bronze prosthesis, probably a wooden peg-leg tipped with bronze, in its place has been excavated from a Frankish cemetery at Griesheim near Darmstadt in Germany from a site dating to the seventh or eighth century CE. The skeleton's left femur was atrophied, indicating that the man had survived for a considerable time after the amputation but had only restricted movement.

Is it fair to say that the use of assistive technology such as a staff or specially made shoe or an extremity prosthesis renders an individual a cyborg? The myth of Oedipus and the riddle of the Sphinx shows that it was not unusual for a staff to be considered and described as a third foot or leg, while an individual using corrective footwear or extremity prostheses sought to supplement or substitute their own feet or legs.⁴⁸

Hybrids: Conveyances; Equids; Bearers

Hephaestus built a number of chariots, including one with wings for himself that he is often depicted riding in on vase paintings.⁴⁹ The extent

⁴⁸ Pseudo-Apollodorus, *Library* 3.52–5; Diodorus Siculus, *Historical Library* 4.64.4.

⁴⁹ See for example an Attic red-figure *kylix*, Berlin inv. F2273, Beazley 201595.

to which physically impaired individuals utilised assistive technology akin to a wheelchair is unknown; there are a few depictions in ancient literature and art of young children utilising wheeled walking frames similar to modern Zimmer frames (ὁ δίφρος ὑπότροχος in Greek, *sustentaculum* in Latin), but none of adults doing something equivalent.⁵⁰ There are rather more depictions of immobilised individuals being carried around in chairs and litters, at least for journeys of short duration; one example of this is Artemon, an immobilised siege-engine designer who was carried around in a litter during the siege of Athens. Longer journeys were likely carried out with the assistance of equids such as donkeys or mules.⁵¹ Here we should bear in mind the mythological episode of the return of Hephaestus to Mount Olympus, a popular motif on Greek black- and red-figure vases in the sixth and fifth centuries BCE, where Hephaestus is frequently depicted riding a donkey, the explanation given for which being his impairment.⁵² This choice has raised questions: while it makes sense for Hephaestus to be depicted upon a donkey when he is depicted in the company of other Olympian deities who are on horses or in horse-drawn chariots, an indication of his lower status, why is he depicted on a donkey when away from Mount Olympus and the other Olympians?⁵³

It is debatable how much agency an immobilised individual had in classical antiquity; someone who used a chair, or a litter, was reliant upon the cooperation of their bearers, while someone who used an equid was restricted to using that equid where equids were permitted or where access allowed.

Automata

Finally, the assistive technology utilised by Hephaestus that has received the most attention from scholars to date are his automata. Hephaestus is described as fashioning a range of automata, humanoid, animal, tripod in form, all of which served and assisted either gods or mortals in some way.⁵⁴

⁵⁰ Soranus, *Gynaecology* 1.114.

⁵¹ For the example of Artemon, see Plutarch, *Pericles* 27.3–4. See Griffith 2006, 324, for discussion of the ‘peculiarly close relationship’ between an equid and its rider.

⁵² Hedreen 2004; Brennan 2016. However, see also MacDonald 2015, 185–8, on the possibility of viewing Hephaestus as a lame sinner.

⁵³ Hedreen 2004 has suggested that this is due to the artists drawing on the real Dionysiac processions that took place in classical Athens for inspiration, as it would make more sense for Hephaestus to travel on or in one of his own creations, such as the winged chariot or winged shoes mentioned above. See Griffith 2006, 348–51, on this.

⁵⁴ See Faraone 1987 for the suggestion that the inspiration for these stories originated in the ancient Near East.

