

Yx27 – Clerical Quackery 7 – Physics vs. Metaphysics in Ancient Greece – 3 – Aristotle

This is the 27th in a series of posts dealing with what I call “the God Lie”, the 7th in a subseries dealing with “Clerical Quackery”, and the 3rd in the sub-subseries (!) dealing with “Physics vs. Metaphysics in Ancient Greece”, i.e., dealing with skirmishes and battles that occurred in ancient Greece in the war between science and religion that has raged during at least the past 2500 years. In the first post in this sub-subseries, I tried to sketch how people from Homer to Socrates were involved in the war; in the second, I focused on the mystic Plato; in this post, the emphasis will be on Aristotle (384–322 BCE), one of the most brilliant person who ever lived.

To try to reveal some of Aristotle’s astounding accomplishments, I’ll first sketch a little historical background for his ideas and summarize a little of the basics of Aristotelian logic. In earlier chapters [**Ib2** (entitled “Basic Ideas in Logic”), **R** (entitled “Reason vs. Reality”), & **T1** (entitled “‘Truth’ and Understanding”), I reviewed Aristotelian logic more thoroughly.

To begin, I’ll address a fundamental problem in logic, which caused difficulties in ancient Greece, whose resolution Aristotle saw, but which continues to cause difficulties to this day. It’s the problem arising from the (unfortunately) multiple meanings of the verb “to be”. An illustration of the problem appears in the syllogism:

God is love;
Love exists;
Therefore, God exists.

In the above ‘syllogism’ [from the Greek word *syllogizesthai*, from *syn-*, meaning ‘with’ or ‘together’, and *logizesthai*, to reason (from *logos* or ‘logic’); so, ‘syllogism’ is “putting reasoning together”], the error arises from the use of two different meanings for the verb “to be”. Thus, in the first premiss, “**God is love**” (which can be traced back from the New Testament to the Greek philosopher Empedocles, c.490–c.430 BCE), the verb “to be” is used to describe an assumed attribute of God (other attributes assumed, e.g., by Zarathustra, include omnipotence, omniscience, and omnibenevolence), whereas the second premiss, “**Love exists**”, deals with ‘existence’, which can also be expressed with the verb “to be” as “Love is”.

As a result, the conclusion of the above syllogism is unreliable, not only because it's based on the untested and untestable assumption that “God is love” but also because the logic is unsound. That is, even if the premisses were valid, the conclusion fails to follow, because the meanings of the verb “to be” have been shifted: it's used in the first premiss to describe attribution, whereas the conclusion relies on the assumption that “to be” can also be used to describe existence.

Such a logical fallacy¹ (in which the meaning of words is shifted or “thrown around”) is called an amphibole or amphiboly (a Greek word derived from the prefix *amphi*, meaning, e.g., ‘around’, and *ballein*, meaning “to throw”). The silliness of the conclusion that the existence of an attribute implies the existence of the subject can be seen from:

Invisible flying elephants are pink;
Pink exists;
Therefore, ... !

In total, there are four different meanings or uses for the verb “to be”. The four are: 1) the ‘is’ of existence (e.g., “She is”), 2) the ‘is’ of equality (e.g., She is the same height as you), 3) the ‘is’ of attribution or predication (e.g., “She is older than you”), and 4) the use of ‘is’ as an auxiliary verb (e.g., “She is becoming confused”). If reasoning is to be sound, it's essential that the different meanings of “to be” are used consistently.

One way to avoid logical problems derived from the multiple meanings for “to be” is to eliminate its use! For example, the above four statements can be re-expressed as: 1) “She exists”, 2) “You and she have identical heights”, 3) “Her age exceeds yours”, and 4) “The subject confuses her.”

Alternatively, in logical analyses we can use symbols rather than words. Thus, we can: 1) express ‘existence’ with the “identically equal to” sign, \equiv , which has three “bars” rather than the usual two, 2) express ‘equality’ with the (two-bar) “equal to” sign, $=$, and 3) express attribution or predication using set theory, e.g., “Consider the set of all people whose age exceeds yours; the set includes her.” Note that, in logic, there's rarely need to use “to be” as an auxiliary verb.

¹ For a review of logical fallacies see <http://zenofzero.net/docs/IfFindingImmortalFallacies.pdf>.

“To be or not to be”

Turning now to some basic ideas of logic, most fundamental is a set of two elementary scientific principles, discovered by fish, monkeys, and eventually people, but apparently first appreciated by Aristotle. These two principles are that: 1) some things exist in reality (e.g., bananas) and 2) such things are distinct (i.e., the banana on the ground is not the same as the banana still in the tree). Those two principles are usually written as 1) $A \equiv A$ (read as “ A is identically equal to A ”, by which is meant that A exists) and 2) $A \neq \neg A$ or $A \neq \sim A$ (either of which are read as “ A is not identically equal to *not-A*”), by which is meant that the A being considered is distinct.

In ancient Greece, the “father of logic”, Aristotle, formulated these two principles as follows (from Part 3 of Book IV of his *Metaphysics*):

This, then, is the most certain of all principles... it is impossible for the same man [maybe Aristotle should have said “the sane man”!] at the same time to believe the same thing to be and not to be; for if a man were mistaken on this point he would have contrary opinions at the same time. It is for this reason that all who are carrying out a demonstration reduce it to this as an ultimate belief; for this is naturally the starting-point even for all the other axioms.

Not to disparage the huge accomplishments of Aristotle to begin to describe how people put ideas together (i.e., create syllogisms), yet it’s unfortunately the case that Aristotelian logic has some severe limitations. I reviewed some of the limitations in the chapters already referenced. One of the limitations in his logic (arising from ambiguity in language) can already be seen in the above quotation from his *Metaphysics*.

Thus, in his statement, “it is impossible for the same man at the same time to believe the same thing to be and not to be”, ambiguity arises from different meaning for the verb “to be”. Possibilities include the following:

1) If by “to be” he meant ‘existence’, then his statement could be written as

... it is impossible for the same man at the same time to believe the same thing to be [or “to exist”; i.e., $A \equiv A$] and not to be [or “not to exist”; i.e., $A \neq A$];

2) If by “to be” he meant ‘identity’, then his statement could be written as

... it is impossible for the same man at the same time to believe the same thing to be [equal to something else, e.g., $A = B$] and not to be [equal to the same thing, i.e., $A \neq B$];

- 3) If, instead, he was using “to be” for ‘predication’ (i.e., according to my dictionary, “to state, affirm, or assert something about the subject of a sentence or an argument of proposition”), then his statement could be written as

... it is impossible for the same man at the same time to believe the same thing to be [a member of the set of, e.g., beautiful things] and not to be [a member of the same set].

In this third possibility (dealing with predication) an additional complication can arise because words can be imprecise (compared, for example, with the language of mathematics). Thus, the concept in the third rewrite (above) can be quite wrong: someone can be simultaneously beautiful (e.g., in appearance) as well as ugly (e.g., in interactions with other people).

Being careful with the definition of words (and, in general, Aristotle was so careful with his definitions that his writings can drive attentive readers up the wall!), Aristotle proceeded to formulate logic for cases in which “to be” is used to express attributions (that is, the “to be” of predication). Thus, from the scientific principles that things exist, $A \equiv A$, and are distinct, $A \neq \neg A$, Aristotle proposed that humans who desired that their thoughts conform to reality must adhere to the following “axioms of logics”:

- 1) “The law of identify”, $A = A$ (read as “ A is equal to A ” – and notice the difference between the identity and the equal signs),
- 2) “The law of noncontradiction”, $A \neq \neg A$ (read as “ A is not equal to *not-A*”), and
- 3) “The law of the excluded middle”, which in set theory can be described as: A can not be both a member and not a member of a specified set – a “law” that has caused subsequent logicians a great many difficulties defining some sets, e.g., see Russell’s paradox.

