PART I

The Socratic Foundations of Teleology

CHAPTER 1

Socrates, Darwin, and Teleology

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The conference whose papers are gathered in this volume fell in the year in which we also celebrated the 150th anniversary of the publication of *On the Origin of Species*.[1] Although the arrival of Darwinism did not sound the death knell of natural teleology, teleology could never look quite the same again. The Platonic case for the presence of divine craftsmanship in the world, and the Aristotelian fixity of species dependent on a divine first cause, had lost their scientific credibility. Just as Darwin marks a kind of ending or watershed, my thesis in this chapter will be that Socrates marks a corresponding beginning. Just what sort of beginning, I shall say in a moment, and develop in the remainder of the chapter. Even though Darwin knew next to nothing of classical antiquity, the recent anniversary will make it natural, as I proceed, sometimes to envisage Socrates in dialogue with Darwin.

Socrates as Creationist

Whether we approve it or deplore it, teleological thought is among antiquity's most widely recognized contributions to the history of science. Although Plato's providentialist teleology has won comparatively little praise among intellectual historians, few would deny that teleology is the driving force of Aristotle's foundational work in zoology. And Galen's standing as antiquity's foremost medical authority owed much to his systematic application of teleological principles to human anatomy.[2]

These successes might well be thought to represent a defeat for Socrates, the philosopher who rejected physical science as an unwelcome diversion and sought to redirect philosophy towards its true goal of providing the foundations for a morally good life. But any such suspicion would be mistaken. Galen certainly did not dismiss or oppose Socrates' project.

[1] Darwin 1859. [2] See R. J. Hankinson's contribution in this volume (Chapter 12).

On the contrary, in his great treatise *On the Doctrines of Hippocrates and Plato*,[3] Galen picks out Socrates, among all his predecessors, as the most sound in his approach to science. Socrates, he explains, as correctly represented by Xenophon's portrayal, did not waste time on unanswerable questions such as how many worlds there are, but concentrated on attainable goods, a priority which Galen sees as the ultimate focus of his own work too. Plato, he implicitly concedes, did tackle those unanswerable questions; but, Galen explains, by doing so in the voice of Timaeus, not that of Socrates, Plato was himself confirming Xenophon's picture of a historical Socrates innocent of such arcane physical speculation. Socrates' special concern with good outcomes, on the other hand, is not something of which Galen wishes to absolve him. On the contrary, in Galen's eyes his own scientific teleology has a strong kinship with Socrates' brand of religiosity.

Love him or hate him, Socrates' credentials as a seminal moral thinker are assured. But that he was also the father of creationism, and hence that he marks a key point in the history of teleological thought, is one of the least-known facts about him. Current discussion of Socrates is dominated by the two books about him written by the late Gregory Vlastos more than a quarter of a century ago.[4] Vlastos's work has permanently raised the level of discussion to which Socrates' ideas are subjected. But Vlastos's focus was almost entirely on Socrates' ethics and methodology, and he never turned the spotlight onto the surprisingly neglected evidence that Socrates was a pioneering teleologist. In Vlastos's aftermath, this theme has remained largely out of view, and Socrates' standing as a flag bearer of religious teleology is to this day a remarkably well-kept secret.

One reason for the neglect is no doubt that the key evidence is to be found, not in the exhilarating pages of Plato's Socratic dialogues, but in the less exciting and less fashionable pages of Xenophon. Like Plato, Xenophon had known Socrates personally, and recorded his memories of him. Often he projected his own philosophical dullness onto Socrates, but sometimes something penetratingly original shines through, and nowhere more so than in the two chapters (*Memorabilia* I 4 and IV 3) that he devotes to Socrates' views on divine creation. As an influence on the development of teleology, Socrates can, on this evidence, compete even with Aristotle for historical importance. Moreover, the post-Socratic tradition is so replete with allusions to this pair of chapters as to leave no possible doubt that their seminal importance was fully recognized.

[3] IX 7.9–16, 588,7–29 De Lacy; V 780–781 K. [4] Vlastos 1991; 1994.

