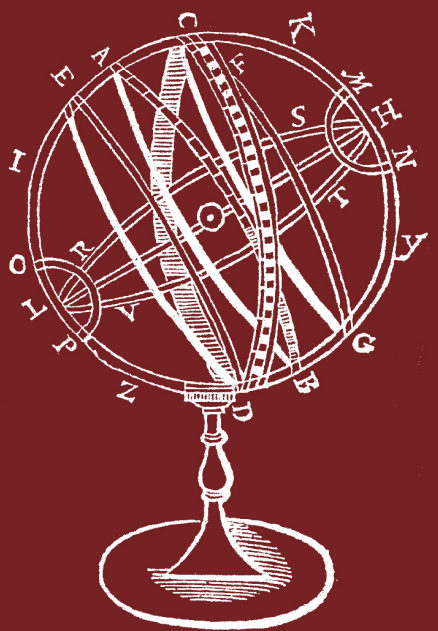
REASON AND NECESSITY

Essays on Plato's *Timaeus*



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PREFACE

This collection of essays derives initially from a conference on Plato's *Timaeus* and related works, held in Lampeter in August 1998, with support from the University of Wales Institute of Classics and Ancient History (UWICAH). Four of the papers given then (by Burgess, Campbell, Opsomer and Zedda) are incorporated into the subsequent publication, with additional original contributions from Barker, Dean-Jones, Gill and Wright. The editors were to have been Burgess and Zedda, but circumstances obliged them to withdraw. The initiative of these two bright young scholars in organizing the conference and making the first moves towards the subsequent publication is gratefully acknowledged, along with the continuing encouragement and editorial expertise of Anton Powell, Director of UWICAH.

M.R.W.
Lampeter,
2000

INTRODUCTION

M.R. Wright

'One, two, three – but where, dear Timaeus, is the fourth?' This deceptively simple opening introduces one of the most complex mathematical and scientific works to survive from antiquity. In this dialogue the character Socrates, in the company of Timaeus, Critias and Hermocrates, recapitulates the main features of the political reforms he had set out the previous day (i.e. books 1–5 of the *Republic*, excluding the philosopher-kings and their education); he looks for similar (philosophical) entertainment in return, in particular some account of his ideal citizens in action. Critias obliges with a summary of the story of Atlantis, involving events that happened nine thousand years ago; this was told to Solon by the Egyptians and passed down through the generations of Critias' family. The noble citizens in action are the Athenians of long ago, who halted the forces of the mighty city of Atlantis as they attempted to extend their empire over all the Mediterranean lands. Then in a single day Athens was reported to have been destroyed in an earthquake, and Atlantis completely flooded by the sea. Critias promises to tell the story in more detail (a promise partially fulfilled in the incomplete dialogue named after him), but before that Timaeus, the most astronomical in the company (ὁ ἀστρονομικώτατος ἡμῶν) and an expert in such matters, will entertain Socrates with a narrative that starts with the generation of the cosmos and ends with an account of human nature. Timaeus begins by making the common Platonic distinction (and one that had featured in books 5 to 7 of the *Republic*) between eternal, changeless independent *being* apprehended by reason, and contingent shifting *becoming*, the object of opinion. An account is of the same character as its content, so a *logos* of the unchanging will be stable and irrefutable whereas a *muthos* ('myth') of a likeness of the unchanging will itself be unstable, no more than 'likely' or 'probable'.

The close links with the *Republic* and then the advance warning on the dubious epistemological status of myth and the ontology of its subject matter are deliberate guidelines set down for the interpretation of Timaeus' narrative. So it is appropriate to begin this collection of essays with an attempt to interpret these guidelines in the general context of the traditional contrast between truth and myth and in Plato's own treatment

of myth in different dialogues. This is Wright's aim in the first contribution as she explores the connections between myth, science and reason in Platonic theory, and the implications for the assessment, in Plato's eyes, of mathematical practices and scientific achievements.