In part because of such complications, the “laws” of logic shouldn’t be called “laws”. Instead, they should be described as statements of scientific principles (that some things exist and are distinct). And being “only” scientific principles (similar to the scientific principles – not laws! – of mechanics, thermodynamics, etc.), then consistent with Popper’s principle, we can claim at most that they are falsifiable but (in the main, i.e., excluding “the law of the excluded middle”!) are not yet falsified.

Aristotle's statement of the "law" of the excluded middle is the following (from his book *Posterior Analytics*, bk. I, pt. 11):

It is impossible to affirm and deny simultaneously the same predicate of the same subject.

His statement of the "law" of non-contradiction is the following (*Metaphysics*, IV, 3):

For a principle which everyone must have who understands anything... which everyone must know who knows anything, he must already have when he comes to a special study. Evidently, then, such a principle is the most certain of all; which principle this is, let us proceed to say. It is, that the same attribute cannot at the same time belong and not belong to the same subject...

Aristotle's statement of the "law" of identity was as given a few paragraphs earlier – depending on exactly what he might have meant by his use of the verb "to be", i.e., if he was using it to represent 'existence' or 'identity' or 'predication'! He states the principle more forcefully in his *Metaphysics* (XI, 5):

There is a principle in things, about which we cannot be deceived, but must always, on the contrary recognize the truth; viz., that the same thing cannot at one and the same time be and not be, or admit any other similar pair of opposites.

Pre-Aristotelian Logic

To gain some appreciation of Aristotle's huge accomplishments in logic, consider first what some earlier Greeks said about 'reason', starting with one of the few fragments we have from the mystical mathematician Pythagoras (c.580–500 BCE), from about 200 years before Aristotle: "Reason is immortal, all else mortal." Such a statement illustrates a mistake made by many people, even today: when they don't understand something (e.g., reason, love, life, how the universe came into existence...) they have a tendency to worship it. The Greek playwright Sophocles (c.495–406 BCE) wrote: "Reason is God's crowning gift to man." Thereby, Sophocles was just as wrong as Pythagoras: no god ever had anything to do with creating reason. Instead, as I tried to outline above and in earlier chapters, reason is simply the application to thoughts of two fundamental principles (discovered by animals millions of years ago) that things exist and are distinct (i.e., $A \equiv A$ and $A \neq \neg A$).

Parmenides (or “Parmen’s son”; c.515–c.450 BCE) appears to be the first who came close to recording that humans and other animals assumed $A \equiv A$ and $A \neq \neg A$. He was born in the Greek city-state of Elea (or Elia) on the western side of southern Italy and founded the Eleatic school of philosophy. About 150 years later, Aristotle wrote that Parmenides (“one of the Italians” i.e., one of the Greek settlers in Italy) was a student of Xenophanes (the fellow who saw: “All is but a woven web of guesses”). Parmenides most famous statements are: “what is, is” and “what is not, is not”. Those statements are close to saying $A \equiv A$ and $A \neq \neg A$, but one can argue that what Parmenides said was “some things exist in reality and other things don’t”, without including the idea that the things that exist are distinct. That is, his statement that “what is not, is not” doesn’t mean $A \neq \neg A$, but that some things (such as gods and invisible pink elephants that fly) don’t exist in reality but only as ideas; it doesn’t include the concept that things can’t be what they’re not (i.e., $A \neq \neg A$).

Unfortunately, Parmenides also wrote:

Whatever can be spoken [of] or thought of necessarily is, since it is possible for it to be, but it is not possible for nothing to be.

And in case there’s doubt that he could have made such a huge mistake, in the same poem (*The Way of Truth*), he stated the same idea again, somewhat differently:

It is the same thing – to think of something and to think that it is – since you will never find thought without what-is, to which it refers, and on which it depends.

That means that invisible pink elephants (and gods) are really flying around all over the place – because “whatever can be spoken [of] or thought of necessarily is...” To which one could appropriately respond, in the vernacular, “Gimme a break!”

During the next ~2500 years, thousands of philosophers, hundreds of thousands of clerics, and billions of people went off on absurd tangents from the crazy idea that “whatever can be... thought of necessarily is...” For example, as I outlined in the previous post, Plato and his followers convinced themselves that gods and immortal souls were flying around all over the place.

Two thousand (or so) years after Plato, Descartes continued the same dumb idea: he convinced himself not only that he existed (“I think; therefore, I am” – rather than the more nearly correct: “I think; therefore, I’m thinking”!) but also that God existed, because he (Descartes) could imagine God. After Descartes, Hegel continued this foolishness with “the real is rational [which may be true] and the rational is real [prove it!]”, which in turn led to Marx’s foolishness and communism. Meanwhile, all organized religions are still based on Parmenides’ absurd idea that “whatever can be... thought of necessarily is...”

After Parmenides, more silliness was promoted by Empedocles (c.490–430 BCE). Empedocles lived in a Greek city in Sicily, and if he didn’t know Parmenides (although I wouldn’t be surprised if he studied under him), he essentially certainly² studied Parmenides’ poem (quoted above) and he unfortunately adopted Pythagoras’ ideas about reincarnation. As summarized by Professor Barry D. Smith at his Ancient Greek Philosophy website:³

Empedocles accepts Parmenides’ view that ultimately there is no generation or destruction; what is, is, and cannot come into being or perish. Fragments 11, 12 says,

Fools! – for they have no far-reaching thoughts – who deem that what-before-was-not comes into being, or that anything can perish and be utterly destroyed. For it cannot be that anything can arise from what in no way is, and it is impossible and unheard of that what is should perish; for it will always be, wherever one may keep putting it.

Such a conclusion apparently seemed obvious (and still seems obvious!) to the mystics of the world, consistent with their desire for eternal life, described by Empedocles as follows:

When, released from the body, you ascend to the free ether; you will become an immortal god, escaping death.

Ancient Greek (and subsequent) physicists, however, considered the mystics to be the “fools”. Currently, an enormous body of evidence supports the conclusion that a huge variety of things “come into being” from “what-before-was-not” (from self-replicating molecules to their abilities to form DNA and consciousness, from elementary particles to their abilities to create

² See <http://en.wikipedia.org/wiki/Empedocles>.

³ At <http://www.abu.nb.ca/courses/GrPhil/Empedocles.htm>.

stars and black holes, and from photons to possibly⁴ the universe itself). It's therefore reasonable to conclude that “immortal souls”, also, “came into being” from “what-before-was-not”, where by “came into being” is meant that such “souls” exist only as ideas in the minds of mystics, one definition of whom could be: those who agree with Parmenides that “whatever can be... thought of necessarily is...”!

Yet, it was an important contribution by Parmenides to begin to formulate the fundamental scientific principles that $A \equiv A$ and $A \neq \neg A$. 2500 years later, these fundamental principles of science – or stated equivalently, these fundamental premisses of logic (that things exist and are distinct) – have yet to be demonstrated wrong. But when Parmenides proposed that whatever could be imagined also exists, he unfortunately abandoned common sense.

Parmenides also abandoned common sense by rejecting the idea of Heraclitus (c.540–c.480 BCE) that “all is flux”. Instead,⁵ “rejecting the reality of change... for [Parmenides] all was one indivisible, unchanging reality, and any appearances to the contrary were illusions, to be dispelled by reason and revelation.” Parmenides’ most famous student, Zeno of Elea (c.490–c.430 BCE), carried this abandonment of common sense to an extreme, resulting in some famous paradoxes, parts of which remained unresolved for more than 2,000 years!

Zeno’s Paradoxes

Zeno of Elea (distinct from Zeno of Citium, who founded the Stoic school of philosophy about 150 years later) apparently traveled with Parmenides, including a trip to Athens where (according to Plato) they met with Socrates when he was about 20 and Parmenides was about 65. As readers probably know, one of Zeno’s most famous paradoxes posits that, in a race, “swift Achilles” could never overtake a tortoise, because when Achilles would, say, cut the distance between them in half, the tortoise would move a small distance forward; when Achilles cut the new distance between them in half, the tortoise would again move a small distance forward; and so on, to infinity. Therefore, Zeno argued, Achilles would never catch up to the tortoise. Of course, common sense responds: “Gimme a break; things pass other things all the time!”

