

ANCIENT TECHNOLOGY & THE PROGRESSIVIST FALLACY

THE PROGRESSIVIST FALLACY

There has long been the misconception that the history of science is a story of continuous upward advancement. This belief has been fostered by evolution with its teaching that man over the ages has developed from a primitive state to modern technology. Modern improvements in technology make the illusion of ever-lasting progress easy to believe.

This illusion has been termed the "progressivist fallacy" and it has been uniformly refuted by serious historians of science. **Cultures and civilizations rise and fall, and their science rises and falls with them.** "[C]ivilizations come into existence, rise and flourish, and go out of existence by a slow process which covers decades or even centuries ..." (Quigley, 1961, p. 127).

Even in ancient times there were highs and lows in scientific achievement, for as Murray (2003, p. 16) notes, "... [T]he world's leading technological, artistic, and economic societies in [800 BC] were not nearly as advanced as Egypt had been 1,500 years earlier."

Since the Reformation of the 1600s, the rise of the West to global scientific dominance has produced to several centuries of continuous technological advancement. One factor leading to the acceptance of evolution in the 1800s was the mistaken belief that this long technological advancement was somehow due to an inborn tendency of man to evolve. Koestler (1959, p. 79) has warned that we should not continue to make the same error in judgment:

"During the past few centuries, from about A.D. 1600 onwards, the progress of science has been continuous and without a break; so we are tempted to extend the curve back into the past and to fall into the mistaken belief that the advance of knowledge has always been a continuous, cumulative process along a road which steadily mounts from the beginnings of civilization to our present dizzy height. This, of course, is not the case."

Since there is no inborn human tendency to advance, there is really no reason to believe that scientific and technological progress will continue indefinitely. Bailey (1994, pp. 372-373) observes:

"We have been brought up to believe in the [myth] of steady and inevitable progress from the squalor and brutality of primitive life to the enlightenment and comfort of the modern academic world. ... **The fact that we see ourselves as living at a peak of technical achievement in no way guarantees that the advance will continue.**"

The progressivist fallacy causes us to assume that ancient cultures were primitive or backward compared to us. In contrast to this view, Colin Ronan (1974, p. 7), a specialist in the history of technology, has pointed out that:

"Knowledge is not the prerogative of modern man, and if we have made more material progress, this is only because we have the advantage of almost fifty centuries of additional experience. Or rather, we should have had if nothing had been lost. As it is, **we know that there are breaks in our**

knowledge, that some discoveries were forgotten and have had to be rediscovered."

Some ancient cultures did descend to primitivity. On the other hand, **we see the artifacts and ruins of antiquity as they appear after centuries of decay and dissolution.** The progressivist fallacy sets up a mental block preventing us from visualizing how they looked when they were new. "[P]erhaps the worst of the biases that distort the findings of historians and archaeologists [is that they] cannot bring themselves to believe that people in earlier times possessed any important knowledge of which we are presently ignorant" (Bailey, 1994, p. 373).

The progressivist fallacy has spawned a number of other myths. One is that ancient peoples believed the earth was flat until Columbus (or Magellan) showed it is round. DeWitt (2004, p. 89) assesses this myth:

"There is a common but mistaken belief that, before the 1500s, people tended to believe the Earth was flat. In fact, **very few educated people, at least since the time of the ancient Greeks (such as Plato and Aristotle around 400 BC) have believed the Earth to be flat.**"

Another common myth is that "cave men" living long ago were primitive. There have been cave dwellers throughout history, but they were not primitive "ape men." Most bones believed to have belonged to ancient cave men are found shattered into fragments that must be pieced together to "reconstruct" the original appearance of the skeleton.

It is possible to piece skeletal fragments together so as to make it appear that ancient men had a stooped ape-like posture. Skulls can be reconstructed with the jaw positioned to give an ape-like facial appearance. This has been done repeatedly by scientists who believed the progressivist fallacy, thereby reinforcing the belief that ancient cave men must have been ape-like.

Orthodontist Jack Cuozzo gained access to museum repositories of Neanderthal and Cro-Magnon skulls. Some of these had not been handled or inspected in many decades. Early "reconstructions" appearing to be primitive had been repeated over and over in journal articles and in textbooks, but Cuozzo studied the bones themselves rather than textbook drawings of the reconstructions. What he found was shocking.

