THE GREEKS WERE THE ORIGINATORS OF MATHEMATICS

(The Falsehood of "Mesopotamian & Ægyptian Mathematics)

*by **Evangelos Spandagos**, professor of Mathematics*

During the 1930s **Otto Neugebauer**, the Austrian historian of mathematics and a known adversary of the ancient Greek spirit, created the tale (1) that the Mesopotamian and Ægyptian mathematics were supposedly advanced and that the Greeks took their mathematical knowledge from the people of Mesopotamia (Sumerians, Akkadians, Babylonians, Assyrians) and the Ægyptians.

Unfortunately, this unfounded story was not contradicted when it was first introduced in Greece through a strong and continuous scientific and historical confrontation (2) by the so-called spiritual leadership of the country, and therefore it continued to prevail, under different variations, during the 1950s,1960s and 1980s, through the works of **George James** (3), **A. Seindenberg** (4) and **Van der Waerden** (5).

Even today this story continues, though under a childish form that lacks any scientific background, reaching and exceeding the boundaries of ridicule. Individuals with no historical knowledge and pseudo-reserchers continue to support the unsubstantiated theories of Afro-centrism (6) through a series of publications in all sorts of magazines, books (7) and information abundant on the internet, that focus on a perpetual degradation of the ancient Greek spirit (8).

In particular those "historical researchers" argue :

- The ancient Greek mathematicians took their knowledge from the Ægyptians and the Mesopotamians.
- The term "Greek Philosophy" is non-existent. There was never a Greek Philosophy and Philosophy was born in Ægypt.
- Many Greek savants were of African origin.
- The so-called Greek mathematicians studied in Ægypt and Babylon at the all-wise priesthood of those countries.
- Trigonometry, number theory, geometry and astronomy were invented either in Africa or in Asia.
- The founder of geometry, **Thales of Miletus**, was African and studied along with **Pythagoras of Samos** in Ægypt and Babylon. They have stolen the principles of Geometry from these countries.
- **Plato**, **Socrates**, **Eudoxus**, **Aristotle** and other Greek scholars were initiated into a mystical philosophical school, where the priests of Ægypt taught them the secret knowledge.

• The savant priests of Ægypt were the first founders of the positive sciences, i.e. mathematics (trigonometry, geometry, number theory), astronomy and natural philosophy, a task easily achieved since the priests and the diviners had plenty of free time to get involved with meditation and research.

• The Greek philosophers and mathematicians tried to cover up their Ægyptian origin.

• The western civilization must detect its roots in Africa, etc.

The sound and solid arguments that disprove all the aforementioned "arguments" are the following:

1. The assertion that Geometry has its roots in ancient Ægypt is false and the fruit of deception. The Ægyptians themselves admitted to **Solon**, around 580 B.C. that they took their civilization from the Athenians, before the Deluge of **Deucalion**, who is placed in time 7 or 10 thousand years B.C. (**Plato**, Timeo [Τίμαιος] 23-25d). Russian researches on a mission proved that indeed Atlantis, which is located west of the Strait of Gibraltar, was sunk during the Flood of **Deucalion** and therefore all that is mentioned by **Plato** in Timeo is not a myth.

Moreover the Greek Mythology supports the idea that Mathematics were brought to ancient Ægypt by the Greeks. According to a certain version of the Greek Mythology, **Saturn** did send **Hermes** to Ægypt and civilized the Ægyptians. **Cyrillus of Alexandria** writes (9): "Ὁ Ἑρμῆς ἀκούει τὴν τε Αἴγυπτον εἰς λῆξιν . . . καὶ πρόσγε ἀριθμοὺς καὶ λογισμοὺς καὶ γεωμετρίαν εὑρόντα, παραδοῦ-ναι καὶ κατάλογον τῆς τῶν ἄστρων ἐπιτολῆς» (Hermes hears that Ægypt was brought to an end . . . and, having found, . . . the numbers and calculus and geo-metry and a catalog of stars rising . . . he handed them over [to the Ægyptians]).

