

CHAPTER NINE

Technologies of Performance

Machines, Props, Dramaturgy

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(translated from German by Martin Revermann)

The history of ancient theatre cannot be described as a linear development. This is because its contexts (spatial, political, cultural) are too heterogeneous respectively, and the preserved pieces of documentation too discontinuous. The resulting impression is one of a series of disparate closed systems which as a whole share only quite general characteristics with each other. This general observation also applies to technologies of performance more specifically. In our time, technological development is almost by default considered to be a history of progress. As far as ancient theatre technology is concerned, however, such an assumption is not warranted by the relatively sparse evidence since, somewhat paradoxically, most is known about the use of performance technology in the earliest phase of institutionalized theatre in the fifth century BCE, less about Hellenistic theatre, and very little indeed about performance technology in the theatre of the Roman Republic, the imperial period and late antiquity, despite the fact that Greek and Roman theatre buildings show significant architectural similarities.¹

This negative finding as far as Roman theatre is concerned is hard to explain. Apparently we have fallen victim to adverse chance. For by the first century BCE already Roman theatre had a penchant for the monumental and spectacular,

as was noted critically by contemporaries. According to Horace, the content of the plays got lost among the spectators' loud conversation,² while Cicero remarks that the sumptuous use of props alone led to an atmosphere characterized less by 'serenity' (*hilaritas*) and 'entertainment' (*delectatio*) than by the 'admiration of the riff-raff' (*popularis admiratio*).³ Livy even goes so far as to call the theatrical extravaganza of his time 'insanity' (*insania*).⁴ In view of all of this it seems likely that, by the imperial period at the latest, Roman theatre had elaborate machinery which could be used for staging ever-changing spectacular surprises. To make those possible, most of the machinery needed would be hidden underneath the raised stage. Seneca (*Epist. mor.* 88.22) mentions 'machine workers' (*machinatores*) and their impressive technologies,⁵ which were a good fit for the analogous phenomenon, the paratheatrical amphitheatre.⁶ Whether in the *Ars Poetica* (191f.) Horace speaks of the *deus ex machina*, which would imply the use of a stage crane at his time, is not entirely clear from the context but possible. Mime and certainly pantomime (the two main forms of theatre in the Roman imperial period) presumably worked well dramaturgically without any machinery. But since only once in preserved Roman theatre scripts is the use of a mechanical device attested (in Seneca's *Medea*, on which see below), there is bound to be a focus in this chapter on Greek theatre of the classical period. For even Roman comedies, which contain a sufficient number of metatheatrical passages, tell us nothing on this matter (unlike Greek Old Comedy). This prompts the suspicion (certainty is out of the question here) that in this genre at least stage machines were not being used a great deal, and that when they were being used they did not leave a footprint in the scripts we have.

Cicero, however, does mention a theatre curtain (*aulaeum*) – a device unknown to the Greek theatre – which was dropped at the beginning of a play and raised at its end.⁷ The right moment was indicated by the beat of wooden clappers (*scabella*). In the relevant passage Cicero maintains that lifting the curtain was designed to hide a dramatically inept ending which, for him, is typical of the mime. A similar verdict, this time about the use by tragic playwrights of the crane with a *deus ex machina* on it, is made by the fourth-century Greek comic playwright Antiphanes in his play *Poiêsis* (fr. 189.12–15 Kassel-Austin): 'Then, when they [i.e. tragic poets] have nothing more to say / and have totally run of steam in their plays, / they lift the crane like their finger, / and for the audience this is satisfactory.'

In general, the point has to be made that, with the exception of a limited number of passages in secondary texts, it is the ancient dramatic texts themselves which are our only source for questions to do with performance and the use of technology. For the latter in particular no information is provided by theatre-related vase paintings while archaeological remains of theatre machines reveal, at best, something about their position within a particular theatre

building but little about their precise appearance and nothing about their actual use in concrete instances. In the preserved dramatic scripts, on the other hand, the use of stage technology is sometimes pointed out quite explicitly but in the vast majority of cases only implied. And since there is no paratext in the form of stage directions (which ancient playwrights do not seem to have written in the first place), the dramatic texts only permit interpretations and suggest certain modes of *mise-en-scène* while usually allowing for some hermeneutic leeway. Even if one were to take the (highly questionable) view that every significant action is reflected in the dramatic script,⁸ this would only lead to a very limited impression of the stage action. More important and profitable than reconstructing precise performance details is analysing the specific dramaturgical and semiotic relevance associated with the use of theatre machines.

The Theatre of Dionysus in Athens in which most of the preserved classical plays appear to have been performed at one point⁹ certainly had two specific machines, the *ekkyklêma* (also sometimes called *exôstra*)¹⁰ and the crane.¹¹ It must remain open whether in addition there also were other, smaller machines and subterranean pathways, as is insinuated by the sophist Pollux of Naucratis (second century CE) who, however, may have conflated information about various theatres and from different time periods.¹² There can be no doubt that in the Athenian theatre there were machines capable of generating a variety of sounds (like thunder), because such were, for instance, needed for the appearance of the chorus of clouds in Aristophanes' comedy of the same title (see *Clouds* 291–4).¹³ The ancient *Life of Aeschylus* assumes the frequent use of scenic technology of this dramatist (the first we have a significant amount of evidence for) in the 450s BCE at the latest.¹⁴ Aeschylus' *Oresteia* (458 BCE) clearly presupposes the availability of a stage house (*skênê*), and on the assumption that not one and the same set of background painting (*skênographia*) was used to signify both Agamemnon's palace and the acropolis of Athens there also had to be the possibility of changing scenography.

CRANE AND EKKYKLÊMA

The crane, attested in a scene of Aristophanes,¹⁵ resembled that of a modern ship.¹⁶ It was anchored in a stone platform behind the middle of the *skênê* building,¹⁷ and when not in use its arm (which could be swung to the sides and lifted up or down) was probably lying flat on the roof of the stage house (Figure 9.1).¹⁸ Its function was to simulate flight, hence its predominant use in tragedy for sudden and spectacular entries, of divinities in particular. The ending of Euripides' *Electra* can serve as a good example. In this play (1221ff.) Orestes and Electra stand on stage in front of their mother's corpse and decide to cover her with a piece of cloth, intending to use this ritual action also to put

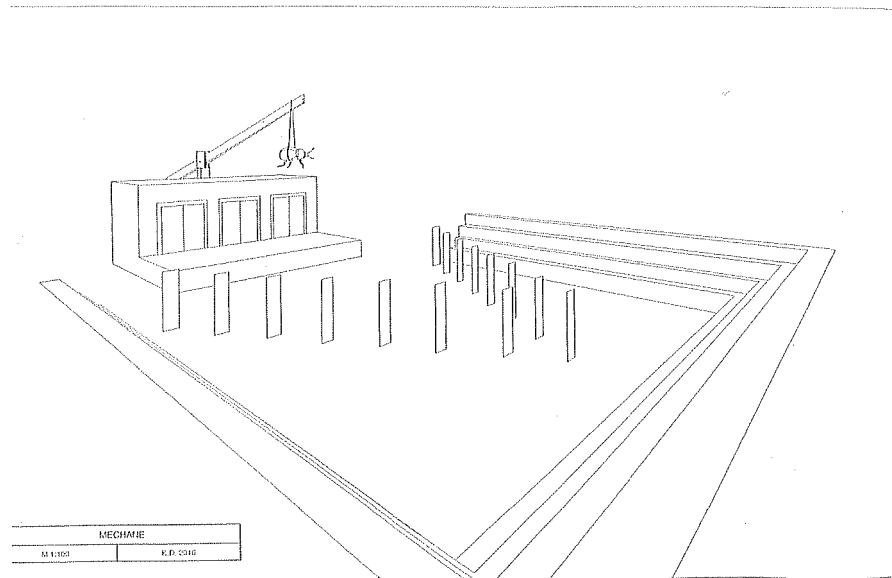


FIGURE 9.1: Schematic rendering of the stage with crane (loosely modelled on a scene in Aristophanes' *Peace*). The rectangles hint at a possible blocking of the chorus in the orchestra. It becomes strikingly clear how much audience perception was informed by the chorus and its movements. Drawing by Katrin Dolle.

a symbolic end to the concatenation of horrors which has been haunting the House of Atreus for several generations (1231f.). For acoustical reasons alone it seems obvious that while speaking these words the actors were turning their backs to the stage house and were looking downwards (since they were dealing with the body of Clytemnestra below them). The chorus, standing below the stage in the orchestra, looks up to them and suddenly spots the Dioscuri (Castor and Pollux) approach from the direction of the palace roof (1233–7).

