

COSMOLOGY without HEADACHES

(Lecture Series)

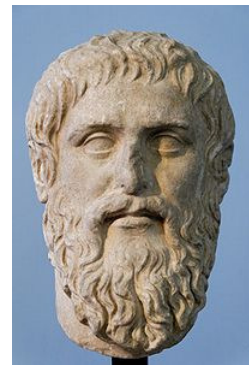
(compiling, transcribing, researching, editing always in progress)

LECTURE VI: Apex of Greek Philosophy; Socrates, Plato, Aristotle; First Physics



Now we are with Socrates. We have little to go on in describing the Socratic cosmos, except what we can find in the dialogues of **Plato** [-427-347] (especially *Timaeus*, but also in *Phaedo*, *Phaedrus*, and his last and unfinished work, *Laws*, and a brief mention of the place of astronomy in the education of the youth of his *Republic*).

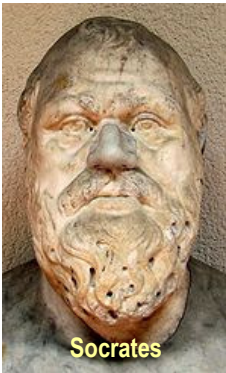
In these dialogues he writes as if he were a witness transcribing the discussions. Socrates is always the interlocutor, except (perhaps) in *Laws*, where Socrates is replaced by the 'Athenian Stranger'—who some believe is the 'Socrates that might have been,' had he allowed his friends to bribe the jailers before he was served the hemlock brew, and thus might have made his escape to Crete. The life and the unwritten ideas and method of Socrates were certainly Plato's inspiration, but it is not without reason that they are called the 'Dialogues of Plato,' rather than the 'Dialogues of Socrates by Plato.'



PLATO

Plato philosophizes on the natural world in several of his 'Socratic' dialogues, but the Socrates we honor is the '*father of political philosophy*'. There is bleed-over (Greek philosophy sought every sort of knowledge), and we will brush with political philosophy regularly in our study. Socrates' impact was greater in morality and ethics and in the understanding political things than in the concept of the structure of the material world.

Socrates [-469-399], for the agnostic humanist, is something like what **Jesus** is for the doubting quasi-Christian—a Jesus without the trappings of the Second Person of God; the Savior of Man (i.e., in the limited sense that he lived and died as an example of how the immortal soul is of higher importance than fulfilling desires of the flesh). As humans, the two share many similarities. They were poor; they were public teachers who went about their work free of charge. Jesus taught by parables as well as sermons; Socrates taught by dialogue: questioning listeners and exposing hidden and improper assumptions; neither wrote their ideas. Both dealt with how men ought to be rather than how they actually were (i.e., they seemed to teach the perfectibility of Man, or at least some form of salvation); they were interested less in



the construct of the cosmos than in the well-being of the spirit; both were tried for corrupting their respective societies with heresies and were given an opportunity to repent and change their ways and thus escape punishment; both chose to cling to their beliefs (which they considered to be knowledge); and both were martyred for taking the trouble to try to rescue humanity from false opinion, perversity, and/or mis-belief—and it was left to their disciples to carry on the work, spreading (and in the process inevitably inflating and/or distorting) the message. Their messages, though they differed in important ways, also had much in common. The great free-thinker of the early Renaissance, Erasmus [c.1466-1536], having read the classics in defiance of monastery orders, discovered what “a heathen wrote to a heathen...yet it has justice, sanctity, truth”, and said he could “hardly refrain from saying ‘Saint Socrates, pray for me!’” [quoted in Jacob Bronowski; *The Ascent of Man*; Little-Brown, 1973; p.427]

Christ, stepping beyond the traditions of blood-ties (tribalism and/or racism) and contemporary interpretations of scripture, preached the brotherhood of man; presented the love and mercy of a fatherly god; expanded the Judaic god’s interest beyond the Hebrews to all of His creatures (a new covenant with a newly envisioned god: *the* God of everything). Furthermore, he promised the salvation of individual souls, if only humans would replace interpersonal strife with world communion; vengeance with forgiveness; hate with love. If, as his cult ascribes, *his* was a perfect life, he did not expect to banish evil from the world—or even completely from the hearts of the faithful. Therefore he did not propose political solutions to worldly problems, seeming to recommend that one must deal with the state as one finds it, on temporal terms, and with the world as it is (‘render unto Caesar,’ etc). But one must do so with the realization that one’s soul, though immortal, is nonetheless endangered by worldliness and that its integrity must be protected by high-mindedness, good heartedness, virtuous behavior, and love of God and His creation, so that one might become *worthy* of Earthly happiness (if the opportunity were to be presented) and reap an eternal reward. His own Earthly reward for promoting such ideas was brutal torture and agonizing death for corrupting the society with his peace-loving blasphemy (a punishment inflicted via civil machinations under a politics already twisted by corruption—the particular corruption caused or at least promoted by Roman occupation and the propaganda of a fearful and fear mongering priesthood).

Socrates, too, had a deific connection, if somewhat less direct. It was well known that the Oracle at Delphi had proclaimed him the wisest of men. He was shocked by this news, protesting that the only thing he knew was that he knew nothing. Perhaps the

Oracle simply meant that the first step to wisdom is knowledge of one's ignorance. After serving (and heroically, too) as a soldier for Athens, he lived, as did Jesus, in considerable poverty while holding forth in the marketplace and acting as a kind of mirror of Athenian society (a gad-fly, he called himself), showing any and all who would dialogue with him that whatever they thought they knew (outside of their particular art or craft) was ill-founded and that they were just as ignorant of the truth behind reality as was he. He welcomed one and all to his dialogues, and many found them entertaining and stimulating if not life-altering. Such public examinations, of course, were a sure-fire means of attracting naturally curious and rebellious youngsters—many from rich and powerful families (e.g., Alcibiades and Critias, perhaps the most admired and promising—and restless— young men in Athens).

The level of Socrates' popularity and the interest in his method is indicated (and comedically exaggerated) in *The Clouds*, a scandalous and highly critical comedy about him written by his friend, Aristophanes. Even without the dialogues of his pupil, Plato, and remembrances of another witness, Xenophon (both done posthumously), one can see by Aristophanes' play (presented



The Death of Socrates, by Jacques-Louis David (1787).

while the both the marketplace-philosopher and the playwright were vitally alive) that Socrates might be headed for trouble. *The Clouds* (as we know ourselves from human nature, especially as reflected by today's scandal sheets) only made him and his ideas more famous. It was envy of Socrates' celebrity, in part; his power of attraction; his exposure of the pretensions to knowledge on the part of the arrogant; and his deflation of swell-headed rhetoricians and 'sophists' (and exposure of the social corruption that is effected thereby) that brought his antagonist, Meletus [*see Plato: Apology*] to charge him before the public court with corrupting the youth. He was convicted by the worried folks of the recently restored Athenian democracy. Fearful that he was spreading a socially corroding atheism—not to mention the expected displeasure of the gods, which they associated with the recently overthrown Tyranny of the Thirty—they sentenced him to death: suicide by hemlock.