⁴ See http://zenofzero.net/docs/Z_The_Zen_of_Zero.pdf.

⁵ From <http://plato.stanford.edu/entries/paradox-zeno/>.

Equally obvious is the time when Achilles would pass the tortoise. Thus, if the Speed of Achilles is S_a , then the Location of Achilles, L_a , at any time, T , is given by $L_a = S_a \times T$. If the tortoise is given a Head Start of HS and if the tortoise moves at Speed S_t , then the tortoise's Location, L_t , at any time is $L_t = HS + (S_t \times T)$. So, the time when the two locations are equal (i.e., when Achilles catches up to the tortoise and will subsequently pass it) can be found by equating the two locations: $L_a = S_a \times T_{cu} = HS + (S_t \times T_{cu}) = L_t$. Solving for the time gives the result that Achilles catches up to the tortoise at time $T_{cu} = HS / (S_a - S_t)$. For example, if the speed of Achilles is 11 m/s and tortoise is given a head start of 100 m but moves at 1 m/s (very rapid for a tortoise!), then Achilles would overtake the tortoise in 10 seconds.

Although Zeno's paradoxes may now seem to be rather silly, they had profound implications for philosophers in ancient Greece – and later! As the mathematician and philosopher Alfred Whitehead wrote in 1947:

I am fond of pointing out to my pupils that to be refuted in every century after you have written is the acme of triumph. I always make that remark in connection with Zeno. No one has ever touched Zeno without refuting him, and every century thinks it worthwhile to refute him.

And although Zeno's paradoxes did provide later philosophers with many challenges,⁶ more important was Zeno's method: he applied to philosophical questions what's now called the method of *reductio ad absurdum* ("reduction to absurdity"), which may have already been available in mathematics in the Pythagorean school. Thus, as stated by the Roman writer Apuleius in his book *The Defense* (Sec. 1, Pt. 4),⁷ Zeno "was the first to discover that most ingenious device of refuting hypotheses by the method of self-inconsistency." The method became known in ancient Greece as "the dialectic", from Greek *dialektikē*, meaning "(art) of debate", from *dialegesthai*, meaning "converse with". Stated differently, Zeno thereby realized that paradoxes can't exist, because $A \equiv A$ and $A \neq \neg A$. Apparently, though, Zeno didn't realize that the method to resolve any apparent paradox (obtained by sound reasoning) is to check the premisses, because at least one of them must be wrong – or if he realized the method, he wasn't able to apply it. If Zeno had applied the method, he might have made some amazing discoveries, including calculus, how to sum infinite series, and maybe even quantum mechanics!

⁶ See, e.g., <http://plato.stanford.edu/entries/paradox-zeno/>.

⁷ Available at <http://classics.mit.edu/Apuleius/apol.mb.txt>.

Nonetheless, Zeno still deserves substantial credit, because he was smart enough to notice that something was wrong, posing some paradoxes. Instead of doing a simple calculation to determine the time when Achilles would overtake the tortoise, Zeno apparently claimed that his argument demonstrated that Parmenides was right (that change was an illusion) and that our senses couldn't be trusted.

In a way, Zeno was right: our senses have their limitations. It's usually a good idea, however, to trust "common sense", because for every one of the few times that it may mislead, there'll be a thousand-or-more times that common sense will be more reliable than any philosophical or religious argument! And when someone reaches a nonsensical conclusion such as runners can't pass one another, or all invisible flying elephants are pink, or God made us in his image, then a reasonable response would be something similar to: "Have you spent much time trying to identify either errors in your reasoning or your incorrect premisses?"

In particular, Zeno's arguments contain many faulty premisses:

- 1) His failure to understand the concept of instantaneous speed (which, about 330 years ago, Newton and Leibniz independently resolved by taking ratios of infinitesimals, thereby creating differential calculus),
- 2) His assumption that forever cutting the distance between Achilles and the tortoise in half (with words such as "and so on, to infinity") would still leave a finite distance between them, and thereby, his assumption that the infinite series wouldn't converge (which, about 250 years ago, Euler showed was wrong),
- 3) His assumption that infinities weren't countable (which, about 140 years ago, Cantor resolved with his theory of transfinite numbers),
- 4) His assumption that the positions and speeds (or momenta) of both Achilles and the tortoise (even when the differences in positions shrunk to atomic sizes) could always be specified exactly (which, about 80 years ago, Heisenberg showed was wrong, providing the foundation for quantum mechanics), and
- 5) His assumption that infinities exist in reality, an assumption that has no evidential support, even though the idea is routinely used in pure mathematics and essentially all religions.

About 100 years after Zeno, Aristotle proposed a resolution of Zeno's paradox about Achilles and the tortoise. It's a rather tortuous explanation

(given in pts. 6–9 of bk. VI of his book *Physics*), because he first tries very hard to understand and describe ‘time’, ‘motion’, and ‘continuity’, but the essence of his argument is correct:

Now since the motion of everything that is in motion occupies a period of time, and a greater magnitude is traversed in a longer time, it is impossible that a thing should undergo a finite motion in an infinite time...

In fact, if Aristotle had gone just a little further with his ideas, he probably would have discovered the concept of instantaneous speed and differential calculus. Still, Aristotle’s analyses of the meaning of ‘continuity’ (and “the continuum”) formed the basis of all “continuum mechanics” (e.g., of solids, liquids, and gases), which was universally used in mechanics until the start of the 20th Century, when the discrete nature of some things and processes was found to be important, leading to quantum mechanics.

“Measure for Measure”

After the mistakes made by Parmenides and Zeno, there were many generations of quiet-muddled thinking (especially by Plato), until Aristotle put reasoning back on track. In the first generation after Parmenides, Protagoras (c.485–c.415 BCE) made a little progress with logic. He was the fellow whom I mentioned two posts ago who was charged with “impiety” and whose books were burned because they contained the honest and totally justifiable (agnostic) statement: “Respecting the gods, I am unable to know whether they exist or do not exist”. One of his few other statements that survived the clerics’ burning of his books was: “Man is the measure of all things; of what is, that it is; of what is not, that it is not.” That’s a great statement, both understandable and correct, but it’s more a statement about humans than about Nature’s principles that $A \equiv A$ and $A \neq \neg A$.

Maybe Protagoras was responding to the clerics who promoted people’s “belief” in the existence of various gods (if not invisible, flying, pink elephants!); it’s then a great “declaration of independence” to say: “Man is the measure of all things; of what is, that it is; of what is not, that it is not”, i.e., “I’ll decide whether or not invisible flying elephants are pink!” Or maybe Protagoras was responding to the silly statement of Parmenides, “Whatever can be... thought of necessarily is...”; it’s then a great response to say: “Man is the measure of all things; of what is, that it is; of what is not, that it is not”, i.e., “I’ll decide what is and what isn’t!”

On the other hand, any implication from Protagoras' statement that an individual's decision (about what exists) being a valid "measure" of anything's existence in reality would be quite wrong: just because someone decides that gods exist doesn't mean that they do! As Aristotle wrote (*Metaphysics*, XI, 6):

The saying of Protagoras is like the views we have mentioned; he said that man is the measure of all things, meaning simply that, that which seems to each man also assuredly is. If this were so, it follows that the same thing both is and is not, and is bad and good, and that the contents of all other opposite statements are true, because often a particular thing appears beautiful to some and the contrary of beautiful to others, and that which appears to each man is the measure... But to attend equally to the opinions and the fancies of disputing parties is childish; for clearly one of them must be mistaken.