The pointer to the gods' movements is not only semantic but also rhythmical in that there is a change from the lyric metres of *Electra* and *Orestes* to anapaestic dimeters delivered by the chorus. The reference to the top of the roof (*Electra* 1233) is decisive for assuming that the crane is being used here. The speed of its movement is measured, as is made clear by the repetition of the verb 'they are walking' (*bainousin*) (*Electra* 1233 and 1237). Since there is no physical contact, it seems correct to infer that the two deities were picked up behind the stage house, hidden from the spectators, moved towards the roof and then put down on it.¹⁹ This movement may have started well before *Electra* 1233. If so, the audience saw the gods approach before they were being noticed by the members of the chorus (who were focused on Clytemnestra's body anyway). They were therefore able to savour the chorus' anxiety as well. The

subsequent action was taking place on three planes simultaneously. At the end of the scene *Orestes* and *Electra* leave the stage via the two side entrances while *Castor* and *Pollux* evidently fly off on the crane again, because they explicitly mention (at *Electra* 1349) that they intend to travel via air to the Sea of Sicily. Depending on how much realism is to be assumed, swinging the crane back behind the stage house, i.e. towards the south-west where the Sea of Sicily is located relative to the theatre, would be appropriate for the play's fiction. The chorus alone remains, leaving pessimistic blessings for *Electra* and *Orestes* before departing from the orchestra. The action which had previously seemed to have come to an end has now literally exploded in all directions.

Only *prima facie* therefore does the use of the crane constitute a strong coda for the dramatic action. At a second glance the closure which the plot has arrived at turns out to be deceptive and opens up the action by identifying new dramatic necessities and activities. In Euripides' *Electra*, Agamemnon's children are given clear instructions by *Castor* and *Pollux* (1284–91): *Electra* is to accompany *Pylades* to his homeland of Phocis as his wife, whereas *Orestes* is to go to Athens to be purged from the murder he has committed. Not only are the siblings separated for good, only hours after they had found each other, but the close friends, *Orestes* and *Pylades*, have to leave each other as well. Contrary to their earlier assumption that the suffering had come to an end (*Electra* 1231f.) the evil continues: an end is now even further out of sight. If tragedy needs a clear closure by its nature, this would be an instance of an 'open ending'. This is not without precedent in previous Greek literature. Both *Iliad* and *Odyssey* finish with an open ending: after *Hector's* death the battle for Troy will go on, and *Odysseus* will have to leave his new-found Ithaca again to be purged, similar to *Orestes*, from an act of violence (in his case that of *Polyphemus*) by sacrificing to *Poseidon*. In a comparable fashion, *Pindar* always presents the extraordinary achievements of the athletes he celebrates as a continuum of previous exploits by mythical heroes and the expectation of further great deeds in the future.²⁰ Open narrative technique, therefore, may be a persistent concern of archaic and classical culture, and is being evoked in this instance by the deployment of a stage machine.

The *ekkyklêma* (Figure 9.2), explicitly mentioned in Aristophanes twice,²¹ was a platform which could be wheeled out from the *skênê* onto the stage. On it the results of (usually lethal) action within the building were demonstrated and (re)integrated into the action. Depending on their dramatic functions, the *ekkyklêma* tends to be used in climactic moments, yet at points within the plot where conflicts might still be resolved or actions of integration and reconciliation are still possible. The crane, on the other hand, would normally be used in the clausal sequence. Accordingly, the deployment of the *ekkyklêma* requires dramaturgical preparation. It turns out that around the appearance of the *ekkyklêma* a specific scene type starts to evolve which can be spotted across a

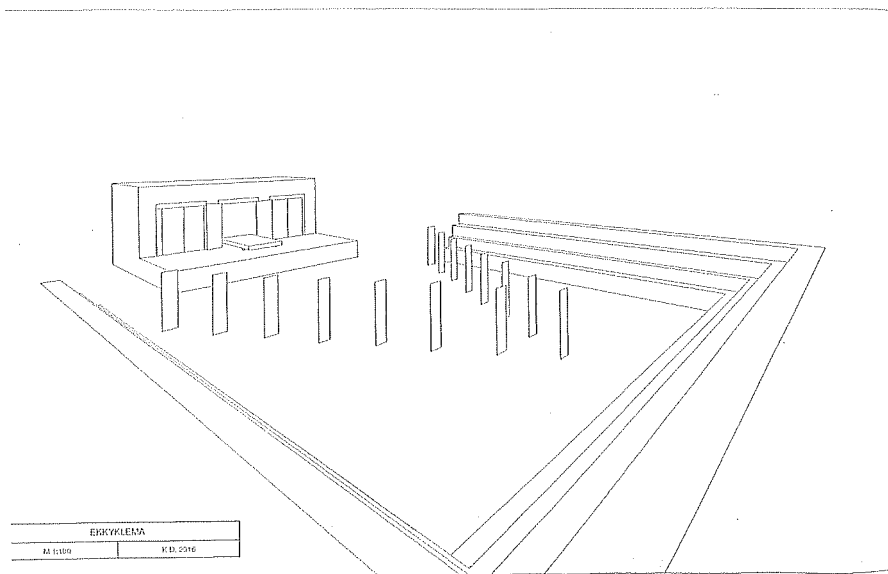


FIGURE 9.2: Schematic rendering of the stage with *ekkyklêma*. The rectangles hint at a possible blocking of the chorus in the orchestra. Here too the prominent role of the chorus in shaping audience perception is evident. For spectators in the lower tiers a good view of the *ekkyklêma* was not guaranteed when the chorus was moving in the orchestra. Drawing by Katrin Dolle.

significant span of time and in various tragic playwrights.²² From the very start the chorus functions as spectator and therefore as a focal point for the audience. The chorus has learned, often by way of an eye-witness narrative, that some catastrophe has occurred within the stage house. Now the chorus is considering a possible intervention or invokes the suffering caused by the catastrophe. The premonition of the chorus is confirmed by a character who emerges from the *skênê*. The chorus demands that the door of the *skênê* be opened and the calamity be revealed: the door opens, the *ekkyklêma* with its tableau is being wheeled out, and the chorus, together with everyone else present on stage, reacts in horror and pain. Now the presentation of the *ekkyklêma*-based tableau segues into speech action. A rapport with the figures on the *ekkyklêma* is being established, and the tableau is being integrated into the scene on the main stage.