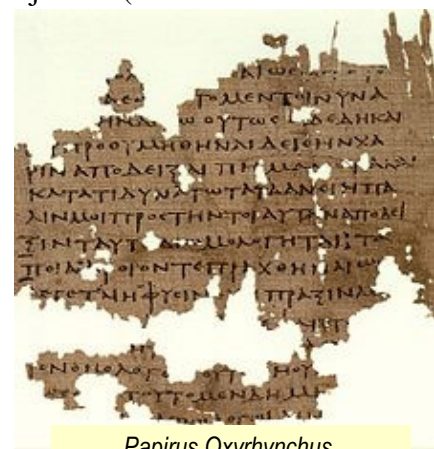
Socrates taught that a just and virtuous life is best, yes, but his main concern was that philosophy (the search for truth—or for *knowledge* as opposed to mere *opinion*), i.e., the freedom to think critically and logically, ought to be granted a secure place in society; a place that would insure that certain truths, which might be perceived as a threat to the regime (and truth can be sometimes so harsh as to prevent its acceptance), need not be kept hidden by the bearer or discoverer of that truth out of fear for his own ruination at the hands of the ruler(s), the courts, or the mob. That this cannot and will never be granted, of course, is proved by Socrates' own conviction and execution and, in general, the intermittent (but historically practically continuous) persecution of contrarians.

To resolve this problem and to save philosophy from censorship of the worst kind (and perhaps from ultimate destruction—or at least to spare it from being eradicated from a given polis), and to preserve its under-appreciated benefits even for those did not see the need for it (i.e., for the benefit of the whole city), Plato would have philosophy package its truths in complicated and esoteric language and purposefully misleading terms that will *seem* to enlighten even the unenlightenable, moving them, if unwittingly, toward ‘the good’ (at least, that is, toward what the philosopher determines is good) and toward the ‘best regime’ (even though we see in Plato’s *Republic* that there is no perfection in political things, and that such, perhaps, cannot be attained by imperfect humans—and that one philosopher’s utopia is another citizen’s torment).

In return for promising to *not* be the cause of civic consternation, and to not incite unenlightenable subjects to unproductive violence against the ruler(s) (i.e., to seek knowledge, truth, and ‘the good,’ and to so advise the state quietly and privately), philosophy would be allowed a place in the polis. It would be a small and unsung place, far short of imitating the leadership of wisdom granted in *Republic*. Such truths as might be of the painful-but-necessary sort would be administered clandestinely to the society, like Aspergum™, in ways that would tend to effect virtuous behavior and higher goals (even if perfection is unattainable) and thus to promote ‘the good’ by means of a convenient mythology rather than a futile attempt to create a nation of philosophers. This tactic (the ‘noble lie’) is sometimes referred to by modern scholars as ‘Platonizing.’

With Plato (it becomes fairly clear in his dialogues concerning politics) that stability is most important in government and politics. The Socratic search for justice described in *Republic* may be a wild goose chase. Certain political thinkers have gone to great lengths to show the seriousness of this quest, pointing out how Socrates waits until the elder man goes off to bed so that he can part the curtains of tradition for the younger men of more revolutionary spirit. These might more willingly follow him, now, on this fruitless quest without fear of shocking ‘old man Tradition’ with out-of-the-box ideas about equality of the sexes and communistic utopias headed by philosopher-kings—who, being men of gold themselves, have no need of others’ gold; wise men held in such high esteem by their inferiors and kept in sufficient luxury (or with sufficient wisdom to live without it) and security by their society as to be, themselves, incorruptible. It is more like a parody of rhetoric. Plato can’t be serious about this silly and soul-robbing outcome being the best regime, or about discovering the true meaning of justice (still not discovered). Otherwise he would have had no need, later, to add another such dialogue: the much more serious and dull and somewhat more practical (but still revolutionary) *Laws*.

Republic is rather an example of logic’s *undependability*: how pure logic, without some prior end in mind (most prudent, if the end were realistic), can lead to absurdity. The trouble with logic is it is completely abstract (as is pure mathematics—which might, some modern philosophers think, actually be synonymous with logic). So the strict logician or mathematician, dwelling among the insubstantial ‘forms’ and/or in the immaterial world of number, has no check against absurdity; may not even recognize it in a realm of Escher-like uncertainty where all



Papyrus Oxyrhynchus,
with fragment of Plato's *Republic*

paths are endless, either turning back on themselves in complex circles or proceeding to infinity. But let us have our dream-world, Socrates/Plato asks of Glaucon. Let us not concern ourselves with what is possible, but first dream of what we want; what would be best: the ‘good’,

...for before they [the dreamers] have discovered any means of effecting their wishes—that is a matter which never troubles them—they would rather not tire themselves by thinking about possibilities; but assuming that what they desire is already granted to them, they proceed with their plan, and delight in detailing what they mean to do when their wish has come true—that is a way which they have of not doing much good to a capacity which was never good for much. Now I myself am beginning to lose heart, and I should like, with your permission, to pass over the question of possibility at present. *Assuming therefore the possibility of the proposal* [lecturer’s italics], I shall now proceed to enquire how the rulers will carry out these arrangements...

[DIALOGUES OF PLATO; Jowett, Oxford; p.458]

to which Glaucon voices no objection. Later, however, while laboring over how to distinguish a philosopher from a mere dreamer [p.476] he has Socrates ask: *Is not the dreamer, sleeping or waking, one who likens dissimilar things; who puts the copy in the place of the real object?* (To which he has Glaucon agree.)

Of course we can’t be sure how much of Plato is actually shining through his depiction of Socrates in *Republic*. Probably it is mostly Plato. That has always been the assumption. Certainly whatever is left of Socrates bows deeply toward Plato’s understanding of him. On the other hand this scenario does seem quite in character for Plato’s mentor, the over-the-top comedic genius Socrates (whose artful twisting of logic gave Aristophanes some of his best material), to have engaged the young and serious Glaucon and his friends in such an instructive if elusive fable.

This is serious political philosophy, but well disguised as a parody of political philosophy, which itself hides behind a further disguise of *seemingly* real political philosophy. Socrates would make the world safe for philosophy by convincing us that it is just—perhaps the very definition of justice—for philosophy to upend whatever sort of regime in which it finds itself; twist society into an ornate pretzel; throw out tradition (along with everyone over ten years old); and present fables to the gullible children left behind: ‘noble lies,’ they are called, that will encourage the ignorant toward behaving as if they were wise while effectively censoring politically dangerous speech and expression—of the very sort, it should be pointed out, in which Socrates was engaging by this dialogue. Even certain sorts of music and poetry would be censored (including, no doubt, plays such as *The Clouds* and many of the other dialogues of Plato). “He [Plato] became incapable of seeing any beauty apart from goodness and truth,” says Will Durant.

He would censor, in his ideal state, all art and poetry that might seem to the government to have an immoral or unpatriotic tendency; all rhetoric and all nonreligious drama would be barred; even Homer—seductive painter of an immoral theology—would have to go. The Dorian and Phrygian modes of music might be allowed; but there must be no complicated instruments, no virtuosos making “a beastly noise” with their technical displays, and no radical novelties.

[THE STORY OF CIVILIZATION; (vol. II)—p.518]:

Durant continues, now quoting from Plato [*REPUBLIC*, p.424]:

The introduction of a new kind of music must be shunned as imperiling the whole state, for styles of music are never disturbed without affecting the most important political institutions....The new style, gradually gaining a lodgment, quietly insinuates itself into manners and customs, and from these it...goes on to attack laws and constitutions, displaying the utmost impudence, until it ends by overturning everything.

All this and more would have to be done in the interest of promoting a secure environment for philosophers—to prevent the tragic civil murder of some future Socrates (e.g., Plato himself?). And what does he think about democracy? Durant points out:

The democrats turn out to be as bad as the plutocrats: they use the power of their number to vote doles to the people and offices to themselves; they flatter and pamper the multitudes until liberty becomes anarchy, standards are debased by omnipresent vulgarity, and manners are coarsened by unhindered insolence and abuse. As the mad pursuit of wealth destroys the oligarchy, so the excesses of liberty destroy democracy.

