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TWISTING IN THE WIND: MONUMENTAL WEATHERVANES IN CLASSICAL ANTIQUITY

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Monumental weathervanes have been overlooked as a tiny but important genre of ancient bronze sculpture. This is the first collective study of all three definite examples: the so-called 'triton' on the Tower of the Winds in Athens, a copy of this somewhere in Rome and the winged female 'Anemodoulion' on the Bronze Tetrapylon in Constantinople. I propose to identify the intended subjects of these sculptures as the weather-deities Aiolos and Iris, thereby restoring a part of each monument's original meaning that was unknown to the authors of our ancient written accounts. I also suggest that monumental weathervanes were first invented in Hellenistic Alexandria, which may explain why the Tower of the Winds shared the octagonal design of the Pharos, and why the Anemodoulion was mounted upon a bronze pyramidion.

The monumental weathervanes of classical antiquity, though few in number, were luxury items shared by antiquity's major cities: Athens, Rome, Constantinople (and, I shall argue, Alexandria). What follows is the first collective study of the three weathervanes known to exist,[1] together with cautious suggestions that other lost Hellenistic artworks

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1 Existing scholarship on ancient weathervanes either concerns their instrumental use or is limited to the Athenian or Constantinopolitan monuments. For detailed studies of anemology in antiquity see Rehm (1916) 1–104, Liuzzi (1996) and Davis (2009); on the winds in ancient art see Neuser (1982); on ancient sundials, which in five extant examples incorporate wind roses, see Gibbs (1976), Winter (2013) and the current Topoi research project led by Gerd Graβhoff (https://www.topoi.org/project/d-5-6/, accessed 14 June 2016); for further relevant observations on monumental clocks see Fragaki (2012). The authoritative work on the archaeology of the Tower of the Winds is Kienast (2014). See also Noble and de Solla Price (1968); von Freeden (1983); Kienast (1997). On Faventinus and the Roman weathervane see Plommer (1973). On the monuments of Constantinople see Dawkins (1924); Mango (1963); Dagron (1984). On the Anemodoulion itself see Anderson (2011). On our Byzantine textual sources see Cameron and Cutler (1968); Cameron and Herrin (1984); James and Vassis

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(two of them known only through Pliny the Elder) belonged in the same class of monument.[2] The task is difficult, since all of the objects concerned were made of valuable – and meltable – bronze, and no physical trace of any survives. But I propose to show that the weathervanes of the medieval period – which spanned Europe in the form of weathercocks on church spires, while also adorning Arabian palace domes – had classical forerunners.[3]

As we shall see, monumental weathervanes were never merely functional, and are best seen as a mechanised sub-genre of bronze statuary: neither the Greeks nor the Romans had any special terminology to differentiate them from other statues. Although weathervanes had a practical use, since the direction of the wind was believed to foretell the weather, most so-called 'anemoscopes' were much humbler, windsock-like devices that used dangling cloth or ribbon.[4] The larger instruments (or, rather, sculptures) are known to us only through a smattering of images and texts, none of which was intended as a thorough study. In fact, the written evidence is so scant and brief that most of it will be reproduced below.[5] We cannot tell how long each vane functioned properly, or whether it was repaired.[6] But at least one of them adorned a major urban landmark for hundreds of years, to be admired by many thousands of citizens and visitors. Furthermore, as anthropomorphic figures moved by windpower (like many of Hero of

(2012). On the Pharos statue, not previously identified as a weathervane, see (besides Fragaki) Adler (1901); Thiersch (1909); Picard (1952); Goodchild (1961); Handler (1971); Behrens-Abouseif (2006).

2 Three metal sculptures that could have been monumental weathervanes, or at least influenced their design, are discussed below: Lysippos' colossal bronze Zeus Thunderer at Tarentum, which could somehow be moved by hand (see Pliny the Elder, quoted below); the bronze Zeus Saviour atop Alexandria's Pharos, a monument sharing several design elements with the later Tower of the Winds; and the 'golden pyramid' in Pompey's triumphal procession of 61 BC, decorated with fruits and animals and wreathed in a vine, which apparently resembled the pyramidal base of the Anemodoulion ornamented with fruits, vines and figures.

3 The earliest known Christian weathercock is that which Ekkehard IV locates in the monastery of St Gall when the Huns sacked it in 995 (Callisen (1939) 177). It was probably a rebus: in Latin, *gallus* = cockerel. Medieval Arab examples of weathervanes include the audience-halls of al-Mansūr, tenth- and eleventh-century ruler of Andalusia, whose four domes bore different figures which turned in the wind (Al-Baghdādī, quoted in Le Strange (1900) 31), and probably also the bronze lancer atop the dome of the Golden Gate Palace in Baghdad, destroyed by lightning in AD 941. Ibn al-Khatib wrote in 1038 that this was said to turn towards approaching enemies.

4 On the evidence for ancient anemoscopes see Rehm (1916); Liuzzi (1996); Davis (2009).

5 The longer passages are provided in translation only. For convenience I abbreviate the eighth-century *Parastaseis syntomoi khronikai*, and the *Patria Konstantinoupoleos* written in 995 with eleventh-century interpolations, both edited by Preger (1901–7), to *Parastaseis* and *Patria*. The tenth book of Niketas Khoniates' *Annals* is given its conventional title, *De signis*. I refer to the poet Constantine of Rhodes as 'Konstantinos', to prevent confusion with Constantine I.

6 A vane might theoretically remain mobile for centuries, especially with maintenance. The large bronze dragon which is now preserved in the belfry of Ghent, and which made its way to Bruges some time before 1380 (allegedly from Constantinople), functioned for centuries with periodic repairs. On a much smaller scale, a bronze falcon of the seventh to eleventh centuries, which was converted in the thirteenth or fourteenth century into a whistling weathercock for the church of San Frediano at Lucca, remained in use until 1954 (Contadini (2010) 54–7). The weathercock of Ottery St Mary Church has purportedly functioned since the twelfth century (Dainton (1957) 119).

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Alexandria's working-fluid toys), monumental weathervanes should be classed as a form of automaton.[7] They arguably represent a 'missing link' between mechanisms and sculptural monuments.

For the three monumental weathervanes that our sources explicitly identify, the dates of manufacture are uncertain. The first vane was a 'triton' adorning the Tower of the Winds in Athens; the second was an imitation of this, at an unknown location in Rome; and the third was the Anemodoulion, a winged female figure atop a pyramid, which in turn crowned a tetrapylon spanning a major intersection in central Constantinople until the sack of 1204.[8] The Athenian example was made in the second or first century BC;[9] Rome's within the following three centuries; and Constantinople's at an unknown date before its alleged importation from Dyrrachium between the fourth and eighth centuries AD. I shall discuss them in chronological order, proposing connections with earlier monuments where relevant, in order to sketch a historical narrative from which general conclusions may be drawn.