The *Heracles* by Euripides may function as an illustration of this scene type. The scene in question extends over c. 550 verses in the preserved playscript. The chorus has a premonition of the bloodbath caused by the mad Heracles in his own palace and verbalizes its anxieties (875–909). They are confirmed by a servant who emerges from the palace (910–1015), and the chorus starts lamenting (1016–27). Now the palace door opens, as is pointed out immediately (1028–38), and the *ekkyklêma* is brought out showing Heracles, a sight

confirmed by the chorus (1028–38). They are joined by Heracles' father Amphitruo, later by Theseus as well. They establish contact with Heracles and lead him from the horror of his deed back into their community (1039–1163ff.). The eventual withdrawal of the *ekkyklêma* back into the stage house is being thematized only superficially at the very end of the play (1422), together with the request to bring the dead children (who must still be lying on the platform of the *ekkyklêma*) back into the palace.²³

The tragic *ekkyklêma* therefore does not show anything new but summarizes, so to speak, an interior event and presents it in the form of a result. In so doing, this technology offers information that is complementary to the preceding report but also creates, by its picturesque nature and positioning on stage, a new permanence of the action, a kind of duration and memorability of impression which is usually not possible to generate in theatre with its relentless progression of presentation and reception. Put succinctly, the *ekkyklêma* functions as an inverted ekphrasis of sorts by providing the picture for the text. As a result, the picture has to be more than a mere documentation of past actions. On the contrary, it obeys different, pictorial rules of presentation (in the same way that in ekphrasis the verbal description has to superimpose a narrative character on the picture described). This is particularly evident in Euripides' *Heracles*, because in this play what is shown to the on-stage characters and the spectators is not the natural result of the action but purposefully arranged. For as the servant reports (971–1000), Heracles had killed the members of his family at various spots within the palace, but now they are all lying around the hero who is tied to a column. The event which was expansive in time and space has been concentrated, compressed and reduced to one single contracted chronotope. It would be interesting to know whether the arrangement of the dead bodies on the platform followed some discernible rule, for instance symmetry (like a funeral) or an intentional and forced asymmetry (like a battle scene) – such an insight would yield a lot for interpretation. At any rate, in this kind of arrangement there seems to be visible the hand of a director who in a metapoetic gesture shows something that we as spectators have to confront. There is a sense of stylization, of wanting to make an important point concisely, which can be found, in the medium of texts, as gnomic expression, a frequent feature of archaic and early classical Greek literature. This is because in gnomic expressions too an argument and train of thought ends up being expressed in a short, memorable statement. Perhaps what holds these *prima facie* different phenomena together is based on a unified cultural preoccupation, namely the need and wish to make the hidden visible (for all, i.e. publicly) and to turn what is complex and difficult into an object of reflection.

By way of contrast, it may be worthwhile at this point to look briefly at the analogous scene in the *Hercules furens* by the Roman playwright Seneca. In

Seneca's play the protagonist falls asleep after having committed the murders on stage (1044). Amphitruo has his weapons taken away from him (1054). The chorus laments the immense suffering, not least the death of the children whose path to Hades is being invoked (1122–35). Does the repeated exhortation to the children's bodies to 'go' (1130, 1131, 1135 and 1137) point to a movement, for instance into the palace which would now denote Hades – a movement which then could only have been performed by means of the *ekkyklêma*? This would hardly seem plausible, and even if this were the case, the intentional and deictic action found in the Euripidean version would be missing.

Provided that the preceding considerations are accurate, other plays too can be tested for this scene type which, if encountered, would in turn make the use of the *ekkyklêma* in this scene more than likely. Thus there is a long-standing and controversial debate on whether or not in Aeschylus' *Oresteia* the body of Agamemnon was shown on the rolling platform.²⁴ But the scene in question (*Agamemnon* 1072–1673) corresponds quite exactly to the type just discussed so that everything points to the murdered ruler being presented on the *ekkyklêma* at *Agamemnon* 1372–1406 (Figure 9.3).²⁵ In the two subsequent tragedies of the trilogy (*Libation Bearers* and *Eumenides*), however, this scene type is only rudimentarily present. The presentation of the dead Clytemnestra and Aegisthus (*Libation Bearers*) as well as that of Orestes sleeping in the Temple of Apollo at Delphi (*Eumenides*) therefore in all likelihood did not involve the

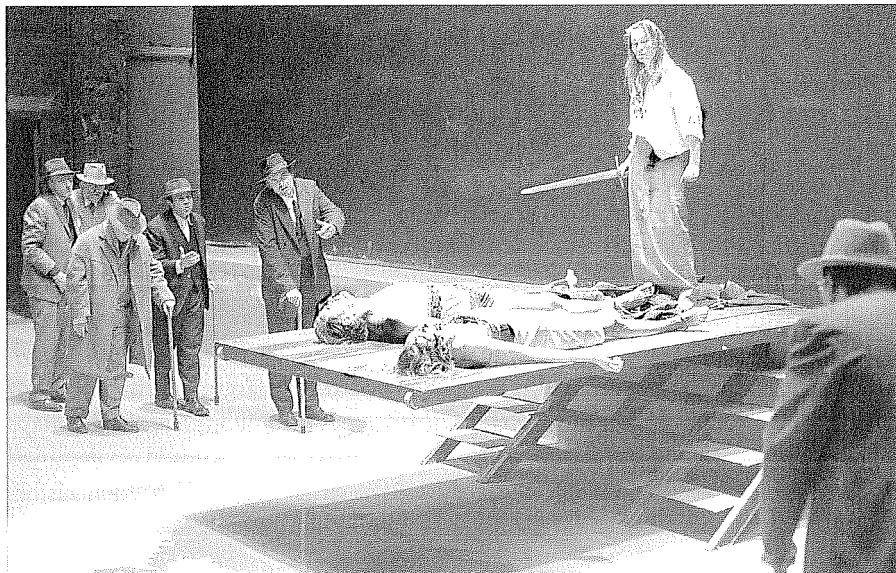


FIGURE 9.3: Clytemnestra on the *ekkyklêma*. Scene from Aeschylus' *Agamemnon* in the *mise-en-scène* by Peter Stein (Berliner Schaubühne 1981). Photo: Ruth Walz.

ekkyklêma. Note that the repeated use of this device within a connected trilogy would in fact diminish its impact anyway.²⁶

In the parodies of tragedy that can be found in comedy, on the other hand, the modes of deployment typical of stage technology and the scene types associated with them are characteristically inverted. Thus Aristophanes in his *Peace* uses the crane right at the beginning of the play, thereby letting his protagonist fly not from heaven to earth like a god but the other way round, because the gods no longer save humankind (from war, in this case). On the contrary: in the hopeless situation of the long armed conflict humans have to take the power of making decisions away from the gods. As in tragedy's *deus ex machina* scenes human beings are deprived of the power to act decisively, so are the gods in comedy. The very choice of the animal which is suspended from the crane, the dung beetle, is also a parody of tragedy: Euripides' *Bellerophon*, which showcased the flight of the protagonist on his winged horse Pegasus.

At the same time, comedy does not ignore the real-life existence of the crane as an auxiliary device. The flight of Trygaeus in *Peace* appears to stop time and again, as is shown by the insertion of spoken verse (in iambic trimeters) into the rhythmical representation of the flight movement by the the anapaestic dimeter.²⁷ Moreover, the crane appears to be lifting Trygaeus far too high initially, as is shown by him fearfully addressing the crane's operator (*mêchanopoios*) (*Peace* 173) before eventually being dropped off on the roof. The return to earth, however, does not involve the crane but is done by foot, a fact which is explicitly thematized (*Peace* 725): while the joke of the flight itself and its crude mechanics is used up, it still retains secondary force by having a character (the god Hermes) point out that the crane is not really needed to get up to the roof of the stage house. This kind of conclusion is less a parody of tragedy than a comic exploitation of the crane's full potential in a situation where tragedy with its self-contained fictionality would be forced to operate in a more reductionist manner.