In the same generation as Protagoras (about 10 years younger) was Socrates (469–399 BCE). As I mentioned two posts ago, what's known about Socrates is only what others recorded, and most of what was recorded was by his student Plato (c.428–c.348 BCE). It's then essentially impossible to know the origin of ideas that Plato attributed to Socrates – or attributed to others. Thus, although I don't know the source of it, the idea that $A \equiv A$ and $A \not\equiv \neg A$ was recorded by Plato in about 380 BCE in his book *Euthydemus*.⁸

More of Plato's Word Games

It appears that Euthydemus was a student of Protagoras, and I'd like to quote a portion of the (alleged) dialogue between Euthydemus and Socrates (as reported by Plato), because some of this dialogue provides an example of the "muddled mess of thinking" that existed before Aristotle, a mess that Socrates (or Plato) partially straightened out and that, later, Aristotle almost straightened out. The alleged conversation starts with the following:

"Then tell me," he [Euthydemus] said [to Socrates], "do you know anything?"

"Yes," I [Socrates] said, "I know many things, but not anything of much importance."

"That will do," he said. "And would you admit that anything is what it is, and at the same time, is not what it is?" [That question contains the ambiguity derived from the verb "to be". Thus, one doesn't know if the question refers to existence, identity, or set membership.]

"Certainly not." [i.e., I, Socrates, maintain that what is, is, and is not what it's not.]

⁸ Available at <http://classics.mit.edu/Plato/euthydemus.html>.

“And did you not say that you knew something?”

“I did.”

“If you know, you are knowing.”

“Certainly, of the knowledge which I have.”

“That makes no difference. And must you not, if you are knowing, know all things?”

“Certainly not,” I said, “for there are many other things which I do not know.”

“And if you do not know, you are not knowing.”

“Yes, friend, of that which I do not know.”

“Still you are not knowing, and you said just now that you were knowing; and therefore you are and are not at the same time, and in reference to the same things.”

“A pretty clatter, as men say, Euthydemus, this of yours! And will you explain how I possess that knowledge for which we were seeking? Do you mean to say that the same thing cannot be and also [cannot] not be? And therefore, since I know one thing, that I know all, for I cannot be knowing and not knowing at the same time. And if I know all things, then I must have the knowledge for which we are seeking. May I assume this to be your ingenious notion?”

“Out of your own mouth, Socrates, you are convicted,” he said.

Euthydemus (i.e., in reality, Plato) then goes on with similar absurdities to “demonstrate” that Socrates knows all things, knew all things when he was born – because it was knowledge possessed by his immortal soul!

A second strange feature of the above report is that Plato seems to have believed the result (i.e., that each person has a “soul” that knows all things and always knew all things), and yet, Plato reports how Socrates demonstrated Euthydemus’ errors. Thus, Plato reports that Socrates states (to someone else who was “tripped up” by Euthydemus or his brother):

The two foreign gentlemen [Euthydemus and his brother] perceiving that [you] did not know, wanted to explain to you that the word ‘to learn’ [or the word ‘know’] has two meanings, and is used, first, in the sense of acquiring knowledge of some matter of which you previously have no knowledge, and also, when you have the knowledge, in the sense of reviewing this matter, whether something done or spoken by the light of this newly-acquired knowledge; the latter is generally called ‘knowing’ rather than

‘learning,’ but the word ‘learning’ is also used; and you did not see, as they explained to you, that the term is employed of two opposite sorts of men, of those who know, and of those who do not know.

There was a similar trick in the second question, when they asked you whether men learn what they know or what they do not know. These parts of learning are not serious, and therefore I say that the gentlemen are not serious, but are only playing with you.

For if a man had all that sort of knowledge that ever was, he would not be at all the wiser; he would only be able to play with men, tripping them up and over setting them with distinctions of words. He would be like a person who pulls away a stool from some one when he is about to sit down, and then laughs and makes merry at the sight of his friend overturned and laid on his back.

Plato thus reported that Socrates saw that these disciples of Protagoras (“Sophists”) were just playing “word games”, and yet, although Plato was apparently aware that the Sophists were capitalizing on failures to define words carefully, Plato in his writings trapped himself in his own word games! He appears to have relied on the foolishness of Parmenides’ statement, “**Whatever can be... thought of necessarily is...**”, and from that blunder (plus not being careful with definitions), he made an enormous number of mistakes, mistakes that, to this day (as I tried to outline in the previous post) continue to be perpetuated by all ideologues, including the promoters of all religions.

Plato’s Euthyphro Dilemma

Still another mess left by Plato is associated with what’s now called “the Euthyphro dilemma”.⁹ Unlike paradoxes (which can’t exist – at least so long as the scientific principles that $A \equiv A$ and $A \not\equiv \neg A$ remain valid!), dilemmas can exist (e.g., not being able to have your cake and eat it, too – or whether to pronounce ‘Euthyphro’ as “u-THY-froh” or “U-thuh-froh”!). The source of the usual “Euthyphro dilemma” is Plato’s statement (allegedly quoting Socrates) in Plato’s book *Euthyphro*:¹⁰

... whether the pious or holy is beloved by the gods because it is holy, or holy because it is beloved of the gods.

A more modern version, stated as a question for monotheists, might be:

⁹ See, e.g., http://en.wikipedia.org/wiki/Euthyphro_dilemma.

¹⁰ Available at <http://classics.mit.edu/Plato/euthyphro.html>.

Is something moral because God said so, or did God say so, because it's moral?

The dilemma follows from consideration of the two options. Thus, on the one hand, if something is moral because God said so, then morality seems to be nothing more than God's whim: if God orders people to kill their children, or if God murders homosexuals, drowns people, kills children and unbelievers, promotes rape and genocide, kills his own son, etc. (as He allegedly does, according to the Bible), then what hideous person would want anything to do with the morality of such a monster?

And on the other hand, if God says something is moral because it is (that is, as I reviewed in earlier chapters, because morality is somehow “[built into the fabric of the universe](#)”, as the Sumerians seemed to have maintained with their concept of *Mummu*, the ancient Chinese maintained with their idea of *Yin-Yang*, the ancient Hindus maintained about *Ritam*, the ancient Egyptians maintained about *Ma'at*, Zarathustra maintained about *Asha*, etc.), then why don't people just skip what God has to say about morality (as allegedly given in various “holy books”) and seek to discern “the moral order” to which the wimpy god is required to conform?

In general, if one encounters a dilemma that can't be resolved, one is forced either to live with the dilemma (which most people find difficult to do) or to choose one of the available options. In the case of the Euthyphro dilemma, Jewish and Muslim clerics advocated (and still advocate) choosing the option that God is all-powerful (and that his ways are too mysterious for mere humans to understand). That is, consistent with the primitive, patriarchal, tribal customs that they “deified”, Jewish and Muslim clerics maintained (and still maintain) that whatever the all-powerful Yahweh or Allah said or did (as alleged in their “holy books”) is right, by definition, fundamentally because they adopt the law of the jungle (“might makes right”) – and wouldn'tcha know, the clerics just happen to be the powerful god's earthly representatives, so you'd better do exactly as they say.

If a resolution to a dilemma is possible, then in principle at least, the resolution can be found in either of two ways: by uncovering faulty logic or by removing unjustified, faulty premisses. For example, upon being told that they can't have their cake and eat it, too, many children will recognize that the dilemma is derived from the “false dichotomy” logical fallacy – and proceed to eat only a portion of their cake!

Similarly, Plato's (and subsequent Christian clerics') proposed resolution to the Euthyphro dilemma was to assume that God is "all good" and, therefore, He would never prescribe anything evil as being moral. Consistently, in *The Republic*, Plato proposed censorship of all suggestions (such as those in Homer and Hesiod) that the gods behaved immorally – and subsequent Christian clerics followed Plato's recommendation to kill anyone who said otherwise. (And actually, subsequent Muslim clerics adopted similar policies, e.g., "kill the infidels", even though they also adopted and still promote the option that whatever God says is right, because "might makes right" – illustrating that clerics don't feel constrained by logic, so long as they can continue to be parasites.)

