CONCLUSION

'At one end, so to speak, it emits mechanical power,
and at the other, the divine principle.'

The Absolute at Large, Karel Čapek (1922)[1]

This book began with a set of propositions about how the ancient Greek religious system worked, particularly in relation to divine manifestation. I set out to explore how technology featured and functioned with(in) those propositions which mediated between human and supernatural realms. Including the mechanical in the discourse on divine epiphany and religious experience is not intuitive. Karel Čapek's satiric vision of a machine that creates practically free energy but spurts out a numinous by-product known as the Absolute is both very relevant and utterly alien to the ancient context. It is alien in that Čapek's novel is focalised through (relatively) modern preconceptions of technology and religion as antithetical. The protagonist's invention is strictly a machine of science fiction. That a sense of the numinous might be created by mechanical technology is entertained in the story as imaginatively (and metaphorically) compelling but remains impossible in practical terms. At the same time, the way that Čapek conceives of the mechanical-divine Karburator machine is strikingly relevant to the exploration at hand precisely because it targets technology's potential to *do more* than power a steam engine. As it turns out, the Absolute affects human populations and the way they see the world to a far greater (and more devastating) extent than the energy produced.

Insofar as the parameters of the research were somewhat counter-intuitive, the book serves, on its most basic level, as a collation of the evidence that attests to the overlapping of mechanics and

[1] Karel Čapek's 1922 *Továrna na absolutno* was translated from Czech into English by Šárka B. Hrbková in 1927.

religion in the ancient Greek world. Simply to document examples would have been to sell the topic short, however. Faced with the examples, I have attempted to think about how technologies – mechanical *objects*, the *knowledge* that these encoded, and the *processes* which they engendered and within which they were bound up – were used to create and to authenticate theological truths in ancient Greek religion. This unearthed an important feature of ancient Greek religion: that mechanical epistemologies were not inimical to ideas of the sacred, but, rather, conditioned them.

The book seeks to reposition ancient 'miracle' technologies within a cultural discourse without reducing them to frivolous gadgets. Instead, I argue that religious technologies were cultural techniques used in presenting, exploring, and solving theological issues. This subsequently has ramifications for the study of Greek religion, foremost for the question of ancient 'belief' and for understanding the relationship between technical and miraculous epistemologies. A running thread of argument is that the visibility of divine appearance and the visibility of the mechanisms producing divine appearance went hand in hand, and that the latter did not diminish the thaumatic effect of the former. Epiphany and its constituent mechanisms were symbiotically constructed and this was embraced within the ancient Greek religious system. The book has also, then, exposed a religious system which was open not just to change, but also to innovations that were informed by *mēchanica*.

I first located mechanical epiphany in the familiar world of fifth-century Athens and the well-known context of the ancient theatre (Part I). The *deus ex machina* has been relentlessly attributed a structural function in wrapping up the plot of Greek tragedies; by contrast, I opted to take its material qualities more seriously to explore the theological potential of the *mēchanē* as a mode of visual epiphany. Rather than cringe at or dodge the inescapable historical fact that the mechanical components of the theatrical crane would have been visible to the audience, I took this as integral to reassessing how the machine was viewed, and thus how it functioned to mediate between human and divine realms. The visibility of the mechanics, I argued, was vital to the success

of this mode of epiphany, challenging the viewer to recognise the divine intervention alongside the mechanics that constructed and enabled it. Part I presents the *mēchanē* as materially, theatrically, and theologically complex in its ability to store and to transmit ideas of divine representation, ontology, and communication.

Accessing and assessing the ancient viewing experience of the tragic *mēchanē* – and indeed of many religious technologies presented in the book – posed one of the book's main challenges and at the same time provided its main insights. In terms of the *mēchanē* specifically, this issue was rendered thornier still due to the influential and damning assessment of the machine in Aristotle's *Poetics*. If Aristotle's judgement were representative of ancient opinion generally, the *mēchanē* could hardly have had the persistent and successful theatrical life it enjoyed and, furthermore, there would likely have been a resistance to the mechanical mode of generating divine presence in subsequent historical periods.[2] Quite the opposite is true. The Hellenistic period sees technological theologies expand not only in terms of mechanical sophistication but also in contexts of deployment, as explored in Part II, and this takes on a different trajectory again in the Imperial period, the focus of Part III.

