The Oldest Object that Proves the Existence of a Method of Calculation

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Abstract:
Society we live in teaches us to think interdisciplinary, to move easily from one area to another and successfully fulfill social roles we are ready. Interdisciplinary connections are not univocal, meaning that the flow of information is one way for an activity; communication takes place in both directions, from one activity to another and vice versa. Interdisciplinary approach assumes that any educational discipline not a closed area, but can establish links between disciplines. The history of mathematics is a field of study is an investigation into the origin of discoveries in mathematics and in a broader sense, an investigation into the mathematical methods and notation of the past.

Mathematics is the oldest science, history stretching over several millennia and in many geographical areas simultaneously in the Far East to Central America, and in Asia Minor and Africa to Europe. With good reason, most researchers have considered the evolution of culture and civilization that preceded the writing mathematics, since the discovery of bones with notches, which dates back over 20,000 years BC Belgian geologist Jean de Heinzelin of Braucourt, in 1950, found in volcanic ash on the bank of a lake in the Great Rift Valley of Africa, on the border between Congo and Uganda, which later was called "bone / stick Ishango" more exactly two bones of about 10 to 14 inches, with multiple incisions and secured with a piece of quartz in the thin end of one of the two bones. Notch, not random, are indicative of counting systems, in base 10, and some basic arithmetic.

Keywords: *Ishango bone, arabic numeric, mathematicians Ishango region, knowledge, science*

1. Greck contribution

Greek contribution to math consisted of refining methods (especially through the introduction of deductive reasoning and mathematical rigor in demonstration) and extended the subject of study of mathematics. Chinese mathematics had early contributions, including writing in a digital system. Indian-Arabic numeric system and the rules for using the operations as we use today have evolved over the first millennium in India and was transmitted to the West by Islamic mathematicians. They, in turn, developed and expanded the mathematics known before. Many Greek and Arabic mathematical texts were translated into Latin, which contributed to further development of mathematics in medieval Europe.

Before the modern period, when there was a spread of mathematical knowledge and not only around the world, evidence of mathematical discoveries were found only in a few places. History of mathematics has a clearly defined beginning, but its occurrence is closely related to human evolution. It is possible for people to have developed some mathematical skills even before the advent of writing what is the method of preserving their words by recording speech support using certain signs or symbols. The writing is so different cave paintings and painting in general, and the audio recordings, photographic or video. The evolution of writing from the early records such information notch or notches on the rope knots until today writing systems is a complex and lengthy. You can not specify when they appeared first writings themselves, because their support was of course destroyed by time. The earliest writings preserved to us is considered to be the fourth millennium BC in Mesopotamia.

The oldest object that proves the existence of a calculation method is the bone Ishango discovered by Belgian archaeologist Jean Heinzelin of Braucourt Ishango region of Democratic Republic of Congo, which dates back to 20,000 BC.

2. The origins of mathematics

The origins of mathematics are closely related to concepts of number, size and shape. Modern studies on animals have shown that these concepts are not unique to the human species. Such concepts were part of the daily life of prehistoric societies, dealing with hunting and gathering. The concept of number evolved over time, so that today's languages distinguish between one or more, but not for numbers greater than two, according to the agreement of verbs.

The word "mathematics" comes from the Greek "mathema" which means "knowledge", "science". From this is derived the adjective "Mathematik", meaning "on the science." The Greek word was taken and Latin, in the form of "mathematicus" inherited within most modern languages.Ishango bone, found near the headwaters of the Nile (northeastern Congo) has around 20,000 years old and has a number of incisions for counting arranged in three columns along the bone. Interpretations of this bone are related to prime numbers or strings of six calendar months.

Bone Ishango is an instrument dated Upper Paleolithic era and the color brown are a baboon fibula with a sharp piece of quartz affixed to one end, perhaps for engraving. Some scientists have suggested that groups of signs indicate a mathematical understanding, which is reminiscent of a higher count. It was also suggested that incrustations have a better grip in hand.

Ishango bone was found in 1950 by Belgian Jean de Heinzelin of Braucourt when explored InZone called the Belgian Congo. It was discovered in the African Ishango area near the headwaters of the Nile and Lake Edward (near the border between Uganda and Congo). Since its discovery in 1950 near Lake Edward (Congo), they continue to fascinate archaeologists. However, at first glance, the object is not very impressive: it is a small bone about 10 cm in length, slightly arched, almost symmetrical. But a closer look can be detected on three sides the best groups of transverse incised lines. This serial numbers is proof oldest known mathematical skills of our ancestors.