The ones that concern us here are the golden maidens that he fashioned to serve and assist him in his workshop.⁵⁵ Whether such things ever existed is beside the point; what is more intriguing is the fact that they were imagined, and that alongside the automata with loftier purposes, Hephaestus is imagined as creating for himself assistive technology.⁵⁶ It has been suggested that there is a specific reason why this assistive technology was envisaged in human form; according to Paipetis, ‘the greater diversity of jobs is required from a robot, the more its form tends to become human, for a simple reason: The human body, through its age-long adaptive evolution within terrestrial environments, is the perfect “universal tool”, therefore, if robots are to substitute for humans in their activities, they must assume their form’.⁵⁷ Additionally, according to Kalligeropoulos and Vasileiadou, ‘two mythical robots, two self-moving manlike machines, having sense, speech and strength. Innovative technological visions: The strength, i.e. the feature that transforms low-power commands into powerful mechanical movements, the speech, i.e. the construction of machines producing sounds to communicate, and the sense, i.e. the particular inner structure that results in skilful, learning machines’.⁵⁸ All three of these have a resonance in relation to the requirements of assistive technology for an impaired individual: strength is necessary for physical assistance, speech for interaction and companionship, sense for anticipation and empathy. Whether or not the poet and the audience *believed* that Hephaestus had created automata/robots/androids to assist him is not the point; the point is that it seemed to be a reasonable supposition, that someone with his physical impairments would benefit from such assistive technology. Aristotle uses this very episode as a starting point to consider and debate the positive and negative aspects of artificial intelligence as it pertains to slavery.⁵⁹ In reality, it is likely that physically impaired individuals sought the assistance of their family, friends, and household staff (whether freeborn, formerly enslaved, or enslaved).⁶⁰ In some cases, this link between assistive technology and human assistance is made explicit, as the individuals rendering this assistance are described in those very terms, even as assistive technology personified.⁶¹ According to

⁵⁵ Homer, *Iliad* 18.418–21; Philostratus, *Apollonios of Tyana* 6.11.18–19.

⁵⁶ Kalligeropoulos and Vasileiadou 2008, 77; Paipetis 2010, 111. See also Berryman 2009, 24–7.

⁵⁷ Paipetis 2010, 108. ⁵⁸ Kalligeropoulos and Vasileiadou 2008, 79.

⁵⁹ Aristotle, *Politics* 1253b35; for discussion, see Devecka 2013. See also LaGrandeur 2011.

⁶⁰ For discussion of the crucial role that human caregivers played in the lives of the physically impaired and immobile, see van Schaik 2018.

⁶¹ See for example Sophocles, *Oedipus at Colonus* 867; Euripides, *Hecuba* 65, 261. See also *Greek Anthology* 9.13b.

Macrobius, the reason that the Cornelii Scipiones bore that particular cognomen was that one of their family members ‘used to guide his blind homonymous father, in place of a cane’.⁶²

The Close Association of Impairment and Technology

There seems to have been a strong connection between impairment and technology, and technology and impairment in the minds of Greeks and Romans. Attempts to explain Hephaestus’ impairment have included seeing his lameness as compensation for his technological talents (and vice versa), seeing it as a visible symbol of his wisdom and intelligence, seeing it as an indicator of fire needing to be crippled in order to be controlled.⁶³ Hephaestus is, after all, not the only example of a god of craft in world mythologies who is physically impaired.⁶⁴ It is also possible that Hephaestus was depicted as impaired because impaired individuals actually did have a tendency to undertake trades.⁶⁵ According to the author of the Hippocratic treatise *Joints*, the Amazons deliberately dislocated the joints of their male offspring and set them to work as artisans.⁶⁶

However, more commonly stated was the belief that those who undertook trades would become impaired, as a combination of the sedentary nature of the occupation and the repetitive physical activity it required would deform the body.⁶⁷ Certainly, repetitive exertion would lead to disproportionate muscle development and build-up of callus. Additionally, due to the dangerous conditions found in ancient workshops, it is likely that individuals who worked in them were frequently scarred. It has also been suggested that impairments could have arisen from arsenical neuritis, poisoning due to the high concentrations of arsenic in metal being smelted and worked.⁶⁸

⁶² Macrobius, *Saturnalia* 1.26 (trans. R. A. Kaster): *qui cognominem patrem luminibus carentem pro baculo regebat*.