The Tower(s) of the Winds

Our earliest reference to a monumental weathervane is in Varro, who mentions the Tower of the Winds when describing his elaborate aviary near Casinum. This had an astronomical clock inside its rotunda, combined with a weathervane of unknown exterior form (which cannot therefore be confirmed as a figural vane), whose display was internal (*Res rusticae* 3.5.17):

> In eodem hemisphaerio medio circum cardinem est orbis ventorum octo, ut Athenis in horologio, quod fecit Cyrrestes; ibique eminens radius a cardine ad orbem ita movetur, ut eum tangat ventum, qui flet, ut intus scire possis.
>
> In the middle of the same hemisphere, around the axis, is a ring of the eight winds, as in the horologium at Athens, which the Kyrrhian built. There, a spoke projecting from the axis moves around the compass, so that it touches the wind which is blowing, so that you can tell from indoors which one it is.[10]

7 It must be remembered that Philo's and Hero's automata usually move or rotate *in toto*, only sometimes containing articulations. On the development of automata in antiquity see Hill (1984) 183–222. Precision engineering did not require hydraulic or pneumatic piping: the Antikythera mechanism, itself a work in bronze, was operated manually. Amid the burgeoning bibliography on this device see Freeth (2008); Bitsakis *et al.* (2010); Kaltsas *et al.* (2012). The challenges involved in making bronze sculptural vanes are illustrated by the first 'Diana of the Tower', made by Augustus Saint-Gaudens and installed atop Madison Square Garden in 1891, which failed to rotate.

8 The tetrapylon is thought to have stood on the Mese at the Makros Embolos intersection, between the Fora of Theodosios and Constantine I: see Berger (1997). Its bronzes were destroyed in 1204 (Khoniates, *De signis* 648).

9 The construction date of the Tower of the Winds is debated, but must antedate Varro's reference to it (*c.* 37 BC). Some, including Von Freeden and Kienast, argue convincingly for the second century BC on stylistic grounds.

10 Unless otherwise stated, all translations are mine.

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Vitruvius, writing two decades or so later, refers not only to the Athenian compass of winds but the entire monument, including the vane (1.6.4):

> Nonnullis placuit esse ventos quattuor, ab oriente aequinoctiali solanum, a meridie austrum, ab occidente aequinoctiali favonium, ab septentrionibus septentrionem. sed qui diligentius perquisierunt tradiderunt eos esse octo, maxime quidem Andronicus Cyrrestes, qui etiam exemplum conlocavit Athenis turrim marmoream octagonon et in singulis lateribus octagoni singulorum ventorum imagines excalptas contra suos quosque flatus designavit, supraque eam turrim metam marmoream perfecit et insuper Tritonem aereum conlocavit dextra manu virgam porrigentem, et ita est machinatus uti vento circumageretur et semper contra flatum consisteret supraque imaginem flantis venti indicem virgam teneret.
>
> Some have reckoned that there are four winds: Solanus from the eastern sky, Auster from the south, Favonius from the west and Septentrio from the north. But those who have explored this more thoroughly have taught that there are eight winds, especially Andronikos of Kyrrhos, who even built an octagonal marble tower at Athens as a model. On each side of the octagon he arranged sculpted images of the winds, each one facing its own breeze. Above the tower he constructed a marble cone and upon it he put a bronze triton holding out a rod in his right hand. He contrived it so that it revolved in the wind and always faced opposite the breeze, and held its rod as a pointer over the image of the wind that was blowing.

Athens' Tower of the Winds is an octagonal Pentelic marble tower standing about 12 m tall and 8 m wide, overlooking the Roman Agora from its east end, about 250 m north of the Acropolis. There is a sundial on each side; above is a relief carving of a personified wind, forming a frieze around the top. The shallow conical roof is crowned with a weathered Corinthian finial. Although all metalwork is lost and the size of the 'triton' can only vaguely be reconstructed, this stone base seems to have been capable of supporting a nearly or fully man-sized bronze sculpture as illustrated in Fig. 1, comparable in scale to the extant relief carvings. Marcus Cetius Faventinus is our only witness to a Roman copy of the Athenian vane. His epitome of Vitruvius, probably written in the early third century,[11] features a few insertions, one of which appears to describe an otherwise unknown copy of the Tower of the Winds in Rome. The original passage in Plommer's edition runs as follows (*Liber artis architectonicae* 2):

> sed plerique duodecim ventos esse adseverant, ut est in urbe Roma Triton aeneus cum totidem thoracibus ventorum factus ad exemplum Andronici Cyrrestae similitudinem. supra caput venti virgam tenens eundem esse flantem ostendit.

11 Plommer (1973) 2.

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Figure 1. Reconstruction of the Tower of the Winds (reproduced from Stuart and Revett (1762): chapter 3 Plate 3).

> But most people assert that there are twelve winds, just as in the city of Rome there is a bronze triton with twelve busts of the winds, created in imitation of Andronikos of Kyrrhos' model. Holding his rod above the head of a wind, he shows that same wind to be blowing.

Although we have no other evidence for what Faventinus is describing, he evidently means something different from the Tower of the Winds. Our closest Roman relics are the Pesaro Anemoscope and the so-called 'Vatican Table', two marble wind roses of the

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Figure 2. The Vatican Table (reproduced from Woods and Symonds (1894): 89).

second or third century AD, whose twelve sides are labelled with the names of winds in transliterated Greek (the Vatican Table adds the Latin names).[12]

Plommer's translation shows a determination to assimilate the Roman monument to these objects: *cum totidem thoracibus ventorum* becomes 'above a pedestal of twelve faces, each showing a wind', and *supra caput venti* becomes 'above the head of the wind on the pedestal'. Yet the anemoscopes are nothing like monumental architecture, serving as stands into which a flag-like indicator was inserted, most likely set near ground level; figural decorations are absent, names are misspelled, and the Vatican Table has a more than passing resemblance to a repurposed column drum. Whether Faventinus' *thoraces* were sculptures or reliefs, they were nonetheless heads-and-chests,[13] and the central sculpture was a bronze vane that would require an elevated position in order to function reliably. It may have been a very close imitation of its model, albeit dodecagonal instead of octagonal, and apparently (unlike Varro's aviary at Casinum) shared both an urban setting and a public function.

12 On the Pesaro anemoscope see Dilke (1987) 248–9; Taub (2003) 177–81.

13 The term *thorax* means 'bust' at Rufinus, *Historia ecclesiastica* 2.29 (*thoraces Serapis*) and precisely 'relief bust' at SHA *Claud. Goth.* 3 (*etiam nunc videtur expresso thorace vultus eius*). The winds were often portrayed as heads or busts: see *LIMC* VIII.1 s.v. 'Venti', especially items 5 and 6 under 'Winde als Köpfe und Büsten', which are both appliqué bronzes of the third century AD.

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The Pharos of Alexandria

Monumental weathervanes were probably invented earlier than the first century BC, when Varro and Vitruvius first mention them. Movable bronze statues already existed in the Archaic period,[14] and the sculptural weathervane – both a spectacular novelty and a meteorological instrument – recalls the intellectual and artistic experimentation of the Hellenistic era. I suggest that it was invented neither in Athens nor Andronikos' native Macedonia, but in Alexandria, the home of innovators such as Ktesibios and Philo. Our two references to the Tower of the Winds are both Roman, while written descriptions of the Anemodoulion vane postdate its erection by several centuries and even disagree over when it was built. However, our imperial Roman sources are detailed enough to prompt limited speculation on the nature of the earliest examples.