These bones Ishango part of a rich archaeological site, which is a highly developed culture. They are dated by Carbon 14 method, between 18.000 and 20.000 years before present. This discovery traces the origins of mathematics in Mesopotamia. This artifact was originally dated as 9000 BC during the period 6500 BC. Hr. Nevertheless dating archaeological site has been reviewed and is now believed to be 20,000 years old. The bones were found in the ruins of a small community that fished and cultivated plants in this part of Africa. This village was buried by a volcanic eruption.

These inscriptions can decode systems are: 2, 4, 10, 12 ... and various mathematical relationships. This puts into questio The word "mathematics" comes from the Greek "mathema" which means "knowledge", "science". From this is derived the adjective "Mathematik", meaning "on the science." The Greek word was taken and Latin, in the form of "mathematicus" inherited within most modern languages.n the fundamental role of the Mesopotamians and Egyptians in mathematics.

Thanks to the support of the European Research Council, bones Ishango have finally found a place of honor in the museum. Through a camera can review all the details of this mysterious object. He will describe the fascinating culture Ishango revealing all assumptions about what is probably the oldest known rule. Ishango Bones exhibition can be viewed at the Museum of Natural Sciences, in "People and monkeys" dedicated prehistory and human evolution.

Bones Ishango, also called sticks Ishango are discovered archaeological artifacts in the former Belgian Congo and dated perhaps 20,000 years. According to some authors, it could be the earliest attestation of the practice of arithmetic in the history of mankind. They were considered first as counting sticks but some scientists believe it would be a much more advanced understanding than simply counting. This thesis is rejected by other authors, Olivier Keller discovery. In the 1950s the Belgian geologist Jean de Heinzelin Braucourt discovered the bones in layers of volcanic ash on Lake Edward in Ishango region in the Belgian Congo (now Democratic Republic of Congo), near the border with Uganda.

First, we felt that it was bone dating from 9 000-6 500 BC, but a dating site where they were discovered their creation brought about 20 000 years. The bones are on permanent display at the Museum of Natural Sciences of Belgium Brussels, main Features. There are two bones of approximately 10 cm and 14 cm, from unidentified animals (think human bones, monkey or lion). A fragment of quartz is embedded at the top of the smallest. These bones are several incisions on each of their faces.

This bone, the smaller of the two, is the first to be exposed to the museum in Brussels. It carries a plurality of incisions arranged in groups of three columns. The column may be divided into four groups. Each group has respectively 19, 17, 13 and 11 notches. The sum of these four numbers is 60 These are the four successive primes between 10 and 20, forming a quadruplet of primes. The column may be divided into eight groups. By a rough count and instinctive, one can count (between parentheses is the maximum number of slots): 7 (8), 5 (7), 5 (9), 10, 8 (14), 4 (6), 6 3 notches. The minimum amount is 48, the maximum amount 63.The column may be divided into four groups. Each group has respectively 9, 19, 21 and 11 notches. The sum of these four numbers, all odd, is 60. Main features of the second bone

The second bone is still poorly understood. It is known that it is composed of 6 groups of 20, 6, 18, 6, 20 and notches 8. Although there are presumptions about its arithmetic meaning, bone is subject to many interpretations. The cuts from the bone Ishango were interpreted by the authors as a prehistoric calculator, a lunar calendar or a bar code prehistoric. In the 1950s, John Heinzelin was the first to consider this bone as a vestige of relevance to the history of mathematics. He assimilated to a set of arithmetic and gave an arbitrary order to the different columns, the first (b), the second (c) and the third (a) according to the notation of the diagram below.

Following his remarks, J. of Heinzelin admits that the "paleo-mathematicians" Ishango knew the primes. More than a numbers game, bone Ishango seems to present itself as an encrypted document using arithmetic and based on prime numbers and duplication. The Belgian physicist-engineer Vladimir Pletser, ESA, proposed an alternative interpretation of the bone: he noticed that the numbers in the center column can be obtained by adding the other two columns. He concluded that the bones would have been the slide rule, on which was written the sum of certain numbers by simply turning the bones. This assumption, though incomplete, has the advantage that the numbers 11, 13, 17 and 19 of the left column does not have to be considered of prime numbers and just give credit to a count in base 6, 10 , 12 and 60.