The alternative (resolving dilemmas by identifying one or more faulty premisses) is the same method used to eliminate all paradoxes derived from sound logic. Such is the method used by Humanists to resolve the Euthyphro dilemma. Thus, given the substantial evidence [which I've at least sketched in early chapters (e.g., see **K** and **Yx14**)] showing that morality is derived from experiences gained by social animals (such as dolphins, monkeys, elephants, and humans) in how to live together cooperatively, Humanists reject the data-less, unjustified premiss (or better, "mere speculation"!) that any god exists or has ever existed. Thereby, the Euthyphro dilemma collapses into meaningless mumbo-jumbo, typical of Plato's mystical ramblings (and similar balderdash in all "holy books" promoted by clerics).

Aristotle

In contrast to Socrates' student Plato, Plato's student Aristotle surpassed his teacher. Two examples are Aristotle's analyses and rejections of Plato's ideas of Forms (outlined in the previous chapter, **Yx26**) and Plato's idea of souls (outlined in an earlier chapter, **Ix11**), leading to Aristotle's famous statement:

...while both are dear, piety requires us to honor truth above our friends.

There's no doubt that Aristotle was brilliant. He was in the same league as Confucius, the Buddha, Epicurus, Spinoza, Hume, Jefferson, Darwin, and Einstein. He was also a prolific writer – and now, it's wonderful that his 29 books are just a few clicks away, courtesy computers, the internet, and

tremendous websites such as Greek Texts¹¹ and the Internet Classics Archive at MIT.¹² Some praise of Aristotle, however, may be too profuse, e.g., Cicero described his books as “a river of flowing gold”; instead, readers might agree more with the assessment that Aristotle drowns his readers in a flood of unnecessary repetitions and pedantry – even while agreeing that his books contain nuggets of brilliance.

For purposes of this series of posts dealing with the God Lie, however, it would be a distraction to try to survey all of Aristotle’s brilliant accomplishments. Instead, I’ll focus on some of the ways that he corrected Plato’s erroneous ideas and then comment on some of Aristotle’s own errors. I should also include at least a brief version of Aristotle’s biography, since he participated in initiating many ideas whose repercussions continue to this day.

The referenced Greek Texts website reviews that Aristotle (384–322 BCE) was born in Macedonia, where his father was court physician. At age 18, he traveled to Athens and studied under Plato. When he was 37 (when Plato died), Aristotle left Athens for Atarneus in Asia Minor and married the ruler’s niece. A few years after Aristotle moved to Atarneus, King Philip II of Macedonia summoned him to become the tutor of his 13-year-old son Alexander, later known as “Alexander the Great.”

Relevant to the next chapter (dealing with the accomplishments of Epicurus, Zeno the Stoic, and others), I want to add that, accompanying Aristotle to Atarneus was another of Plato’s former students, Xenocrates, whose later lectures were said to have been attended by Epicurus and Zeno the Stoic. Similar to Aristotle, Xenocrates was a prolific writer, writing books on topics similar to those addressed by Aristotle. In contrast to Aristotle, however, Xenocrates promoted Plato’s Theory of Forms. In addition, Xenocrates attempted to resolve the paradoxes of Zeno of Elea by proposing (without justification) that some magnitudes were indivisible.

In about 335 BCE, when Alexander the Great (356–323 BCE) started his Asiatic campaign, Aristotle returned to Athens and opened his own school. It’s reported that, similar to Plato, Aristotle expounded his philosophy in “popular language” in various *Dialogues*, which haven’t been found.

¹¹ At <http://www.greektexts.com/library/Aristotle/index.html>.

¹² At <http://classics.mit.edu/>.

What we have are his 29 more formal treatises (which may have been lost or hidden for ~200 years after his death, a year after Alexander's death). It has been suggested that some of Aristotle's surviving books were lecture notes recorded by his students, but from my experiences, it's difficult for me to imagine how any student could have recorded such details as appear throughout his books. Below, I'll briefly review a few of his ideas, including his ideas about souls and gods – although in some cases, it's difficult (and even inappropriate) to isolate such ideas from his other ideas; for example, his erroneous idea about God followed logically from the errors he made in physics.

Some of Aristotle's Accomplishments

In the previous post I already showed at least a little of Aristotle's criticism of Plato's Forms. Here, I'll add only a few more comments. As readers can find, Aristotle devotes most of his book *Metaphysics* to debunking Plato's (or Pythagoras') Theory of Forms and his idea of a "good" god, involved in human affairs. As an example, Aristotle struck devastating blows to the foundation of Plato's attempt to meld Pythagorean ideas about numbers and Socrates' ideas about "the Good" (with a capital 'G', no less) with his comments: "[but the mathematical sciences take no account of goods and evils](#)" and "[the impossible results of this view \[Plato's\] would take too long to enumerate.](#)"

With respect to the setting for Aristotle's ideas about souls, recall (e.g., from the previous post) that Plato proposed some bizarre ideas about souls and "eternal life", which were subsequently used to construct the theoretical abominations subsequently called Christianity and Islam. In turn, Plato probably obtained his ideas from the Egyptians and from the Pythagoreans, and in turn, Pythagoras probably picked up his ideas from the Egyptians and perhaps from the Zoroastrians and Hindus. In contrast to the possibility of automatically adopting such ideas from "the ancients" and in conformity with Socrates' recommendation to be careful with definitions, Aristotle started his book *On the Soul* by carefully examining what "the ancients" seemed to have meant by the word 'soul'.

Thus, in Part 1 of Book I of *On the Soul*, Aristotle states: "[The soul is in some sense the principle of animal life.](#)" He then summarizes his investigation of the meaning of the word 'soul' (bk. II, pt. 1):

We have now given an answer to the question, What is soul? – an answer which applies to it in its full extent. It is substance in the sense which corresponds to the definitive formula of a thing's essence.

Stated differently, if Aristotle could have used modern terminology, he might have said: “the soul is the DNA sequencing that defines any life form's genetic code”! Aristotle then proceeded to the obvious conclusion:

From this it indubitably follows that the soul is inseparable from its body...

Thereby, Aristotle not only undermined Plato's (and Pythagoras' and the Zoroastrian/ Hindu/ Egyptian – and subsequent Christian/ Islamic...) idea of soul, he prepared the way for what, still today, should destroy all religious people's silly ideas about “immortal souls” – if only religious people would begin to base their idea on evidence rather than on dreamy speculations!

That is, consistent with Aristotle's idea that “the soul is inseparable from its body”, modern neurology has provided a vast amount of evidence that a person's character, outlook on life, behavior, etc. (or, as religious people would say, a person's ‘soul’) can be changed dramatically by physical or chemical changes in the brain. The obvious conclusion, then, is that there's no “ghost in the machine” (i.e., ‘soul’); instead, the brain, itself, is what religious people are wont to call ‘soul’. As “Ebonmuse” recently wrote at his blog:¹³

As Carl Sagan observed, the history of the human species is a series of great demotions. The first was the Copernican revolution, demoting Earth from the center of the universe to one planet among many. The religious conservatives fought against this for a long time, but for the most part, they've come to accept it. The second was the Darwinian revolution, making human beings just one species among many, rather than the apex of creation. The religious conservatives, for the most part, have refused to come to terms with this and are still fighting against it. The third one, I think, is going to be the neurological revolution – the one that shows our mind is the result of physical causes, rather than the product of a supernatural soul. For the most part, religious conservatives haven't even felt this blow yet. But I think, when its full force is recognized, it's going to be the most decisive one of all. The knowledge that the mind is a physical phenomenon strikes directly at religious belief, far more so than evolution or heliocentrism do.

¹³ At <http://www.daylightatheism.org/2008/09/ten-questions-to-ask-your-pastor.html>.

Stated differently, now that ample evidence is available to debunk Plato's (and earlier people's) idea of 'soul' (a "ghost in the machine"), maybe religious fundamentalists will finally accept Aristotle's idea!