Since I do not want here to get too enmeshed in the so-called Socratic Question, let me say at the outset that I shall be making no very sharp distinction between on the one hand the direct and non-literary influence of the historical Socrates, and on the other his influence as mediated through narrative or dramatic representations by Plato, Xenophon, and others. For present purposes, those two influences form a seamless whole. Whether the ideas found in Xenophon and Plato represent concepts already expressed by the historical Socrates or a development of his concepts by those who sought to understand and learn from him, they remain equally significant vehicles of his influence.

In attributing a seminal role to Socrates, I do not mean to ignore the teleological tendencies of earlier philosophers.[5] The idea that organisms are the product of divine craft was already by Socrates' day well documented in the poetry of Empedocles. It in fact had its ultimate roots in Hesiod, who had referred to a series of races, culminating in the human race, as products of divine creation (*Op.* 110, 128, 144, 158), and in particular had described in some detail how the first woman was cunningly fashioned by the craftsman god Hephaestus, aided by an entire support team of other gods and goddesses (ibid.: 47–105). Nevertheless, in Socrates' hands divine craftsmanship came to be theorized to a considerably higher level than in any predecessor, in ways which would impact directly upon the teleology of Plato and, ultimately, of Aristotle too. Socrates, on Xenophon's evidence, was the first to introduce not divine creation as such, but the key idea that creation is a special benefaction bestowed by god on mankind.

For all its influence on later science, Socratic creationism is not any kind of scientific thesis, but on the contrary a pillar of religion. According to Socrates, the whole world, including lower animal species, has been created for human benefit. If the gods have done all this for us, we enjoy a unique relationship with them, one which we should express in religious devotion. This was in its day, I believe, an importantly original philosophical position. If so, it represents the dawn of religiously motivated creationism, a thesis that was thereafter to hold almost uncontested sway for well over two millennia, until the publication of *On the Origin of Species* 150 years ago, and continues today to be upheld reflectively or unreflectively by millions, or more likely billions, of people.

[5] This is the subject of my first two chapters in Sedley 2007. The third, on Socrates, naturally has considerable overlap with the present study, although I have done my best to keep repetition to a minimum. I also take the opportunity to mention that the present chapter shares a good deal of its content with my 2008 study.

Piety was for Socrates a more fundamental value than it ever came to be again in the work of his pupil Plato, or in that of Plato's own pupil Aristotle. And it played a key part in Socrates' negative attitude towards the scientific speculations that his predecessors had indulged in. To attempt to uncover and reconstruct the details of god's world-building benefactions, in the style of the natural philosophers, was in Socrates' view to overreach one's nature as a human being.

The gods are not only our benefactors, but also the divine artisans who created our world and its contents, ourselves included. That the gods should do all this for us is not a matter of our mere good fortune. Gods are essentially good and beneficent, and a unique bond links us, as their primary beneficiaries, to them. Study of the workings of nature is justified only to the extent that it confirms and deepens our understanding of the gods' goodness to us. True piety lies not in uncovering the hidden structures of nature, but in appreciating the intentions and outcomes of divine creation, and thus reinforcing the special relationship that links man to god.

This religious agenda undoubtedly helps explain why Socrates became the inventor of the Argument from Design.[6] 'Argument from Design' is a generic title for that family of arguments which seek to prove the existence of god, or more specifically of a provident god, by cataloguing the evidence for design in the world. Typically, these arguments seek to demonstrate the existence of divine craftsmanship by appealing to the most prestigious or intricate creative craft practised by man, and showing that god's creative powers must be such as to dwarf their human counterpart.

As reported by Xenophon, Socrates' own version of the Argument from Design appealed to the expertise of representational artists, and especially sculptors. If you admire above all others an artist like Polyclitus, who can make such exquisite human figures of bronze, how much more must you revere whoever it was who made living, breathing human figures like us! And there must indeed be such a maker, Socrates adds, because the structures and attributes of human beings are far too consistently beneficial ones to have been the outcome of mere accident. Socrates' argument here centres on a detailed compilation of evidence for the beneficial purposes served by the construction of animal bodies. He cites, among many examples, the five senses, the provision of eyelids and lashes to protect

[6] See Powers 2009: 252–254 for the alternative interpretation that in this argument the existence of a designer is simply assumed, and that the thesis defended is that the designer is a wise one. I do not myself think that the natural reading of *Mem.* I 4.4.

the eye from damage, and the user-friendly arrangement of the teeth, with the front ones suitable for cutting food, the rear ones for grinding it. These were to become classic examples of teleology in the subsequent tradition, closely echoed by Aristotle in his physical and biological writings.