To escape the Aristotelian judgement and unearth the possible variety of responses to the theatrical crane, the issue of viewership was assessed from three angles (Chapters 1 and 2). I first adduced the evidence of Old Comedy to demonstrate how paratragic uses of the crane undercut the interpretative symbiosis between man, machine, and divine agency on which tragedy was predicated. I then explored how the theatre as a form of mass media made it fertile ground for development and exploration of theological ideas, not just a reflection of literary norms. Finally, I put the *mēchanē* within the broader picture of rich visual theologies that existed both on the tragic stage and within the context of the Great Dionysia to illustrate some of the ways that the machine spoke to contemporary religious and cultural realities.

[2] This is similar (and related) to the problem that Porter 2010 identifies in using Plato and Aristotle as guides to understanding ancient aesthetics.

Contemplating how mechanical epiphany worked, in comparison with other, better-studied models of visual representations of the divine, shed light on this new mode's unique material, theatrical, and theological characteristics. Certain elements of the *mēchanē*, it was shown, are always in play; others are emphasised to a greater or lesser extent according to the specific theological point of the play at stake. The *mēchanē* was always visible and thus paradigmatic of the constructed nature of the divine encounter. This was an integral component of the epistemological challenge that the *mēchanē* posed to the audience (the external witness), in contrast to the characters in the play (internal witnesses). This is something that a divine prologue delivered on stage could not 'do' in the same way, for example. The *mēchanē*, by its very nature, toyed with the structural poles of epiphany, wavering between its spontaneous, divinely ordained dimension and its constructed, humanly ordained component. The *mēchanē* was always part of a range of visual theologies within the plays, alongside (as it were) actors playing gods, statues, and altars – and we noted how the plurality of theatrical visual theologies here paralleled cultural norms – but, crucially, the *mēchanē* has utterly distinctive spatial and locomotive qualities. The manufacture and prominence of artificial movement – or what we might think of as 'technological animation' – within the divine encounter is a feature which I further emphasised in Part II and Part III. Finally, mechanical epiphany is shown to complicate the anthropomorphic expectations of divine epiphany on which a lot of secondary literature on the topic has fixated.

Despite the existence of such common features that united disparate uses of mechanical epiphany in tragedy, it would be a mistake to be entirely schematic in our reassessment of the *mēchanē*. Part I thus closes by offering a series of case studies to display how playwrights innovated in and around the mechanical epiphany's paradigmatic qualities and imbued these with particular theological implications (Chapter 3). The *mēchanē*'s visibility in tragedy was at times noted meta-theatrically, not by drawing attention to the role of the *mēchanopoios*, as in comedy, but by partaking in explorations of the themes of cunning and ingenuity, as in Sophocles' *Philoctetes*,

for example. At other times, and far more frequently, the constructedness of the machine proved vital to the proper recognition of divine ontology: in Euripides' *Helen*, *Bacchae*, and *Orestes* the *deus ex machina* was the epiphanic form that trumped all others. At other times again, the mechanics of the crane became a way to (re)present channels of communication between realms and to literally suspend a divine conversation prior to intervention, as seen in Euripides' *Heracles*. The *mēchanē* performed the constant negotiation involved in human–supernatural encounters between divine distance and proximity, simultaneously linking and separating human and divine realms, with the notable exception of *Medea* and the horizontal shift from Corinth to Athens undertaken there. While in certain cases the *linking* component was stressed (e.g. in a mimetic sense between Philoctetes and Heracles in Sophocles' *Philoctetes*), in other cases it was the characteristic of spatial *separation* which made mechanical epiphany useful. The cases of *Orestes* and *Helen* are two such examples of the latter. Even beyond its paradoxical capacity for concurrent linking and separation, the *mēchanē* constructed a rich vocabulary of spatial semantics: an ideological free zone and instrument of Helios (*Medea*), a platform for divine discussion (*Heracles*), a bridge of respite between man and god (*Philoctetes*), an unexpected expansion of seemingly finite space (*Orestes*).