2. **Thales of Miletus** (10) went to Ægypt as a traveler and not for studies. A proof of this is that he taught the theory of similar triangles to the Ægyptians priests, calculating the height of the great Pyramid by its shadow and the shadow of a stick (**Plutarchus**, Ethics [Ἠθικά] 147A). **Pythagoras of Samos** also went there as a traveler and gave lectures to the priests of Ægypt and Babylon on number theory and arithmosophy (a kind of numerology), as testified by **Iamblichus**. **Eudoxus** was praised by the Ægyptian priesthood for his vast knowledge on mathematics -knowledge that was totally unfamiliar to them, since he referred to asymmetry and proportions, as witnessed by **Eutokius**. To summarize, the ancient Greek philosophers were visiting Ægypt, Phoenicia and Babylon to teach and not to be taught.

3. While there is information provided by **Herodotus**, **Eudemus of Rhodes** (the disciple of Aristotle), **Heron of Alexandria** and other ancient writers that

geometry is a creation of the Ægyptians, this information has been misinterpreted. Their term "geometry" however does not mean the known branch of the science of mathematics, but a kind of practical topography. As for the assertion of **Herodotus** ("δοκέει δέ μοι ἐντεῦθεν γεωμετρίῃ εὑρεθεῖσα εἰς τὴν Ἑλλάδα ἐπανελθεῖν"), {=its seems to me that from here [Ægypt] geometry (. . .) was retransferred to Greece}, **Evangelos Stamatis** (11) proclaims that by the word "ἐπανελθεῖν" (coming back) is meant that Geometry was transferred from Greece to Ægypt, according to **Plato's Timeo** (where it is clearly stated that the Ægyptians priests announced to **Solon** that they took their civilization from the Athenians, a long time before the Flood of **Deucalion**) and after the Deluge it came back from Ægypt to Greece. In any case, by "geometry" is meant the practical geometry and not the theoretical and scientific one that was founded by **Thales of Miletus.**

4. There is no evidence that the ancient Greeks were in touch culturally before 700 B.C. with the Sumerians, the Babylonians and the Assyrians.

5. At the excavations held in modern Iraq, many thousands of Babylonian inscriptions (boards) were found, all made of unbaked clay. A single intact board bears the size of the palm. Out of those boards 400 (intact or in pieces) have a mathematical content. They date from 1700 B.C. to 300 B.C., while their content refers to elementary geometrical notions given in a practical way. Among them there is the board 322 that belongs to the archeological collection of the University of Columbia in New York and refers to the triad of numbers 3, 4, 5 that verifies the relation of the Pythagorean Theorem (i.e. we have a practical application).

The ever memorable **Evangelos Stamatis** in his work "**Greek Science**" (Ἡ Ἑλληνικὴ Ἐπιστήμη, Athens 1968) writes relevantly (12): «What is said by few,

> that the Babylonian Semites knew the Pythagorean Theorem in 1800 B.C., brings out laughter. Because the boards found last century in Mesopotamia, that comprise mathematical propositions in which the Pythagorean Theorem is probably stated, came to light in most cases from smugglers and therefore it is not possible to date the time in which they were written. This is verified as early as 1959 by **Kurt Vogel**, professor of History of Mathematics at the University of Munich in his book under the title "**Vorgriechische Mathematik**" (13). The examination of the mathematical content of those boards leads to the conclusion that their content derives from Greek knowledge that arrived in Mesopotamia during the time of the **Seleukides'** emperors, i.e. after the death of **Alexander the Great**, in 323 B.C.».

As far as the assertion of **Neugebauer** that the Babylonians knew about a *certain kind of proof* in mathematics, we have to say that this assertion proves clearly the repulsion of **Neugebauer** for the ancient Greek spirit, because the Babylonians either had proof in mathematics or not. In this case there is no place for middle ground, nor "a kind of proof". All these are written by the Austrian historian, because the invention of proof in Mathematics, which is a sublime creation of the human mind, is owed to **Thales of Miletus** and not to the Semites nor the Babylonians, who **Neugebauer** admired for reasons unknown.