Cuozzo (1998, pp. 38-39) noted that E. Patte, in *Neanderthal Century*, p. 270, depicted in a drawing the Neanderthal Pech de l'Aze skull "with what appeared to be its lower jaw out of joint," and Patte claimed that, "When the teeth are placed in occlusion [contact], the condyle does not articulate [fit properly] with the socket in the cranium." This lack of fit was supposed to indicate primitivity, with better occlusion allegedly evolving later. But when Cuozzo actually handled and examined the skull, it did not match the drawing in Patte, or Patte's claims about the relation of the jaw to the skull. In **Cuozzo's (1998, pp. 39-40)** words:

"I picked up the Pech de l'Aze skull in my hands and carefully placed the lower teeth against the upper teeth in what is known [in orthodontia as] centric occlusion ... i.e., normal, central position of upper and lower teeth with maximum contact of all the cusps ... **It didn't look like the drawing at all!** ... [The jaw] really *did fit* [into the skull] with the teeth in the normal occlusion, normal contact position.

"... [This] would be a major clash with E. Patte's reconstruction and evolutionary theory. ... [This] would be a shock for everyone in the [discipline] of human paleontology, in France, and eventually in the world.

"... Francis Ivanhoe had written an article in *Nature* magazine in 1970 [Was Virchow right about Neandertal? 227:577-579] defining the teeth as 'grossly maloccluded [with numerous enamel and] crown anomalies.' ... Grossly maloccluded means that the teeth didn't fit together in a good occlusion [or bite]. ... [But the Pech de l'Aze skull] wasn't grossly maloccluded. [Ivanhoe] was grossly wrong."

Ivanhoe apparently had reached his erroneous conclusion by studying models or drawings of a faulty reconstruction done decades earlier. **Cuozzo found that the anatomy of the Pech de l'Aze skull was identical to that of modern man.**

Besides the modern anatomy of the so-called "ape men," the cave art of these peoples was also modern in its sophistication. According to art historians **de la Croix and Tansey (1975, p. 33)**,

"It is not simply that [Stone Age Man] made images but that he made them skillfully and beautifully. ... The art of the caves is of an extraordinary level of quality. ... Breuil, while copying the originals [of animal drawings at Font-de-Gaume], discovered some **highly sophisticated pictorial devices that one expects to find only in the art of far later times**; for example, the darkening of the forward contour of the left hind leg [of a reindeer] so as to bring it nearer to the observer than the right leg."

The art in the Altamira Cave in Spain is so modern that scientists at first believed that the drawings must be fakes. **James and Thorpe (1994, p. xvii)** describe the discovery:

"In 1879, Don Marcelino Sanz de Sautuola was digging Stone Age remains out of the floor of a cave at Altamira on the north coast of Spain while his small daughter, Maria, played nearby. Suddenly she cried out, '*Mira, Papa, bueyes!* (Look, Papa, oxen!).' What she had spotted was a group of massive multicolored bison ... on the cave roof. ...

"[At] Lisbon in 1880 [the] experts dismissed the Altamira paintings out of hand. ... **The evolutionists of the day saw history in terms of steady progress through the ages. The Altamira finds ... completely upset that notion -- but rather than change the theory, the experts tried to discredit the evidence.** Only in 1902, after a series of discoveries of French cave paintings, was the genuineness of these great works of art accepted."

In France, the Lascaux cave art was discovered several decades ago. Cave art authority Andre Leroi-Gourhan has described his emotions on viewing an animal image in the Lascaux Cave (**Ruspoli, 1987, p. 8**):

"Gradually out of the gloom I saw emerge, like a mythological figure, the enraged bison, its entrails hanging out. It is lashing the air with its tail and has brought down a little spindly puppet of a man, who falls backward stiffly ... [This] scene is so powerful, so charged with emotion ..."