Aristotle made many other contributions, but attempting to outline them all would distract from the goal of this series of posts. Earlier in this post and in an earlier chapter, I outlined some of his astounding accomplishments in logic; in summary, it's a testament to his brilliance that limitations on "Aristotelian logic" have been uncovered only during the most recent century. In earlier chapters, I already addressed some of his ideas about ethics (e.g., in **M3** and **P6**) and about politics (e.g., in **X8** and **X33**).

Here, I should at least mention that, in addition to demolishing Plato's ideas about Forms and souls, Aristotle demolished Plato's damnable ideas (described in Plato's *Republic*, which I criticized in the previous post) about "the ideal society" (i.e., a communistic, totalitarian, theocracy, much like today's Iran). Instead, Aristotle's analysis in his *Politics* led to such gems as the following:

- Man is by nature a political animal.
- Political society exists for the sake of noble actions, and not of mere companionship.
- The two qualities which chiefly inspire regard and affection [are] that a thing is your own and that it is your only one [which undermines not only communism but also the polygamy of Islam].
- If liberty and equality... are chiefly to be found in democracy, they will be best attained when all persons alike share in the government to the utmost.
- The best political community is formed by citizens of the middle class.
- The basis of a democratic state is liberty.
- Law is order, and good law is good order.

Some of Aristotle's Major Mistakes

Unfortunately, Aristotle also made many mistakes, and as inconsistent as it may seem, reliance on logic was his nemesis – as it is, to this day, with all religious philosophers who claim to be logical.

Thus, although Aristotle obviously realized that sound logic provides knowledge consistent with assumptions, yet he apparently didn't realize (what modern-day religious people still don't seem to realize) that logic can never produce new information – only knowledge that's consistent with existing information. Therefore, for example (as I've described in detail in Chapter **R**), it's impossible to use logic to prove that any god exists (or has ever existed), since such a demonstration would yield new information. Thereby, all the claimed “logical proofs of God's existence” (see Chapter **Ie**) are, as Kant said, “**So much... labor lost.**” Instead, the only way to demonstrate that any god exists would be to provide relevant evidence.

Many of Aristotle's errors can be traced to his major mistake of starting from Socrates' unproductive (even counterproductive) view of science, which Aristotle described as follows:

For two things may be fairly ascribed to Socrates – inductive arguments and universal definitions, both of which are concerned with the starting-point of science.

That assessment is consistent with Plato's reports that Socrates spent his time talking to people, trying to determine what they meant by various concepts (such as honor, truth, wisdom, etc.) and then trying to find some common features of these concepts from which he could generalize (i.e., some common features from which, by induction, he could infer general principles).

Such a procedure is, however, not the “starting-point of science.” Instead, as emphasized and repeatedly demonstrated by (especially) “the father of modern medicine” Hippocrates (c.460–377 BCE, a contemporary of Socrates), the “starting point (and essence!) of science” is the scientific method, i.e., observe, try to infer some hypothesis from the observations, and then perform experiments to test predictions of the hypothesis.

Aristotle's failure to appreciate the essence of science (i.e., his emphasis on definitions rather than data), as well as historical consequences of his failure, were well summarized by the 20th Century philosopher Karl Popper in Section II of Chapter 11 of his book *The Open Society and Its Enemies* and in Chapter 6, entitled “Two Kinds of Definitions”, of *Popper Selections* (David Miller, Ed., Princeton University Press, 1985). Below, I've melded quotations from those two sources.

In science, we take care that the statements we make should never depend upon the meaning of our terms. Even where the terms are defined, we never try to derive any information from the definition, or to base any argument upon it. This is why our terms make so little trouble. We do not overburden them. We try to attach to them as little weight as possible. We do not take their “meaning” too seriously. We are always conscious that our terms are a little vague (since we have learnt to use them only in practical applications) and we reach precision not by reducing their penumbra of vagueness, but rather by keeping well within it, by carefully phrasing our sentences in such a way that the possible shades of meaning do not matter. This is how we avoid quarrelling about words.

Our “scientific knowledge”, in the sense in which this term may be properly used, remains entirely unaffected if we eliminate all definitions; the only effect is upon our language, which would lose, not precision, but merely brevity...

There could hardly be a greater contrast than that between this view of the part played by definitions, and Aristotle’s view. For Aristotle’s essentialist definitions [i.e., in which a word is burdened with “capturing the essence” of some thing or process] are [assumed to be] the principles from which all our knowledge is derived; they thus [are assumed to] contain all our knowledge; and they [are assumed to] serve to substitute a long formula for a short one. As opposed to this... scientific... definitions do not contain any knowledge whatever, nor even any ‘opinion’; they do nothing but introduce new arbitrary shorthand labels; they cut a long story short.

The problem of definitions and of the “meaning of terms” is the most important source of Aristotle’s regrettably still prevailing intellectual influence, of all that verbal and empty scholasticism that haunts not only the Middle Ages, but our own contemporary philosophy [and all religions!]; for even a philosophy as recent as that of L. Wittgenstein suffers... from this influence.

The development of thought since Aristotle could, I think, be summed up by saying that every discipline, as long as it used the Aristotelian method of definition [such as in all religions!] has remained arrested in a state of empty verbiage and barren scholasticism, and that the degree to which the various sciences have been able to make any progress depended on the degree to which they have been able to get rid of this essentialist method...

...Aristotle’s doctrine of definition... led to a good deal of hairsplitting. But later, philosophers began to feel that one cannot argue about definitions. In this way, essentialism not only encouraged verbalism, but it also led to the disillusionment with argument, that is, with reason. Scholasticism [,] mysticism [,] and despair in reason [the hallmarks of all organized religions!]... are the unavoidable results of the essentialism of Plato and Aristotle...

In spite of Aristotle’s major error to emphasize definitions rather than data, Aristotle did appreciate that all his analyses relied on certain “primary

premisses.” He didn’t see, however, that the reliability of his primary premisses could be judged only through experimental tests of their predictions, instead proposing and promoting the blatant idiocy (*Posterior Analytics*, I, 31):

Scientific knowledge is not possible through the act of perception.

In *Posterior Analytics* (II, 19), he went on to propose the following nonsense (to which I’ve added the italics):

From these considerations it follows that there will be no scientific knowledge of the primary premisses, and since except intuition nothing can be truer than scientific knowledge, it will be intuition that apprehends the primary premisses – a result which also follows from the fact that demonstration cannot be the originative source of demonstration, nor, consequently, scientific knowledge of scientific knowledge. If, therefore, it is the only other kind of true thinking except scientific knowing, intuition will be the originative source of scientific knowledge. And the originative source of science grasps the original basic premiss, while science as a whole is similarly related as originative source to the whole body of fact.

Aristotle’s bizarre proposals that “intuition [apprehends] the primary premisses” (a proposal that, during the 20th Century, Kurt Gödel pursued, even after he proved his incompleteness theorem, and drove himself insane attempting to prove) and that “intuition [is] the originative source of scientific knowledge” led Aristotle to another major mistake, which I’ll summarize as follows: by failing to see that the only authority in science is evidence and by claiming, instead, that intuition is the source of scientific knowledge, Aristotle became an authoritarian, demanding that others acknowledge his intuition (and resulting pronouncements and definitions) as “the authority”.

To illustrate and try to explain what I mean, as well as to suggest why Aristotle’s authoritarianism was successful for so long, I’ll start with his famous statement (from his *Metaphysics*, I, 1): “Man by nature desires to know.” Thereby, although Aristotle didn’t realize how knowledge of the world external to our minds can be gained (i.e., *via* the scientific method), yet he not only saw that humans have a desire to know, he also saw (perhaps intuitively!) that humans unfortunately have a propensity to accept even crazy “explanations” (such as the existence of various gods) as “knowledge”, if such explanations are presented with sufficient authority and give superficial appearances of explaining the unknown (e.g., “our holy book says...”).