In comedy, the use of the *ekkyklêma* too is part and parcel of parodying tragedy. The texture of such comic scenes, if analysed with the preceding considerations in mind, becomes transparent indeed, as can be demonstrated by looking at the entry of Euripides in Aristophanes' *Acharnians* (performed in 425 BCE). The play's comic protagonist, the Athenian Dicaeopolis, is fed up with the pro-war politics of his home city and decides to strike a private peace with the enemy, Sparta. When being attacked for this by a chorus of militaristic charcoal burners from the deme of Acharnai, Dicaeopolis is prepared to provide an account and a justification for this actions. To do this he would like to put on a tragic costume which he plans to borrow from none other than Euripides. In response to Dicaeopolis' repeated calling Euripides eventually rolls out of his house on the *ekkyklêma* while emphasizing that he has no time to 'come down' from the machine (*Acharnians* 408). Also on the *ekkyklêma* are all of his tragic

props, which he passes to Dicaeopolis upon request. When his teasing becomes too much of a nuisance, Euripides orders his servants to pull back the *ekkyklêma*, at which point Dicaeopolis turns back to the chorus (*Acharnians* 395–479).

This scene is without doubt intended to be a caricature of tragic poetics, as is shown by the fact that the tragic playwright is being shown on the *ekkyklêma*. The standard dramaturgy and mode of operation of the *ekkyklêma* is consequently inverted in full. Thus the rolling out of the *ekkyklêma* is already unusual qua being almost entirely unprepared: Euripides enters at the very moment he is announcing his entry, mentioning the device explicitly (something which would be unthinkable in tragedy). An eye-witness narrative from within which would prepare for what will imminently become visible is missing almost completely in view of the fact that the preceding comments of the servant only deal with Euripides' poetic methods. The pushing back of the *ekkyklêma* is highlighted very strongly, something for which in tragedy only Sophocles' *Ajax* is comparable (and even this instance appears to be untypical of the genre). Also, in tragic scenes where the use of the *ekkyklêma* is likely the chorus tends to be heavily involved, whereas it is very much in the background during the Euripides scene in *Acharnians*. So while in tragedy the presentation of the *ekkyklêma* is embedded within a largely standardized sequence of scenes, comedy provides its viewers with a clearly demarcated and uniquely designed single scene. The intention is *not* to focus emotions and information, nor to provide complementary information. In a similar vein, the spectator is given hardly any opportunity to dwell on what is being presented. The interaction between stage and moving platform kicks off instantly and is significantly more intense than in tragedy because of the fact that objects are being passed down from the *ekkyklêma*. It is also striking how comedy relishes playing up the paradox of an interior world turned 'inside out', which in tragedy is almost completely played down. This is achieved not least by a quantitatively busy, hence funny arrangement of domestic objects on the *ekkyklêma*. Last but not least, the comic *ekkyklêma* scene of *Acharnians* is being used by Aristophanes for discussing tragic poetics (this applies to an even greater extent to its companion scene in the *Women at the Thesmophoria* (95ff.), performed in 411 BCE). This presumably shows that the previously mentioned metapoetic dimension of this technology (that is, the sense that the author-director is, as it were, co-present on stage when the *ekkyklêma* is being used) was keenly perceived as such in antiquity already, which is why comedy was able to capitalize on it by gross and aggressive distortion.

That Euripides is often chosen by Aristophanes for comically theatricalizing his tragic dramaturgy is not necessarily motivated by Aristophanes' general penchant for this particular tragic colleague of his rather than the result of the fact that Euripides, who was more a poet of innovation than tradition anyway, experimented with this stage technology, which in turn caught the attention of the alert comic playwright. Indeed, subtle uses of theatre technology were not

alien to tragedy either, and Euripides in particular seems to have deployed stage machines regularly and in often unexpected ways (including instances where there were comic undertones, as in the previously mentioned scene from the *Bellerophon*). For while the theatrical impact of the crane much depends on the character's sudden and unexpected appearance, the rolling out of the *ekkyklêma* is, on the contrary, usually prepared quite elaborately by the effectively standardized scene type described above which primes and prepares on-stage characters and spectators alike for what they are about to witness. In this way the *ekkyklêma* generates, in Aristotelian lingo, not horror (*phobos*) but pity (*eleos*) by gradual accumulation of lamentable elements.²⁸ These eventually materialize before our eyes in a deictic gesture (e.g. the command to open the palace doors), thereby complementing the spectators' mental image which has been generated by the preceding verbal information and turning into crystallization points of their emotions. Yet Euripides succeeds in combining these different dramaturgical effects when in his *Medea* he prepares the appearance of the *ekkyklêma* with Medea's dead children in a way typical of this device while then bringing the protagonist on stage with the crane, riding the serpent chariot of her father the Sun (*Helios*). Emotionally, we have been primed for sympathy and pain because of the innocent young victims, and Jason's predictable lamentation for his children could have been received as an incipient attempt at coping with this kind and magnitude of suffering. But Medea's triumphant entry, which turns her into a kind of inverted *dea ex machina* who does not solve but perpetuate the tragic dilemma, provokes nothing less than an emotional shock. The spectators are not being presented with the anticipated visual complement to what they know already but with a sudden and unexpected turn to the horrific.

Contrast the *Medea* by Seneca: here Boyle has assumed the use of the *ekkyklêma* for Medea's scene in her 'witch's kitchen' (Seneca *Medea* 740–848), because this was without doubt the representation of an interior scene.²⁹ It was shown above that in Greek drama the use of the *ekkyklêma* could not be reduced to such a narrowly technical function. At first glance, in the Senecan *Medea* scene there seems to be a scenic preparation roughly of the kind as is known from Greek dramatic texts, since the scene is preceded by an elaborate eye-witness narrative by the nurse about the events in the interior of the house (*Medea* 670–739). But then the nurse mentions steps (738f.): 'There – she made a sound with her crazed step and starts to sing' (*Sonuit ecce vesano gradu / canitque*). This reduces, in my view, the probability that the *ekkyklêma* is being used here. Also the fact that immediately after (740ff.) Medea is shown performing sacrifices rather supports the notion that Medea comes out of the stage house by foot and engages in her ritual actions at altars on the raised stage (*pulpitum*). Otherwise at the end of the scene (after line 848) Medea would have to be pulled back into the house on the *ekkyklêma*.³⁰

It seems therefore that the use of such a machine, though possible, is not really endorsed by the text. If the *ekkyklêma* was deployed in this scene at all, its use was not dramaturgical but entirely technical. A slightly different case is the crane which is certainly used for the ending of the *Medea* (1022–5), because Medea, standing on the house, leaves on the serpent chariot. Her cynical remark ‘This is how I usually escape’ (1022: *sic fugere soleo*) can possibly be seen as a metatextual reference to Euripides.³¹ All of this said, there is none of the subtle play with the dramaturgy of these stage technologies that is found in preceding Greek theatre. It may perhaps be justified to extrapolate from this that in Roman theatre stage machines were used as spectacular auxiliary devices which were denied dramaturgical value proper, and that this may precisely be the reason why, on the whole, the preserved playtexts provide hardly any indications of their use.