There are various ways in which playwrights also used mechanical epiphany to comment on contemporary cultural understandings and experiences of divine presence: how divine beings move and what they look like, when and why they might be motivated to appear, and how this fits with human affairs. The *Bacchae* casts the mechanical as one of the many modes of epiphany which Dionysus could adopt; *Orestes* uses the *mēchanē* as part of a conversation on simulated epiphanies and divine ontologies, reflected both in ritual re-enactments by priestly personnel and in visual media where gods and their effigies were represented side by side. In *Heracles* the *mēchanē* becomes a window into divine deliberations perceived to occur around the event of the *theophania*. In all cases the *mēchanē* is far richer theologically than scholars who reduce it to a structural tool have been prepared to admit, and far more

complex visually than those blindly following Aristotle's line of assessment will see.

Having explored the range of ways that mechanical epiphany worked on the ancient tragic stage, and having tentatively offered a picture of the ways that this mode interacted with other visual modes of epiphany both on and off stage, I turned in Part II to look at how technologies were incorporated into rituals and what this meant for the experience of worshippers. This section explores both objects – *astragaloi*, mirrors, wheels, articulated figurines, wheeled tripods, automata – and spaces – temple interiors, oracular sites, and processional routes – as inherently devised, altered, and theologised through technical knowledge. Taken together, the chapters in this part of the book not only reveal that technical interventions were imperative to accessing the divine and creating sacred presence in a number of contexts, but posit, counter-intuitively, that technical intervention *increased* the accuracy and authenticity of an encounter.

Divination, for example, is shown to have been impacted from various angles by the intervention of human technical knowledge (Chapter 4). The first step to unearthing the ways that this functioned was to reposition our understanding of divination as an act of sought epiphany and of the objects used in the divinatory process as not only conduits for questions and answers, but also as media and thus asserting agents in the construction of divine presence and the transmission of theological ideas. Catoptromancy (mirror divination) and astragalomancy (knucklebone divination) were two 'technical' modes of ancient divination which carried theological implications and shaped theological suppositions as to how the gods intervened in the human realm and how this connected to human knowledge. Both worked in the same way, broadly speaking, in that both manipulated technical knowledge – catoptric and mathematical, respectively – to manifest the numinous. But precisely how this worked in each case differed significantly. The physical alterations of *astragaloi*, and the resultant manipulation of mathematical probability of the throws of the knucklebones, can be understood to be coterminous with the way that the gods intervened in the human world: relying on constraints imposed and created by the human world but retaining an element of the uncontrollable and unpredictable. The use and distortions of

reflection made ancient mirrors useful in ancient divinatory contexts to fashion an image of distinct ontological status. Indeed, this capacity of the ancient mirror was harnessed beyond divination to create religious aura within ancient temples more generally. It was not just the interiors of temples that were artificially enhanced for religious ends, but subterranean spaces too, as demonstrated through the notable case of the Oracle to Trophonios in Lebadeia.

When worshippers chose to dedicate objects to the gods, a number of factors conditioned their votive choices. Chapter 5 sought to discover what technological ingenuity 'did' to the reciprocal favour – or *charis* relationship – that underpinned the act of dedication. The answer, I proposed, lay in the mechanical marvel's unique position in navigating invocation and evocation, or mortal call and divine response. Indeed, one unique feature of technological interventions in/of the divine realm is precisely their ability to collapse these two poles. The pneumatically enhanced dedications described both in Hellenistic epigram and in technical texts, for example, demonstrate, in the first instance, that a number of ways existed by which technical ingenuity could invoke divine presence through the creation of movement, stillness, sound, silence. And yet in each of these cases, there was an overt negotiation between the *thauma* that the object invoked, and the technical knowledge which allowed this *thauma*. Mechanical texts not only offer a firm religious context to inventions described but help to unpack the relationship between wonder and *mēchanē*, making further contributions to the issue of viewership and the intention behind the construction which Part I began to address. Hellenistic epigram reveals the same relationship between mechanics and the marvellous within the confines of its own genre. Analysis of epigrams describing the Bes *rhyton* and the Lykon *thēsauros*, for example, showed how religious awe and technological capabilities were co-constructed and mutually reinforcing.