[Durant; *THE LIFE OF GREECE*, pp.519-520]

SOCRATES: In such a state the anarchy grows and finds a way into private houses, and ends by getting among the animals and infecting them....The father gets accustomed to descend to the level of his sons...and the son to be on a level with his father, having no fear of his parents, and no shame...The master fears and flatters his scholars, and the scholars despise their masters and tutors...Young and old are alike, and the young man is on a level with the old, and is ready to compete with him in word or deed; and old men...imitate the young. Nor must I forget to tell of the liberty and equality of the two sexes in relation to each other...Truly, the horses and asses come to have a way of marching along with all the rights and dignities of freemen...all things are just ready to burst with liberty...

ADEIMANTUS: But what is the next step?

SOCRATES: The excessive increase of anything often causes a reaction in the opposite direction....The excess of liberty, whether in states or individuals, seems only to pass into slavery...and the most aggravated form of tyranny arises out of the most extreme form of liberty.

[*REPUBLIC*, p.562]

To attain civic security, then, it seems philosophy must usurp the throne. Ah, the irony: the *tyranny of philosophy*. It would seem that philosophers would consider that the apex of the ‘good.’ After all, as Aristotle explained, while Monarchy tended toward a bad form, tyranny, the rule of a wise king was the best of all regimes. Still, even Nietzsche couldn’t bring himself to advocate philosopher-kings. He knew (as well as did Socrates/Plato) that philosophers won’t rule—*can’t* rule. They are hard put even to convince each other, let alone the ‘unwise,’ and they are utterly defenseless against might of arms. The better among them can barely tie their shoes (or fasten their sandals—thank modernity for Velcro!), let alone organize and administer a state—even one as small as

ancient Samos or Clazomenae. No, no, I can't buy it. While it is undeniable that wisdom does sometimes accompany political power, such fusion is purely circumstantial; cannot be regulated. Wisdom, in fact, when you think about it, cannot even be identified prior to action and results. The best we can do is seek to elect one whose past actions or decisions (or whose professed beliefs—or better: his *actual* beliefs as expressed by his actions) have had generally positive results, thereby *seeming* to be wise. It's a lottery, however, for being unwise ourselves, how can we judge the candidates?

In my humble opinion, then, *Republic* is a huge and wonderfully elaborate joke, which, in seeming to reveal the truth clearly and openly to everyman, actually reveals it only to those who understand and can correct for the distortions of Plato's compound lens (those would be other true philosophers). And what is that truth?

The *fake* truth is that philosophers are worthy of police protection and entitlements, and that philosophy, if it cannot actually rule, ought to be at least fostered by the state: supported and even consulted and given serious consideration by the rulers and lawmakers so that political wisdom (an oxymoron if ever there was one) will prevail.

The *real* truth is: philosophy is incapable of finding a final truth. If it ever did, that truth would seem crazy and would not be understood by the people in general—or even by the non-philosophic rulers. It might even be despised and/or feared and create instability and panic, extreme reactions and even senseless revolutions, and would therefore need to be presented in a permanently sealed box hidden inside a golden reflecting ball. After all, how can anyone expect more of an answer from one who openly admits that his knowledge is so limited that he is certain only that he knows nothing?

It is with this in mind that *THE CLOUDS* is to be considered, and a small writing assignment is to be announced at this point—perhaps only a review or commentary showing that the reading was accomplished, or, for extra credit, an essay based on what is found in Aristophanes' play. Such works, especially those produced for popular consumption, are like windows in the wall between present and past, through which we can get a brief but valuable glimpse of the character of another age.

(Papers to be submitted at the next class session, and some time allowed for discussion, if possible, before proceeding to the next lecture topic.)

If the truth cannot be found (or is forever uncertain, or must be hidden), what, then, is the point of seeking it? Thus it seems the seeds of philosophy's demise are already sown amidst the hoped for crop of wisdom. Is Socrates, then—the 'Father of Political Philosophy'—actually the would-be assassin of philosophy itself? If so, Plato could not let *that* 'truth' be known. Instead, perhaps to further disguise it, he founded his own school of philosophy (in the grove of Academe), with which Aristotle (Plato's prominent pupil for several years, and who would become known to the ages as 'The Philosopher') found some disagreement; went off to teach the Prince of Macedon (the young Alexander—soon to be 'the Great'); and then returned to Athens to carry on in his own 'peripatetic' school, so called because it is said he lectured while taking his students on walks along a *peripatos* (covered walkway). He perhaps walked faster and faster as he taught, with political reality gaining on him, until he found himself trotting right out of Athens once again—to prevent that city, he said, from 'sinning twice against philosophy.'

Looking back toward classical Greece from the present, there are two distinct points of view from which much else has been derived: On the one hand, Greek philosophy (including science, and especially Aristotle), encouraged and made possible the modern world; opened the door, as it were, to reason over religion. Without this bedrock of Western thought, this view continues, our civilization could never have developed. On the other hand, Greek philosophy was (Platonistically) sufficiently confusing in its message: ‘there is no truth’—or ‘the truth is too harsh to expose.’ I.e., its truth was so well disguised and the seeming search for truth was so finely and laboriously argued, that it sidetracked the best subsequent thinkers (not to mention: the search was eventually limited by the boundaries of scripture) and thus prevented any practical outcome. So it delayed modernity for well over a thousand years. Its meaning is still debated today. Greek ideas (that is the world-view we call Hellenism) enjoyed a huge surge with Alexander’s conquest of the known (or somewhat manageable) world. Little was changed in that regard during the course of the Roman hegemony, except that much of that understanding was lost to Rome’s carelessness in armed conquest. The prime example of that is the senseless murder in Syracuse of the great genius Archimedes by a common soldier. And much of what Rome did retain from the Greeks was forgotten with her own subsequent decline. Later, Christianity so authoritatively reshaped the (only partially) rediscovered Aristotle to fit with scripture that, in trying to advance one’s scholarly reputation, only esoteric minutiae could be debated without risking heresy.

Again we have stepped well beyond the boundaries of the era and the topic in question. Here we want to see how Plato and Aristotle understood the cosmos; how those views affected their general philosophical outlook; and the interaction of their ideas with the world-view (if there was such) of their era and culture.

Plato, geometer *par excellence* of his time, was seriously influenced by the Pythagoreans. He was so engrossed in the perfection of the abstract world; the world of ideas, that he taught the imperfect world of our senses was untrustworthy as a guide to truth and knowledge. His description of the physical universe comes from a combination of dialogues, but mostly from *Timaeus*. For all its wealth of words, the description is not at all clear, and has led to several conflicting interpretations. Without attempting to resolve those various views, the clearest general explanation goes something like this:

The great globe of fixed stars turns on the (imaginary) polar axis (*one movement*), with the unconnected Earth as the unmoved center (there is some argument about this). Inside the all-encompassing globe the planets, sun, and moon orbit about the (to all intents and purposes, vertical) axis of the Universe, on an imaginary plane (or planes) intersecting the center (at Earth), but slightly tilted (*several more movements*). The individual bodies of these objects orbit at distances (from Earth, or from each other?) derived via number theory, in a cosmos similar to that of the later Pythagoreans, including (possibly) a spherical Earth.