The construction of the world, according to Timaeus, comes about through a combination of reason and necessity, but reason is the dominant partner. Reason (*nous*, a masculine noun) persuades necessity (*anagkē*, feminine) to work for the best, and so brings order out of disorder:

> The composite genesis of this cosmos arose from the union of necessity and reason; since reason controls necessity by persuading it to bring most of what is being generated to the best result, in this way, because of this and through the subjugation of necessity by intelligent persuasion, there began the construction of this whole universe.[1]

The narrative therefore falls into three sections: (i) the explanation of the role of reason, (ii) the interpretation of necessity as the 'receptacle' (ἡ ὑποδοχή), like a nurse or mother of generation, and (iii) the focus on human structures as particular results of reason working with necessity.

Reason is instantiated in the divine craftsman or demiurge (ὁ δημιοῦργος). The title *dēmiourgos* means literally a 'workman of the people'; surprisingly perhaps, the aristocratic Plato uses the lowliest artisan – potter, metal-worker, cobbler – as the model for this supreme god.[2] The universe is therefore viewed as an artefact constructed by a skilled craftsman from formless material, but, since the demiurge is god, and supremely good, he aims to make his artefact good like himself. So, through his providence (πρόνοια), he puts reason in soul and soul in body to produce the finest and best possible natural construction, resulting, according to this plausible account (κατὰ λόγον τὸν εἰκότα), in an ensouled intelligent living creature (ζῷον ἔμψυχον ἔννουν).

The body of the world is then briefly described. It is made of the four Empedoclean elements with water and air between fire and earth in proportion to give a three-dimensional structure, formed into a sphere and set to rotate uniformly on its axis. The soul of the world is superior to its body but the exigencies of the narrative have put its construction later. Timaeus' account of the construction of the world soul is extremely complex. Here the demiurge needs all the skill of a master metalworker to fashion it, and it is in this context that Zedda's essay 'How to build a world soul – a practical guide' is indispensable. Zedda takes us through the complexities of the construction, involving the operations of blending, hammering, marking according to harmonic proportions, cutting and shaping the strips, and then the insertion of this structure into the world

body to give the proportionate movements of the planets. Zedda plausibly suggests that the description of what is in effect an armillary sphere itself acts as an intermediate term between objects of becoming and the model that the demiurge has in mind as his inspiration.

With the world soul fitted right through the world body time itself, a 'moving image of eternity' (εἰκὼν κινητός τις αἰῶνος), is measured by the orbits of the sun, moon and planets. In the continuation of Timaeus' narrative, the next stage is the introduction of living creatures into the structure to complete it. First the demiurge produces two kinds of lesser gods – the bright and beautiful fiery stars that make up the 'embroidery' of the sky and the traditional gods known from Hesiod – and hands over to them the construction of the bodies of mortal creatures. He himself had made their souls from the residue of the world soul mixture, and had sown some in the stars (from which they would descend to live on earth) and some in the moon and other planets. If he were to fashion the bodies for these creatures they would be equal to gods, but, since they are to be a combination of mortal and immortal, he entrusts the task to the lesser gods. These then, using minute 'rivets' (γόμφοι), construct the bodies from earth, air, fire and water, and insert into them the orbits of immortal soul.

The shape of the human body is described in teleological terms, according to the guiding principle that all must be for the best. The head is made spherical to contain the orbits of the soul in imitation of the pattern of the cosmos; the body keeps the head raised from the ground and prevents it rolling around; the arms and legs provide movement and support; the face looks forward, with the eyes designed to contemplate the revolutions of the heavens, and the ears to listen to harmonies. But Timaeus leaves the details of the functioning of sense-perception to the end of the second main section of the narrative, and human physiology and psychology are treated in the third section, when he tells of the lesser gods constructing bodily parts and organs around a tripartite soul in the *minutiae* of their task. It is convenient therefore, in dealing with the human body, to takes these passages together and relate to them the three essays dealing with the human body – those of Burgess, Gill and Barker.