The best-known post-classical version of the Argument from Design is that of William Paley (1743–1805).[7] Paley's version developed the (by then in fact quite common) comparison of the world and its natural contents to a watch. Someone happening upon a watch for the first time, he argued, could not but infer that 'there must have existed, at some time and at some place or other, an artificer or artificers who formed it for the purpose which we find it actually to answer, who comprehended its construction and designed its use'. To trace the long line of descent to Paley's watch from Socrates' original Argument from Design, we need to bring in a key intermediary, the Stoics.

The Stoics were self-declared Socratic philosophers who sought to impose an up-to-date methodological rigour on Socrates' key insights. The third and second centuries BC, in which Stoicism emerged, were also a time of stunning Greek achievements in engineering. Archimedes (third century BC) was the creator of a famous sphere which was said to reproduce accurately the cycles of the sun, moon, and planets. A later version of this sphere was said to have been built by the Stoic philosopher Posidonius in the early first century BC. In the absence of independent evidence for there having been such a technology in the ancient world, the reports were long assumed to be at best exaggerations. But the picture was dramatically changed by the discovery of the so-called Antikythera mechanism, found by sponge divers in 1900 on the seabed near the Aegean island of Antikythera. Derek de Solla Price minutely examined this encrusted lump of bronze. In his brilliant 1974 study, Price revealed, on the basis of x-ray evidence, that the object was in reality an extraordinarily complex astronomical calculator, with some thirty gearwheels meshing in parallel planes.[8] Recent studies by the Antikythera Mechanism Research Project have been able to advance and correct Price's findings, and we now know it to have been a machine which correlated all the major solar and lunar cycles, predicting with remarkable accuracy everything from the dates of eclipses all the way down to the four-year cycle of games which included the Olympics.[9] Although not Archimedes' own, this device is likely to be a direct descendant of it, datable around a century after his death.

[7] Paley 1802. [8] Price 1974. [9] Freeth et al. 2008.

I have emphasized these astonishing feats of engineering because in Stoic thought they played a role closely analogous to Paley's watch. The ancient Greek sphere and the early nineteenth-century watch have in common not just that each might claim to be the most minutely intricate man-made mechanism known to its respective era, but also that each in its own way displays a temporal cycle which accurately reproduces the temporal cyclicity of the world itself. In Paley's age the celestial rotations were acknowledged to represent not the view from the centre of the universe, but a deceptively eccentric one from a rotating Earth itself orbiting the sun. In the geocentric era of Stoicism, by contrast, the heavenly bodies were generally assumed to be circling a central earth. Hence the cycles charted by Archimedes' sphere appeared to reproduce the complex rotation of the heaven around the earth far more closely and directly than anything in Paley's heliocentric world could do. For all its complexity, Paley's watch is a mechanism with little more to reproduce than, in effect, the diurnal rotation of the earth.

The Stoics were consequently in a position, when mounting their own mechanized version of Socrates' Argument from Design, to devise one with a far richer cosmic significance than its later descendant in the writings of Paley. Their argument, as reported by Cicero (*ND* II 87–90), ran as follows. Consider an astronomical sphere made by Archimedes or Posidonius. If you were to transport it to the most barbarian place on earth – Scythia, perhaps, or Britain – even there the natives would have no difficulty in recognizing it as the product of an intelligent creator. And what is the world itself, they added, if not the vastly superior original mechanism which these devices imitate in miniature? If so, how absurd it would be to doubt that the great original is itself the product of an intelligence, and, what is more, of an intelligence vastly superior to that of the great Archimedes.