6. Our knowledge about the Ægyptian mathematics is owed mainly to 2 papyruses. One of these, which is located at the London Museum, was written around 1800 B.C. by **Ahmes** and bears the name "**Papyrus of Rhind**" (14). Its length is 5½ m. and its width is 32 cm. The papyrus of **Rhind**, that was deciphered by **A. Eisenlohr** in 1880, contains 85 elementary topics of practical arithmetic and practical geometry. The other papyrus is housed in the Moscow Museum and has the same length as the papyrus of **Ahmes**, but its width is 8 cm. This papyrus which goes back to the 17th century B.C., was deciphered by **W. Struve**, and contains 25 topics of elementary and practical mathematics. Besides those 2 papyruses, there are also a few small fragments of papyruses housed in the Museums of Berlin, Cairo and London, bearing insignificant content. In short, the papyruses found show practical mathematics and not scientific methodology, which requires the use of logical proof**.**

7. The assertion that trigonometry was created by the Babylonians and the Ægyptians has no base whatsoever. Trigonometry was founded by **Aristarchus of Samos** (320 - 240 B.C.), the great **Archimedes** (287 - 212 B.C.) and **Hipparchus** (2nd century B.C.). **Aristarchus**, for the first time in the history of mathematics used trigonometrical relations to calculate the distance of the Sun from Earth. **Archimides** used trigonometry in his work "**Κύκλου μέτρησις**" (Measurement of a Cycle) and **Hipparchus**, who is the main founder of Trigonometry, devised the trigonometrical tables. There is not even one Ægyptian or Babylonian work that contains even a hint of a trigonometrical definition or a trigonometrical relation.

8. Not even one Ægyptian or Babylonian manuscript or board was ever found bearing even one geometrical or arithmetical proposition along with its proof. The word "**proof**" (ἀπόδειξις) occurs only in the works of the ancient Greek mathematicians and other scientists.

9. The allegations of certain writers that the founder of theoretical geometry was of Phoenician origin are inventions and misinformation. The family of **Thales of Miletus**, according to the ancient writer **Douris** (15), belonged to the noble

gender of **Thelides'** who claimed their origin from **Thebes** (Greece) and were descendants of **Cadmus** and **Agenor**.

10. **Today 58 works of ancient Greek mathematicians and 32 works of ancient Greek physicists and natural scientists have been preserved, all of which are more than enough to prove the unrepeatable greatness of the Ancient Greek Spirit (16 & 17). If the so called "researchers" bothered to read even one of these works, they wouldn't dare to write so many childish inaccuracies, distorting History and Truth.**

11. The Italian historian of Mathematics **Gino Loria**, in his book "History of Mathematics", published in Greek by the Greek Mathematical Society (Athens 1971), writes: "The influence of the eastern peoples upon the Greek spirit must not be overestimated for also another reason. The ancient Greeks had deficient knowledge of foreign languages, which prevented them to go deep down to the depths of thoughts of people with whom they had commercial relations".

12. It cannot be questioned that Mathematics in Ancient Greece were infinitely much closer to Philosophy itself and were far away from the various practical matters.

In conclusion we state that :

During the end of the 7^{th} century B.C. there was a great turn in the evolution of the human mind, which gave meaning to the term science. This turn is owed to the invention of one man, **Thales of Miletus**, one of the great 7 savants of ancient Greece, **to whom the invention of proof in mathematics is attributed**. **This invention is the basis upon which the Science of Mathematics is founded**. It is an unshakable fact, worldwide accepted, that Mathematics were initiated, founded and promoted in Ancient Greece.

A quote from a paper of professor **Nicolaos Artemiades**, member of the Athens Academy, is appropriate (18):

> "Unanimously all the historians of mathematics attribute their growth to the Greeks of those days; **Thales of Miletus**, one of the 7 savants of antiquity, being the pioneer. (. . .) In the History of Mathematics, **Thales** is the first and only individual that is referred to by his very name, for bringing forward the method of proof in geometry, an achievement that represents a **great moment in the History of Mathematics**.
>
> At this point, a question is raised. Why is it that out of all the ancient civilizations the Greeks were the only ones that figured that all geometrical results must be verified through logical proof and that practical verification is not sufficient?

The answer to the above question composes and encompasses the so called "**Greek Mystery**".

The common answer to this question is that it is owed to the sui generis structural genius of the Greeks as to the philosophical research. In philosophy, it is of major importance to proceed with certainty into accurate and precise results, deriving from certain hypotheses. The empirical method provides only a certain amount of probability as to the correctness of a given result. Because the logic of proof was an essential instrument for the philosopher, it was natural for the Greeks to indulge into the logic of proof while studying Geometry as well.