As a result and with his connections to the most powerful political authority of his time, Alexander the Great (Aristotle's student), Aristotle became one such arrogant "authority", dictating superficial "explanations" as "knowledge", thereby trampling on the two-centuries-old wisdom of Xenophanes: "all is but a woven web of guesses".

Many illustrations of Aristotle's authoritarianism are available. One is his statement in his *Metaphysics* (II, 2): "Nothing infinite can exist [in reality]." That may be correct, but such a bold pronouncement can't be justified; instead, he should have stated something similar to: "To date, nothing infinite has yet been found in reality." Another illustration is his statement in his *Physics* (VIII, 1):

...that which is produced or directed by nature can never be anything disorderly: for nature is everywhere the cause of order.

He provided no justification for such a claim, and (of course) we now know that his claim is exactly contrary to the second principle of thermodynamics, one of whose statements is that, in isolated systems, nature always seeks to produce maximum disorder!

Still another example of Aristotle's authoritarianism is in his *Metaphysics* (IV, 4) where he attacks those who disagree with the scientific principles that things exist and are distinct (i.e., $A \equiv A$ and $A \neq \neg A$):

There are some who... assert that it is possible for the same thing to be and not to be... But we have now posited that it is impossible for anything at the same time to be and not to be, and by this means have shown that this is the most indisputable of all principles. Some indeed demand that even this shall be demonstrated, but this they do through want of education, for not to know of what things one should demand demonstration, and of what one should not, argues want of education. For it is impossible that there should be demonstration of absolutely everything (there would be an infinite regress, so that there would still be no demonstration); but if there are things of which one should not demand demonstration, these persons could not say what principle they maintain to be more self-evident than the present one.

That's terrible authoritarianism, and moreover, it's just plain dumb! In fact, if it weren't for the appearance of similar statements elsewhere in his writings, I would wonder if it were a translation error – for it rather hurts to see such a brilliant mind make such a colossal error.

That is, Aristotle was totally wrong to suggest that it is “for want of education” or “the mark of a man who is unable to distinguish what is self-evident from what is not” that someone would demand a demonstration of any fundamental scientific principle (or axiom). In contrast, what Aristotle should have said is that the instances of demonstrations that things exist and are distinct (i.e., that $A \equiv A$, that $A \neq \neg A$) are so numerous that even monkeys and babies have wholeheartedly adopted these hypotheses!

Stated differently, what Aristotle should have written is that, if anyone should suggest (in seriousness) that one of the fundamental axioms (or scientific principles) of logic is wrong, then the person should be strongly encouraged to demonstrate how the principle is wrong – guaranteeing a prize to anyone who can do so! Stated in the vernacular, if anyone should say something as horrible as the Bible’s “it’s a wicked generation that wants a sign” or Aristotle’s “[it’s] the mark of a man who is unable to distinguish what is self-evident from what is not”, then an appropriate response is:

Blow it out your ear!

Some of Aristotle’s Specific Errors

Aristotle’s misunderstanding of the essence of science, his failure to test predictions of his hypotheses and, instead, his reliance on definitions, intuition, and authoritarianism, led him to sometimes silly and sometimes serious errors. An example of one of his silly errors was his hypothesis that women have fewer teeth than men – and he apparently never took the trouble to ask his wife (or any other woman) to open her mouth, so he could count her teeth! Yet, maybe he wasn’t on speaking terms with his wife, for as Aristotle the philosopher said:

By all means, marry. If you get a good wife, you’ll become happy; if you get a bad one, you’ll become a philosopher. [!]

Some illustrations of Aristotle’s more serious errors are available in his book *Physics*. As a first example, consider his fundamental premiss (from *Physics*, I, 5):

Our first presupposition must be that in nature nothing acts on, or is acted on by, any other thing at random, nor may anything come from anything else...

One can understand why Aristotle would make such an assumption, and one can admire Aristotle for trying so hard, so long ago, to understand Nature, but we who are accustomed to the scientific method would now inquire:

What evidence supports such assumptions? What predictions follow from such a hypothesis? What are the results of experimental tests of those predictions?

And, of course, we now know that, for example, all 20th Century results in quantum mechanics show that both aspects of Aristotle's above-quoted "first presupposition" are wrong.

Another serious error also appears near the beginning of his book on *Physics*. Thus, by considering the behavior of plants, animals, and people, he concludes (bk. II, pt. 8):

If purpose, then, is inherent in art, so is it in Nature also... It is plain, then, that nature is a cause, a cause that operates for a purpose.

Unfortunately, however, Aristotle reached his generalization considering only animate parts of nature; meanwhile, as far as is known, rocks, stars, galaxies... don't have purposes – or stated more meaningfully, 'purpose' is a concept attributable only to life. Stated still differently, life has a purpose (namely, to continue living), but no evidence supports Aristotle's assumption that inanimate Nature has any purpose.

Thereby, Aristotle made the mistake of arguing by analogy, apparently not appreciating the important conclusion reached by another of Socrates' students, Euclid of Megara (c.435–c.365 BCE), that arguments by analogy never constitute "proof". A still more serious example of Aristotle's error of relying on an argument by analogy is his disgraceful "justification" of slavery, which I addressed in Chapter **R**.

Similarly, by relying only on logic (based on incorrect premisses), Aristotle erroneously concluded in his *Physics* (IV, 7 & 8) that a vacuum cannot exist:

It is clear, then, from these considerations that there is no separate void.

Further, in his *Metaphysics* (XI, 8) he erroneously added:

If, then, luck or spontaneity is a cause of the material universe, reason and nature are causes before it.

Aristotle gave no justification for such claims. We could now argue that if (for example) the universe was created by a symmetry-breaking quantum-like fluctuation in the original void, then “before” such a “creating fluctuation”, nothing existed; therefore, neither reason (based on existence and uniqueness) nor “nature” had any meaning; therefore, they couldn’t have been “causes before it.” Instead, the “cause” of the “spontaneity” would have been simply that, similar to other quantum mechanical systems, “total nothingness” fluctuates (and some such fluctuations are unstable). But Aristotle certainly can be pardoned for taking the easier route: he assumed (e.g., *Meteorology*, I, 14) that “the universe is permanent”.

Relative to Aristotle’s influence on religions, his most egregious error followed from his unsupported and incorrect assumption (*Physics*, VII, 1):

Everything that is in motion must be moved by something.

The above error led Aristotle to conclude that there must have been a “prime mover” (God) who set things in the universe in motion, a conclusion later copied by many foolish religious philosophers, including Thomas Aquinas (1225–74). Unfortunately, Aristotle (and later religious philosophers) apparently never observed and considered motion resulting from, for example, a bubble bursting!

That is, there’s no need for any external force (putting the water droplets from a bubble’s burst into motion); there’s need only that momentum be conserved (i.e., that the momenta of all exploded components of the bubble sum to the same value they had before the explosion, i.e., zero). In contrast to his silly conclusion that a God must have started all motions, if Aristotle had thought about an exploding bubble (or similar), he might have concluded that motion in the universe could have been started by a Big Bang!

Aristotle repeats the same error in his *Metaphysics* (XII, 6), and then extended his error:

... it is impossible that movement should either have come into being or cease to be (for it must always have existed), or that time should. For there could not be a before and an after if time did not exist.

Relative to the first part of the above statement (i.e., his claim that movement can’t come into being or cease to be), Aristotle apparently never

saw either a bubble burst (i.e., motion come into being) or something stop moving (e.g., a ball, stopped from rolling because of friction). And relative to the second part of his claim, he can be forgiven for not seeing that time is meaningless without energy; therefore, before the Big Bang (which created motion), i.e., before there was energy, there was no time.

The culmination of his errors about motion and time appears in his *Metaphysics* (XII, 7), where he introduces his god as the prime mover, who (he decides, siding with Plato) must be “good”:

...The first mover, then, exists of necessity; and in so far as it exists by necessity, its mode of being is good, and it is in this sense a first principle. For the necessary has all these senses – that which is necessary perforce because it is contrary to the natural impulse, that without which the good is impossible, and that which cannot be otherwise but can exist only in a single way.