In the 1970s, science journalist Alexander Marshack examined the bone under a microscope. He noted, as did John Heinzelin, that the sum of all the numbers for the 60 gave either of the columns (a) and (c), and 48 to the column (b). These considerations led him to suggest that bone Ishango be the oldest known lunar calendar. Indeed 60 is approximately the number of days between moons and 48 may represent a moon and a half. Claudia Zaslavsky suggested that this could indicate that the creator of the object was a woman, according to the lunar phases in comparison to the menstrual cycle.

Recently, astrophysicist John Paul Mbelek brought new observations: The sum of all the three columns of numbers extreme is equal to 60 (10 + 20 + 30 = 60). The amount of numbers in column (b) is equal to the sum of the numbers of columns (a) and (c) or 8 (for one side) and 4 + 4 = 8 (the other face); there is a greater than the one obtained by adding or subtracting the amount of numbers appearing in a column to the total sum of the column pattern. There is a symmetry about the center through the number 17 and number 10. He noted that indeed in column (c) extreme (9 = 10 -1, 11 = 10 + 1) and the means (19 = 20 to 1, 21 = 20 + 1)

The series of numbers 20, 6, 18, 6, 20, 8 would think a calculation bases 10, 12, 6 or 60 The second stick Ishango therefore seems to confirm the thesis count in these databases and seems to rule out thesis of the lunar calendar. Olivier Keller, in an article criticizing the temptations of over-interpreting the archaeological traces in the history of mathématiques4, describes the interpretations of Heinzelin of "fantasies" and says the grouping of Alexander Marshack "seems very forced or trafficked."

The most interesting, of a large number of tools discovered in 1960 at Ishango, is a bone tool handle called the Ishango Bone (now located on the 19th floor of the Royal Institute for Natural Sciences

of Belgium in Brussels, and can only be seen on special demand). At one end of the Ishango Bone is a piece of quartz for writing, and the bone has a series of notches carved in groups (shown below). It was first thought these notches were some kind of tally marks as found to record counts all over the world. However, the Ishango bone appears to be much more than a simple tally. The markings on rows (a) and (b) each add to 60. Row (b) contains the prime numbers between 10 and 20. Row (a) is quite consistent with a numeration system based on 10, since the notches are grouped as 20 + 1, 20 - 1, 10 + 1, and 10 - 1. Finally, row (c) seems to illustrate for the method of duplication (multiplication by 2) used more recently in Egyptian multiplication. Recent studies with microscopes illustrate more markings and it is now understood the bone is also a lunar phase counter. Who but a woman keeping track of her cycles would need a lunar calendar? Were women our first mathematicians?

3. Central column

Some believe that the three columns grouped notches imply that the implement was used to build a system of numeration. Central column begins with three positions and then doubling in six notches. The process is repeated for the number 4 doubles in 8 notches, and for the number 10 is being halved to 5 notches. These numbers can not be purely random and suggests how to understand the principle of multiplication and division by two. The bone may therefore be used as a counter tool for simple mathematical procedure.

In addition, the numbers of both columns (left and right) are odd numbers (9, 11, 13, 17, 19 and 21). The numbers in the left column are all the prime numbers between 10 and 20 (which form a first quadruplet), and the right column is made up of 10 + 1, 10 - 1, 20 + 1 and 20 - 1 numbers on each of the column 60 are gathered at the gathering center column of numbers is up to 48.

In the book How Mathematics Happened: The First 50,000 Years, Peter Rudman argues that the development of the concept of prime numbers could only have come after the concept of division, dating from 10,000 BC. Hr., With primes. He also writes that "no attempt has been made to explain why the correlation should submit multiples of two, prime numbers between 10 and 20, and some numbers that are almost multiples of 10" Development of mathematics as a knowledge base transmitted across generations in the first era of civilizations is strictly linked to its concrete applications: trade, crop management, measurement of areas, predicting astronomical events, and sometimes religious rituals. These needs led to the division of the branches of mathematics that deals with the study of quantity, structure and space.

Since the man was able to use and understand abstract concepts, but also due to the development of human relationships and intertribal and, not least, the first writing systems (notes written on cave walls in the form of images expressing both experiences in the real realm, but in the dream and increasingly more in the realm of ideas), the need for "number". We know that nNumber is one of the simplest abstract because a number can not be revealed by a material object; there are only conventional signs expressing it. Trade relations were developed with the evolution of the human spirit; At the same time, the number began to be increasingly more present in people's lives and, ultimately, indispensable a human existence as we began to realize that mankind 5,000 years ago, when the first traces date back to states that occurred in the world.