The Lascaux drawings utilized many colors (they were "polychrome"), and in general the artists' tools were those a modern artist would use (**Ruspoli, 1987, p. 16**):

"The polychrome compositions codified in the large animal paintings -- in the Rotunda at Lascaux, for instance -- imply a sophisticated conception of wall space and all sorts of preparations. The artists had perfected their materials: they made good use of a wide variety of pigments ... The ochres were 'burned' to obtain cooler or darker shades, black was obtained from manganese or charcoal, and red from haematite. Brushes were made from hair and bristle [like modern ones], and 'sponges' from fur, and the artists even cut out stencils."

The Lascaux cave artists also used techniques of perspective commonly believed to date from the Renaissance (Ruspoli, 1987, pp. 162-163):

"[The] artists ... invented a kind of artificial but convincing perspective. The position on the wall of each of these animals -- in relation to the topography of the cave, to the edges and irregularities of the panels, to the natural or imaginary ground-level and to the neighboring animals -- is not a matter of chance, but the result of as deliberate choice ...

"... Even before it was painted, the cave chosen was one of the most beautiful -- if not the most beautiful -- of the many caves in the Vezere Valley. This is because it is below a layer of impermeable marl which prevented the formation of stalactites and stalagmites."

What is perhaps most amazing about the Lascaux cave art is that so far as is known, none of the artists would have been professionally trained. They were supposed to have been primitive hunter-gatherers! Yet their art exhibits techniques that modern students seek to master by enrolling in professional schools (**Ruspoli, 1987, p. 168**):

"There are other methods [used by the painters] for creating the impression of three dimensions: by the gradation of colors, ... by the markings on the animal's coat, ... and the painting of the legs, belly, breast and muzzle black.

"A very elegant method is to break up the outline and interior painting of the animal to indicate where a front or back leg furthest away from the viewer is attached."

A SURVEY OF ANCIENT SCIENCE AND TECHNOLOGY

The following survey is chronological, beginning with the oldest examples first. The earliest civilization after the Flood was that at Sumer (Shinar, Gen. 11:1). Nimrod founded Babylon (Babel) there, and that is where we find some of the oldest science and technology.

The Babylonians were mathematically advanced: "The Babylonians ... had the beginnings of what later came to be called algebra" (Ronan, 1974, p. 56). The word "algebra" comes from Arabic and reflects the mathematical advances the Muslims accomplished in about 700 AD. **But the Babylonians had accomplished the same feats nearly 3000 years earlier!** For the Babylonian algebra was not just the "beginnings."

The fact is that, "The Babylonians ... possessed a very sophisticated algebra, and its techniques reappear in later Greek mathematics (**Grant, 1982, p. 61**). **Thus the origin of Greek mathematics is to be found in the knowledge of the**

Babylonians. Even the Pythagorean theorem originated with the Babylonians (**Quigley, 1961, p. 90**):

"By 2000 BC the Babylonians were familiar with the fact that the square of the hypotenuse of a right-angle triangle is equal to the sum of the squares of the other two sides. Introduced to the Greeks in a generalized form by Pythagoras before 500 B.C., this statement came to be called the 'Pythagorean theorem'."

In other words, Greek mathematics was anticipated by the Babylonian civilization. That knowledge was lost, then recovered by the Arabs in about 700 AD. One mathematical "invention" the Arabs made was the concept of *zero*, but the Babylonians were using zero as a place holder as far back as 2000 BC. The Greeks and Romans had no place-holding zeroes, and there is no Roman numeral for zero. This made numerical calculations extremely cumbersome for the Greeks and Romans, and may partly explain why their science failed to progress.

LENSES IN ANTIQUITY

Conventional wisdom says that lenses were invented before 1300, then first used in telescopes and microscopes in the 1600s (**Boorstin, pp. 312, 314, 327-328**). **Yet the ancients appear to have been using magnifying lenses as far back as 2000 BC** -- the same era in which the Babylonians were developing the sophisticated algebra recovered nearly 3000 years later (**James and Thorpe, 1994, pp. 157-159**):

"In 1853 Sir Austin Henry Layard returned from his excavations at Nimrud, one of the capitals of the ancient kingdom of Assyria in northern Iraq. Of the many treasures he submitted to the British Museum, one particularly intrigued him. It was a small piece of polished rock crystal, about one-quarter inch thick, in the shape of a lens with one flat surface and one convex, which he had found among a collection of glassware of the ninth to the seventh centuries B.C. Layard consulted Sir David Brewster, a famous physicist and specialist in optics, who pronounced that the mysterious object could have been used 'either for magnifying or for concentrating the rays of the sun.'