Then, stuck with the assumption that his prime mover is “good”, Aristotle produces the following gobbledegook:

... If, then, God is always in that good state in which we sometimes are, this compels our wonder; and if in a better this compels it yet more. And God is in a better state. And life also belongs to God; for the actuality of thought is life, and God is that actuality; and God’s self-dependent actuality is life most good and eternal. We say therefore that God is a living being, eternal, most good, so that life and duration continuous and eternal belong to God; for this is God.

And with that error, he manages to dig himself into an even deeper hole (*Metaphysics*, XII, 9):

The nature of the divine thought involves certain problems; for while thought is held to be the most divine of things observed by us, the question how it must be situated in order to have that character involves difficulties. For if it thinks of nothing, what is there here of dignity? It is just like one who sleeps. And if it thinks, but this depends on something else, then (since that which is its substance is not the act of thinking, but a potency) it cannot be the best substance; for it is through thinking that its value belongs to it. Further, whether its substance is the faculty of thought or the act of thinking, what does it think of? Either of itself or of something else; and if of something else, either of the same thing always or of something different. Does it matter, then, or not, whether it thinks of the good or of any chance thing? Are there not some things about which it is incredible that it should think?

Evidently, then, it thinks of that which is most divine and precious, and it does not change; for change would be change for the worse, and this would be already a movement. First, then, if ‘thought’ is not the act of thinking but a potency, it would

be reasonable to suppose that the continuity of its thinking is wearisome to it. Secondly, there would evidently be something else more precious than thought, viz. that which is thought of. For both thinking and the act of thought will belong even to one who thinks of the worst thing in the world, so that if this ought to be avoided (and it ought, for there are even some things which it is better not to see than to see), the act of thinking cannot be the best of things. Therefore it must be of itself that the divine thought thinks (since it is the most excellent of things), and its thinking is a thinking on thinking.

Thus, according to Aristotle, after God set things in motion, then (in the vernacular), **God has spent eternity contemplating his own navel!** Well, sorry to burst Aristotle's (and Thomas Aquinas', and...) bubble, but if they'd watch a bubble bursting, then they'd see no need for "a first cause" (of motion); i.e., God isn't needed – except, of course, in the case of clerics such as Thomas Aquinas and all other clerics before and since, God is needed for them to have the time to contemplate their own navel, rather than go out and produce something useful for other humans.

Some of Aristotle's Gems

But even though we can now see that Aristotle made many major errors, he was obviously an astounding genius, contributing such gems as:

It is the mark of an educated mind to be able to entertain a thought without accepting it.

In that regard, consider the wisdom of what he wrote in *Metaphysics* (II, 1):

The investigation of the truth is in one way hard, in another easy. An indication of this is found in the fact that no one is able to attain the truth adequately [as Xenophanes said], while, on the other hand, we do not collectively fail, but every one says something true about the nature of things, and while individually we contribute little or nothing to the truth, by the union of all a considerable amount is amassed. Therefore, since the truth seems to be like the proverbial door, which no one can fail to hit [is the proverb about hitting a barn door that old?!], in this respect it must be easy, but the fact that we can have a whole truth and not the particular part we aim at shows the difficulty of it... It is just that we should be grateful, not only to those with whose views we may agree, but also to those who have expressed more superficial views [such as, as he points out, Pythagoras and Plato]; for these also contributed something, by developing before us the powers of thought.

By the same token, although Aristotle was wrong about much, he quite likely contributed more to "the powers of thought" than has anyone else! Still more to his credit, Aristotle demonstrated in his *Metaphysics* his disdain for all theologians:

The school of Hesiod and all the theologians thought only of what was plausible to themselves, and had no regard to us. For, asserting the first principles to be gods and born of gods, they say that the beings which did not taste of nectar and ambrosia became mortal; and clearly they are using words which are familiar to themselves, yet what they have said about the very application of these causes is above our comprehension. For if the gods taste of nectar and ambrosia for their pleasure, these are in no wise the causes of their existence; and if they taste them to maintain their existence, how can gods who need food be eternal? – *But into the subtleties of the mythologists it is not worth our while to inquire seriously...* [Italics added]

Aristotle adds a point that is especially appropriate for those who claim so many meanings for the word ‘God’ (e.g., God is Good, God is the creator of all, God is love, etc.):

If, however, they [i.e., definitions of words] were not limited, but one were to say that the word has an infinite number of meanings, obviously reasoning would be impossible; for not to have one meaning is to have no meaning, and if words have no meaning our reasoning with one another, and indeed with ourselves, has been annihilated...

Similar continues to this day. Thus, if you engage in discussions with religious people about their god, then if you don’t want “reasoning... [to be] annihilated”, first demand a clear and unique definition of their ‘god’ – rather than their usual definition, which is some version or other of:

I dunno.

But in the end, Aristotle was unable to overcome the entrenched, self-serving interests of the clerics in ancient Greece: they (and after them, Christian and Muslim clerics) lapped up Plato’s ideas like warm milk (and are still doing so, 2400 years later), causing Aristotle major problems. Thus, as described in the Wikipedia article on Aristotle,¹⁴ which also refers to Aristotle’s former student, Alexander the Great:

Upon Alexander’s death, anti-Macedonian sentiment in Athens once again flared. Eurymedon the hierophant [a priest who “interpreted sacred mysteries”] denounced Aristotle for not holding the gods in honor. Aristotle fled the city to his mother’s family estate in Chalcis, explaining, “I will not allow the Athenians to sin twice against philosophy,” a reference to Athens’s prior trial and execution of Socrates.

Looked at differently, the real “sacred mystery” was how clerics managed to dupe and enslave so many people for so long!

¹⁴ At <http://en.wikipedia.org/wiki/Aristotle>.

But Aristotle saw how power mongers used religion to their advantage:

Our forefathers in the most remote ages have handed down to their posterity a tradition, in the form of a myth, that these bodies [the planets] are gods, and that the divine encloses the whole of nature. The rest of the tradition has been added later in mythical form with a view to the persuasion of the multitude and to its legal and utilitarian expediency... [For example] A tyrant must put on the appearance of uncommon devotion to religion. Subjects are less apprehensive of illegal treatment from a ruler whom they consider god-fearing and pious. On the other hand, they do less easily move against him, believing that he has the gods on his side.

As the Greek historian Polybius (c.204–c.122 BCE) later summarized:

Since the masses of the people are inconsistent, full of unruly desires, passionate, and reckless of consequences, they must be filled with fears to keep them in order. The ancients did well, therefore, to invent gods and the belief in punishment after death.

Thus, the clerics duped and enslaved people (and still do) by capitalizing on people's ignorance, egotism, fears, and greed (e.g., for eternal life).

It's clear why the Greek clerics were so opposed to Aristotle's idea of God – and why, still today, all clerics continue to oppose his idea, instead promoting Plato's prattle: if God is consumed by contemplating his own navel (or, according to Aristotle, thinking about himself), then there's no need for clerics. The clerics therefore realized that Aristotle's "heretical ideas" had to be stopped, since they undermined the clerics' con games, threatening the clerics with what frightens them the most: the possibility that they might need to actually do something productive, like go out into the real world and work for a living! No cleric will willingly work; so, the ancient Greek clerics (and all clerics ever since) chose the easier route: stir the rabble to reject Aristotle's idea.

And thus, once again, the clerical quacks stymied science and humanity with their God Lie, just as they subsequently have done for more than 2300 years. Fortunately for us in the West, progress has been made constraining the clerics, permitting science and human rights to advance (although much still needs to be done to constrain the damnable Christian clerics in the U.S.), but unfortunately for all of us, Islamic clerics still enshroud most of the Muslim world in their version of the Dark Ages, caused by clerical power-mongering and the people's ignorance, egotism, fears, and greed. With the internet, maybe it won't be too much longer before such ignorance and arrogance are dispelled.