Chapter 5 also demonstrated how ritual actions and the worshipper's body interacted in different ways to confirm divine presence with these inventions-turned-votive-objects, or 'dedicated inventions'. From the worshipper spinning a bronze wheel to taking a sip from a pneumatically enhanced drinking horn to

carrying an articulated figurine in procession, the technological components of these objects framed and gave sense to the ritual experiences within which they were used. Finally, Chapter 5 took us much further back chronologically in order to think about an early history of the phenomenon and made two interrelated points. The well-known passage from *Iliad* 18 describing Hephaistos' self-animated tripods shows that from as early as the eighth century BCE there was not such a gap between human and divine *technē*. The myth of Prometheus, who gave mortals access to the divine privilege of fire and thus incurred the wrath of Zeus, offered a clear aetiology for this phenomenon whereby *technē* was always ambiguously divine and human. Yet while the Hesiodic tradition is general in its description of the theft, and focuses on the punishment that the Titan then experienced, the fifth-century *Prometheus Bound* vastly extends the discussion surrounding what exactly fire represented as a '*pantechnos*' and places mechanics within this. From its place in archaic epic, the myth of Prometheus writes a history of technology as one that is, from its inception, both inherently human and divine and *Prometheus Bound* then makes this point specifically about mechanics through meta-theatrical use of *mēchanē* vocabulary throughout the play.

Read in a different way, the chapters of Part II also offer a new narrative for thinking about ancient technological objects, as well as their relationship with people – both past and present. Wheels, for example, are often overplayed in histories of technology as the simplest of machines which betray (and direct) humanity's inevitable, climactic arrival at its modern state of technological genius. Without dismissing the importance of the wheel for production and transport, the evidence of the Peripatetic *Mechanical Problems* suggests that the wheel was foremost a source of fascination for the miracle-inducing capacity of circular motion. Similarly, mirrors were not simply 'objects related to the female realm' (vel sim.), but were always embodiments of catoptric knowledge and their uses in religious contexts, recorded both technically and anecdotally, show that it was precisely the manipulation of the laws of reflection which made them religiously useful.

In a similar vein, ancient automata, the focus of Chapter 6, should not be considered proto-robots. Reading these objects as

anticipations of modern constructions misses the role they actually play in historical contexts. Large, self-animated machines were a feature of Hellenistic *pompai* which, I argue, were effective as *pompeia* because they enhanced existing features of religious procession: narrative, synaesthesia, and the call–response relation between worshippers and the deity. Automata in procession attest to new technological capabilities of the Hellenistic period, certainly, and are harnessed within new religious and political realities including the development of ruler cult, but their effective deployment was based on existing theological structures. Their use spoke to an existing mode of mechanical epiphany and to existing understandings of how the Greek gods cooperated in and coordinated ancient festivals from as far back as the *deus ex machina* of the Classical period. By this point in the book, a shifting diachronic picture has therefore begun to emerge. On the one hand, the evidence points to the fact that there is a continuity over time in the sorts of mechanisms used to enhance the presence of the gods. On the other hand, the degree of independent interest in the mechanisms for their own sake increases over time, as does the awareness of how crucial the theological work of mechanisms is, which is precisely what leaders of the Hellenistic and Imperial periods politicised. The discussion of Part III further explores and exemplifies this latter claim.

The mechanical miracle was always man-made, bound by the constraints and empowered by the potential of technical human knowledge. At the same time, manufacturing the marvellous always exceeded epistemological boundaries and thus attested to divine interference and presence. Yet if this symbiosis was to tip too far one way or the other – if the hand of the *mechanopoios* was too visible, if the simulated epiphany was more theatrics than it was *theophania*, if the automated wagon whirled around without Apollo overseeing the occasion – then the situation could change drastically. Thus, the roles that technology played in contemporary critiques of human behaviour in relation to the gods, whether fraudulent or overreaching, formed the focus of Part III.

The issue of religious forgery through technological means is central to Lucian's *Alexander* (Chapter 7). The protagonist of Lucian's text 'falsifies' a number of miracles and while the

narratorial perspective works to uncover the trick behind the trick, the *Alexander* as a whole testifies to technology's role in the effective propagation of the cult of Glykon. Lucian intentionally complicates the narrator's defrauding programme by questioning in both religious and scientific terms what it means to plan and to perform miracles. The *Alexander* demonstrates the various ways that technical knowledge is integral to the act of miracle-making, turning the text, in spite of its satiric self, into a manual for these very same purposes. A comparison with Hippolytus' *Refutation of All Heresies* not only attests to the broader use of technological miracles in ancient contexts, but also exemplifies how technology could be configured differently within a religion's theological truths.