Another answer to the "**Greek Mystery**" bears its roots to the "**worship of the beautiful**" that characterizes the Greek spirit, something that is evident in Art, Literature, Sculpture, Architecture . . ."

The aforementioned **Gino Loria**, in his work "History of Mathematics" writes: "*Moreover, what we know now from the scientific work of Ancient Greece* (19) *proves that even if the Greeks took certain elements of knowledge from others, they managed to transform them so deeply and to evolve them in such original ways, so that we can not deny that their whole scientific creation constitutes their sole and inalienable spiritual property, since there is not a special characteristic or fact in the ancient Greek spirit that is not in accordance with everything else that we know about the ingenuity of this privileged race*".

NOTES

(1) **Neugebauer O.**, Studien zur Geschichte der Antiken Algebra III, Quellen und Studien zur Geschichte der Mathematik, B, 3 (1936).

(2) The Greek historians **Κωνσταντῖνος Γεωργούλης** (Constantinos Georgoulis) and **Εὐάγγελος Σταμάτης** (Evangelos Stamatis) tried to shutter the allegations of **Otto Neugebauer** through a series of sound arguments, but unfortunately their attempt was not followed by others and they themselves were strongly opposed.

(3) **James George**, Stolen Legacy, Arkansas, USA 1954

(4) **Seidenberg A.**, The ritual origin of geometry, Archive for His. Exact Sci., Vol. 1, No 5, 1962.

(5) **Waerden V.L.v.d.**, Geometry and Algebra in Ancient Civilizations, Springer, Berlin 1983.

(6) **Bernal Martin**, Black Athena: The Afroasiatic Roots of Classical Civilization, New York 1989.

(7) **Poe Richard**, Black Spark, White Fire, New York 1999 and **Zaks Edgar**, Mathematics were born in Babylon, New York 1981.

(8) Fortunately, **Mary R. Lefkowitz**, professor of Classical Studies at Wellesley College, pulverized all the anti-scientific theories of Afrocentrism, through her book “Not Out of Africa: How Afrocentrism Became an Excuse to Teach Myth as History”, 1997.

(9) **Scott H.**, Cyrillus of Alexandria, IV, p.195-7 and **Λεγάκης Γιῶργος,** Προμηθέας: Ένας Χριστὸς π.Χ. (Legakis George, Prometheus, a Christ B.C., article in Ἑλληνικὴ Ἀγωγή [Elliniki Agogi], October 1999).

(10) **Miletus** was an ancient Greek city on the coast of **Ionia**, in ancient **Caria**.

(11) **Εὐάγγελος Σταμάτης**, Ἱστορία τῶν Ἑλληνικῶν Μαθηματικῶν (Sta-matis Evangelos, History of Greek Mathematics), Athens 1971, p. 165-6.

(12) **Εὐάγγελος Σταμάτης**, Πυθαγόρας ὁ Σάμιος (Stamatis Evangelos, Pythagoras of Samos), Athens 1981, p. 52.

(13) **Vogel Kurt**, Vorgriechische Mathematik, Schroedel-Schöningh Verlag, Münich 1959.

(14) Its name comes from the British **Alexander Henry Rhind** who “bought” it in Ægypt in 1955.

(15) **Douris** (340 - 260 B.C.): historian of Samos.

(16) Here is a list of some of the works written by ancient Greek scientists and their commentators published in Greek [editions “**AETHRA**”, Athens, Greece] by Evangelos Spandagos:

“The Lost Treatises of **Euclid**” (190 p.) ["Οἱ Χαμένες Πραγματεῖες τοῦ Εὐκλείδου"].

“Optics” and “Catoptrics” by **Euclid** (360 p.) ["Τὰ Ὀπτικὰ καὶ τὰ Κατ-οπτρικὰ τοῦ Εὐκλείδου"].

“Phaenomena” by **Euclid** (216 p.) ["Τὰ Φαινόμενα τοῦ Εὐκλείδου"].

“Sphaerics” by **Theodosius** (288 p.) ["Τὰ Σφαιρικὰ τοῦ Θεοδοσίου"].