⁶³ Delcourt 1957, 121–8, views Hephaestus as a magician; Detienne and Vernant 1974, 272; Faraone 1992, 134. However, Bremmer 2010, 200, sees Hephaestus’ impairment as symbolic and not a reflection of ancient reality.

⁶⁴ For a survey, see Brandon 2004. ⁶⁵ Garland 1995, 62, 32–5.

⁶⁶ Hippocratic Corpus, *Joints* 53; see Mayor 2014, 156 on this.

⁶⁷ See for example Xenophon, *Estate-Management* 6.2; Aristotle, *Household-Management* 1.2.3; Aristotle, *Politics* 1.4.3–4, 8.2.1; Lucian, *The Dream* 6–13. It is worth noting that the funerary monuments of artisans do not tend to depict them as suffering from impairments; see for example the stele of the shoemaker Gaius Julius Helius, whose funerary monument is dominated by a carefully rendered portrait of his nude upper body rather than an image of him participating in his trade, see George 2006, 27–8, for analysis and discussion.

⁶⁸ Rosner 1955, 362–3; see more recently Craddock 1976, 1977; Nriagu 1983; Harper 1987.

Whether impaired individuals were likely to undertake trades or those undertaking trades were likely to become impaired, we do need to consider the possibility that physically impaired artisans utilised their experiences of being physically impaired to inspire and inform their work. After all, who better to understand the requirements of an impaired patron, especially if they were attempting to commission something out of the ordinary such as a prosthetic limb, than their impaired client?

Just as assistive technology augmented, supplemented, and even transformed the human body, so too did it augment, supplement, and on occasion even transform the practice of medicine. It offered physicians the opportunity to expand their horizons and initiate dialogues and collaborations with the practitioners of the τέχναι of leatherworking, woodworking, and metalworking, amongst others.

Assistive Technology, *Technê*, and the History of Technology

Ancient philosophers such as Plato, Aristotle, and the Stoics all depicted nature as operating in a manner characteristic of *technê*.⁶⁹ Erasistratus seems to have frequently likened nature to artisans, and the works of nature to the works of artisans.⁷⁰ Assistive technology, although underrepresented in ancient technological treatises, accords with the nature/art dichotomy, with the impaired individual utilising art to overcome their nature and bring about what nature cannot.⁷¹ In the particular examples discussed and analysed in this chapter, what nature cannot bring about is physical mobility. Additionally, if one of the points of ancient technology such as automata was to inspire ‘wonder’ in the viewer, might it have been equally wonderful, in the eyes of an ancient viewer, to see an impaired individual apparently restored to health?⁷²

Conclusion

As I stated at the outset of this chapter, relatively little attention has been paid to the different types of assistive technology that could or would have been utilised by individuals in classical antiquity with impairments that

⁶⁹ von Staden 2007, 38. ⁷⁰ On Erasistratus, see von Staden 2007, 38.

⁷¹ Pseudo-Aristotle, *Mechanical Problems* 847a11–12: art imitates nature and brings to fruition what nature cannot? Aristotle, *Nature* 199 b 28–9: art goes beyond nature and brings about results that nature cannot? For discussion of this dichotomy/polarity, see Schiefsky 2007. See however Micheli 1995, 64; van Leeuwen 2016, 12–18.

⁷² On the miraculous healing of those with mobility impairments, see van Schaik 2018, 145–7.

affected their physical mobility. Assumptions have been made regarding the capabilities (or rather lack of capability) of ancient technology in relation to impairment and disability.⁷³ While ancient assistive technology was clearly not as advanced in actuality as it was in the poetic imagination, all incarnations served the same purpose: art was used to improve upon nature and ‘fix’ something was ‘broken’ or ‘replace’ something that had been ‘lost’. The differences between actual assistive technology – wood, leather, bronze, iron, litters, chairs, equids, people – and imagined assistive technology – winged shoes, winged chariots, automata – are less significant than they first appear.