The only known precedent for the octagonal, statue-crowned design of the Tower of the Winds, and probably its direct inspiration, was the world-famous Pharos of Alexandria commissioned by Ptolemy I Soter in the first half of the third century BC.[15] The tallest tower in the world when built, it is now completely destroyed, but can be reconstructed from later texts and images, especially imperial Roman coins of the second and third centuries AD (Figs. 2–4). Other ancient lighthouses are very little help, since all known examples are later and smaller and the few survivors are heavily damaged.[16] One type of coin representing the Pharos and its sculptures is exemplified by a hemidrachm of AD 107/8 (Fig. 3), which on the reverse shows two figures facing outward and a statue at the top. On this type the lighthouse bears the proportions given by much later Arab sources, although the sculptures may still be shown larger than life. They are greatly magnified on a drachma of AD 132/3, exemplifying a second type of coin, on which the Pharos is dwarfed by a figure of Isis Pharia holding a billowing sail (Fig. 4). The statue seems to be gripping a long object near its top. The sculptural elements are largest and clearest on another example of the hemidrachm type, from 136/7 (Fig. 5): the two figures on the

14 The sixth-century BC sculptor Kanakhos made a bronze Apollo Philesios at Didyma and a cedar copy at Thebes. In its hand was a deer, attached at two of its hoofs by means of sockets. This allowed it to be moved from one position to another (Plin. *HN* 34.75). Sometime in the fifth century, Kleotas built a bronze eagle with outspread wings, which was launched above an altar as the starting-signal for the chariot race at Olympia (Paus. 6.20.11–12).

15 For bibliography on the Pharos lighthouse see n. 1. The design of the Tower of the Winds is 'obviously Greek, both in the severity of decorative treatment and in the antiquated method of roofing', and the Pharos 'must be included' among its lost prototypes (Lawrence (1996) 181). Kienast (2005) 249–50 notes that two smaller and less elaborate structures had similar roofs: a classical monument in the Kerameikos, and the first-century Babbius monument at Corinth.

16 Most ancient *pharoi* (Pliny lists several at *HN* 36.83) are completely lost. The first-century Dover Lighthouse and second-century Tower of Hercules at La Coruña survive, but their upper levels have been rebuilt. The contemporary copy of the Pharos at Abusir has also lost its top, and shows many other differences. On this probably funerary monument, see El-Fakharani (1974). On the wider evidence for ancient *pharoi*, see Lazos (2007) 131–63.

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Figure 3. Hemidrachm showing Pharos with figures facing outwards and statue on top.[17]



Figure 4. Drachma showing Isis Pharia beside Pharos.[18]

reverse are fish-tailed and blowing long trumpets, and the central statue now loosely supports a long object in his elbow.

The Pharos monument is agreed to have stood well over 100 m high in three tiers: a square base, an octagonal middle and a cylindrical top accommodating a watchfire, crowned with a statue. This statue is one of many suggestive foreshadowings of the Athenian monument. The eight-sided middle section – really a smaller tower in its own right, founded upon the

17 Fig. 3 is reproduced courtesy of Dr Busso Peus Nachf, auction no. Peus 406, 2012, 604.

18 Fig. 4 is reproduced from www.bibalex.org/CulturalRoutes/Publications2.html, accessed 10 June 2016.

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Figure 5. Hemidrachm showing Pharos with figures trumpeting and statue holding an object.[19]

massive square base – is the only classical parallel for the eight-sided Tower of the Winds.[20] Furthermore, the coins all portray fish-tailed figures leaning out from a high ledge who, in the more detailed images, are shown blowing trumpets. Scholars discussing the Pharos, perhaps influenced by Vitruvius' description of the Tower of the Winds, or by the ancient tradition that Pharos was the home of the sea-god Proteus,[21] have referred to them as 'tritons'.[22] I suggest instead that they are trumpet-blowing (or conch-blowing) winds,[23] numbering either four or eight and occupying the edges of the base around the octagon. It is unlikely that these winds had serpentine tails, as in archaic art;[24] more likely they were kneeling, as Konstantinos of Rhodes (193–4, quoted below) says those on the Anemodoulion monument were. We can securely identify the lone statue on the top of the monument (Fig. 7) as Zeus Soter ('the Saviour'), thanks to verses written by two poets resident in Alexandria when the Pharos was built: an epigram of Poseidippos first published in 2001

19 Fig. 5 is reproduced from http://ancientcoinage.org/lighthouses-of-alexandria.html, accessed 10 June 2016. Image courtesy of Edward J. Waddell, Ltd.

20 Although octagonal buildings are known from the third century AD onwards (the base of the Tor de'Schiavi in the Villa of the Gordians, and possibly the Tempio di Siepe), the only known *towers* of this design are the Pharos (with smaller imitations at Abusir and Dover) and the Tower of the Winds. According to Kienast, the latter was built in the second century BC, perhaps a few decades after its model. On octagonal architecture see von Freeden (1983) 65–8.

21 On Proteus and Pharos see El-Abbadi (2004). There is no evidence that the Ptolemaic building programme made reference to Proteus. There was, however, an additional reference to the winds in a famous image of Isis Velificans, whose billowing mantle was the prototype for sails: Bruneau (1961), (1963); Castiglione (1970); Ridgway (1990) 366.

22 E.g. 'conch-blowing tritons' (Handler (1971) 59–60), 'four bronze Tritons blowing trumpets' (Ridgway (1990) 365). Tritons, though common in ancient art, were regularly associated with water, especially as sculptures (*LIMC* VIII.1 s. v. 'Tritones'): thus the starting-horn for a naumachia at Suet. *Claud.* 21 was a silver mechanical triton (cf. [Verg.] *Aetn.* 294–302, with Garani (2009) 103–21).

23 The shell-trumpet motif first appeared in Hellenistic art, remaining standard in Roman art (Simon, 1967). Boreas blows a conch on the Tower of the Winds, the winds appeared as kneeling youths blowing bronze trumpets. Greek vase paintings portray the winds as humanlike except for their wings (LIMC s.v. 'Venti').

24 Boreas was snake-legged on the chest of Kypselos (Paus. 5.19) and some (e.g. Furtwängler (1905) 435–8; Benton 1965) have also identified the snake-tailed 'Bluebeard' on the Acropolis as a wind-figure.

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explicitly refers to the Pharos and Zeus Soter, and Kallimachos asks Zeus Λιμενοσκόπος ('the Harbour-Watcher') to protect his beloved's ship.[25] Zeus Soter was doubly appropriate, being patron of harbours and also the namesake of Ptolemy Soter, who commissioned the tower.[26] The long, thin object he held instead of a thunderbolt is possibly a royal sceptre, but more likely a sceptre-like rudder symbolising protection of ships,[27] with which the weather-god rules his subjects.[28] It has been proposed that the statue and pointer were part of a mechanical clock,[29] but this seems unlikely on both practical and iconographic grounds.[30]

I suggest instead that the statue of Zeus Soter holding a royal sceptre was originally a weathervane, indicating which wind was blowing. A much larger bronze Zeus that was movable (though exactly how is unclear) had been built at Tarentum a century earlier.[31] A

25 Poseidippos: Austin–Bastiniani 115, reproduced with translation and commentary in Obbink (2005) 105–6; see more recently Schröder (2008); Furley (2009). Kallimachos: fr. 114 = *Anth. Pal.* 13.10. Handler (1971) 60 proposes that there were three successive statues of Ptolemy, Poseidon and (following Goodchild (1961)) Helios, though the first identification is now disproven and the other two remain conjectural.

26 Ptolemy I received the title 'Soter' after assisting Rhodes against Demetrios in 305–304 BC (Paus. 1.8.6). (The tower was completed under Ptolemy II Philadelphos, but its design is unlikely to have changed.) We might also detect an allusion to the dedicator's own name, Sostratos ('Saviour of the Army'; στρατός sometimes means 'Navy' in the tragic poets). Sostratos might only have dedicated the statue and not made it or the tower (see Bernand (1996) and especially Bing (1998) 22–3), though in any case, the two works formed a unified design.