There are no early Hippocratic texts on anatomy, and Aristotle, coming after Plato, admits that the internal parts of the body were not well known. Their structure and function mainly seem to have been understood from the external signs, and from war wounds and other injuries. Human dissection was almost certainly taboo, but some information would have been derived by analogy with animals, in particular in the context of animal sacrifice and the jointing and distributing of meat. An early

physician-philosopher like Alcmaeon of Croton may have derived his theories about the connection of the brain with sensory passages in eye, ear and nose from such sources. Plato ostensibly sets out, in the *Timaeus*, to give an account of the human frame, the bodily organs and tissues, perception and the mechanisms of digestion and respiration. But the details come in the account of the work of the lesser gods as they attempt to harmonize reason and necessity within a comprehensive teleology, and this programme overrides any interest in anatomical precision. The priorities are well brought out in the different approaches to the topic found in these three essays.

The idealist's guide to building a human body in Burgess' contribution focuses on the sinews 'in order to see Plato's biology as an integral part of the cosmic system'. Although the distinction between muscle and sinew was available to Plato he used a single term *neura* which allowed him to set up the main structure of the body as a triadic formation. Sinews are an intermediate blend of the two extremes of bone and flesh, acting as a mid-term between them, and this reflects the blended nature of both world soul and human soul, each 'in the middle' between the indivisible and divisible, the enduring and the temporary. And human soul in turn is proportionate to world soul and human body, the crucial link between the two. The harmony of the whole cosmic design, from the grandeur of the heavenly revolutions of world soul to the fragility of human flesh, is thus secure.

How then are obvious failures to be explained? The reasoning faculty of the human soul often fails, physical and psychic diseases are rampant, and the goodness of the divine demiurge is challenged by human wrongdoing. Gill's essay tackles Plato on the great Problem of Evil by concentrating on its most obvious manifestation, moral evil, and exploring its interpretation as a consequence of psychic illness. The final part of Timaeus' narrative, after the account of human soul and human body, discusses the phenomena of their 'diseased' condition. Diseases of the mind appear as madness and ignorance, and these are closely linked as aspects of psychic illness with a physiological cause. Plato's focus, as Gill explains, seems to be on producing a comprehensive explanation of the whole range of psychological defects as forms of illness. The immediate and apparently astonishing consequence of this theory is that people should not be blamed or held responsible for their wrongdoing since it is attributable to some physical defect affecting the *psychē*. The implications may be assimilated to Platonic thought elsewhere concerning wrongdoing as 'ignorance' or 'disorder', to be treated by education and dialectic rather than punished in a traditional sense. But Gill also suggests that the text of the *Timaeus* here can be

illuminated by reference to Galen on the body-*psychē* relationship and to Stoic ideas of psychic illness as disruption of the harmonious structure of the body. We could add that the Stoic emphasis on the right tension (*tonos*) of the soul for psychic well-being also has its counterpart in the *Timaeus* in the need for the correct tension of sinews, as explained by Burgess, for optimum physical health.

Music is a key issue in psycho-physical therapy and, as Barker shows, links the organ of hearing via the brain to the lower part of the soul in the liver. From there a response is returned to the rational soul where it can be interpreted within the framework of the divine harmonics of the world soul. The human soul is then able to improve its imitation (*mimēsis*) of the cosmic order, correct defects in itself (which might lead to the madness and ignorance that Gill discusses) and programme the body to restore and maintain its own harmony. Barker tracks this pattern through the brief and sometimes ambiguous exposition given in the narrative, complemented by some very convincing speculation. The phenomenon of hearing a sound starts with movement in the outside air, which causes an impulse to enter the ear and make an impact on the reasoning part of the soul located in the head. The impact is immediately transmitted to the lower part of the soul concerned with perception, which is located in the liver. The liver apparently then translates the movements that make up hearing into patterns (according to the relative speeds) of concordant and discordant sounds; these patterns are reflected on its smooth surface as images and so returned from the lower to the upper part of the soul. Liver images that are harmonious bring pleasant days and peaceful nights, but when they are subject to rational analysis the enjoyment is enhanced by the appreciation of them in terms of the science of mathematical harmonics; in this way the human soul has the opportunity to approach and imitate the divine. As psychic illness has been interpreted in the *Timaeus* as the 'body's fault', so, in this theory of aesthetics, rhythm and melody could be therapeutic as well as enjoyable for both body and soul.