Socrates as Theologian

Socrates' invention of the argument from design was a landmark in the history of theology. Moreover, resistance to physics does not make Xenophon's Socrates similarly resistant to theorizing about the nature of divinity itself. On the contrary, he has a bold theology, heavily indebted to that of Xenophanes. In his universe, a multiplicity of gods is subsumed under one supreme omnipresent and all-seeing divinity which governs the cosmos (especially *Mem.* IV 3.13). It should be clear that Socrates, although a minimalist about physics, was a full-blooded theologian. This was not an

easy separation to maintain, and only a minority of his philosophical heirs endorsed his abstention from physical speculation. Plato in the *Phaedo* (96a–99c) sought to circumvent it by reinterpreting its real meaning. It represented, according to his interpretation, not any disapproval of physics as such, but Socrates' recognition that he himself lacked the talent to pursue it in a properly teleological manner, a confession which he tempered with the express hope that he might learn this elusive teleological physics from others better equipped for it than himself.[10] Moreover, in the *Timaeus* Plato brought this hope to fruition, portraying Socrates as an appreciative auditor of Timaeus' speech, in which just the right kind of teleological physics is finally worked out in detail. It should not escape notice that the gods of the *Timaeus* – a governing deity, and beneath him a committee of secondary gods creating organic life – bear the strong imprint of Socrates' creationist theology as outlined in Xenophon's *Memorabilia* I 4.

One manifestation of Socrates' own theological agenda is an argument preserved by Xenophon (*Mem.* I 4.8) and subsequently imitated by Plato (*Phlb.* 29a9–30d9), Aristotle (*PA* I 1 641b13–15),[11] and the Stoics (Sextus Empiricus, *M.* 9. 92–103) to underpin their own teleologies. Each of the components constituting our bodies, for example, earth, is a tiny portion drawn from a great cosmic mass of that same stuff. Since, then, a further distinctive component of us is intelligence, Socrates argues, we should infer that there is likewise a great cosmic intelligence from which our own portion of intelligence has been drawn. And that cosmic intelligence is to be identified with the supreme world-governing divinity.

So far as the argument's conclusion is concerned, Socrates is a bold theological theorist. But in Xenophon's historically plausible report, Socrates couples this theological forthrightness with an impressive self-restraint about physical theorizing. In formulating the premises of the argument, that is, Socrates avoids committing himself to even the simplest cosmological doctrine, that the world is constituted out of some specific set of primary bodies, such as the familiar quartet of earth, water, air, and fire. Where Plato and the Stoics would, in formulating the premises of the same argument, list the standard four elements, and Aristotle two of his own ultimate physical principles, the hot and the cold, Xenophon's Socrates speaks here, with minimal theoretical commitment, of our tiny share of the cosmic mass of 'earth', likewise 'moisture' (*hugron*; not even 'water'), and

[10] *Phd.* 99c6–8, ἐγὼ μὲν οὖν τῆς τοιαύτης αἰτίας ὅπῃ ποτὲ ἔχει μαθητὴς ὁτουοῦν ἥδιστ' ἂν γενοίμην.
[11] I argue for this in Sedley 2007: 194–6.

other stuffs 'which are no doubt large' as well.[12] Earth and water were the human components already listed by Hesiod in his mythical account of Pandora (*Op.* 61, 70), and were to that extent pre-theoretical.[13] Beyond these, no further components are specified.

It is thanks to his theology that, despite his abstention from physical speculation of his own, Socrates was able to exert a seminal impact on the teleological physics of his successors. Socrates' god, we have seen in the pages of Xenophon, is a cosmic intelligence (*nous*). This attribution finds plentiful confirmation in Plato, and nowhere more so than in the *Phaedo*. There, in Socrates' semi-fictional autobiography, his youthful ambition (96a–99d), prior to his abandonment of physics, was to understand the world's structure and functioning as resulting from the operations of intelligence. For present purposes, the important aspect of this aetiological model is an indissoluble association upon which it rests: that between intelligence and good. As Socrates clarifies there, to explain some feature of the world as the product of intelligence would be *ipso facto* to explain why it is better for things to be that way. Intelligence is essentially focused on the good, and whatever intelligence succeeds in bringing about is good.