"... The use to which the ancient Assyrians could have put such optical aids is easy enough to guess. Their craftsmen followed a long tradition in Mesopotamia of manufacturing intricately carved seals, most commonly in the shape of cylinders that were rolled on clay to leave an impression. As a matter of course archaeologists study these impressions with photographic enlargements or by using a magnifying glass -- simply because the details on many seals are not clearly visible to the naked eye. **It seems reasonable enough that the craftsmen themselves employed some optical aid.**

"... The characters on one example written about 2000 B.C. -- from the early Mesopotamian civilization at Sumer -- are so tiny that they prompted Samuel Noah Kramer, a senior authority on the Sumerians, to write, 'We wonder how the ancient scribe succeeded in writing them and how, once written, he could read them without a magnifying glass or microscope.'

"The lens from Nimrud is not an isolated example. In the century and a half that have elapsed since Layard's discovery, [about 75] similar rock-crystal lenses have turned up

in archaeological excavations throughout the Mediterranean and the Near East.

"... Some of them have impressive magnifying powers. One lens, probably of the fifth century B.C., found in the sacred cave on Mount Ida in Crete, can magnify with perfect clarity up to seven times."

Like the post-Babel Sumerians living about 2000 BC, "primitive" cave men living at about the same time made microscopic carvings on bone. **Cuozzo (1998, p. 131)** raises an fascinating question:

"Alexander Marshak of Harvard University is a specialist in ["prehistoric" works of art carved on bones or stones] with many years of first-hand study of original objects.

"... Much of Marshak's studies had to be conducted under the microscope to properly visualize the inscriptions and drawings. ... How could the ancient artists see with their eyes what we cannot see today without magnification?"

Did the "primitive" cave men have lenses and have some understanding of optics? For that matter, if the Sumerians had optical lenses, did they assemble their lenses into compound microscopes and even telescopes?

Before reflexively answering no, one should consider the comments of science historian **Richard DeWitt (2004, p. 158)**:

"With the naked eye, one cannot observe the fact that Venus, like our moon, goes through a full range of phases. But with a telescope, the phases of Venus are easily observable, and Galileo was the first to discover them."

But Galileo was not the first to discover the phases of Venus. The Babylonians were.

Astronomical texts of the Babylonians describe the horns of the planet Venus (**Schaumberger, 1935, p. 302**):

"[T]he cuneiform texts ... speak of the right or the left horn of Venus. ... [T]he phases of Venus were observed already by the Babylonians ... Galileo, in the [1600s], was not the first to see them."

If the phases of Venus cannot be seen without a telescope, how did the Babylonians discover them -- unless they had telescopes?

ANCIENT HYGIENE VERSUS MEDIEVAL HYGIENE

Medieval Europe is known among historians for its absolute lack of hygiene and bodily cleanliness. People rarely changed clothes or bathed.

Lack of hygiene was one reason for the terrible Black Plague pandemics sweeping Europe from the 1300s to the 1600s. The Crusading Europeans were known to their contemporaries for their uncleanness (**Lewis, 1982, p. 280**):

"[An Islamic] writer, possibly Ibrahim ibn Yaqub, ... comments on the Frankish practice of shaving as well as on other dirty habits.

"You shall see none more filthy than they. ... **They do not cleanse or bathe themselves more than once or twice a year, and then in cold water, and they do not wash their garments from the time they put them on until they fall to pieces.'**"

Besides the plague, other illnesses such as typhus were endemic in Medieval Europe. Typhus in particular flourishes only in living conditions that are habitually filthy. Epidemiologist and typhus expert **Hans Zinsser (1935, pp. 137-138)** recounted one of the most famous examples of the Medieval lack of hygiene:

"In England, in the twelfth and thirteenth centuries ... [w]ashing was practically out of the question, and the better classes -- not very much more comfortable [than the poor] in their badly heated domiciles wore a great many clothes, which they rarely changed. MacArthur's story of Thomas a Becket's funeral illustrates this:

"The Archbishop was murdered in Canterbury Cathedral on the evening of the twenty-ninth of December. The body lay in the Cathedral all night, and was prepared for burial on the following day. The Archbishop was dressed in an extraordinary collection of clothes. He had on a large brown mantle; under it, a white surplice; below that, a lamb's-wool coat; then another woolen coat; and a third woolen coat below this; under this, there was the black, cowled robe of the Benedictine order; under this, a shirt; and next to the body a curious haircloth, covered with linen. **As the body grew cold, the vermin that were living in this multiple covering started to crawl out**, and, as MacArthur quotes the chronicler: 'The vermin boiled over like water in a simmering cauldron, and the onlookers burst into alternate weeping and laughter'."

Canterbury Cathedral was made into a shrine, and Geoffrey Chaucer memorialized the pilgrimages there in his *Canterbury Tales*. **Few of us remember the filth that the pilgrims took for granted.** European hygiene had not improved when the Puritan Pilgrims from England landed at Plymouth Rock in 1620. After weeks on the Mayflower, they stank. Even 200 years later, public sanitation was no better than it had been in the time of the Crusades (**Barzun, 2000, p. 492**):

"Venturing into the side streets [of Paris in 1830] would be risky. Many were narrow, some dead ends, most of them unpaved and without sidewalks. Not a few had the ancestral gutter in the middle for the slops daily emptied from the houses on each side."

Not until the late 1800s would public sanitation in Europe approach modern norms. **But inhabitants in the city of Mohenjo-daro in the Indus Valley had "modern" hygiene and sanitation in 2000 BC (Ronan, 1974, pp. 101, 103):**

"In the Indus Valley civilization, at Mohenjo-daro, in the third millennium BC, **there was a public sanitation system similar to the kind we should provide in a city today, and surpassing anything in Babylonia or Egypt.** There were plenty of sewers, made of brick with a bitumen finish, and these drained not only the main streets but the side streets as well. They were big enough for a man to walk through them standing upright. From the houses, ceramic drains ran to the sewers. There were underground water pipes, too. The city also boasted large public baths, with changing rooms, fountains and even steam baths, while there was also a large swimming pool with pipes and drains for changing the water. The quality of construction may be judged from the fact that the swimming pool is still watertight, 5,000 years after it was built. But perhaps ancient sanitation reached its peak in

Rome, where, by AD 315, there were 144 public lavatories flushed by the public water supply.

"The contrast between Rome and a medieval city is marked; between Mohenjo-daro and, say, medieval London it is astounding. **The retrogression from the ceramic drains and brick sewers of the Indus Valley city, and the slops tipped out into open sewerage channels running down the streets is utterly astonishing;** if it were not a matter of known fact it would be unbelievable."

ANCIENT GEOGRAPHICAL KNOWLEDGE

Genesis 10 names the family groups dispersing worldwide from Babel. It might be expected that their global dispersion would have produced a knowledge of world geography. Such is the case, for, as investigators have noted, **evidence exists of ancient maps rivalling the accuracy of modern ones (James and Thorpe, 1994, pp. 56, 61, 66):**

"The maps prepared by Greek and Roman geographers during the last few centuries B.C. provide the most familiar textbook examples of the 'world's earliest maps.' In fact, however, these maps represent the culmination of thousands of years of earlier experimentation. ... **So when the Greeks began their mapmaking, they had considerable experience to lean on -- particularly from the Babylonians,** who had already developed scales, cardinal points and the concept of global maps. ... After the fall of the Roman Empire, in the sixth century A.D., mapmaking in the West, like so many other sciences, went into serious decline. ... **The existence of extremely advanced maps from the Middle Ages therefore places historians of cartography in something of a quandary [because these maps imply a once-present but then vanished map-making skill]."**

Here again, Babylonian knowledge was the origin of Greek achievements. The existence of increasingly sophisticated maps as one goes backwards in time raises an interesting question: **Did explorers like Columbus perhaps have access to copies of these ancient maps which are now lost?** And if this is so, did these explorers of the 1400s have some inkling of the existence of a New World before they sailed? Before reflexively answering *no* to this question, consider the so-called Piri Reis map, made by a Turkish cartographer from now-vanished copies of previously existing maps, including at least one that Columbus made (**Lewis, 1982, p. 152**):

"Piri Reis (d. c. 1550), the first noteworthy Ottoman cartographer, seems to have known some Western languages and to have made use of Western sources. As early as 1517, he presented a world map to Sultan Selim I which included a copy of Columbus' map of America made in 1498. Since Columbus' original is lost, this map -- probably captured in one of the numerous naval encounters with the Spaniards and the Portuguese -- survives only in the Turkish version, which is still to be found in the Topkapi Palace Library in Istanbul."