The main character in Timaeus' cosmology myth is the divine demiurge, who imposes form on shapeless material, constructing an artefact in the manner of a human craftsman, whether a potter working with clay, a sculptor with marble or a metal-worker with alloys. The craftsman has a paradigm, in his head or as a sketch or model, and aims to reproduce this in his material, but to some extent the material is recalcitrant so that the resulting product, whether pot or statue or shield, is never perfect, but the best possible. The formless material in which the demiurge sets out to reproduce his model is called 'necessity', not here a universal principle ordaining what is to be (the sense it bears in Plato's Myth of Er)[3] but quite

the opposite. It is disorderly and irregular, characterless but 'receiving everything' (πανδεχές, 51a), comparable to what Samuel Alexander called 'the restlessness of space-time'.[4] This receptacle (ὑποδοχή) is 'persuaded' by reason (exemplified by the demiurge) to receive the geometric forms which will be the basis of the four elemental solids (fire-pyramid, air-octahedron, water-icosahedron and earth-cube) from which the cosmos, like a craftsman's artefact, will be constructed as a close but never exact copy of its model.

From another aspect the three entities *being* (ὄν), *space* (χώρα) and *becoming* (γένεσις) can be seen as a triad of *father* (the eternal paradigm), *mother* (the receptacle) and *child* (the perceptible cosmos). This is the focal point of Dean-Jones' essay as she elucidates Plato's meaning here, compares it with the work of Aristotle on generation from form and prime matter, and explores its significance for Aristotle's theory of family resemblance. In her careful analysis of the relevant texts on sexual reproduction she finds a way in which the *Timaeus* can illuminate the conundrum of how, according to Aristotle, a child might resemble its mother, and allows the mother a role in determining some of the characteristics of her child.

The influence of the *Timaeus* extended beyond Aristotle into Hellenistic philosophy and it eventually became a key text for Neoplatonism, due in no small part to Proclus' commentary on it. In this context Opsomer studies the role of demiurgy as a means of illuminating the complex hierarchical structure of Neoplatonic reality and the problem of making the causal transition from the unmoved One to the perpetual motion of the physical world. The distinction between being and becoming, rest and motion, the eternal and the transitory is clear enough throughout the *Timaeus*, but the activities of the eternal demiurge and those of the lesser gods who carry out his purpose allow both a unity to the whole and a ranking within it of a range of causes. But the demiurge himself is a mediator in that he transmits the powers of the higher realm, consisting, after the One, in Being, Life and Intellect, to the lower as 'intellective intellect'. Opsomer takes us through Proclus' interpretation of these levels and then focuses on the status of the lesser 'encosmic' gods as between immortal and mortal, eternity and time, having a beginning but then perpetually being regenerated. Mortals therefore receive their unity, being and form from the first demiurgic activity but their multiplicity, individuality and generation from the secondary. Problems remain, but the relevance and importance of Plato's *Timaeus* to the interpretation of Neoplatonic procession is firmly established.

In a broader sweep of the history of ideas Campbell explores the *Timaeus* in the context of theories of zoogony and evolution stretching from the

Presocratics to Darwin and Lamarck. Campbell starts from Lucretius book 5, since this contains early anti-teleological ideas going back to the Presocratic Democritus to which Plato was obviously replying. In this scheme all possible animals came into being at the same time in the beginning; some that were viable bred and continued their line, whereas others died out. Then, in a second round of extinctions, whole species disappeared where there were no individual or co-operative strengths to enable them to survive in a competitive environment. Empedocles, as far as can be gleaned from the evidence, held a similar non-evolutionary theory, one in which maladapted forms passed away because they were made of a non-viable (chance) combination of parts. Anaximander earlier may have believed that originally humans were linked to or protected by fish in some way, and this is consistent with anthropogenic myths of human origins from earth or earth and water. So the general picture facing Plato was of more or less mechanistic developments, with humans emerging from an earlier state that was akin to, but not to be identified with, other animal forms. In principle Campbell finds that Plato reverses this programme in the *Timaeus*: humans are created first, and then animal species are generated from humans by a series of degradations from the human form which are brought about through behavioural defects. By processes of metamorphosis and metempsychosis, more akin to myth than scientific theory, humans are said to change into birds or animals, and then some animals into fish. Plato may have subverted earlier scientific cosmogony and zoogony for his own teleological purposes, which in turn yielded over the centuries to Darwin's continuation of the mechanistic tradition in his *Origin of Species*, but the *Timaeus* retains its relevance, and is currently being reinstated in contemporary theories of 'Scientific Creationism'.