It seems, however, that most of the mathematical knowledge of the ancient world of Mesopotamia started in the flourishing culture of the region between the rivers Euphrates and Tigris (territory which today is Iraq) as shown preserved clay tablets till now. Mesopotamian numeration system was designed under 60 and under 10 The under 60 started from the fact that it could include the phalanges of the hand, using the index finger (5X12 = 60). What Mesopotamians lacked their counting system was that they had no symbol for zero. Zero was invented in India later, but it seems that the Maya used it a hundred years before the Indians, but it has not spread into other cultures at that time.

Mathematicians of Babylon - the city best known in Mesopotamia - mastered logic of linear equations and quadratic polynomial, creating algebra as a science. Problems with determining areas and volumes, in geometry, were studied also in the same period, and also at that time is calculated and the value of π (pi), with great exactitate.

Base Babylonian and Greek mathematics was submitted that begin intensive study of this science, since the early 450 BC "Zeno's paradox" from Elea opens in a mathematical methods used today - "reduction to the absurd" (reductio ad absurdum). A more precise formulation of these concepts led to the discovery that rational numbers were not sufficient to measure all lengths, so it is theorized irrational numbers. Conic sections of Apollonius formulated theory will lead to the development of pure mathematics and trigonometry. Plane geometry theorems, which the Greeks attributed to Thales them, including Thales's theorem (an angle inscribed in a semicircle is a right angle) and the Mesopotamians were known.

In China, from the first century AD, preserved manuscript "The nine chapters on the mathematical art", which includes methods of arithmetic, fractions, radicals, calculating volumes etc.

Mathematics flourished in Islamic countries, Iran and Syria, especially. Since the eleventh century, Adelard of Bath, an English Benedictine priest will bring Europe Greek integrated the Islamic science, testifying that the most important thing he learned while he was in Arab countries was to be guided reason. Also he is the one who translates into English the work of Euclid (Greek mathematician of antiquity, one of the founders of mathematics as a science), entitled "Geometry".

Mathematical sciences modern era has seen a tremendous growth, impossible to grasp in a presentation, be it even just statistics or analogue. Mathematics applications have expanded in all areas. By calculation (later confirmed by reality) have discovered new planets, explained the origin of the solar system were based principles of electricity, of magnetism, fluid mechanics, strength of materials, etc. Computer science, applied mathematics, is an area of exploration that, at least at the moment, seems inepuizabila.Ramurile mathematics

Who thinks a mathematics you closer to the contemporary era should think about that before you write, man has learned (forced by the reality of life) to count as, for example, Napier, Briggs and others have introduced the concept of logarithms about 400 years ago, and they were used for a period of 350 years, the main tool in arithmetic calculations, which save time and without elaborate and required calculations could not never be made.

At one time the world changed suddenly appeared Pocket PC, logarithms remained only an important mathematical function and their role in the calculation was lost. It is a challenge to imagine at present, the future of mathematics. Theoretically, it would seem that all important aspects of this science have been discovered. Mathematics applications open road but increasingly wider. Pocket computer - we ask - who / what will replace? Anyone could say it is a question with obvious answer ("It's irreplaceable!), But Napier (inventor of logarithms) formulated the basic concepts of mechanical computer in the same period logarithms and had to pass about five centuries until technology has found an application.

The basic ideas necessary replacement computer pocket with anything more powerful or unexpected are certainly around us.

4. Conclusions and sugestions

It also emerged operations: addition, subtraction, multiplication, and finally division, which has problems of learned men to the Renaissance, when it developed the modern method of sharing called Shah method, since it was inspired by some moves on the chessboard.

The XXI century witnessed a mathematics majors, the birth and development of many new branches such as spectral theory, algebraic topology and algebraic geometry. Computer had a strong impact on research. On the one hand, facilitated communication between scientists and discoveries spread, on the other hand, gave a very powerful tool for testing theories. They noted several current trends in mathematics that has grown ever larger, computers are becoming increasingly important and advanced, extend the applications of mathematics in Bioinformatics and the number of scientific papers is a real expansion.

The importance of mathematics comes from its very definition, it is a science that deals with the study of abstract patterns and structures, appealing to logical analysis, the inference and calculation. When these patterns are found in many different areas of reality, science and technology, they can be used to explain and control situations and natural events. Otherwise, separated from reality as mathematics would remain sterile, and poet of the "ivory tower."

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