None of this would be remarkable except for the fact, which Lewis does not mention, that **the Piri Reis map shows details of the North and South American coastlines not discovered**

by Europeans till years after Columbus had sailed (Hapgood, 1966, pp. 1, 40). It also shows the continent of Antarctica to a level of detail not rediscovered until the 1900s (Hapgood, 1966, p. 72).

With evidence that the ancients had a high level of geographical knowledge -- mostly lost as Europe slid into the Dark Ages -- it might be expected that the ancients would have known basic facts like the shape of the earth and its size. The Hellenistic technologist Eratosthenes in 2300 BC knew not only that the earth was round. He computed its circumference (Bailey, 1994, p. 52):

"[In] emulation of the Egyptians, the Greek Eratosthenes had made a far more accurate measurement [of the circumference of the earth]. ... And once we have disposed of the progressivist fallacy we face the question: **if Eratosthenes, seventeen centuries before Columbus, was so much better a geometer, why could not even earlier attempts to measure the earth have been as successful as Eratosthenes'? Or perhaps even more so?'**"

Scholars now acknowledge that Eratosthenes' circumference measurement was within 1% of the true value. Yet because of the progressivist fallacy, the caliber of Eratosthenes' achievement was doubted for years. In recent decades he has been "rehabilitated." Likewise, the achievements of the Hellenistic technologist Archimedes were once doubted, but they, too, have been reassessed. Scholarly judgment (Jaki, 1985, p. 42) now is that:

"**Archimedes [was] the greatest scientist-engineer of all antiquity.** His catapults hurled enormous rocks. His huge cranes picked up Roman ships from the sea as soon as they reached the walls of Syracuse."

It might be expected that an advanced ancient knowledge of global geography would be matched by worldwide voyages, trade, and commerce in distant antiquity. There are archeological conundrums that are difficult to explain without this. One of these puzzles involves the copper mines on Isle Royale near Michigan's upper peninsula. The puzzle is that from about 2000 BC to 1000 BC, multiplied tons of pure copper in the form of huge nuggets were removed from these mines, but virtually no archeological trace has been found of this copper in the New World (Bailey, 1994, p. 23):

"The mines on Isle Royale did not go out of use until 1000 B.C. Just as we cannot account for the supply of native copper (and, later, alluvial tin associated with copper) in the Old World, so we cannot find evidence in the New World that anything like enough metal was used there at this time to absorb the output of the mines. **The North American metal was then exported,** just as almost all African metals are exported to this day, although a lot of copper came to be used across America later on."

The exportation of the thousands of tons of copper mined at Isle Royale means that **there must have been an extensive -- even global -- distribution network involving worldwide shipping and trade.** This network had vanished by the Dark Ages, leaving most Europeans of the 1600s with the mistaken impression that their Age of Exploration was the most extensive the world had ever seen.

HELLENISTIC TECHNOLOGY

The city of Alexandria, Egypt, founded by Alexander the Great shortly before 300 BC, was home to the Pharos Lighthouse, one of the seven Wonders of the World known to Hellenistic travelers and tourists centuries before Christ. Not surprisingly, Alexandria boasted many technological marvels (James and Thorpe, 1994, p. xix):

"By 200 B.C., [Alexandria was a] bustling metropolis of more than 500,000 people ... [boasting] a university, a library with over half a million volumes, luxurious multidecked liners, theaters with mechanical figures and moving scenery, temples with automatic sliding doors and slot machines, and engineers capable of devising every conceivable gadget, from executive toys to a simple steam engine ..."