Notes

[1] *Tim*. 48a: μεμειγμένη ἡ τοῦδε τοῦ κόσμου γένεσις ἐξ ἀνάγκης τε καὶ νοῦ συστάσεως ἐγεννήθη· νοῦ δὲ ἀνάγκης ἄρχοντος τῷ πείθειν αὐτὴν τῶν γιγνομένων τὰ πλεῖστα ἐπὶ τὸ βέλτιστον ἄγειν, ταύτῃ κατὰ ταῦτά τε δι᾽ ἀνάγκης ἡττωμένης ὑπὸ πειθοῦς ἔμφρονος οὕτω κατ᾽ ἀρχὰς συνίστατο τόδε τὸ πᾶν. The present participles ἄρχοντος and γιγνομένων and the imperfect συνίστατο shows that the process is continuous.

[2] Alternatives used are *maker* (ὁ ποιῶν, ὁ ποιητής), *fitter* (ὁ τεκταινόμενος), *constructor* (ὁ συνίστας) as well as simply *god* or *father*.

[3] Cf. *Rep*. 617b–d, where Necessity is personified as the mother of the Fates and holds in her lap a model of the cosmos.

[4] Cf. S. Alexander, 1920, *Space, Time and Deity*, London, *passim*.

OUTLINE OF TOPICS IN PLATO'S *TIMAEUS*

The left-hand numbers refer to the pages of the Stephanus edition (1578), the traditional method of reference for works of Plato.

1

MYTH, SCIENCE AND REASON IN THE *TIMAEUS*

M.R. Wright

In Platonic theory science is myth, and an investigation into the structure and functioning of the natural world is to be classified as *mythologia*, 'myth-making'. To the modern reader such an assumption seems extraordinary, for the two concepts appear to be incompatible, even contradictory. Myth is taken to belong with narrative and imaginative fiction, appealing to emotion, suitable for children and the less intelligent, capable of numerous versions and adaptations, slippery and above all unreliable and unverifiable. Science on the other hand is associated with reasoned argument and the conceptual, practised by the brightest minds; it deals with evidence and proof; the results are demonstrably verifiable; and here surely is where truth is to be found, and the confident expansion of the *corpus* of human knowledge.

This essay sets out to tackle a number of problems related to Plato's assessment of his great scientific achievement in the *Timaeus*, with its account of some of the latest developments in cosmology, astronomy, mathematics, medicine, human biology, metallurgy and chemistry, as a kind of story-telling, a relaxation from the hard toil of dialectic and metaphysics. I first look at Plato's use of myth as an educational tool, coupled with his rejection of the traditional mythology of epic and tragedy, and his disparaging treatment of other philosophies as mythologizing, and I set this attitude against his own myth-making in the areas of prehistory and eschatology. On this basis, and given the close connections of *Phaedo*, *Phaedrus* and *Republic* with the *Timaeus*, light may be shed both on the ontological status of the subject of science as belonging to the sphere of change and 'becoming', and the epistemological ranking of scientific study as opinion or belief (*doxa*), which deals with guesses and uncertainties, where myth-making thrives. Furthermore, Plato's concern with introducing providence into the study of nature in his ongoing struggle with atheistic cosmic models requires the *narrative* of a divine craftsman constructing an artefact, who has the

best of reasons for the placing and function of all its parts. According to the metaphysics of the related dialogues, this artefact will be an image or copy of an eternal perfect model, and so the narration of it is likewise an 'imaging', a fiction guessing at the truth. In this guise natural science is recreational, but also 'serious play' in that the intellectual effort involved, especially in the grasp of the mathematical details, is excellent training for the practice of mature philosophy.