“On the Section of a Cylinder and On the Section of a Cone” by **Serenus** (352 p.) ["Τὰ Περὶ Κυλίνδρου Τομῆς καὶ Περὶ Κώνου Τομῆς τοῦ Σερήνου"].

“On the Sizes and Distances of the Sun and Moon” by **Aristarchus of Samos** (152 p.) ["Τὸ Περὶ μεγεθῶν καὶ ἀποστημάτων Ἡλίου καὶ Σελήνης τοῦ Ἀριστάρχου"].

“Synagoge” or “Collection” by **Pappus of Alexandria**, vol. I (500 p.), vol. II (406 p.), vol. III (432 p.) & vol. IV (152 p.) ["Ἡ Συναγωγὴ τοῦ Πάππου τοῦ Ἀλεξανδρέως" (τόμοι Α′,Β′,Γ′,Δ′)].

“Introduction to Arithmetic” by **Nicomachus of Gerasa** (312 p.) ["Ἡ Ἀριθμητικὴ Εἰσαγωγὴ τοῦ Νικομάχου τοῦ Γερασηνοῦ"].

“A Commentary on the First Book of Euclid's Elements” by **Proclus** vol. I (392 p.), vol. II (384 p.) ["Ὑπόμνημα εἰς τὸ πρῶτον τῶν Εὐκλείδου Στοιχείων τοῦ Πρόκλου"].

“Introduction to Phaenomena” by **Geminus of Rhodes** (320 p.) ["Εἰσα-γωγὴ εἰς τὴν σπουδὴν τῶν οὐρανίων φαινομένων τοῦ Γεμίνου τοῦ Ροδίου"].

“Constellations” by **Eratosthenes of Cyrene** (160 p.) ["Οἱ Καταστερι-σμοὶ τοῦ Ἐρατοσθένους"].

“Phaenomena” and “Diosemeia” by **Aratus of Soli** (160 p.) ["Τὰ Φαινό-μενα καὶ Διοσημεῖα τοῦ Ἀράτου].

“The 14th and 15th books of Elements of **Euclid**” (144 p.) ["Τὸ 14° καὶ τὸ 15° βιβλία τῶν «Στοιχείων»"].

“Commentary on the Phaenomena of Eudoxus and Aratus” by **Hipparchus** (400 p.) ["Τῶν Ἀράτου καὶ Εὐδόξου Φαινομένων ἐξηγήσεως τοῦ Ἱππάρχου"].

“On the Moving Sphere” and “On Risings and Settings (of celestial bodies)” by **Autolycus of Pitane** (192 p.) ["Τα έργα του Αυτολύκου του Πιτα-νέως "Περὶ κινουμένης σφαίρας" και "Περὶ ἐπιτολῶν καὶ δύσεων"].

“On the Circular Motions of the Celestial Bodies” by **Cleomedes** (256 p.) ["Το έργο του Κλεομήδους "Κυκλική Θεωρία Μετεώρων"].

“Data” by **Euclid** (272 p.) ["Το έργο του Ευκλείδου "Δεδομένα"].

“Mathematical Syntaxis” vol. I, by **Ptolemaeus** (416 p.) ["«Ἡ Μαθημα-τικὴ Σύνταξις» του Πτολεμαίου" (τόμος Α′)].

“On Mathematics Useful for the Understanding of Plato”, by **Theon of Smyrna** (384 p.) ["«Τῶν κατὰ τὸ μαθηματικὸν χρησίμων εἰς τὴν Πλάτωνος ἀνάγνωσιν» του Θέωνος του Σμυρναίου"].

“Metaphysics” by **Theophrastus** (128 p.) ["Τῶν τὰ μετὰ τὰ φυσικὰ τοῦ Θεοφράστου"].

“On Ascensions” by **Hypsicles of Alexandria** ["Ὑψικλέους: Ἀναφο- ρικός"].

“On the Phaenomena of Aratus” by **Eratosthenes of Cyrene** ["Ἐρατο-σθένους: Εἰς τὰ Ἀράτου Φαινόμενα"].

“On everything about the Phaenomena of Aratus” by **Achilles Tatius of Alexandria** ["Ἀχιλλέως Τατίου: Περὶ τοῦ Παντὸς (τῶν Ἀράτου Φαινομένων πρὸς εἰσαγωγήν)"].