Most traces of this technology had vanished by the time of the Dark Ages, and what we know of it is only from written records left by those who saw it. Very occasionally, an actual technological artifact surfaces. **The most remarkable artifact recovered to date is the Antikythera Mechanism made in about 65 BC (Ronan, 1974, p. 65):**

"[In 1900] Greek sponge divers, anchoring off the island of Antikythera, south of the Peloponnese, during a storm, saw an old wreck. They went to investigate, and what they found was enough to bring archaeologists to the scene.

"After a careful examination, it was clear that this must have been a commercial vessel, sunk sometime about 65 BC while on its way to Rome from either Rhodes or Cos. The cargo was mainly pieces of sculpture, but among the items recovered was something quite different, **a device of bronze plates with complicated gears and engraved scales.** Subsequent study has shown that it was designed to display the positions of the Sun and Moon, and possibly the planets as well. This might not have been particularly remarkable if it had been a model of the celestial bodies operated by a gear train, a kind of mechanical orrery; but it was not. It was an instrument that gave the positions of the celestial bodies in figures -- **there were pointers that moved over dials to indicate the results of its internal calculations. ... In short, this was a mechanical computer, and a complex one at that.** Internal evidence also shows that it was a contemporary machine definitely made for everyday use, and not a treasure from some bygone age. **We are forced to the conclusion that it pays tribute to a tradition of highly advanced technology in Greece,** a technology never mentioned by the philosopher, whose interests were theoretical and not practical, but one that existed nonetheless ..."

The sophistication of the Antikythera Mechanism led to the reappraisal of Archimedes' accomplishments mentioned above. Ferguson (1973, p. 109) explains:

"[The Antikythera Mechanism] has led us to a new respect for Greek mechanical genius. It is some rebuttal of the scepticism shown about Archimedes' inventions, and **leads us to wonder whether Plato may not have had an actual working model of the universe before him when he wrote the tenth book of *The Republic*.**"

Thus the Antikythera Mechanism prompted scholars to shed the progressivist fallacy not only for Archimedes, but for Plato as well. As mentioned above, **Ronan (1974, p. 65)** claimed that no literary evidence exists for the level of technology in the Antikythera Mechanism. But **James and Thorpe (1994, pp. 122-123)** point out that there is in fact such literary evidence, suggesting that the high level of technology of this Mechanism was well known in the world of 2000 years ago:

"The Antikythera mechanism turned out to be a complex computer for calculating the calendars of the sun and moon. One rotation of the wheel represented a solar year, while the smaller wheels showed the positions of the sun and moon and of the rising of the most important stars. The wheels were housed in a wooden box, the doors of which would have been opened to reveal the mechanical marvels inside. **Rather than being a navigational aid used by the captain of the ship, the device was probably part of the cargo, along with the statues.**

"The Antikythera discovery provides striking confirmation of some tantalizing literary clues that suggest that Greek scientists of this time had already been experimenting with such complex machines for astronomical purposes. Only a few years after the Antikythera ship went down, the Roman lawyer Cicero (106-43 B.C.) wrote that his friend and teacher, the philosopher Poseidonius, had 'secretly made a globe which in its revolutions shows the movements of the sun and stars and planets, by day and night, just as they appear in the sky.' He also noted that the great Archimedes ... had devised an earlier model 'imitating the motions of the heavenly bodies.' It has even been suggested that it was the very machine made by Archimedes that was found in the shipwreck.

"... Now, as Professor **de Solla Price [1962, pp. 8-17]** has concluded, the Antikythera discovery 'requires us completely to rethink our attitudes toward ancient Greek technology. **Men who could build this could have built almost anything they wanted to.** The technology was there, and it has just not survived like the great marble buildings ..."

Murray (2003, pp. 16-17) points out the contradiction between the Antikythera Mechanism and the progressivist fallacy:

"The problem with the standard archaeological account of human accomplishment [is] that the data available to us leave so many puzzles.

"The Antikythera Mechanism is a case in point. ... **The Antikythera Mechanism is a bronze device about the size of a brick.** It was recovered in 1901 from the wreck of a trading vessel that has sunk near the southern tip of Greece sometime around [65 BC]. Upon examination, archaeologists were startled to discover imprints of gears in the corroded metal. So began a half-century of speculation about what purpose the device might have served.