I. The educational value of traditional myth

The dichotomy between fact and fiction in an account of gods, nature and humans goes back to Hesiod. In the prologue to the *Theogony* the poet attributes his inspiration to the Muses, whom he describes as appearing to him on Mount Helicon, and offering him gifts: the staff which assures his authority as minstrel, the breath of divine voice and the subject for his poem. The resulting account of the emergence of the world and the settlement within it of divine, human and natural features will be a combination of lies and truth, for, as the Muses say, 'we know how to relate many false things that resemble what is real, but, when we wish, to tell the truth'.[1]

This assessment of the myth of Hesiod's *Theogony*, as a narrative of lies like the truth yet including an element of the true, reappears at the beginning of Plato's account of the education syllabus in the second book of the *Republic*. In the context of the suitability of myths for children, Socrates as expositor claims that there are two forms of *logoi*, the true and the false; children have to be educated in both, but first in the false. When Adeimantus admits that he does not understand, Socrates explains that at first children are brought up on myths. In the pre-school education of infants we use stories in which a false account is given, but with some truth in it;[2] mothers and nurses aim to use the καλὸς μῦθος (the noble type of myth in which truth prevails) to mould the souls of their charges. The assumption that it is obvious that babies take in myths about gods with their mothers' milk, and in this way are brought up on orthodox theology, persists through to the *Laws*: 'these myths,' says the Athenian spokesman there, 'are recited like mantras, part playful and part serious, and children love hearing them, and watching the ceremonial re-enactments of them'.[3] The contrast with rational exposition emerges in the case of a young atheist who might grow up to reject such myths, for then a detailed refutation of the scientific arguments he puts forward will be an appropriate and necessary replacement for the earlier training through myth. This dichotomy has support from a semi-serious etymology in the *Cratylus* which downgrades myth compared to reason. Socrates in this dialogue

suggests that the god Pan reflects in his name the whole of things (τὸ πᾶν), and, since Pan is son of Hermes, the god of speech, we infer that the whole of things can be signified in words. Yet the god Pan is bi-form, human above and goat below, and so the speech that he instantiates is double (διπλοῦς), both true and false; truth, which corresponds to the upper part of the god, is described as 'smooth and divine and living with the gods', and falsehood, the lower part, is 'rough and goat-ish, and belonging with the majority of the human race'.[4]

So, despite myths being acceptable as an educational tool for the young, Socrates can introduce into the discussion of his school syllabus in the *Republic* the concept of the 'truly false'; this is found as a result of being deceived by the plausible or from blind ignorance with regard to the topics that are rated most highly. As such it is said to be utterly abhorrent to gods and men, and inflicts lasting harm on the soul, the most important part of ourselves, in its most important concerns.[5] When, however, the innate falsehood is put into words and made as like the truth as possible, the result may be positively beneficial. Plato therefore regards Hesiod-type 'lies that are like the truth and with some truth in them' in two ways: on the one hand the myth-making of poets and orators is to be condemned as using persuasion and emotional appeal rather than correct teaching methods which foster reason, but, on the other hand, where we are dealing with the unknowable, myth-makers may produce something useful when their skilful verbal images bring the false close to the true.[6] Plato's treatment of Hesiod's tale of the Titan Kronos is a good example of this ambiguous approach. In the *Theogony* Hesiod tells of how Kronos mutilated his father and in turn was overthrown by his son Zeus; this, Plato says in the *Republic*, is 'the greatest lie (ψευδός) about the greatest subject' and, even if it were true and despite its antiquity, it has no place in his educational programme. But, in another context and another dialogue, Plato would recommend that Hesiod's tale in the *Works and Days* should definitely be published, for in that poem Kronos is an acceptable role-model, in that he was said to have inaugurated a golden age of happiness on earth, watched over by daimonic spirits of the departed who established for humanity secure peace, mercy, justice and law.[7]

One reason why the narrative structures that are characteristic of myth, if used with caution, might be helpful in preparing the way for more demanding topics is that they stay in the memory. We feel at home with what we are used to, just as we remember what we learned when young although we may forget recent events. For this reason Critias claims that he is accurately reporting the tale of Atlantis: 'it's true, as is said, that we well remember what we learned as children; I'm not at all sure that