<p>Refer to/discuss <i>Timaeus</i> HAND OUT from previous session (assigned reading)—also at this point, show diagram regarding <i>Timaeus</i> in ARISTARCHUS OF SAMOS (Heath, p.160) on black- or white-board, or in an additional hand-out to display how this system was thought to have worked.</p>

However carefully it is analyzed and illustrated, as with all the preceding concepts we have examined, Plato's geocentric version does not explain the actually observed movements of the planets. Plato does not see this as a shortcoming. It is rather expected, since observed reality has no affect on the truth of the ideal that lies behind it. These dialogues, however, do show how much gods are needed for setting up this marvel of mechanics and for providing the otherwise unexplainable forces behind all these mysterious motions, and how divinity still pervades the thought of these ancient men despite their diligent search for a purely rational view. On the other hand, in Plato all these references to the gods as creators and the granting of souls to the stars, etc., etc., could be simply more 'Platonizing' to ward off non-philosophic political antagonists—hardly different than what Copernicus and Galileo and Descartes had to contend with while the church still brandished the instruments of torture (this is not to imply that any of the aforementioned did not believe in God). We recall she had no compunction about burning Giordano Bruno (1548-1600) at the stake for expressing his scripturally incompatible ('heretical,' according to the Inquisition) ideas concerning 'island universes' beyond our solar system.

In any case, especially given Plato's admission that 'noble lies' are necessary in exposing the public to philosophy, it is difficult to determine just where the truth lies in his musings. It is clear, however (since, for Plato, the world of our senses is such a poor copy of the ideal world: the abstract world of number, logic, geometry and the perfect intention of its eternal creator), that observation was not a viable way to understanding the universe. So, finding agreement between the temporal (false) world and the ideal (true) world was not high on Plato's list of priorities. Thus his celestial revolutions were all perfect circles and his globes (perhaps the only true globe was the universal shell) were perfect spheres and he rejected the idea that studying the heavens would lead us to truth, since truth exists only in the realm of ideas and pure logic.

This is not to be taken to mean 'in the mind.' True, the realm of ideas has no substance: that is, it is incorporeal. But for Plato it seemed a kind of limbo; a 'no-place;' a dreamland that enjoys a pseudo-being, a non-locality outside of us that we could visit via thought. Plato even suggests that we have come from 'there': that our knowing part at least—the soul—has much of its knowledge as a vague remembrance of our origin in this 'Formville.' It is 'there' that we shall find the perfect forms that make possible (or which are the essence, possibly the *cause* of) material reality. In any case, the physical world is but an imperfect copy of the ideal, and therefore is unreliable as a guide in the quest for knowledge.

What we call 'reality,' according to Plato, is the material world's poor imitation of the perfect; the ideal (which for the Platonists was the 'true'). Perhaps this view is conditioned by the fact that 'knowledge' itself is not of the material world, but is (like the ideal world) either a mental construct or (more likely for Plato) *a priori*: a given. As the mold comes before the casting, form comes before substance. Since the casting cannot be perfect, it is the mold that interests Plato more than what comes out of it; the *form* is what is true. Thus it is hardly surprising that deep preparation in geometry was a requirement for entry into his 'academy' (*medeis ageometretos eisito*). Furthermore, this method pre-supposes opposition to the later, more familiar (though generally misconstrued) Baconian scientific method, by downplaying its first step: observation.

One could not, of course, proceed blindly, as if there were no ‘reality.’ After all, the material world is where we live. It is from that world that we get the impetus to (re)visit the ideal world for knowledge. So a very general observation is natural. After all, Plato says, seeing the whole (or what we can see of it by looking at the heavens) is the sensing that made knowledge desirable; made asking the right questions possible and thus opened the door to philosophy: “than which no greater good has come nor shall come hereafter as the gift of the gods to mortal man.” The ‘things’ we see, however, are only poor copies of the perfect concept of them, so measuring and weighing and involving oneself in their intimate details—i.e., doing physics—can never lead to true or complete understanding. (This was a position rediscovered several times on the way to modernity.)

The Theory of Concentric Spheres (*possibly a separate lecture*)
Eudoxus & Callippus

Eudoxus of Cnidus [-410 or -408 to -355 or -347] was perhaps the most original mind among the many great Greek geometers. In fact he was a champion of all phases of knowledge and very highly regarded. He was a pupil of Archytas, the master geometer of his era, and owed much to him in the complicated working out of the theory of concentric spheres: a mechanical explanation that comes very close to describing the movements of the sun, moon, and planets (including the retrograde motions) without the complicated and improbable epicycles that had been proposed, and which would continue to plague the cosmic system through Ptolemy and even up to the acceptance of the Copernican heliocentric system.

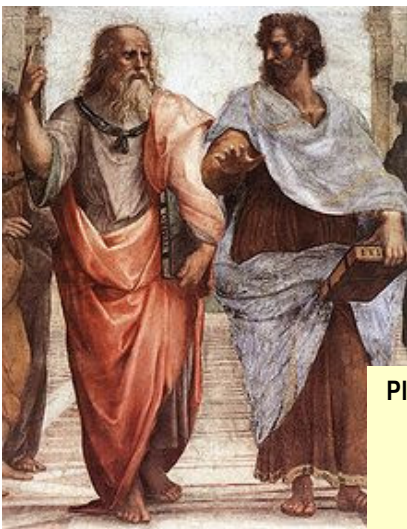
Remind/review of Sir Thomas Heath's ARISTARCHUS OF SAMOS: *The Ancient Copernicus* (HANDLED OUT LAST SESSION or included in the assigned reading for the course), Chapters XVI ‘The Theory of Concentric Spheres. *Eudoxus, Callippus, and Aristotle*’ and XVII ‘*Aristotle, cont.*’ (pp.190-248). At this point use projector, go online to <http://faculty.fullerton.edu/cmconnell/Planets.html> for animated diagrams displaying several ancient systems leading to that of Ptolemy.

He was presumably influenced to apply his penetrating mind to the problems left unresolved concerning the condition of the Universe by the challenge Plato issued to the students in his Academy: to find “the uniform and ordered movements by the assumption of which the apparent motions of the planets can be accounted for” [Heath, *Aristarchus*, p.141]. Eudoxus imagined the planets as globes affixed to (or as globs of material on) huge transparent (as if crystalline) spheres, each turning generally about the universal axis, something like what was discussed above as found in Plato (except for Plato they were not spheres, but rings or ‘whorls’). Eudoxus then discovered how to imbed in his geometric model extra transparent spheres, in between those carrying the planets. By careful and complex adjustment of the axes of rotation of the various spheres and the location of their attachment to the next outermost sphere, and by ingenious differential in the velocities of their interdependent rotations, he could include the figure of a lemniscate (the modern symbol for infinity – [a sidewise 8], which Eudoxus called a ‘*hippopede*’: a Greek word meaning ‘horse-fetters’ and referring here to the figure-eight path followed by horses in equine showings at the amphitheater) resulting in something closer to observed motions of the real system—tending toward (but not quite succeeding in) ‘saving the phenomena.’

This was appreciated but still criticized by Aristotle and others as overly complex as well as not exactly accurate (even though the timing and backward planetary motions were better matched than in any previous model) and thus Eudoxus' system was unlikely to reflect the true universe (although Aristotle did not hesitate to adopt the concentric spheres idea in his own interpretation of planetary motions). It is possible that this was merely theoretical; not intended by Eudoxus as a model of reality but only a means of overcoming the retrograde problem (not solving it). Having lost everything originally written by Eudoxus and depending only on the explanations and criticisms of others, it is impossible to know exactly what was the real purpose of this convoluted scheme. Regardless of its misconception as a model of the system, the ingenuity of this concept is one of history's (certainly ancient history's) most amazing feats of visualization—a great example of what total immersion in geometry can do for the human mind.