Returning again to Greek drama, a further example for a highly sophisticated and far from ‘topical’ use of these machines in the theatre of the Greeks is the (certain) deployment of the crane during Socrates’ entry in Aristophanes’ *Clouds* (218–38). The farmer Strepsiades has already been talking to the servant of Socrates when the philosopher appears on a rack functioning as a basket which is suspended with rope and hooks from the crane (*Clouds* 218, 226). The crane is not explicitly mentioned but unmistakably implied (*Clouds* 218, 225 and 237). Socrates uses it as a purely technical device in order to be closer to the ‘things above’ (*ta meteôra*) and to be able to conduct his observations of the sky. A genuinely and properly tragic element is then introduced by having Socrates address the peasant Strepsiades as ‘creature of the day’ (223: *ôphêmere*) and utter ‘I airwalk and think around the sun’ (225: *aerobatô kai periphronô ton hêlion*), which Strepsiades instantly translates into ‘from your mat you think higher than the gods’ (226: *apo tarrou tous theous hyperphroneis*). The ambiguous terminology of *periphronein* (‘to think around’, in the sense of thinking carefully) and *hyperphronein* (‘to think beyond’, in the sense of looking down on others) implies that Socrates believes to be far superior to ordinary human beings and even gods. If the peasant is nothing but an ephemeral being, then Socrates ought to be counted among the immortals, and his approach to the sky can be seen as a contemptuous act of hubris. Socrates is, quite literally, being ‘put up’ for the tragic fall, and his demise in the play’s final moments will be all the greater: he is about to be burnt inside his house, while that ephemeral creature Strepsiades is now sitting on the roof, making fun of him by quoting Socrates’ own ‘I airwalk and think around the sun’ (*Clouds* 1503). The use of the crane therefore can indeed not be considered paratragic.³² Yet it marks the Socrates plot as a tragic one by invoking tragic associations connected with the use of the crane. And this in turn fits excellently within the tragico-comic design of *Clouds* as a whole.

A lot therefore supports the notion that the deployment of the crane could have been preceded by a corresponding use of the *ekkyklêma*. For Strepsiades,

who is sold on the idea of taking rhetoric lessons with Socrates, will not let Socrates’ disciples get rid of him (*Clouds* 132–80), similar to Dicaeopolis in the *Acharnians* who did not get chased away by Euripides’ servant. Instead, he again knocks hard at the door (*Clouds* 181–3). On this occasion the spectators even get a prep talk of sorts about the scientific activities of Socrates which captivate the peasant so much that he now wants to see the master himself more than ever. The door opens, and Strepsiades is confronted with a sight that terrifies him at first: nothing but pale students,³³ engaged in a wide range of disciplines (astronomy and geometry, for instance). Since the master disciple says that they should not be exposed to the fresh air for too long (*Clouds* 195–9), it is natural to assume that with Socrates’ appearance on the crane (*Clouds* 218) and the departure of the master disciple into the house (*Clouds* 221) the remaining disciplines too disappear into the stage house. Evidently a number of diverse instruments were visible with them, definitely a map of Greece (*Clouds* 206–17) which Strepsiades discusses with his master student. The *ekkyklêma* may therefore have been used for the disciples’ entry.³⁴ But it must be emphasized that the sequence of events bears more similarity with the tragic scene type than with a parodic inversion (as is usually found in comedy). Here, too, *Clouds* turns out to be a tragico-comic text, with much comic effect deriving from the juxtaposition, even interweaving, of the *ekkyklêma* scene and the crane scene: the house of Socrates – his ‘Thinkery’ (*phrontistêrion*) – is marked as heavily ‘tragic’ by this intense and compressed use of stage technology which is, in this density and compression, not attested in preserved tragedy and may therefore at the same time convey a comic overtone.³⁵

SCENOGRAPHY

While quite a bit can be said about the various modalities with which stage machines were deployed, other technologies and their dramaturgical functions often permit only less precise analysis. The ones to be discussed here (if briefly) are scenery, props and masks. Aristotle (*Poetics* 1449a18) attributes the invention of scenery (*skênographia*) to Sophocles. More vaguely, the same is maintained of Aeschylus (*Life of Aeschylus* 14), whose productions are associated with the painter Agatharchus of Samos (Vitruvius *De architectura* 7, Preface 11); these should be reproductions of Aeschylus’ plays in the last quarter of the fifth century as Agatharchus is to be connected to Alcibiades.³⁶ Since the construction of the *skênê*-building took place by the time of Aeschylus’ *Oresteia* in 458 BCE (where, as mentioned previously, the availability of a stage house is presupposed) and because Sophocles, according to an important inscription called ‘The Parian Marble’ (*Marmor Parium*), celebrated his first victory in 469/8 BCE, the introduction of scenography can tentatively be dated to the

late 460s BCE. Vitruvius further claims that for each of the three dramatic genres (tragedy, comedy and satyr play) there was a distinct scenery.³⁷ His description, however, of the comic scenery (private houses with balconies and windows) matches at best New Comedy but not Old Comedy. Scenery that could be pushed and/or turned, which Pollux mentions, did not exist prior to the late Hellenistic period at the earliest,³⁸ and it is still unclear where exactly such kind of scenery would have stood in front of a stone façade like that of the Lycurgan Theatre of Dionysus in Athens and its successors, let alone the very lavishly ornamental ‘stage fronts’ (*scaenae frontes*) of Roman stone theatres which rose to enormous height.³⁹ When plays were performed on wooden stages, scenic images would probably be suspended in between door openings.

Much therefore remains controversial: what precisely was shown, in what kind of perspective, even what precisely is meant by the term ‘scenography’? Small has plausibly argued that scenography consisted only of oblique views of buildings.⁴⁰ From a dramaturgical point of view scenery, however, is not always a background of action which is weakly indicated semantically, but can be integrated into the action very prominently. Thus, in Aeschylus’ *Agamemnon* the palace of the sons of Atreus is sometimes addressed directly, even treated as a distinct character in the prologue by the watchman (*Agamemnon* 1–39, esp. 18 and 37f.). And in the subsequent *Libation Bearers* the action, at least in the first part of the play, primarily revolves around the tomb of Agamemnon, the social symbol of the demise of the House of Atreus.

PROPS AND MASKS

Props are being used very differently in tragedy and comedy. Broadly speaking, tragedy operates intensively with few props whereas comedy deploys a plethora of props while devoting more cursory attention to them.⁴¹ Methodologically, props which are not more than they seem to be need to be distinguished from props with additional symbolic value.⁴² This symbolic value can exist on its own or be generated from scratch by the surrounding action. Using Electra’s urn as an example (Sophocles *Electra* 1113–1229), Revermann points out that a prop can function as an ‘emotional focalizer’ of several dramatic characters.⁴³ Pollux (4.117) provides a list of typical tragic props.

The protagonist’s sword in Sophocles’ *Ajax* (esp. 657–65 and 815–22) illustrates well the dynamic complexity of tragic props. At least during Ajax’s ‘deception speech’ the sword has been extensively presented to the audience.⁴⁴ Ajax received this sword in exchange for his own from his enemy, Hector. This fact makes it, first of all, a weapon designed to kill an opponent, whereas by virtue of the exchange it also acquires the connotation of friendship (*Ajax* 665 and 817f.). It has, however, not brought good fortune to its bearer. During

the competition for the weapons of Achilles, Ajax was beaten by Odysseus, because he conquered Troy *without* a sword and solely by cleverness, an accomplishment which was denied to Ajax despite all his martial prowess. The sword therefore also symbolizes Ajax’s defeat and, more than that, the fact that the power of the intellect has rendered obsolete the sword and the brute force it stands for. Thus it represents a kind of heroism which is in decline. In sum, the sword symbolizes a competition of values that overwhelms the straightforward Ajax. This in turn makes it the obvious instrument for his suicide being itself motivated by his inability to deal with conflicting values. At the other end of the spectrum there are striking examples in comedy for the ridiculous overflow of props, especially in *ekkyklêma* scenes where in a very small space one finds the accessories of a female bedroom (Aristophanes *Women at the Thesmophoria*), the chaos of the habitat of ‘thinking men’ (Aristophanes *Clouds*) or, precisely, the plethora of props in the study of a tragic playwright (Aristophanes *Acharnians*).