27 What the statue's two hands held is unclear. A glass beaker found at Begram in Afghanistan, last seen in Kabul Museum (Fig. 6), bears an admirably detailed image of the Pharos supporting a figure with an oar or rudder propped in its left elbow. Handler (1971) 60 finds this inconsistent with the coin images and (oddly) suggests that the anti-monarchical Romans replaced this oar-bearing Ptolemy with a sceptre-bearing Poseidon. In fact, the statue on the reconstructed beaker seems to be missing its right arm and may have held both objects at once. The coins are unhelpfully variable, with spear on either left or right, and sometimes what resembles an orb or *phialē* in the other hand.

28 For Zeus as master of the winds see Hom. *Il.* 12.281. In equine form, the winds draw Zeus' chariot (see Pl. *Phdr.* 246e; Nonnos, *Dion.* 2.420–3).

29 See Fragaki (2012), who also follows Goodchild (1961) in using the mosaic labelled 'Pharos' made at Qasr el-Lebya in AD 539 to argue that the topmost statue represented Helios.

30 Practically: whereas the clepsydra in the Tower of the Winds was powered by an aqueduct from higher ground, the Pharos stood on an artificial peninsula and at considerable height. Clepsydras are also too fragile and sensitive for their moving parts to be exposed to the elements (especially on a coastal tower); all known ancient examples, from the Tower of the Winds onwards, stood under shelter (thus Scipio Nasica installed Rome's first clepsydra under a roof: *sub tecto dicavit*, Plin. *HN* 7.215). Iconographically: Fragaki's case rests on the identification of the statue as Helios (see previous tnote), the god who served as pointer on Procopius' Gaza clock. But there he occupied his customary chariot, whereas there is no parallel for Helios holding a sword (*LIMC* IV.1 s.v. 'Helios/Sol'). The sword's exactly vertical position resembles that of the spear-like object on the Roman coins. Likewise, the unexplained second statue in the mosaic suggests the coin-type juxtaposing Isis Pharia with the Pharos. Both statues are grey, as if the artist did not know that they were bronzes. In sum: if the mosaic is based on autopsy of the original monument (which stood 450 miles away along the coast) it is very inaccurate, but if based on Roman Alexandrian coins (which circulated widely) it is a very reasonable reconstruction. Its date and location alone do not guarantee its value: the mosaic at Tzippori in Israel is of similar date and geographically closer, but its Pharos (in a scene labelled 'Alexandria') is simply a flame-topped tower and otherwise unrecognisable.

31 Around 340 BC, Lysippos built a colossal Zeus Keraunios at Tarentum that, although resisting strong winds, could be moved by hand (*mirum in eo quod manu, ut ferunt, mobilis ea ratio libramenti est, ut nullis convellatur procellis*, Plin. *HN* 34.39–40). Lysippos may conceivably have brought the principle of the pivoting bronze statue to Alexandria, resulting in a Zeus Soter weathervane atop the Pharos one century later, when he became court sculptor to

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Figure 6. Mosaic from Qasr el-Lebya representing the Pharos (reproduced from Fragaki (2012), Fig. 1).



Figure 7. Glass beaker from Begram representing the Pharos (detail from a 1970 photograph, reproduced from The Huntington Archive, scan number 0010399).

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sculptural vane would illustrate Aratos' claim that Zeus gives weather-signs to sailors.[32] This increases the likelihood that the octagonal Tower of the Winds (sheer sides, sundials, clepsydra and marble reliefs notwithstanding) is a miniature adaptation of the Pharos, like the one at Abusir. On the other hand, no surviving text indicates that the statue of Zeus Soter was a weathervane; most images show the 'pointer' pointing upwards, not outwards; and the lower statues may conceivably have been a team of watchful tritons. Yet the design of an octagonal tower with a regal deity on its top, and lesser deities arrayed around it, still inspired the shape of the Tower of the Winds – and, as I shall demonstrate, the Anemodoulion monument.

The Anemodoulion of Constantinople

After Faventinus' description of a Roman 'tower of the winds' in the third century AD, the next reports of ornamental weathervanes appear in eighth-century Constantinople, to which we now turn. There are no visual images, but several verbal descriptions suggest great renown. The earliest certain references to the Anemodoulion date from the eighth century AD: the *Parastaseis* locates a bronze statue of Empress Verina near the 'Anemodourion' (29).[33] Over time, the name Anemodoulion came to denote the whole edifice, previously known as the 'Bronze Tetrapylon'.[34] In the same way, the tower of Seville Cathedral is

Alexander the Great. Propertius praises Lysippos' skill in making *animosa … signa* (3.9.9 Heyworth), translating ἔμπνοος, 'breathed-into', which could mean both 'lifelike' (*Epigr. Gr.* 860.3) and 'blown upon' (Philostr. *Imag.* 1.23). If weathervanes numbered among Lysippos' hundreds of lost works, Propertius' epithet would be especially apt.

32 ὁ γὰρ οὖν γενεὴν ἀνδρῶν ἀναφανδὸν ὀφέλλει | πάντοθεν εἰδόμενος, πάντη δ' ὅ γε σήματα φαίνων ('For he openly aids the race of men, showing himself from every side, revealing signs all around', Aratos, *Phaen.* 168–72). Aratos primarily means that sailors can foresee storms by examining the moon and sun, but Zeus' roles as forewarner (Σημαλέος, 'Sign-Giver': Paus. 1.32.2) and weather-god (Εὐήνεμος, 'Fair-Wind': Paus. 3.13.8) may both have inspired his presence on the Pharos.

33 This alternative spelling is confirmed by Kedrenos (1.55.20), who derives it from ἀνέμων δῆρις, 'battle of the winds'. In the Life of St Andrew the Fool-for-Christ (*BHG* 115Z), also of the eighth century (Mango (1982); Rydén (1978) prefers the tenth), there is a passing reference to the Anemodoulion in a joke about winds: one might dispose of chaff there (Rydén (1978) 139–40). Two other, corrupt, passages may be describing the monument without naming it or mentioning the winds, but they are at best confused and probably irrelevant. First, an assemblage of reliefs including various birds and animals, among them rams and heifers (as well as two gorgons), is located at or near the Bread Market and ascribed to Constantine I (ταοῦ δὲ καὶ ἀετοῦ καὶ λεαίνης λαγωοῦ τε καὶ κριῶν κάραι, καὶ στρουθῶν καὶ κορωνῶν καὶ τρυγόνος μιᾶς καὶ γαλέας καὶ δαμαλίδες †ἑμαοῦσαι καὶ Γοργονίδες δύο, ἀμφότεραι ἐκ δεξιῶν καὶ ἐξ εὐωνύμων†, *Parastaseis* 40). Second, a 'female statue, engraved on all four sides with zodiacal signs' (θηλύμορφον ζώδιον, τετραμερέσι ζωδιακοῖς γράμμασι γεγραμμένον), somehow associated with Constantine I, is on display in the Hippodrome (64). The first of these is correctly located, but otherwise doubtful: everything is marble, and despite all the detail there is no mention of winds, vane, bronzes, pyramid or tetrapylon (or indeed Erotes, apples, vines, sheep or fish). The second is in the wrong location, but more recognisable, bearing a female figure and four engraved sides. The ζωδιακὰ γράμματα could be either 'animal carvings' or 'zodiacal signs': later in the same chapter, Galen the philosopher finds hieroglyphic and astronomical meaning in sculptures.