Callippus [approx. -370-300], another famous geometer, recognizing the merit of Eudoxus's system but seeing that it fell short of perfection, set about to add even more imaginary spheres. There were, by now, well over fifty of them proposed (with never ending adjustments pending that would more than likely increase that number in order to continue refining the model toward the observed retrograde motion of the actual planets—Mars was the toughest problem—and their apparent changes of velocity).

It might have seemed to some that this represented actual progress toward truth. In reality these remarkably clever schemes were merely papering over defects due to the false premise: the geocentric or fire-centric cosmos. Aristotle's major criticism was that such schemes, relying on perfectly concentric spheres, did not account for the alternating brightness and dimness of the planets, which seemed to indicate significant changes in distance from the Earth. Still, failing to resolve that problem himself, he adopted the basic idea, hardening it into what amounted to the crystalline spheres with added epicycles: a concept of the universe that passed through the Hellenistic era and the Roman experience via fine tuning by Ptolemy and his promotion of it through the *Almagest*. Then, through its having been adopted by the Christian church as scripturally acceptable, it inhibited astronomical progress for another millennium.



Though **Aristotle** [-384-322] did not follow Plato all that deeply and unflinchingly into pure idealism, proving himself (in his many writings, his categorizing, and in his collecting of 'things' from all over the known world) to be a quite careful observer (*step one* of the scientific method), he still agreed that logic (the greatest achievement of Greek thought) was the means to truth and understanding.

Plato (left) & **Aristotle**, a detail from The School of Athens: fresco by Raphael (c.1510). Aristotle gestures to earth, representing belief in empirical knowledge (via observation/experience) while holding a copy of his *Nicomachean Ethics*; Plato points upwards, representing his belief that knowledge is in the forms.

He separated science into three basic categories:

1. Physics, the study of temporary but substantial things; what things are—*changing things* and their sensible qualities ('the snubness of Socrates' nose').
2. Mathematics, the *abstract understanding* behind real things (but not of their detached essences)—the quantitative and continuous: numbers, geometry ('the compound curve as separated from the snubness of Socrates' nose').
3. First Philosophy (which did not exclude theology), *study of changeless things*; things existing in the realm of the Platonic ideas; foundation and becoming (the 'Why?' of Socrates' nose—things studied according to function).

He laid out his observations as facts and exposed certain problems, many of which he resolved logically; he then discovered new facts and problems and, through evaluation of these, formed hypotheses. Yet from our modern perspective (which we must endeavor to mitigate when trying to understand the ancients), he missed the next logical step: experimentation. He continued philosophizing about reality instead of testing his 'hypotheses' by means of experiments.

Perhaps that step only *seems* logical, if one presumes that knowledge and truth are not synonymous and that certain knowledge (that which has been sought by the scientific method) pertains more to control, to action, and to power (i.e., dependable formulae) than to understanding and truth. But for the thinkers of Ancient Greece, generally, the end was understanding, simply. There was no practical or useful side to science (other than a sort of self-aggrandizement in the realm of reputation as some sort of wizard—for which a juicy position as a tutor might be forthcoming, or legal/political work as a sophist; a rhetorician). And maybe the various techniques of observation we moderns take for granted (and which often cause us to adjust our hypotheses and thus to provide a deeper 'understanding') simply never occurred to a man without instruments with which to see more deeply; to measure more accurately; to uncover more facts—unsuspected and unsensed facts; facts that could have forced Aristotle to a different perspective. But he did not notice any weakness in his very basic and natural observational technique (what you see is what it is), and he could hardly long for instruments of which he had no concept. So Greek and all subsequent science until Galileo continued to be theoretical (scripturally contorted by the schoolmen so that it became theological) and the Universe remained encased in a plastic-like globe, impenetrable even by ancient imagination.

Development of a new mentality, in a new age and under a new cosmology, would be required to gain deeper penetration. Ironically, the quasi-godlike status achieved by Plato and (particularly for the early Western Europeans) Aristotle proved to be a major barrier on the road to modernity. Having been partially lost in translation by the Romans, distorted by various magi, and mentally forced by medieval scholars into a sort of 'handmaiden to religion,' philosophy actually assisted the Church in seriously delaying the discovery (invention?) of the ultimate heresy: modern science. I.e., believing (or pretending) they knew 'all'—at least all they needed to know—prevented practical progress through technology. The heavenly glow of Biblical revelation blinded them to the possibility of Earthly enlightenment. In a later session we will consider the possibility that this delay was necessary (unbeknownst to the Middle Ages) for the gradual settlement of our modern civilization's base and the 'curing' of its foundation.

It is with that very modernity—the basis of our present culture (what Oswald Spengler [DECLINE OF THE WEST] calls the ‘Faustian’ culture)—whereby the ends of nature have come to be ‘invented,’ and continually re-invented, by beings who have chanced to become self-aware. In other words, our present-world goals are *decided* rather than *discovered* by reasoning. But this is a culture that seems now to have been checked in its ‘progress’ or its development by the increasing disagreement over aims, due to the indeterminacy of ‘good’ in a non-philosophical and secularist and facts-first cosmos. So we are fragmenting: disintegrating into the atoms from which we believe our everything was produced. The Roger Bacon or Galilean/Newtonian concept of space and time; the purposeless mechanical, clockwork or billiard ball universe of pure accidental determinism has led us into an absurdity that was avoided by Aristotle. This has been recognized by several thinkers, including Darwin—recognition largely instrumental in his long hesitation to publish his theory of evolution; a theory which attempts to explain development without a goal; a process which continually invents its own end—an unpredictable and ever changing end—i.e., an infinite regression, in that the ‘result’ or unexpected/unpredictable outcome of the process presents itself as the goal, a goal that is never quite achieved because it, too, is forever ‘evolving’ as the process continues.

It was about that very process and what is behind it that concerned Aristotle, whereas ‘process’ is simply assumed or accepted as given by modern science, since science, it is now believed, can only record and arrange the facts; the steps; the ‘how’ of the world, and can know nothing of the ‘why.’ Yet it was the ‘why’ that most interested Aristotle. *It was attaining knowledge of the ‘why’ that was, for him (and for classical Greece, generally), the ultimate goal of science*, and much more important than unraveling the ‘how.’ It was expected, through philosophy, observation, and contemplation, that answers would be forthcoming. There was thought to be a goal of nature, which could be discovered: the ‘good,’ a sort of natural perfectibility (a seeking for the ‘man of gold’) that was influential in shaping a Greek morality. Whereas 2,000 years later, with the advent of modernity, ‘Why?’ was downgraded to an unanswerable and therefore silly question. So it was eliminated (or the attempt was consciously made to eliminate it) from Newtonian science (which was pretty much sheer mechanics: various special departments of ‘hard’ physics all describing their subject mathematically with the help of the new calculus) and all considerations of ‘purpose’ were relegated to the futile and inconsequential cud chewing of metaphysicians and theologians.

For Aristotle, however, there was a ‘What for?’. Although Empedocles and Democritus seem to have been correct to a degree, in that atomic motion and bonding has come to be accepted as at least part of the cosmic picture (constituting the ‘How?’), attempting to reduce life and the emergence of novelty in nature to Newtonian mechanics has not been successful. Aristotle was interested in life above all. Living and knowing—especially knowing about living—these are the very objects of his philosophy, and thus of science. More than just angles and velocities and collisions, science, for Aristotle, was truth-seeking, not control-seeking. He is thus interested in the ‘why?’ of the world. Modern science has had a respectable level of success in explaining the level of change regarding the process from egg to chicken; from chick to hen or rooster; from peeping to clucking, and from losing feathers to ultimate decay. Aristotle wanted to understand and explain the overarching chicken-or-egg level of being—and he thought it could be done.