“On Movement” by **Proclus** (160 p.) ["Το «Περὶ Κινήσεως» έργο του Πρόκλου"].

“On Polygonal Numbers” by **Diophantus of Alexandria** (144 p.) ["Το «Περὶ Πολυγώνων Ἀριθμῶν» έργο του Διοφάντου"].

(17) Here is another list of works written by ancient Greek mathematicians and other positive scientists, either published or meant to be published in Greek :

“Elements” by **Euclid**, vol. 1-4 [“Στοιχεῖα Εὐκλείδου″ τοῦ Εὐαγγέλου Σταμάτη (τόμοι 1-4)].

“Complete Works of **Archimedes**” vol. 1-4 [“Ἀρχιμήδους Ἅπαντα″ τοῦ Εὐαγγέλου Σταμάτη (τόμοι 1-4)].

“Arithmetics” by **Diophantus**, [“Διοφάντου Ἀριθμητικά″ τοῦ Εὐαγ-γέλου Σταμάτη].

“Conics” by **Apollonius of Perga** [“Ἀπολλωνίου Κωνικά″ τοῦ Εὐαγ-γέλου Σταμάτη].

“Geometrics” by **Heron of Alexandria**, [«“Γεωμετρικά” τοῦ Ἥρωνος τοῦ Ἀλεξανδρέως» τοῦ Χρήστου Κηπουροῦ].

“On Dioptra” by **Heron of Alexandria**, [«“Περὶ Διόπτρας″ τοῦ Ἥρωνος τοῦ Ἀλεξανδρέως» τοῦ Χρήστου Κηπουροῦ].

“Manual of Introductory Arithmetic”, by **Domninus of Larissa (Syria)** [Δομνίνου: "Ἐγχειρίδιο Ἀριθμητικῆς εἰσαγωγῆς"].

“On a Sphere” by **Proclus** [Πρόκλου: "Περὶ σφαίρας"].

“Chapters of Optical Hypotheses” by **Damianus** [Δαμιανοῦ: "Κεφάλαια τῶν ὀπτικῶν ὑποθέσεων"].

“Sphaerics” by **Menelaus** [Μενελάου: "Σφαιρικά"].

“Small Works”, by **Ptolemaeus** [Πτολεμαίου: Μικρὰ ἔργα].

“Exposition of Astronomical Hypotheses” by **Proclus** [Πρόκλου: "Ὑπο-τύ πωσις ἀστρονομικῶν ὑποθέσεων"].

“Theology of Mathematics” by **Iamblichus** [Ἰαμβλίχου: "Θεολογούμενα τῆς ἀριθμητικῆς"].

“On Common Mathematical Science” by **Iamblichus** [Ἰαμβλίχου: "Περὶ τῆς κοινῆς Μαθηματικῆς Ἐπιστήμης"].

“On Burning Mirrors” or “Pyria” by **Diocles** [Διοκλέους: "Πυρία"].

“Complete preserved Works” by **Apollonius of Perga** [Ἀπολλωνίου: "Ἅπαντα τὰ σῳζόμενα"].

“Comments on Ptolemaeus’ Mathematical Syntaxis” by **Theon of Alexandria** [Θέωνος τοῦ Ἀλεξανδρέως: "Σχόλια εἰς τὴν τοῦ Πτολεμαίου Μαθημα-τικὴν Σύνταξιν"].

“Comments on On Heaven by Aristoteles” **by Simplicius** [Σιμπλικίου: "Σχόλια εἰς τὸ περὶ Οὐρανοῦ τοῦ Ἀριστοτέλους"].

(18) **Νικόλαος Ἀρτεμιάδης,** Ἀπὸ τὴν ἱστορία τῶν μαθηματικῶν παλαιό-τερων ἐποχῶν (Βαβυλώνιοι – Ἀρχαῖοι Ἕλληνες), (Artemiades Nicolaos, “From the History of Mathematics of ancient

times” (Babylonians – Ancient Greeks). Reprint from the annals of Athens Academia, vol. 67 (1992).

(19) Only a small fragment (less than 7%) of the entire works of ancient positive scientists written in Greek is preserved and made it to our days.