34 Χαλκοῦν Τετράπυλον: Berger (1988) 316–17, followed by Anderson (2011) 42.

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now called 'La Giralda' after its own bronze weathervane, the 4 m high sculpture of Faith Victorious erected there in 1568.[35]

Our first detailed description of the Anemodoulion comes from the tenth-century poet Konstantinos of Rhodes: it is fifth (lines 178–201) in his 'seven wonders' of the city.[36] The other six wonders seem selected as the loftiest of Constantinople's many monuments.[37] The lines giving concrete details of the decorations (187–201) describe it as:

πλευραῖς χαλκαῖς τέτρασι καθηρμοσμένον
ζῴοις τε πλαστοῖς πάντοθεν κεκασμένον
βλαστοῖσι καρπῶν καὶ ῥοΐσκων ἐμπλέοις.
γυμνοί τ' Ἔρωτες ἐμπλακέντες ἀμπέλοις
ἑστᾶσιν αὐτοῦ προσγελῶντες ἡμέρως
καὶ τοῖς κάτωθεν ἐγγελῶντες ὑψόθεν·
ἄλλοι τ' ἐποκλάζοντες ἔμπαλιν νέοι
σάλπιγξι χαλκαῖς προσφυσῶσιν ἀνέμους,
ζέφυρον ἄλλος, ἄλλος αὖ πάλιν νότον.
Ἐφ' οὗπερ ὕψει χαλκοσύνθετον τέρας
πτέρυξι χαλκαῖς προσφυσώμενον κύκλῳ
πνοὰς λιγείας ζωγραφεῖ τῶν ανέμων,
ὅσας ἀῆται προσφυσῶσιν εἰς πόλιν,
βορᾶς νότος τε καὶ καλός <τ'> ἀπαρκτίας,
εὖρος θρασύς τε καὶ βαρύπνοος λίβας.

. . . joined together with four bronze sides,
Adorned on all sides with carved creatures
And tendrils full of fruit and pomegranates.
Naked Erotes, entwined in the tendrils,
Stand there smiling amiably
And making fun from above at those below;
Other youths, meanwhile, kneeling down,
Blow out the winds through bronze trumpets,
One of them Zephyros, another in turn Notos.
At the top, a bronze-fashioned marvel,
Blown around in a circle by its bronze wings,
Indicates the shrill blowing of the winds,

35 The original vane, which including the pedestal is 7 m tall, remains on display outside the cathedral's Puerta de San Cristobal. It bears a 'banner of Constantine' with a large semicircular pennant to catch the wind.

36 James and Vassis (2012) is a recent edition, translation and commentary of Konstantinos of Rhodes. The short prose account in Kedrenos (1.565.20) closely paraphrases these lines.

37 Constantine I's curia (with its bronze door from the Ephesian temple of Artemis and 10 m tall bronze Athena), Justinian's equestrian statue and four monumental columns.

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Whichever breeze blows into the city,
Boreas, Notos, the lovely Aparktias, 200
Vigorous Euros and hard-breathing Libas.

It is not clear how many winds the Anemodoulion portrayed, though it was probably more than four; unfortunately the enduring competition between the eight-wind and twelve-wind compasses limits their value in dating.[38] The 'kneeling' winds, whatever their form, apparently resembled the figures surrounding the Pharos. The next account appears in the *Patria* of the tenth and eleventh centuries AD. The new description in the *Patria*, although transmitted in the same corpus as the earlier *Parastaseis* (114), seems entirely independent:

τὸ δὲ Ἀνεμοδοῦριν τὸ χαλκοῦν ἐστηλώθη παρὰ Ἡλιοδώρου τοῦ δυσσεβοῦς ἐν τοῖς χρόνοις Λέοντος τοῦ Συρογενοῦς, καθώς εἰσιν ἐστηλωμένοι οἱ ιβ΄ ἄνεμοι. τὰ δὲ τέσσαρα χαλκουργεύματα τὰ μεγάλα ἤχθησαν ἀπὸ τοῦ Δυρραχίου· εἶχεν δὲ αὐτὰ γυνὴ εἰς προῖκα αὐτῆς ἀπὸ ναοῦ τινος· μετὰ πολλῆς δὲ ἐπιστήμης καὶ ἀστρονομίας τοῦτο ἐποίησεν.

The bronze Anemodouris [*sic*] was set up by the impious Heliodoros in the time of Leo III the Syrian, such that the twelve winds are portrayed on it. The four large works of bronze were brought from Dyrrhachium. The woman herself had them as spoils from some temple. Heliodoros made it with great scientific and astronomical skill.

This passage – which gets the name of the monument wrong – is our sole evidence that its bronze decorations were taken from Dyrrhachium, and that it was created under Leo III (by contrast, the *Parastaseis* says Constantine I and Konstantinos says Theodosios I). The emphasis on the nefarious skill of the architect should cast both of these claims into doubt, because a wicked sorcerer called Heliodoros is prominent in the hagiography of another eighth-century Leo (AD 709–89), who was bishop of Catania. This Sicilian Heliodoros, in turn, was created by an iconodoule author of the ninth century as a

38 Anderson (2011) believes that the winds were relief carvings, as on the Tower of the Winds, and numbered only two. However, Konstantinos of Rhodes (195–201) throws out six names: Zephyros, Notos, Boreas, (Notos again,) Aparktias, Euros and Libas. The *Patria* (114) says that there were twelve winds, which according to the Vatican Table makes these W, S, NNE, (S,) N, SE, SW, though if Boreas is interpreted as NE, then we have six of eight (omitting E and NW). The eight- and twelve-wind roses were both in use throughout the imperial period: for a full review of the literary and archaeological evidence see Davis (2009). A four-sided pyramid would most naturally support four or eight figures, and four is indeed possible: Ampelius reduces all the named winds to four, identifying Boreas with Aparktias (Ampel. 5: *aquilo, boreas, aparctias idem a septentrione*), and the twelfth-century visitor Al-Harawî seems to refer to the Anemodoulion as 'the Cupola of the Four Winds' (Meri 2004) 121).

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caricature of John VII the Grammarian (patriarch AD 837–43), who postdated Leo III.[39] The *Patria* seems (understandably) to confuse Leo III with his Sicilian namesake and near-contemporary whose nemesis was a sorcerer called Heliodoros. It thus names the architect as an impious and learned 'Heliodoros' who is almost certainly fictional, while also disagreeing with the more reliable Konstantinos about the date of construction. It is quite plausible that the bronze works came from Dyrrhachium, a major Hellenic port in the third century BC,[40] but the dating to Leo III in the eighth century is at best uncertain.

Our final notices of the Anemodoulion postdate its destruction in the sack of Constantinople in 1204. Niketas Khoniates names it twice, first only briefly (*Annals* 333):

> ἀλλὰ καὶ ἐπὶ κίονος κατὰ τὸ χαλκοῦν μετέωρον τετράπλευρον, ἐν ᾧ γυμνοὶ περιβλημάτων μηλοβολοῦσιν ἀλλήλους Ἔρωτες, ὃ Ἀνεμοδούλιον κέκληται, ἑαυτὸν ἀναστήσειν ἐμελέτα χαλκοῦν.
>
> And on a column near the lofty four-sided bronze monument on which unclothed Erotes throw apples at one another, which was called the Anemodoulion, he [Andronikos I] intended to set up a bronze of himself.