The purpose of any thing was its end; its particular goal. He was strictly a *functionalist*, as especially unveiled in his work on biology. The purpose of an acorn is clear: an oak tree. No matter that 99 percent of acorns are eaten by squirrels or fall on unfertile soil or are somehow discontinued. The nature or potential of the acorn is not altered by actual circumstance. That acorns are a favorite breakfast of squirrels is incidental and has no affect on their *intended* end—even though most individual acorns do not get the opportunity to complete their natural assignment. But what, then, is the purpose of the oak tree, unless (anthropically conceived) it is for ships and houses and furniture. Otherwise, it could only be to make more acorns, for how could nature have foreseen and assigned it such anthropic potential before there were humans to cut the tree and trim it for masts, or hew it into logs for the milling of lumber? And no matter how many infinities of oak trees might grow, nary a one will develop naturally into a war-rigged trireme.

“Motion is a process”, says Aristotle, “by which something that has the power to become a definite something else, becomes that something else...it is the continuous actualization of what is potential, taken as being potential”. Motion, then, is ongoing; never complete. But it is somewhat determinate, in the sense that only what is potentially possible [*a priori*] can take place. A ‘something’ may develop fully, not at all, or only partially. But it will not exceed or alter in its potential. It will never develop into something other. Thus, for Aristotle, the Darwin/Spencer/Wallace version of evolution seems precluded. “We must first admit,” claims ‘the Philosopher’, “that of all beings there is none whose nature permits it to act on another or be acted upon by another in any chance way whatsoever, nor is there any coming into being of any kind of being from any other kind”. And despite the power of their theories, and the genetic advancements founded thereon, the fossil record would seem to favor the more ancient thinker. I doubt Darwin would have much luck in trying to convince Aristotle that a rooster once was hatched by a dinosaur—besides, even if it were so, how would he have found a mate?—a conundrum still unanswered conclusively by advanced biology.

It was in the nature of humans, part of their potential, says Aristotle, to find and perfect art—in this case the art of carpentry. That is in the nature of Man. Man is potentially a carpenter or shipwright (among many other things) as a rational and political animal. Man acts, then, as a sort of agent of Nature or of the divine, promoting Nature’s hidden potential by creating things that she, without humans, could not bring forth. For Aristotle and for the Greeks, then, “art is not a problem to be solved (as in most modern theories of art) but a natural process to be analyzed and understood” [John Herman Randall Jr. in *ARISTOTLE*, Columbia Univ., NY, 1960; (p.278)]. The Greeks also made no distinction between fine arts and practical arts. The artist is simply a craftsman (and he or she remains so, essentially, until Beethoven): a person who makes things (even with an art such as rhetoric—the art of persuasion—whereby arguments are carefully ‘crafted’).

Hence, by generating rational beings, Nature realizes her highest potential (and, certain later philosophers of science would add, births her would-be master). In saying ‘art is imitative of nature,’ Aristotle means not that we should paint only portraits and landscapes; not that we should aspire to be like Apelles, whose paintings of fruits were said to be so realistic as to attract birds and insects), but simply that humans mimic nature in the *act of creativity*. I.e., art is humans consciously imitating what Nature does unconsciously. E.g., through art, humans create necessary items that nature provides

insufficiently (a house or hut, since caves are not plentiful); a boat, because swimming or floating on driftwood could hardly sustain trade across a large body of water), just as Nature creates hearts and lungs and legs and hands in the effort to fulfill her potential. In addition, art has created language and music and poetry and the decorative adjuncts that realize the potential for living well, rather than merely surviving. Hence the governing and legislative arts and deliberations on what is ‘good.’ All this, too, then, by being potentially in Man (since Man is natural), is *potentially in nature*. The rise of society culminates in the *polis*, which is why Man is the rational animal and the political animal. So Man is always potentially (though unknowingly) ‘in’ Nature: a partial realization of her full potential. And within Man lies potential awareness and reason. And further, in the power of reason are, potentially, all the arts necessary for civilization and for the discovery of ‘good.’ It is only one more short step to understanding that man’s power of reason is the means by which nature comes to self-knowledge—the reason for reason.

Like the acorn that falls to the squirrels, however, the good—along with wisdom (right reason); the polis; a journey to the moon; and the hydrogen bomb; and in fact *all* potential phenomena—is only *possible*. Good might not be realized, forever thwarted by circumstance and ill fortune. Or, once realized, it could be lost again (but historically only; not lost potentially). It could be prevented, also, simply by wrong reasoning, as with barbarians and societies that practice human sacrifice—*reasoning* (improperly, one would like to suppose) that the gods will be pleased by the purposeful destruction of certain of their own, wonderfully conceived creatures; or figuring (as certain Meso-American societies) that the gods need human blood to recreate or re-energize the sun each day, etc.; or even, in certain present-day cultures (somehow spared modernization, or actively resisting it) who ‘reason’ that an ill tempered Almighty actively recruits soldiers merely to appease Him by destroying His enemies—as if He also created His own enemies just so He could get sadistic pleasure from the maiming and torturing of them by His recruited armies, gaining added satisfaction from the sacred murdering of their own sinful or wayward kin as a display by His followers of their unshakeable faith.

In the next few sessions we will briefly discuss the spreading of ‘Greekness’ via the conquests of the amazing Alexander and pass rather quickly through a Hellenicized but not so progressive or philosophical Rome. We will also mention a few notable scholars of East and West as, still locked inside this seamless cosmic ball, the Medieval Period stagnates. We will wade quickly through nearly two thousand years of these murky shallows to find Galileo at the dawning of a new era, but we will not see Aristotle’s like again, nor shall we ever. His scope is impossible to achieve by any man in our age, since we are now drowning in an ocean of cacophonous information, that it seems likely will be lost with our demise before it can ever be sorted out. Aristotle left us thinking more deeply about several problems: concepts that have not yet been understood, and probably are incapable of presenting anything like full understanding, such as:

INFINITE: Aristotle understands this only as an adjective: ‘Infinite power;’ ‘infinite time;’ or an adverb: ‘infinitely divisible;’ ‘infinitely additive,’ etc. Thus ‘infinite’ is (like perfection, i.e., a perfect circle or perfect triangle) unknowable, but not unimaginable. So infinity is all potential. Eternity might be conceived as the ideal (perfection in the dimension of time) behind limited real duration imperfectly realized.

SPACE: Aristotle denies space or ‘the void.’ For him there is only ‘place,’ and this is only a reference from one body to another [an embryo of relativity theory?]. All things, then, have their relative place (except Universe, having nothing outside of itself by which to locate it). This, very generally, is the problem wrestled with in modern ‘set theory’: Does the Universe, as the set of all sets, include itself in that set? (This question may have been responsible for the biggest single waste of Bertrand Russell’s time.)