Very similar considerations, finally, apply to masks which could be worn in all dramatic genres, even if perhaps not in all periods.⁴⁵ That the masks connect theatre to the cult of the god Dionysus has been both emphatically postulated and rejected with equal vigour. But the question is of little relevance for the issue of their performative functionality.⁴⁶ From the perspective of performance, acting with a mask means, on the one hand, having to compensate for the loss of some expressive potentials, which remain hidden, by the use of text, voice, gesture, movement and body language. On the other hand, the mask predetermines the range of expressive possibilities from the very start if it happens to be the mask of a type or stock character, as is regularly the case in tragedy and New Comedy.⁴⁷ Especially with the masks of Old Comedy which grotesquely exaggerate some facial features (nose, mouth, chin) for comic effect these predeterminations are something the actor to a certain degree has to act against, so to speak. One advantage of the mask is the better visibility in theatres where spectators could be seated 50–60 metres away from the stage action. At the same time, the mask made high demands on the actor’s vocal and enunciatory precision.

In addition, Old Comedy also worked with portrait masks when known personalities of public life were brought on stage, like Socrates in *Clouds*,⁴⁸ or perhaps Aeschylus and Euripides in *Frogs*. Here the mask is the iconic equivalent to individualized ridicule (*onomasti kômôidein*). In the *Knights* Aristophanes capitalizes on audience expectation to generate an additional joke by pretending that out of fear of the demagogue Cleon none of the mask makers dared turn the mask of the Paphlagonian into a portrait mask of Cleon.⁴⁹

Like props, masks too could acquire symbolic meaning in the course of a play, even in comedy. *Clouds* make up the chorus in Aristophanes’ play of the same name, and Socrates starts to reflect on the various shapes which can be

adopted by them, offering everyone metaphorical mirrors of oneself.⁵⁰ But Strepsiades, and with him the audience, sees them as ‘wooly creatures’, with apparently exorbitant noses (*Clouds* 344). Köhnken, invoking a Greek phrase which describes deception, has interpreted this as a reference to Strepsiades’ deceitful intentions.⁵¹ The noses, initially nothing but a grotesque facial feature, now acquire meaning when confronted with Strepsiades. They become symbols which point ahead to the progression of the play and its ending.

PANTOMIME

Starting in the late Roman Republic, the new art form of pantomime rose during the imperial period and late antiquity to a superior status, increasingly surpassing in importance and cultural presence the traditional genres of ancient theatrical art.⁵² In its standard form, pantomime featured a single, usually male performer who, supported by a speaker, singer and/or chorus and instrumentalists, would present mythical narratives by means of gesture and dance. Contrary to the traditional forms of theatre where, at least from our modern perspective, language was the prime communicative channel, pantomime prioritized the body and its meaning-generating capacities while language, in the last resort, had the status of scenery, hence of a second-order performance medium. Pantomime could be put on wherever a stage could be put up, including private homes. This suggests that the significance of additional technologies should not be over-estimated, also bearing in mind that the extant sources are particularly thin: not a single pantomime libretto has been securely identified.⁵³

While we know that pantomime, when staged in theatres, could involve scenery, the use of technologies like the *ekkyklêma* or the crane would seem intrinsically unlikely, not least because the contrast between rapid movement and sudden, statuesque ‘freezing’ was considered a hallmark of pantomimic art.⁵⁴ Thus, via body control, the pantomime achieves precisely what in traditional theatre was achieved by, for instance, the *ekkyklêma* (hence the term ‘technology of the body’ has justifiably been used).⁵⁵ Deploying a machine as an auxiliary, so to speak, would almost have detracted from the pantomime’s art. The use of machines is therefore to be considered less typical of pantomime, also considering that not all devices will have been available at the various sites where pantomime could and would be performed. That said, mention must be made of the loud water-organ that was used in (large) theatres according to the poem *Aetna* (which is wrongly attributed to Virgil and must pre-date the eruption of Mount Aetna in 79 CE).⁵⁶ This does not, of course, preclude the use of ‘special effects’. Thus Apuleius (*Met.* 10.30–34) has a pantomime troupe put on ‘The Judgement of Paris’ at the theatre of Corinth, which involves water games, live animals, scent dispensers and, as a dramatic climax, sinking an artificial mountain into the ground. But in this passage, too, it is evident that

the spectator devotes significantly more attention to the pure achievement of the pantomime and the bodies of the dancers. The ‘special effects’ only serve to enhance the overall appeal and highlight the largesse of the event’s organizers, but are not an indispensable part of the art of pantomime. There are also legitimate doubts as to how realistic Apuleius’ description is as a whole, and what in his description is owed less to the reality of pantomime than to the author’s intention to place at the end of his novel a final meta-fictional *mise-en-abyme* of the metamorphosis story.⁵⁷ Costumes too were more sparingly used. After all, it was the dancer’s body which was to achieve the presentation in and of itself. Only the dancer’s cloak is mentioned as a medium of representation to be used in manifold ways.⁵⁸ Similarly, the pantomime dancers were wearing masks (which had closed mouths; see Figure 7.1), and other props could be used, surely with similar implications as have been set out above.

41. That the chest was a traditional prop in such mimes is signaled by the Roman satirists Horace (2.7.58–61) and Juvenal (6.42–4).
42. Revermann 2006a *passim*. For the wife meeting her lover, sleeping with slaves, and plotting her husband's death as themes shared by Inlaw's speech and novella, see Trenkner 1958: 80–8.
43. Wives with slaves: Ar., *Tb.* 491; fr. 592.29; fr. 715 ('you grind the mistress all night in sweet-smelling covers'); Eupolis fr. 192.100–2.
44. For these two types first defined by Plutarch, see Webb 2008: 95–138.
45. Tertullian (*Apol.* 15.1), for example, lists *Anubis the Adulterer*, *The Manly Moon*, *Diana Lashed*, *The Will of the Late Jove*, and *Three Starving Heracleses* as mime titles.
46. See Wiemken 1972: 48–80; Revermann 2006a: 320f.
47. While it is possible that Alcaeus' *Seduced Sisters* and Ameipsias' *Adulterers* portrayed seduction in some detail in late fifth-century comedy, their four meagre fragments tell us almost nothing.
48. The debate over the specifics of drama's development from the cult of Dionysus is a notoriously thorny problem and falls well outside the scope of this chapter. For an accessible discussion of this question, see Storey and Allan 2005: 24–34.
49. Griffith 2002: 202, 207. Dionysus may be the unnamed speaker complaining in Aeschylus fr. 78a.64–72, but this is uncertain.
50. Griffith 2002: 211–24.
51. For a useful, concise discussion of the different tendencies of the tragedians, see Rutherford 2012: 343f.
52. A possible exception is Aeschylus' *Psychostasia*.
53. Mastronarde 2010: 176.
54. Zagagi 1995: 142–4; Miles 2014: 83.
55. For the former explanation, see Miles 2014: 78.
56. While later Roman comedy adopts the free-standing prologue, it often introduces a generic prologue speaker, 'prologos', of analogous omniscience.
57. One exception is Juno's appearance at the beginning of Seneca's *Hercules Furens* 1–124.
58. Mayer 2002: 19–35.
59. Mayer 2002: 46f. reasonably considers this to be a flimsy pretext for Phaedra's bad behaviour, and perceives no divine scheme setting the agenda for the human agents. However, there are Senecan parallels for such inherited guilt (cf. *Pho.* 338, *Ag.* 233, *Tby.* 23–32), and it is quintessentially tragic. Venus' curse also has a precedent in Ovid (*Her.* 4.53ff.).
60. For a useful, concise overview of the genre, see Hall 2008: 1–40. In their appendix, Hall and Wyles 2008: 378–419 offer a collection of primary sources (with English translation).
61. Csapo and Slater 1995: 370; Hall and Wyles 2008: 378–80 (T1); Webb 2008: 60. Exceptional features include two dancers (as opposed to one), who are unmasked and also speaking.
62. Aside from Xenophon's proto-pantomime, the epigrammatist Dioscourides (*AP* 11.195 = T2 in Hall and Wyles 2008) laments his loss dancing the myth of the 'Temenidae' (perhaps from the Euripidean tragedy of the same name) in competition against an opponent performing the story of the 'Galli' in the middle of the third century BCE.
63. Webb 2008: 80.
64. See Lada-Richards 2007: 44–8; Webb 2008: 149.