Studying assistive technology in classical antiquity is also worthwhile from the perspective of facilitating efforts to apply the theoretical frameworks of the discipline of Disability Studies to the disciplines of Classics, Ancient History, and Classical Archaeology. In the twenty years since Robert Garland published the first edition of his *The Eye of the Beholder: Deformity and Disability in the Graeco-Roman World*, impairment and disability has become a popular topic in the disciplines of ancient history and classical archaeology, and the theoretical approaches of Disability Studies have been brought to bear on this material, with varying degrees of success, as neither the Medical Model nor the Social Model are entirely appropriate for dealing with impairment and disability in classical antiquity. Martha Lynn Edwards (later Martha Lynn Rose) has proposed that what she designates a ‘Community Model’ be utilised instead, arguing that the impaired and disabled were thoroughly integrated into ancient society, and the contribution that they made to their particular community was what was important.⁷⁴ Sarah Newman has elaborated upon this with what she designates a ‘Civic Model’, in which the impaired and disabled were viewed in the context of citizenship and belonging and thereby rendered impaired and disabled if they were unable to function physically, mentally, or morally within their community.⁷⁵

However, it is with the Medical Model that I would like to conclude. The Medical Model sees disability as a personal limitation arising from the impairment that is part of the individual’s constitution, with the necessary response being medical intervention, treatment, and cure by medical or technological means. Resources are targeted at the individual in order to ‘fix’ them and render them able to participate more fully in the world

⁷³ See for example Rose’s opinion of the technological capabilities of ancient extremity prostheses: ‘It is difficult to believe that any prosthetic device would have been practical as well as cosmetic’, at Rose 2003 (2013) 26. Obviously, this has been proved incorrect by Finch (2018) discussed above, p. 000.

⁷⁴ Edwards 1997. ⁷⁵ Newman 2013, 12, 16.

around them. The onus is on the individual to do what is necessary to make the effort to adjust and fit in and be 'normal'. While the Medical Model accords with the prevailing view of impairment and disability in some historical periods, particularly more recent historical periods, it is not considered to accord with impairment and disability in classical antiquity. This is because medical intervention, treatment, and cure by medical means was not the general rule in ancient cases, because ancient physicians did not tend to treat what they perceived to be incurable conditions.⁷⁶ Individuals who attempted to treat such conditions, such as hunchback or dwarfism, were dismissed as quacks and charlatans.⁷⁷ Individuals suffering from conditions that physicians were unable or unwilling to treat are believed to have resorted to other types of healing practice, such as the religious or magical.⁷⁸

Yet if we focus on medical intervention, treatment, and cure by technological means, as we have seen, it is clear from attestations in the earliest surviving classical literature that when individuals were experiencing physical impairments such as lameness or the loss of a limb, they are depicted utilising a variety of different types of technology to assist them in their everyday activities, to 'fix' themselves, as it were. Relatively little attention has been paid to the different types of assistive technology that could or would have been utilised by individuals with impairments that affected their physical mobility in antiquity, yet, as I have argued, paying closer attention to Hephaestus can be informative and provide a starting point from which to further examine not just physical impairment but also assistive technology in classical antiquity. I have examined the use of technology as a means of supplementing, augmenting, and even transforming the impaired body, surveyed the mythological examples and assessed the insights that they can offer into the ways in which the impaired body was scrutinised and stigmatised, and investigated the extent to which these insights can be applied to real examples of impaired individuals. It is clear that impaired individuals in ancient Greece and Rome could utilise technology as an aid or even a cure for their conditions, and it is clear that under some circumstances and in some cases they did. In light of new research into ancient technology, might it be time to reconsider the

⁷⁶ See for example Hippocratic Corpus, *Prognostic* 1; Hippocratic Corpus, *On the Art* 8; Hippocratic Corpus, *Prorrhetic* 2.8; Hippocratic Corpus, *On the Sacred Disease* 2. See von Staden 1990.

⁷⁷ See for example Hippocratic Corpus, *Joints* 42, on attempting to straighten a spinal curvature with a ladder.

⁷⁸ See for example Wickkiser 2008 with specific reference to the growing cult of the Greek god Asklepios during the classical period.

perceived inappropriateness of applying the Medical Model to impairment and disability in classical antiquity?

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