TIME & MOTION: Time is an aspect or dimension of motion. Is time discrete (divisible into instants as with elemental matter in the atomic theories), or is it a continuum (as perhaps applicable to the ideal world)? Does time move past the instant of the present, or do we move through time as we move through space? For Aristotle the instant is simply the present—our present; the connection between past and future. Time is not a collection of instants any more than an imaginary line is a collection of imaginary points. There is no duration to the instant. It has been approached in the past, and we shall immediately recede from it in the future, so it has no existence in that sense. Thus there can be no motion in an instant, nor can there be rest since an instant has no length. So Zeno’s arrow is never at rest; never in one place. Zeno is correct that one cannot traverse an infinite (or infinitely divisible) distance in a finite time, but he can’t have it both ways. He says to those who claim the world is continuous (reflecting the continuity of imaginary lines and planes in the mental world) that such a world requires matter and distance to be infinitely divisible. Therefore, it will take an infinite amount of time for Achilles to catch the Tortoise. However, in a world where distance is finite but infinitely divisible, so is time. Since both distance AND time are infinitely divisible, the infinities mutually cancel and we have only a finite distance which *is* traversable in finite time. Thus, due to their difference in relative velocity, Achilles easily overtakes the tortoise.

Even if the infinities do not cancel (by some strange mathematical principle or trick of which, not being a mathematician, I am unaware) we still have a world according to relativity, in which Achilles is either catching the tortoise or has already passed it and is receding from it (depending on the situation of the observer—the velocity and direction of his coordinate system relative to the race). But in no possible instance (given that Achilles and the tortoise share a coordinate system—i.e., they are competing together on the same course) would any observer see anything but Achilles gaining on the tortoise. Even if the observer could exceed the velocity of light and somehow see the race run in reverse, he would still see ‘gaining,’ though it could be so construed (while they obviously would be going backward) that the tortoise was gaining on Achilles.

We might ask: Is there not an instant at which they are even—a moment between Achilles almost catching and having passed the tortoise? The answer is no, since *there is no instant*. An instant is as imaginary in time as a point is in space—and, as Einstein would later explain, there is no such thing as simultaneity whereby more than one thing ‘happens’ at the same moment. Time is very elusive. We still have no agreement there.

GENESIS: How did things come to be? What was the first thing?

(1) There is no ‘first matter’ for Aristotle, thus there is no absolute beginning. There is, however, a basic matter (or can it be ‘submatter’?) but it never occurs by itself. (At least not in our cosmic location, though it might be construed as Aristotle’s fifth element, ‘essence,’ of which the heavenly spheres partake. But this idea is pure speculation on my part. I have not found it so described by Aristotle.) Whatever is this

substuff it is always mixed such that the smallest or most pure forms of matter that we perceive by our senses are the four elements (Fire, Air, Water, and Earth—which, by somehow mixing with the submaterial to various degrees, are altered so as to change ‘through’ and into one another).

(2.a) Matter is passive; not generative of anything.

(2.b) Logos (pure knowledge or idea) generates nothing by itself. Form does not ‘form’ anything. It is perfectly abstract. There is no causal connection between the temporal and ideal realms. And,

(2.c) Nothingness (if it could ‘be’—but ‘it’ can’t) would produce nothing.

So what we consider generation is only a form of alteration. Actual moving and making belong to another power, not to matter (which is only acted upon), and not to ideas (which are exempt from action). Therefore there must exist a third power or ‘*arché*’ or essential, thus:

(3) *Arché* is motion-in-place: the primary motion—that of the whole celestial sphere—perpetual motion of rotation, accounting for cosmic dynamics: the essential cause of world process. I.e., everything ‘within’ is moved in ultra-complicated fashion by this continuous turning of the all-encompassing sphere. Aristotle calls this ‘*phora*’: the foundation (not the ‘beginning’) of all change. It seems to be eternal, and by the resulting mixing and alteration of the elements various things, according to their natural potential and as passing circumstance allows, blossom and decay.



We could go on *ad infinitum* about Aristotle. Whole courses are still taught in several disciplines based on the fragments of his writing and on 2½ millennia of varying interpretation. Books continue to be published, conferences and seminars held, and societies and near-cults formed in the attempt to unravel or condense (or twist) his thought. But we cannot abandon him here without a word about his *Ethics* and *Politics*.

Government, for Aristotle—the idea of the *polis*, in particular (a kind of city-state)—was not an invention of humans or an agreement by which they lifted themselves out of savagery, as later Western political thinkers convinced themselves was the case. The *polis* was quite natural—potentially in the nature of Man all along, thought Aristotle, and simply awaiting the circumstances conducive to its emergence: the Greek situation and mentality.

Thus the Greeks were not apologetic and did not feel the least guilty about being what they were and doing what they did. Helping each other or killing each other; joining their city-states loosely in confederations for defense or destroying their neighboring *poleis* utterly and selling the inhabitants into slavery after violating their temples and raping their women; soldiers sacrificing their lives altruistically in defense of honor or rulers openly assassinating their brothers and princes murdering their parents to accede to their power; from ostentatious displays of obscene riches to Diogenes living in a clay tub; from drunken orgies and wild Bacchanalian rituals to the summit of thought regarding virtue and wisdom—*everything done by men was natural to humans*.

That, of course, didn't mean you would not be punished for violations of the law, or that you would not be the victim of vengeance if you committed some atrocity. One would also feel ashamed, certainly, of his own weaknesses or of his actions (or inactions)—i.e., dishonor—but he would never feel unnatural, so guilt, that is in the most profound sense, was not accumulated psychically, for souls were not formed by men but given by gods or by nature. Character might be molded through training to compensate for a poor soul—even to disguise (but not transform) a barbarian or a slave. If improvement were possible, it would mean improvement as Greeks—not morphing into something different. This is what Nietzsche and Spengler, *et al*, mean when they look wistfully back toward the freedom of those ancient Greeks and the (seeming) lustiness of that apparently *ahistorical* life and time. They accepted what was given; they lived completely in their present: their own era, envious perhaps of past ages of gold but not moping about it; hoping for the best but not expecting some future utopia. They never suspected that history might be a process and they had no idea of human progress. The world was just as they experienced it.

The *polis* (an organization of Greeks—almost a social organism) arose somewhere around 700 BC and quickly spread through Hellas. Aside from climate and soil conditions, there were a number of social leveling factors that contributed to its formation, including 'codification of law into written records...and dispersal of hereditary priestly offices among a number of noble families.' Peter Green, however [ANCIENT GREECE: *An Illustrated History*; Thames & Hudson Ltd. London/NY, 1973 (pp.62-63)], believes

The most significant development...was the emergence of the hoplite phalanx—a well-equipped, well-drilled heavy infantry force, recruited (on a part-time emergency basis) from citizens who could afford the new, cheaper, much-improved panoply now being imported from the Near East, or manufactured locally in imitation of it.

The psychological and political implication of this new civic defense force, in which farmers, merchants, well-to-do artisans and indigent aristocrats fought shoulder to shoulder for their community, were nothing short of momentous.

The *polis* was characteristically small enough (later, 5th century Athens, Thebes, Argos and a few others being excepted) for a citizen in the full assembly to physically address the whole of the citizenry. Another prideful attribute, more ideal than real in most cases, was autonomy: the freedom by means of self-sufficiency (and often sheer stubbornness) of each city, even while the people tended toward collectivism, which was reinforced by fear of neighboring cities. Yet Aristotle could write that the goal of society was the development of the highest and morally best possible man. That was the nature of the *polis*: its 'What for?' as it were; the 'special theory' of ancient politics. How far that could be carried before the onset of fascism is not made clear in the theory. Free individuals must be trained, therefore, and made moral (or their potential morality encouraged), so they can care for themselves and their families and each other. If they began to expect to be cared for by government, they were (1) wrong, and (2) weak—and any weakness would be felt by the whole. (Sparta displayed this in the extreme.)