65. Webb 2008: 84.

66. Lucian affirms the influence of earlier cultic dances on pantomime, specifically those of the cult of Cybele (8), and the mysteries and dramatic festivals (22, 26) of Dionysus.
67. Cf. Lucian's story (64) of the barbarian from Pontus. See Webb 2008: 59.
68. I would like to thank Martin Revermann and Ian Ruffell for their extremely helpful comments on an earlier draft of this chapter.

Chapter Nine: Technologies of Performance: Machines, Props, Dramaturgy

1. Both Greek and Roman theatres have a stage house (Greek: *skênê*, Latin: *scaena*) at the back with up to three doors; a slightly raised stage (Greek: *logeion*, Latin: *pulpitum* – although the attribution of the Greek term is not secure whereas the sheer existence of a raised stage in classical Greek drama certainly is, cf. Aristophanes *Wasps* 1342–1344 and Csapo/Slater 1995: 268); and an area in front of the stage (Greek: *orchêstra*, the dancing area of the chorus, Latin: *orchestra*; note that in Roman theatres senators could be seated here as well).
2. Horace *Epist.* 2.1.194–207.
3. Cicero *Ad fam.* 7.1.2.
4. Livy 7.2.13. In this chapter Livy dates the beginning of the Roman theatre business to 364 BCE and describes the evolution from pure dance to dramatic works (see Oakley 1998: 40–72, Feeney 2016: 99f.). In those early days, machines do not seem to be involved.
5. 'To them [i.e. the arts of the stage] you may add the machine workers who come up with stage machines which lift themselves up, silently rising platforms and other surprise effects where things which were connected drift apart, or things which were separated unite on their own, or things which were sticking up gradually collapse.'
6. Drama was also performed in amphitheatres of the imperial period, but then in the form of 'fatal charades' in which the characters (usually convicted criminals) were in fact killed according to their role, see Coleman 1990 (cf. Coleman 2006: lxxv–lxxxv). That the huge machinery of the amphitheatre was used on such occasions can hardly be doubted. Conversely, the staging of such charades will not have adhered to a dramatic text in the narrow sense of the term.
7. Cicero *Pro Caelio* 65, cf. also Manuwald 2011: 69f.
8. See the legitimate criticism of such a position, as for instance endorsed by Taplin 1971 and Taplin 1977a: 28–39, by Revermann 2006a: 46–65.
9. This also applies to the plays performed at the Lenaea festival, which until about the middle of the fifth century BCE were probably staged on the Athenian agora (cf. Pickard-Cambridge 1988: 37–9 and Csapo and Slater 1995: 123). That the first performance of comedies took place in Athens can be considered as fairly certain, while for tragedy there may be slight doubts. It is, however, important that there were frequent re-performances in the Attic deme theatres and outside of Attica (especially in Western Greece), not so frequently in the city of Athens before the fourth century (cf. Revermann 2006a: 66–95 and Lamari 2015). The existence of reperformances makes it possible that the basic technical equipment as described in this chapter was also available in deme theatres. Conversely, it is also possible that dramaturgy could be adapted to match local theatre resources which were less lavish than those found in the cultural capital, Athens.

10. Cf. Pollux 4.128.
11. Pollux 4.128 maintains that only in tragedy the crane was called *mêchanê* whereas in comedy it was called *kradê* (cf. also *P.Oxy.* 2742.3–19, probably a commentary on the *Seriphioi* by Cratinus; cf. Csapo and Slater 1995: 269).
12. Pollux 4.127–32. This source, however, is only reliable for the time after late Hellenism, a period for which we lack dramatic texts.
13. On the acoustics of the Athenian Theatre of Dionysus generally see Kampourakis 2008.
14. *Vita Aeschyli* 14.
15. Aristophanes *Peace* 79–178.
16. Cf. Lendle 1995.
17. The necessary supporting structure for the crane can now also be considered documented in the archaeological record for the classical phase of the Athenian Theatre of Dionysus, in the form of the much-discussed foundation T (cf. Papastamati-von Moock 2014: 63–72 and Papastamati-von Moock 2015: 69–71).
18. This function can be derived quite plausibly from Antiphanes fr. 189 Kassel-Austin (see also n. 5 above).
19. For a reconstruction of the scenic ensemble and the crane model used see Papastamati-von Moock 2014: 71. Her drawing, however, lacks a raised stage (which would have been wooden, hence leaving no archaeological trace). Also, her rendering of the height of the back portico which is slightly elevated relative to the stage house has to be questioned, since in this case the crane could not have been swung towards the back of the stage house. It remains unclear how the crane could have picked up actors without spoiling the surprise for the audience.
20. Cf., for instance, Currie 2005: 71–84.
21. Aristophanes *Acharnians* 407–479 and *Women at the Thesmophoria* 95–265.
22. On this whole topic see van Möllendorff 2015.
23. The push-back of the *ekkyklêma* can be passed over in silence or be heavily marked (as in Sophocles' *Ajax* 579–595).
24. See Taplin 1977a: 322–7 who decides against the use of the *ekkyklêma* and even argues (443) against its existence at so early a date.
25. Cf. van Möllendorff 2015: 53. Here too one may ask how this was staged. If Clytemnestra emphasizes that the platform of the *ekkyklêma* is identical with the site of murder, it would be not so much hyper-realistic but heavily symbolic to present the corpse in the bathtub. Such a stylizing presentation, which can also be witnessed in other plays – for instance Sophocles *Ajax* 347ff. (Ajax in the middle of the sheep and the ram murdered by him) and, as shown above, Euripides *Heracles* 1028ff. (Heracles asleep, leaning at a column with his murdered family around him) – would prominently highlight the vulnerability of the victim, the particular cowardice of the murderers and the metamorphosis of a place of relaxation into a site of cruel violence.
26. This also applies to the beginning of the *Eumenides* (cf. van Möllendorff 2015: 54f.). In particular, the *ekkyklêma* could in this case not present the result of an action the genesis of which had been described earlier. And would the Furies, who were not asleep according to the report of the priestess (*Eumenides* 54), have been put to sleep (*Eumenides* 67f.) by Apollo, before or perhaps while they were being rolled out on the *ekkyklêma*?