In the second and more lavish description, Niketas eulogises it among the major bronze sculptures that the invaders tore down, cut up and melted (*De signis* 648):

> τὸ δὲ τετράπλευρον χαλκοῦν μηχάνημα μετέωρον ἀναβαῖνον καὶ μικροῦ τοῖς τῶν κιόνων μείζοσιν ἐς ὕψος ἀνθαμιλλώμενον, ὅσοι πολλαχῇ τῆς πόλεως ἀνεστήκασι, τίς οὐκ ἂν ὀφθαλμὸν ἐκείνῳ ἐπιβαλὼν τῆς ποικιλίας ἐθαύμασεν; ἅπας μουσικὸς ὄρνις τὰ ἐαρινὰ μελῳδῶν ἐκεῖ ἐντετύπωτο· γεηπόνων ἔργα καὶ αὐλοὶ καὶ γαυλοὶ καὶ προβάτων βληχήματα καὶ ἀρνῶν σκιρτήματα ἐξεικόνιστο· ὑφήπλωτο καὶ θαλάττιον πέλαγος καὶ νεπόδων ἀγέλαι καθωρῶντο, οἱ μὲν ζωγρούμενοι, οἱ δὲ τὰ δίκτυα τυραννοῦντες καὶ κατὰ βυθοῦ πάλιν ἀνέτως φερόμενοι· οἱ δ᾽ Ἔρωτες σύνδυο καὶ σύντρεις ἀλλήλοις ἀνθοπλιζόμενοι, γυμνοὶ περιβλημάτων, ἐβάλλοντο μήλοις καὶ ἔβαλλον, γλυκεῖ περιβρασσόμενοι γέλωτι. τοῦ δὲ τοιούτου τετραπλεύρου ἐς ὀξὺ σχῆμα κατὰ πυραμίδα τελευτῶντος ἀπῃώρητο ἄνωθεν γυναικόμορφον εἴκασμα καὶ ταῖς πρώταις τῶν ἀνέμων κινήσεσι περισοβούμενον· ὁπόθεν καὶ Ἀνεμοδούλιον ἐπεκέκλητο.
>
> Now, the four-sided bronze device, mounting up aloft and almost equal in height to the tallest columns which have been set up in many parts of the city: who, laying eyes

39 Thus Alexakis and Wessel (2011).

40 Epidamnos/Dyrrhachium prospered as the connection between Italian sea-traffic and Eastern Europe, even before the construction of the Via Egnatia in the late 140s BC. Like the future Constantinople (as well as both Alexandria and Tarentum, which was only eclipsed after the Romans conquered it and extended the Via Appia to Brundisium in 264 BC), Dyrrhachium was a major Hellenic city and hence a plausible location for a monumental weathervane.

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> on this, did not marvel at its ornamentation? Every musical bird, giving its springtime song, was carved there; the works of husbandmen – pipes, pails, sheep bleating, lambs skipping – were fully rendered. The ocean waves were outspread and shoals of fish were on display, some being caught, others mastering the fishing-nets and swimming freely again in the deep. The Erotes in twos and threes, arming themselves against one another but unclothed, threw apples and were hit by them, convulsed with delightful laughter. Suspended above this four-sided monument, which terminated in a point like a pyramid, was a female likeness which revolved around at the first breath of the winds; for this reason it was called the Anemodoulion.

The monument was clearly a surpassing work of craftsmanship, primarily praised for its reliefs with their rich scope for ekphrasis and only incidentally for its vane. Niketas seems to describe four thematically unified scenes on the sides of the pyramid: songbirds, shepherding, fishing and apple-picking. (The amount of detail raises the interesting question of how, and how well, these panels could be seen.)[41] These probably represent the four seasons with a cardinal wind presiding over each, since wind direction was thought to herald the progress of the weather: as discussed above, the Andronikos who built the Tower of the Winds was an astronomer and probably intended that vane as part of an astrometeorological assembly, together with the armillary sphere and sundials.[42] Niketas mentions this vane, both to explain the name and because it added to the monument's beauty. His omission of the images of the winds suggests not that they had disappeared, but that they seemed mundane and functional: his concern is the beauty of the monument.

Motifs and symbolism

All of these sources represent the vanes as nameless type-figures, though this is almost certainly not what their sculptors intended. (I have proposed that the sole exception is

41 On the classical practice of richly adorning even very elevated surfaces, and the aesthetic values behind it see de Angelis (2014).

42 Pliny's complex wind-calendar (*HN* 2.122–5, largely based on Aristotle's *Meteorology*; see also 18.119–30) places Favonius/Zephyros in spring, Subsolanus/Euros in summer, Auster/Notos in autumn and Aquilo/Boreas in winter, i.e. WESN. According to Ptolemy, *Tetrabiblos* 1.10, the seasonal cycle is Euros (dry), Notos (hot), Zephyros (wet), Boreas (cold), i.e. ESWN in clockwise order. The sequence of the pyramidal friezes is unknown, but seems to represent spring (songbirds), summer (milking season), autumn (vintage and harvest) and winter (rain). Pliny and Ptolemy's only agreement is that the North wind represents winter, but the variation is unsurprising, since wind direction does not actually change sequentially through the year nor does it closely correspond with the weather. The Tower of the Winds displayed the time of day and the motion of the planets, and the direction of the wind may have been consulted in the use of a *parapegma* on these tables as instruments of astrometeorology (studying the regular movements of heavenly bodies to predict the weather): see Lehoux (2007). Winds were not indicated on *parapegmata*, but textual sources frequently associate particular winds with the seasons: see Lehoux's 'Astrometeorological Index'.

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the Zeus Soter on the Pharos that the sources, conversely, do not identify as a vane.) Seeing figural pointers as generic may seem natural today, when metal weathervanes have been conventionalised as flags, roosters and so on (just as a modern clock's hands are usually non-figural, or at best arrow-shaped). Yet these long-lost bronze weathervanes were landmarks in the history of art, as well as in the history of science. Remembering that each was a highly visible sculpture, crowning a highly ornamented monument, we might well expect them to represent specific individuals. This was customary for the elaborate monumental clocks of late antiquity, which marked time with automata as well as sound-making instruments and whose pointers bore figural designs.[43] The clock described in sixth-century Gaza by Procopius in his *Ekphrasis of the Horologium* featured twelve doors, which opened in hourly sequence to reveal Hercules dressed for one of the Labours. But they only did so when a moving statue of Helios pointed at them.[44] The position of the Sun marked the passage of time, allegorically combining the iconography of myth with observed reality. Figural motifs sharply distinguish monumental clocks and vanes from more commonplace instruments, being rare and inconsistent on sundials, and absent from wind roses.

Given these circumstances, it is worth asking why the rotating statues of Athens and Constantinople took the forms they did. The presence of Zeus on the Pharos is very logical, but why would the winds be accompanied by a triton or a winged woman? In each case, clues exist, but they lay hidden even from our ancient witnesses, who were not concerned with iconographic details. For example, Varro and Vitruvius merely state that images of winds adorned the Tower of the Winds, whereas we know from the surviving reliefs that they were given individual named portraits and distinctive attributes. We must look not only *at* our textual sources, but *through* them, since they convey only the impressions of later viewers and not the designs of the creators.