"Finally, in 1959, science historian Derek de Solla Price figured it out: the Antikythera Mechanism was a mechanical device for calculating the positions of the sun and moon. A few years later, improvements in archaeological technology led to gamma radiographs of the Mechanism, revealing 22 gears in four layers, capable of simulating several major solar and lunar cycles, including the 19-year Metonic

cycle that brings the phases of the moon back to the same calendar date. What made this latter feat especially astonishing is not just that the Mechanism could reproduce the 235 lunations in the Metonic cycle, but that it used a differential gear to do so. **Until then, it was thought that the differential gear has been invented in 1575.**

"... The existence of this one artifact tells us that a hitherto unsuspected technology existed as of [the first century BC] that may well have included many such mechanisms. But what might they have been? We have no idea. The Antikythera Mechanism is one of the rare examples of mechanical devices to survive -- understandably, since mechanical devices made of metal will by their nature hardly ever survive the centuries. ... We know only that the technology of the era was more extensive than the archaeological record can reconstruct" [emphasis added].

Murray (2003, p. 17) notes that "mechanical devices made of metal will by their nature hardly ever survive the centuries." Then how much of our technology would remain after 2000 years, or 4000? Contrary to the progressivist fallacy, ancient technology is telling us that man has never really been primitive, but has always existed in the image of God (Gen. 1:26-27).

References. Bolded emphases in quotations have been added and are not in the original sources.

- Bailey, J. 1994. *Sailing to Paradise: The Discovery of the Americas by 7000 B.C.* Simon and Schuster, New York.
- Barzun, J. 2000. *From Dawn to Decadence: 500 Years of Western Cultural Life, 1500 to the Present.* HarperCollins, New York.
- Boorstin, J. 1983. *The Discoverers.* Random House, New York.
- Cuozzo, J. 1998. *Buried Alive: The Startling Truth about Neanderthal Man.* Master Books, Green Forest, Ark.
- De la Croix, H., and R. Tansey. 1975. *Gardner's Art through the Ages.* HBJ, New York.
- De Solla Price, D. 1962. Unworldly mechanics. *Natural History.* 71:8- 17.
- DeWitt, R. 2004. *Worldviews: An Introduction to the History and Philosophy of Science.* Blackwell, Malden, Mass.
- Ferguson, J. 1973. *The Heritage of Hellenism.* Science History Publications, New York.
- Grant, M. 1982. *From Alexander to Cleopatra: The Hellenistic World.* Scribner's, New York.
- Happgood, C. 1966. *Maps of the Ancient Sea Kings: Evidence of Advanced Civilization in the Ice Age.* Chilton, Philadelphia.
- Jaki, S. 1985. On whose side is history. *National Review.* 37(15):41- 47.
- James, P., and N. Thorpe. 1994. *Ancient Inventions.* Ballantine, New York.
- Koestler, A. 1959. *The Sleepwalkers: A History of Man's Changing Vision of the Universe.* Macmillan, New York.
- Lewis, B. 1982. *The Muslim Discovery of Europe.* Norton, New York.
- Murray, C. 2003. *Human Accomplishment: The Pursuit of Excellence in the Arts and Sciences, 800 B.C. to 1950.* HarperCollins, New York.
- Quigley, C. 1961. *The Evolution of Civilizations: An Introduction to Historical Analysis.* Liberty Fund, Indianapolis. Reprinted 1979.
- Ronan, C. 1974. *Lost Discoveries: The Forgotten Science of the Ancient World.* Bonanza Books, New York.
- Ruspoli, M. 1987. *The Cave of Lascaux.* Harry N. Abrams, New York.
- Schaumberger. 1935. Die Horner der Venus (The horns of Venus). In F. Kugler. *Sternkunde und Sterndienst in Babel (Science and Religion of the Stars in Babylon).* Verlag der Aschendorffschen Verlagsbuchhandlung, Munster. 3rd Supplement. English paraphrase in I. Velikovsky. 1950. *Worlds in Collision.* Doubleday. Reprinted 1965. Dell, New York, page 167.
- Zinsser, H. 1935. *Rats, Lice and History.* Bantam, New York. Reprinted 1971.