27. *Peace* 82–101: anapaestic dimeter; 102–153: iambic trimeter; 154–172: anapaestic dimeter; 173–179: iambic trimeter. On the whole scene see van Möllendorff 2002: 75–80. Mastronarde 1990: 285f. and Olson 1998: xliii–xlviii believe that the following scene (set in heaven) was staged in front of the *skênê*.
28. At *Poetics* 6.1449b24–28 Aristotle considers both these emotions as co-operating towards the overall impact of tragedy, while he also maintains that they do not have to manifest themselves simultaneously (cf. *Poetics* 11.1452a38–b3).
29. Boyle 2014: 312f.
30. Boyle 2014: 65 assumes an empty *ekkyklêma* being wheeled back while the characters walk or rush back into the palace. This seems to me to be an unnecessarily complicated way of staging.
31. See also Boyle 2014: 384 who points out that this is the only place in Seneca's plays where the use of the crane is certain.
32. But cf. the discussion by Revermann 2006a: 187–9 who insists on the 'comic point' of the philosopher's seriousness. This is certainly true, but I would like to focus on the specifically tragic dimension of this intellectual business doomed to fail at the end.
33. Against the background of the question pursued here it is not unimportant that Strepsiadés (*Clouds* 186) compares their pallor with that of the Spartans who were defeated at Sphacteria and then brought to Athens as prisoners of war. In the year 423 (the year in which the first version of *Clouds* was performed) they had been detained for two years already and were therefore hardly in healthy condition (cf. Dover 1968: 120). If Socrates' house is compared to a PoW camp in this way, this can plausibly be seen as an equivalent to the horrific events that take place in the heroic palaces of tragedy.
34. Cf. already Dearden 1976: 65–7 and Sommerstein 1998: 170; for ancient commentators assuming the use of the *ekkyklêma* cf. Revermann 2006a: 186 n. 12 who himself opts for a staging with individual students bringing out one prop after the other. This is certainly not to be dismissed but perhaps underrates Strepsiadés' astonishment when apparently being confronted with a number of students all at the same time (*Clouds* 184).
35. Newiger 1990 provides an overview of the use of both machines which is still valid and shows sound judgement, even if it may not be correct in all instances. (1) Crane: (a) Comedy: *Peace* 79–178, *Birds* 1196–1261, Aristophanes fr. 192 Kassel-Austin, *Clouds* 218–238. (b) Tragedy: Euripides *Medea* 1317ff., *Electra* 1233ff., *Heracles* 815ff., *Hippolytus* 1283ff., *Ion* 1549ff., *Helen* 1642ff., *Andromache* 1226ff. (in other words, only Euripidean plays). That the crane was used at Sophocles *Philoctetes* 1409–1417 cannot be proven from the text but perhaps might be indicated by the metre. (2) *ekkyklêma*: (a) Comedy: *Acharnians* 407–79, *Women at the Thesmophoria* 95–265 (for the passage of *Clouds* analysed in the main text above Newiger [1990: 42] is reluctant to assume the use of the *ekkyklêma*). (b) Tragedy: Sophocles *Ajax* 344–594, Euripides *Hippolytus* 808–1089, *Heracles* 875–1426. Of note is the observation that within tragedy Euripides not only uses these machines most often but also several times uses both of them within a single play. In the *Clouds* scene Aristophanes would therefore be taking his guidance from Euripides.
36. Cf. Plutarch *Alcibiades* 16.14, Demosthenes *Against Meidias* 147, Andocides *Against Alcibiades* 17.

37. Vitruvius *De architectura* 5.6.9.
38. Pollux 4.126.
39. Small 2013: 116f.
40. Small 2013.
41. See Revermann 2013: 79. Tordoff 2013: 100 and 103 offers a statistical analysis to support this distinction.
42. On this differentiation between the de- and connotation of props see Tordoff 2013: 94–6.
43. Revermann 2013: 85. Electra's monologue of despair about the assumed death of her brother is directed towards the urn which Orestes out of pity tries to take away from her until he can no longer contain himself and, against his earlier intention, discloses his true identity to his sister.
44. Whether the sword was also visible during Ajax's subsequent suicide speech continues to be controversial, as is the related question whether Ajax's suicide was visible on stage, see Finglass 2015b and Martinelli 2015. The question is not of vast importance to the problem discussed here, since the sword has been shown extensively to the spectators and, most of all, because its connection with Hector has been established at length by Ajax. Therefore, although it may later be invoked only verbally (even involving the use of demonstrative pronouns) without being visible any longer, the sword nonetheless has a semiotic presence on stage.
45. See the discussion in Manuwald 2011: 79f.
46. Extensive discussion in Csapo and Miller 2007, esp. the 'General Introduction' (1–38). Wiles 2007 and 2008 argues emphatically against an overly political and in favour of a cultic-religious reading of Greek drama.
47. Cf. Dugdale 2008: 114–24. Pollux devotes most of the theatrical section of his *Onomastikon* to naming and describing masks: masks of tragedy and satyr play (4.133–42) and masks of New Comedy (4.143–54). On the latter see also Ruffell 2014: 149–55.
48. The question of whether the character of Socrates was wearing a simple comic mask or a portrait mask, and the implication of either scenario, are discussed in Dover 1968: xxxiii.
49. Aristophanes *Knights* 230–233.
50. Aristophanes *Clouds* 348–350.
51. Köhnken 1980.
52. On pantomime see Lada-Richards 2007, Garelli 2007 and the contributions (including the excellent Introduction and appendix of sources) in Hall and Wyles 2008.
53. Cf. Hall's discussion of the fourth-century CE 'Barcelona Alcestis' papyrus as a libretto of Latin pantomime in Hall and Wyles 2008: 258–82. The text (124 hexameters) contains dialogues and monologues which may have been recited as background to the pantomime's dancing.
54. See, for instance, Plutarch *Sympotic Questions* 9.747c and Libanius *or.* 64.118.
55. Lada-Richards 2007: 38–55 (esp. 47).
56. *Aetna* 294–301, cf. Hall and Wyles 2008: 27.
57. On this topic see May 2008.
58. Cf. Fronto *On Orations* 5, p. 150 van den Hout, and Lada-Richards 2007: 40.

Chapter Ten: Knowledge Transmission: Ancient Archives and Repertoires

1. 'Old drama' (*palaion drama*) was the standard way of referring to a play that had premiered at a previous festival.
2. *Acharnians* 394–489.
3. Hall 2015: 1–2.
4. For a survey of *scholia* on dramatic texts see the relevant chapters in Dickey 2007.
5. Taylor 2003: 19.
6. Athenaeus 1.3a, cf. Knox 1985: 9; in Aristophanes' *Frogs* Euripides' use of books is mentioned at 943 and 1409.
7. Ancient plays have been transmitted with minimal stage directions, though Taplin argued that stage directions are implicit in the dialogue (for an overview of his theory see Taplin 1977b and 1978); for discussion and critique see Revermann 2006a: 46–65.
8. On costume in Greek tragedy see Wyles 2011; in comedy see Compton-Engle 2015. On stage props see Revermann 2013 and Tordoff 2013; on the evidence for 'technologies of performance' (such as stage machinery) see von Möllendorf in this volume.
9. Vitruvius 7.11; the authors named are Agatharchus, Anaxagoras and Democritus.
10. *Suda* σ 815.
11. Athenaeus 1.19e.
12. On the Greek institution of the *chorêgia* see Wilson 2000 and Lightfoot in this volume.
13. For an overview of choregic monuments see Townsend 2010.
14. Duncan 2015: 'Dramatic masks were portable, physical, and non-ephemeral items of theatre which, when part of a winning production, were publically dedicated in the Dionysion.' Cf. Aristophanes F 130 K-A on the dedications of masks in the Dionysion. For an overview of the use of masks in Greek tragedy see Wiles 2007.
15. Lysias 21.4; see Green 1982 on such dedications. For a highly speculative account of costs associated with the material reality of the Great Dionysia see Wilson 2008.
16. For a full-length study see Hanink 2014a; see also Lambert 2008 for evidence of the use of theatre as a political/diplomatic tool in this period.
17. [Plu.] *Lives of the Ten Orators* 841f; see the discussion and bibliography at Hanink 2014a: 60–89. The law is often seen as an attempt to curb the introduction of actors' interpolations into the tragic scripts. The question of how early musical notation was introduced into dramatic scripts is still debated: see esp. Fleming 1999 and, for a more cautious view, Prauscello 2006.
18. See esp. Papastamati von Moock 2014.
19. Csapo 2007.
20. On the date see Tracy 2015, esp. p. 559 on the inscription's date and location. For an edition of this inscription, *IG II² 23218* (the 'Fasti') see Millis and Olson 2012 (scholars prior to Tracy had dated the inscribing of the Fasti to a year between 347 and 342 BCE).
21. On this set of inscriptions, the 'Didascaliae', see most recently Tracy 2015: 560–6 and Millis and Olson's 2012 edition.