The 'general theory' had to do with the art of government (as more or less disassociated from ethics). What Aristotle sought was the best way to govern, given any particular structure or existing regime type, even if it meant 'teaching the tyrant how to

succeed in tyranny' [George Sabine, HISTORY OF POLITICAL THEORY, pp.91 and 106]. Always ready to categorize, Aristotle pointed out the three sorts of government (by the *one*, by the *few*, or by the *many*), each with a good and bad tendency:

1. The best form was **monarchy**, if a city was fortunate to have a wise king who ruled with advice of the aristocrats and knew *how to control them all in the best interest of the whole* community. But Tyche was fickle, and this form also presented the greatest danger of morphing into the worst type: **tyranny**—in the pejorative sense—the opposite of wisdom, whereby *the tyrant ruled (definitively) in total self-interest*.

2. Next best: **aristocracy**, rule of the few by their merit, *in the best interest of the whole*. Its darker side: **oligarchy**, whereby the few, by might and chicanery, came to rule, ostensibly by the power invested in them by the gods and *in the interest of keeping themselves wealthy and in power* even to the detriment of the demos. And:

3. **Democracy**, generally a bad or weak form, whose best manifestation was when *the many ruled themselves under just and well made laws*. It was short-lived, however, as *the many cannot rule effectively* and fell into factions, or overplayed the opportunity to despoil the few and best and it deteriorated into a kind of '**mobocracy**,' which gave way fairly soon to a tyranny of the first leader who could gain control of the citadel and the support of the soldiers—the phalanx.

So the best regime was unlikely, and even if something good occurred it all too quickly deteriorated into the worst. Therefore Aristotle recommended a fourth but highly variable type: a **mixed regime**, in which *elements of all three types of government* interacted to promote greater stability and inhibit corruption. The mixture was not a recipe suitable for all states, but adjustable to existing constitutions. Some cities might not be suited to such a mixture at all. In fact, he wrote recommendations for making the best of tyranny, if that reflected the character of a particular state. The idea was to make the best of what already exists.

He also recommended practical education, including tough citizenship training. This was not meant to turn out robots who obey principles unthinkingly even when such might be to the detriment of the 'good,' but to make youth safe in decision-making by providing guidelines (myth, wrathful gods, whatever will work—*unenforced principles are usually ineffective*) until intelligence and moderation are gained with adulthood, whereby Santa Claus becomes laughable. As we know, some never attain sufficient maturity and understanding and need traditional guidelines: like an auto-pilot—or gods, or the morality police. Others attain it too early and use their intelligence to rebel and lead others astray—detrimental to society. Some few, resistant to the training altogether, will find ways of using their intelligence as a weapon to gain advantage over their fellows without regard to morals or the well-being of the collective. But all these can be tolerated as long as they are aberrations and remain rare rather than becoming usual.

Despite continual unrest due to the fragmented world of these obstreperous city-states, it was the *polis* by which the Greeks came to measure other cultures and came to consider themselves superior to barbarians who did not live in *poleis*—who were ruled by might alone, and were incapable of reaching the level of culture and refinement of Greeks. This attitude was a big factor in the generally favorable reaction to Alexander's claim that he intended to wreak vengeance against the Persian Empire; favorable even though Macedonians were not really seen as quite Greek. In fact Macedon was generally considered a threat to Greece and actually had to conquer Greece before

moving on to the remainder of the known—or worthwhile—world. Her cities were thought to be not-quite-*poleis*. On the other hand, Macedonians were perhaps not-quite-barbarians either, and seemed disposed to adopting Greek culture. So much so that they not only joined in the mix that was Hellenism but, through Philip II and especially through Alexander the Great, became the primary force behind the explosion of Greek ideas across the known world.

After Alexander's death, however, his several commanders had a falling out. The intrigue and maneuvering and actual combat between rivals ultimately weakened their hold over Greece. There was an anti-Macedon reaction, especially in Athens, whereby Aristotle found it necessary to depart again, dying shortly thereafter. Greek *poleis* degraded over the next two centuries into a lesser form—some practically to non-form, with declining population due to reduced birthrate; class wars and revolutions; significant emigrations to the healthier of the widespread Hellenic colonies (to Asia, to Egypt, to Rhodes, to Carthage, to Italy and Sicily); and heavy pressure by European barbarians in the north. Defenseless and with an overabundance of slaves, Athens was probably spared destruction only by her fame as an intellectual center. Sparta, spiritually corrupted, slowly diminished nearly to a ghost town. Many other cities were practically deserted, their fields lying fallow, walls crumbling, grass growing in empty streets. Aged by philosophy and softened by recent prosperity, Greece ultimately opened herself to the stern embrace of Rome. Ironically, generally, Hellenism elsewhere was in ascendancy.

We have said that the cosmic view affects the culture. In the pre-Greek world whole societies seemed to see the Universe, generally, as their leaders and priests understood it and presented it to them (with obvious, but temporary, exceptions such as Ikhnaton). But now we have philosophers stepping beyond the folk. Not only are they thinking beyond the comprehension of the uneducated, but even speaking in terms difficult to understand by kings and priests—in fact (as Leo Strauss has so often pointed out) they are purposefully hiding certain 'truths' they believe they have found (or they are hiding their ignorance); distorting harsher truths in such manner as not to disrupt political life, or lose their own, as in the case of Socrates—not unlike later clerics burning witches and warlocks for the welfare of the greater society. Besides, life in this tumultuous time was never (or was only intermittently and briefly) settled. It was not a peaceful empire under a single flag. Who, other than a few self-sufficient or independently wealthy odd-balls, had the time to wend their way through these labyrinthine arguments? The exalted thinking of ancient Greece, then, had a delayed effect on civilization, but one that would far outlast the culture that spawned it (or as Aristotle might say, through which such potential was realized by nature), and it would have its greatest effect on a very distant future that no ancient man would recognize. The expansion of Hellenism—particularly through the conquests of Alexander the Great (during Aristotle's lifetime), and later through a kind of reversal: the conquest of Greece by an unenlightened Rome—would set the stage for the much delayed and unexpected entry of modernity.

While the Romans respected Athens as a source of ancient wisdom, by the time Greek philosophy actually penetrated Rome it had taken a turn inward. It was the weary philosophy of a declining culture that constituted part of the Roman booty. During the general Greek submission to Macedonian arms, philosophy sought safety in solitude rather than truth in public. Instead of searching for a deeper understanding of a world gone sour, intellectuals looked for a way to escape from reality.

Common folk, however, in looking for some correspondence between the eternal procession of the stars across the heavens and the fits and starts of the short parade of earthly mortality, found it in astrology. “The growth of science,” says Daniel J. Boorstin,

would depend on man’s willingness to believe the improbable, to cross the dictates of common sense. With astrology man made his first great scientific leap into a scheme for describing how unseen forces from the greatest distance, from the very depth of the heavens, shaped everyday trivia. The heavens, then, were laboratory of mankind’s first science, just as the interior of the human body, the inward realm of his consciousness, and the Dark Continents in the atom, would be the scenes for his latest sciences. Man sought to use his growing knowledge of the patterns of repeating experience in his never-ending struggle to break the iron ring of repetition.

.....

Astrology married the human needs which later centuries would divorce into science and religion.

[Boorstin: THE DISCOVERERS; Random House, NY, 1983; pp.18-19]

As we have seen and will continue to see, clear through the European Middle Ages, despite vehement anti-astrology arguments from philosophy and/or science, cosmological theory was too multi-faceted and too esoteric to gain support from those who found some comfort in their ‘enslavement to the stars’.

Assign hand-out for reading preparation for next class: Lucretius' THE NATURE OF THE UNIVERSE; Book V; R.E. Latham, trans.; Penguin Classics, [pp.171-216]