There can be little doubt that this vital association of intelligence with the good came to Socrates through his ethics. Like his predecessor Anaxagoras, Socrates treats all intelligence, whether divine or human, as essentially the same power. It follows for both thinkers that the characteristics of a cosmogonic intelligence can be discovered by examination of human intelligence and its functioning. And whereas Anaxagoras' great eulogy of intelligence (B12; *TEGP*31) concentrates on its amazing cognitive and motive powers, Plato's Socrates is, as an ethicist, more concerned with intelligence as the source of good, an aspect which he accuses Anaxagoras of neglecting. The most developed form of Socratic ethics, found in the *Euthydemus* and *Meno*,[14] argues that virtue is wisdom or knowledge, on the ground that only what is guided by intelligence is unfailingly good and beneficial. For Socrates to extend this insight to the understanding of divine cosmic intelligence was an entirely natural further step.

[12] ἄλλοθι δὲ οὐδαμοῦ οὐδὲν οἴει φρόνιμον εἶναι; καὶ ταῦτ' εἰδὼς ὅτι γῆς τε μικρὸν μέρος ἐν τῷ σώματι πολλῆς οὔσης ἔχεις καὶ ὑγροῦ βραχὺ πολλοῦ ὄντος καὶ τῶν ἄλλων δήπου μεγάλων ὄντων ἑκάστου μικρὸν μέρος λαβόντι τὸ σῶμα συνήρμοσταί σοι. *Memorabilia* I 4.8.

[13] It should, however, be added that, because earth and water could have been thought to function as Xenophanes' primary elements (B29; *TEGP*50), B33; *TEGP*51), they may constitute a further sign of Xenophanean influence.

[14] *Euthydemus* 280b-281e; *Meno* 87e–89a.

In turning the spotlight onto divine creation, Socrates was in a way doing no more than follow the lead of his own ethical agenda, and of three aspects of it in particular. Two of these we have already considered. One was his characteristic religiosity: he viewed his own philosophical project in Athens as a divinely commanded mission, and his conviction of god's essential goodness brought him into a conflict with local religious practice sufficient to make possible his trial and execution on charges of religious innovation. The second factor, as we have seen, was his interest in the nature of intelligence as a force which is essentially good-focused.

The third factor was Socrates' fascination with the functioning of crafts, including the most humble of them, an interest so strong as to border on obsession. In the Socratic writings of Plato and Xenophon, a familiar complaint from Socrates' auditors, amply borne out by the way he talks and argues, is that he endlessly harps on about shoemakers, builders, doctors, cooks, fullers, navigators, and the like.[15] Why so? As a moral philosopher, Socrates was above all else interested in what it is to be good at something, and to succeed in doing good. To him the crafts practised all around him in Athens seemed to offer the best possible starting points: simple working models of systematically successful human practice, from which the far more demanding task of leading a good life might take its lead. In thinking of god too as a craftsman, he was turning that very same body of data to a further use.

Socrates' idea of god as the world's craftsman lies at the centre of Plato's *Timaeus*. And Aristotle, although he eliminated literal craftsmanship from his teleology, was so indebted to the craft model of nature as an explanatory tool that it remains ubiquitous in his physical and biological writings. Divine craftsmanship, as I said earlier, had a long history in Presocratic thought, stemming ultimately from Hesiod. But what Socrates adds is a highly articulated analysis of the principles of craft. This analysis arose in an ethical context, but its fruits remain clearly visible in Plato's construction of a cosmic craftsman.

Socrates, who characteristically views virtue on the model of a craft, frequently engages with paradoxes about craftsmanship, and in particular (above all in the *Hippias Minor*) with the problem that any craft is a capacity for opposites: the best doctor also the best killer (375b). This Socratic thesis reappears in the *Timaeus*, where it is put to positive use: the supreme craftsman who created our world made it so durable that he and he alone has the capacity to destroy it (*Timaeus* 32c, cf. 41a, 43d).

[15] Plato, *Gorgias* 491a; *Symposium* 221e; Xenophon, *Mem.* I 2.37.