I suggest that the weathervane of the Tower of the Winds represented a meteorological deity, in keeping with its other figural motifs. It was built before the first century BC but was attributed – at least in its later form – to Andronikos of Kyrrhos, and was much more sophisticated as a scientific apparatus and architectural specimen than as a sculptural monument. It originally bore a weathervane, sundials and a water-clock (Varro calls it a *horologium*) that probably gave astronomical information.[45] Around the top of the surviving building are the eight cardinal winds, relief carvings of male figures, of indifferent quality. Their presence in the composition is easily understood. However, the lost central vane is described by Vitruvius as 'a bronze triton holding out a rod in his right hand'.[46] Scholars from Faventinus to the present day have repeated this assertion, apparently accepting the presence of a merman as an allusion to the seafarers trading nearby, and

43 Fragaki (2012).

44 Diels (1917) provides a detailed discussion of the text with reconstructive drawings.

45 On the Tower of the Winds and its date of construction see von Freeden (1983); Kienast (2014). On its water-clock see Noble and de Solla Price (1968).

46 *insuper tritonem aereum conlocavit dextra manu virgam porrigentem* (Vitr. 1.6.4; cf. Varro, *Rust.* 3.5.17).

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incurious as to why he would extend a rod instead of his customary conch; only von Freeden has attempted an explanation.[47] Vitruvius may have expected to see a triton because mechanical tritons were employed in their conventional role as trumpeters.[48] I suggest that the vane actually represented Aiolos, keeper of the winds, who was regularly identified in antiquity with Poseidon's son of the same name, and consequently imagined as a fish-tailed marine deity.[49] Identifying the vane as the mythical governor of the winds, who indeed (according to *Odyssey* 10) has them in his gift, would support Kienast's persuasive argument that the whole monument emblematised cosmic order.[50] Aiolos would naturally rule the winds with a symbol of his power, either a magic wand like Circe's or more likely, since he is regularly imagined as a king, a royal sceptre.[51] Since vanes point *towards* the wind, he is playfully portrayed as commanding (while really obeying) his subjects, just as ancient mechanical automata purported to act for themselves while really being acted upon.

The Anemodoulion vane is even more in need of identification, as our sources give it no name at all. We have seen that it stood at the apex of a pyramid, clad in antique bronze reliefs, which rested on a tetrapylon.[52] Two sources unambiguously call it a statue of a woman;[53] Konstantinos adds another detail by dubbing it 'a bronze-composed marvel blown about in a circle by its bronze wings'.[54] I suggest that we identify this winged woman as Iris, who directs the actions of wind-gods in Homer and Apollonius.[55] Artists usually depict Iris as a winged female holding a herald's staff or *kerykeion*;[56] like Aiolos'

47 Robinson (1949) 297 argues that the Tower of the Winds primarily benefited traders in the Roman Agora. According to von Freeden (1983) 78 and n. 47, the vane is a triton holding a *radius*, embodying the role of astronomy in the natural world. Although two known sundials bore images interpreted as tritons (a sundial from Sparta has relief tritons on its base (Schaldach (2006) no. 33); another sundial, now lost but inventoried in the ball-court on Delos in 155 BC, supported a small bronze triton: *ID* 1417AI 140), these are not among the five sundials accompanied by wind roses (Gibbs (1976) nos. 4002G, 4008G, 4010, 4009), none of which are ornamented.)

48 Cf. Hero of Alexandria, *Pneumatika* 2.35, edited in Schmidt (1899), and Suet. *Claud.* 21.

49 See *LIMC* I.1 s.v. 'Aiolos'.

50 Kienast (2014). He argues that the large device inside the tower was an armillary sphere, and presents evidence (Fig. 140) that its domed ceiling was an *ouraniskos*, painted vivid blue and decorated with gold stars.

51 κεῖνον γὰρ ταμίην ἀνέμων ποίησε Κρονίων, | ἠμὲν παυέμεναι ἠδ' ὀρνύμεν, ὅν κ' ἐθέλῃσι (Hom. *Od.* 10.21–2); *celsa sedet Aeolus arce* | *sceptra tenens* (Verg. *Aen.* 1.55–6), *sceptra* (78), *se iactet in aula* | *Aeolus et clauso ventorum carcere regnet* (140–1); *ille Noto Zephyroque et Sithonio Aquiloni* | *imperat et pinnis, Eure proterve, tuis.* | *imperat heu! ventis, tumidae non imperat irae,* | *possidet et vitiis regna minora suis* (Ov. *Her.* 9.13–16). The fact that a type of spinning steam-engine was called the *Aeoli pila* or 'ball of Aiolos' (Vitr. 1.6.2; Hero of Alexandria describes the toy in much greater detail: *Pneumatika* 2.11 Schmidt) also implies a conceptual link between Aiolos and air-driven devices. Vitruvius discusses the steam-engine in the context of winds and does not distinguish steam from air.

52 The 'pyramid' should perhaps be called a spire, being a distant forerunner of the church weathervanes that are usually installed upon pyramidal rooftops.

53 γυναικόμορφον εἴκασμα (Khoniates, *De signis* 648).

54 χαλκοσύνθετον τέρας | πτέρυξι χαλκαῖς προσφυσώμενον κύκλῳ (Konstantinos 196–7). James (James and Vassis, 2012) too literally translates τέρας as 'monstrous creature', then concludes that this contradicts Khoniates' description.

55 Hom. *Il.* 23.194–221 (Boreas and Zephyros); Ap. Rhod. *Argon.* 2.283–300 (Zetes and Kalais). Iris also literally steers the winds, in their equine form, for Zeus at Quintus Smyrnaeus 12.189–95. On the iconography of Iris see *LIMC* V.1 s.v. 'Iris'.

56 *LIMC* V.1 s.v. 'Iris 1'.

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sceptre, this would serve well as a pointer. Furthermore, the tradition that Iris was mother by Zephyrus to one or more Erotes would link her thematically with the apple-throwing Erotes on the reliefs.[57] More generally, there are many visual and literary parallels for the collocation of conventional fecundity symbols, wholesome 'ripening' winds and personifications of desire.[58] The whole sculptural assembly is therefore likely to be a unified design, transposed intact from some earlier monument at Dyrrhachium.

Anthropomorphic weathervanes held enormous potential interest for Hellenistic intellectuals and their Roman successors, not only as scientific instruments like the sundials that appeared in that period,[59] but also as statues 'given life' by the wind. The animation of statues had multiple resonances: early myths ascribed golden and bronze automata (both humanoid and otherwise) to the supernatural art of Hephaistos and Daidalos,[60] while dreams and miraculous anecdotes empowered cult statues to speak, act and function like living beings.[61] The conceit that artistry, including the verbal artistry of ekphrasis, brings figural art 'to life' preoccupied ancient art criticism in general and gathered considerable momentum in the Hellenistic period, especially in ekphrastic epigram.[62] For these reasons it seems likely that the weathervanes of antiquity were born not from necessity alone, but from the same desire for ingenious installations that produced Ktesibios' musical statue of Arsinoe, or indeed the Horologium of Augustus, a vast sundial created at Alexandria before Augustus transferred it to Rome.[63] As a fusion of scientific engineering and 'living' art, the monumental weathervane is a characteristic product of the Hellenistic *Zeitgeist*.[64]