Technologies are also used to mediate between human and supernatural realms in Lucian's *Icaromenippus* (Chapter 8). In that text the protagonist devises and constructs a pair of wings which allow him to fly up to Olympus and come face to face with the gods of the Greek pantheon. He stays with the gods for twenty-four hours, during which time he watches Zeus communicate telephonically with humans through prayer-wells, reminiscent of Alexander's mechanical autophone, and dines with the gods. Lucian's *Icaromenippus* shows once more that technologies are integral to the tricky business of navigating the junction between human and divine, but there are also hints in this text that this can be manipulated in ways that pose potential threats to the existing divine order. The wings not only give Menippus access to Olympus, for example, but endow him with divine characteristics of flight and, further, allow him to see things beyond what human sight can perceive.

The suggestion that Menippus' actions mark him out as a pseudo or fake god provided a useful entry point for discussion of the issue of technology as a tool for theomachy more generally in the Greek cultural imagination. If mechanics were always linked to the human – in knowledge, construction, performative use – this begs the question of whether at some point in Greek history an antithetical relation was established between religion and mechanics. *Icaromenippus*, I suggested, plays into two distinct but related traditions which connect technology and

theomachy. On the one hand, we know of several individuals in Greek myth who physically encroach on divine territory, such as Otus, Ephialtes, Icarus, and Bellerophon, all of whom meet terrible ends which Menippus notably escapes. On the other hand, there are those who insult the gods by being overambitious in their technical abilities: Salmoneus stands as the paradigmatic example of this category of theomach, with his mimetic imitation of Zeus' thunder and lightning. In both cases – astral theomachies and technophile theomachies – theatrical fragments indicate that the intersection of mechanics and religion was played out meta-theatrically through the use of stage machinery, as the case of *Prometheus Bound* had also shown earlier in Part II.

The insistent meta-theatricality of the phenomenon at hand – an element that recurs in all three parts of the book from the *deus ex machina* and simulated epiphanies to articulated figurines, processional automata, and Lucian's texts – is worth stressing for what it illuminates about the history of ancient Greek religion. Religious technologies were, I argue, effective in large part because of their self-referentiality, pointing to their own ability to reproduce the theatrics and rituals around which Greek religion was constructed. In this sense, the book contributes to a re-characterisation of ancient Greek religion and its ritual experiences. To the theatrical, I have also repeatedly insisted on the related quality of the playful. While we often think of religion as sombre, play and lightheartedness are clear features of the Bes *rhyton*, the Lykos *thēsauros*, and the articulated figurines, not to mention the polyvalence of these objects as both toys and votive objects. The divinatory use of *astragaloi* relies on the role of *alea* (chance), rotating wheels in temples capitalise on the discombobulating, dizzying power of *ilinx*, and spectacle and *mimesis* underscore the use of theatrical machinery from the *deus ex machina* to processional automata. Further, conceptual models of play allowed at various points in the book for reflection on the parallel modes of functioning between the player's and the believer's attitudes which, in both cases, involve a careful balance between awareness and ignorance, compliance and detachment. This offers an important contribution to current scholarly discussions on belief in ancient Greek religion.

This book is, I hope, far from the final word on the interplay between technology and the divine in Graeco-Roman antiquity. Most obviously, and as indicated in Part III, the Roman world merges these two components in a different cultural configuration to that of the Greek world. This deserves full treatment in its own right, particularly as Christian theologies adopt, reject, and intersect with the pagan treatment in historically illuminating ways. There is also more to be said of architecture as a *technē* which formed and informed theologies, often employing elements of *mēchanē*, as discussed in Part II. Finally, and, in my eyes, most pressingly, discussion of manifesting the divine needs to be inserted in wider discussion of modelling the cosmos and understanding the place of the human within this. Celestial technologies, lunar (as hinted at in Chapter 8) and solar as well as complex astronomical models such as the Antikythera mechanism, do not mechanically manufacture the marvellous but technologically configure the cosmos, and how we relate to the divine cannot be divorced from how we relate to the cosmos itself.