57 Alkaios, fr. 327 Voigt = Plut. *Amat.* 20; Nonnos, *Dion.* 31.110–13, 47.341–2; Eustath. *ad Hom.* pp. 391, 555.

58 See *Hymn. Hom.* 5.1–6, 6.1–5 (Zephyros escorts Aphrodite). The traditions of the rape of Oreithyia, winds impregnating horses (Hom. *Il.* 20.223–4, cf. 16.149–51; Verg. *G.* 3.271–9), and wind-eggs (Arist. *Gen. an,* 750b), directly link fertility with breezes. Cf. Hor. *Carm. saec.* 31–2 (*nutriant fetus et aquae salubres | et Iovis aurae*); Plin. *HN* 18.333–6. For a wealth of evidence for the ancient belief that seasonable winds promoted growth see McCartney (1930). Lucretius' encomium of Venus (1.1–20) links the happy fecundity of beasts, fish and birds with 'the breeze of the fertilising Zephyr' (*genitabilis aura favoni*, 11). The female figure (Tellus or a similar goddess) on the east frieze of the Ara Pacis bears grapes, pomegranates and a pair of Erotes, one of them holding an apple, while an ox and a sheep recline beneath her and lush plants grow behind her. Eros was commonly depicted picking fruit (*LIMC* III.1 s.v. 'Eros'; for another scene of naked Erotes picking and throwing apples see Philostr. *Imag.* 1.6; on apple symbolism see Littlewood (1968) 154–7). On either side are two *velificantes* riding a swan and a dragon, personifying the gentle Breezes (*Aurae*) of land and sea (on this monument's iconography see Castriota (1995); Sauron (2000). On its *Aurae* (cf. *duaeque Aurae velificantes sua veste*, Plin. *HN* 36.29) see Rizzo (1939) 141–68; Simon (1967) 27; *LIMC* III.1 s.v. 'Aurai').

59 Gibbs (1976) 5–8.

60 Hephaistos: Hom. *Il.* 18.369–79; Daidalos: Arist. *De an.* 1.3.406b.

61 On animated statues in the ancient imagination see Pugliara (2003); Hersey (2009); Bussels (2012).

62 On the motif of animation in discourses of naturalism see e.g. Schnapp (1994); Spivey (1995); Gutzwiller (2002); Squire (2010).

63 Alföldy (2011) made this identification, noting that the inscriptions are in Greek, and also indicate when the Etesian winds cease: important for the harbour city of Alexandria, but not for Rome. For recent work on the Horologium see Haselberger (2014). On the wider influence of Alexandrian culture on Rome see Takács (1995).

64 It has been argued that the invention of automata and simulacra inspired a fundamental intellectual shift towards 'mechanistic philosophy' (de Solla Price, 1964; Berryman, 2003). It is tempting to see the pyramidal shape of the Anemodoulion assembly, like the elongated pyramidal shape of the gnomon on ancient sundials, as a sign that the instrument derived ultimately from an Alexandrian model. Its closest

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If I am correct that the vanes at Athens, Rome and Constantinople soon lost their intended names, they are now at last restored, long after the monuments themselves were destroyed. If we interpret them as Aiolos and Iris (whether or not Zeus Soter on the Pharos is included), then all known monumental vanes have a consistent theme. They represented deities who exercised authority over the winds in Homer and in later myth, holding pointer-like objects that conformed to iconographic convention. However, in each case except the Roman copy of Aiolos, the sculpture was apparently original. This speaks against the existence of a shared direct model, as do major architectural differences including the octagonal versus pyramidal shapes. However, we must note how few examples are known, and the fact that both the Pharos-style octagonal tower and the Egyptianising pyramidion shape may well derive from the same city of Alexandria. Furthermore, although our sources give the impression that the Pharos and Tower of the Winds were superior scientifically and the Anemodoulion artistically, the vanes themselves could have been very similar in manufacture and style.

Finally, although we have no record of the size of the vane sculptures, it now seems possible that they numbered among the largest mechanised statues in the ancient world, and that their semiology related closely to their function. The Pharos was over 100 m high, the Tower of the Winds 12 m and the Anemodoulion nearly as high as the tallest columns (Khoniates, *De signis* 648), therefore at least 25 m. If the statues were portraits of specific gods, not mere mannequins or generic tritons, then we can more easily imagine them as far greater than life-size, suiting the Hellenistic taste for grand designs that produced the Tarentine Zeus and the Colossus of Rhodes. Looking beyond those famous statues, we find other massive experimental creations concentrated at Alexandria that often combined engineering with ornamentation. Ptolemy IV Philopator's enormous galley, the 'Forty', was one, the Pharos another. Others still were representations of deities: the statue of Helios in the Serapeion built by Ptolemy III Euergetes was reportedly to be suspended in midair using magnets, amazing worshippers.[65] A more relevant construction is attributed to Ptolemy II Philadelphos: this was a 4 m tall (i.e. 8 cubit) automaton representing Nysa, which Kallixeinos of Rhodes describes as part of the

comparandum is one of the Hellenistic treasures paraded in Pompey's third triumph of 61 BC, 'a four-sided golden mountain (*montem aureum quadratum*) with stags, lions and all kinds of fruit, surrounded with a golden vine' (Plin. *HN* 37.14). Here, 'four-sided mountain' almost certainly means 'pyramid', since the official *acta* from which Pliny quotes were written before *pyramis* had entered the Latin language. The Anemodoulion assembly therefore shares its pyramidal shape and bounteous iconography with Pompey's 'golden mountain'. The *pyramidion* (*benbenet*) capping Egyptian pyramids and obelisks was often inscribed on all sides, and usually covered with shining gold, electrum or bronze (Curran *et al.* (2009) 14–15). It is tempting to speculate that Alexandrian artisans and their Hellenistic imitators designed new *pyramidia* to crown monuments, just as a gilded bronze sphere crowned the obelisk repurposed as a scientific instrument in the *horologium Augusti* (Plin. *HN* 36.72).

65 See Rufinus, *Historia ecclesiastica* 2.23, who claims that the temple held other mechanical 'miracles'. Hero of Alexandria describes several appropriate contrivances, including automated temple doors. On magnetic levitation in antiquity see Lowe (forthcoming).

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stupendous procession of 270 BC.[66] Drawn on a cart by sixty men and adorned with gold, it could rise to its feet, pour a libation and sit down again unaided. The Pharos was under construction at the time and would be completed twenty-three years later. If its statue of Zeus Soter was a weathervane, as I have argued, then it was a far simpler instrument than the Nysa automaton had been. Four metres seems disproportionately large for the Aiolos on the Tower of the Winds, which was probably man-sized at most, but quite plausible for Zeus Soter or the Anemodoulion on their much taller monuments: it is also the exact height of La Giralda, and slightly shorter than Saint-Gaudens' Diana of the Tower (the first version was 5.5 m tall, the second 4.4 m). Anyone who objects that the wind could not easily stir such large and heavy objects may inspect La Giralda outside Seville Cathedral, the Diana at the Philadelphia Museum of Art, the dragon in the belfry of Ghent, or indeed the vane still in use at the Yukon Transportation Museum, which is a Douglas DC-3 airliner.[67]

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66 Ath. *Deipn.* 5.198–9. Other automata in Hellenistic and later processions include Demetrios of Phaleron's mechanical snail, which trailed slime as it moved (Polyb. 12.13.2); the bloodied wax statue of Julius Caesar, rotating mechanically above his bier (τὸ δὲ ἀνδρείκελον ἐκ μηχανῆς ἐπεστρέφετο πάντῃ, Polyb. 2.20.147); and the self-propelled ship carrying Athena's peplos in Herodes Atticus' Panathenaic procession (Philostr. *VS* 550).

67 www.explorenorth.com/library/aviation/cf-cpy.html, accessed 14 June 2016.

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