ARCHAEOSIMULATION:
NEW SIGHT ON ANCIENT SOCIETY
AND LESSONS FOR COMPUTER ERA

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INTRODUCTION

By the word "archaeosimulation" we shall designate ancient methods and tools for simulation.

The sky was almost always one of the most complex and important objects of simulation for mankind. Therefore the term "archaeosimulation" in many respects is the same to known terms "archaeastronomy" and "astroarcheology". However we shall understand it much wider: as all tools and methods, which provide not only storage and transfer of knowledge, but also their production and clarification? The main object of the ancient simulation was not only the sky, but also the person as a part of the universe.

The history of modern study of archaeosimulation begins from researches of Gerald S. Hawkins on Stonehenge more than 30 years ago (Hawkins 1966). Hawkins not only first of all used a modern computer for the analysis of the ancient construction, but also has declared existence of "stone computers". Other megalithic monuments, which were probably used as an observatory and original analog computer for registration and forecasting of the astronomical events, were investigated and described late (see, for example, Wood 1978). Almost all described structures can be interpreted as simulation tools.

As well as for modern science, the various forms of analog and discrete simulation were for ancient people the most powerful means for research and understanding of complex dynamic processes of the real world.

New results described in the given work permit:

- to extend a history of simulation in comparison with Stonehenge in some times;
- to interpret some other well known ancient structures as special tools for simulation;
- to reveal numerous traces of ancient simulation in the different forms of human culture.

Two brightest examples of archaeosimulation are considered in details further.

"LIFE / WORLD TREE": THE EARLIEST FROM KNOWN MODELS

In the Hermitage in St. Petersburg a small plate from mammoth bone with spiral figures from many tens points is stored. It was found in 1929 in the village Malta near western part of the lake Baikal (Siberia). The plate is about 25 thousand years old. During storage of the plate in Hermitage it was repeatedly investigated by scientists of various orientations. One of the first 60 years ago was German mythologist Karl Hentze. Hentze interprets spirals of a plate as symbols of the moon phases and even as the image of whole cosmos, but without any quantitative analysis. The most careful analysis of the semantic system of the plate was made more than 10 years ago by Russian professor Larichev (Larichev 1989). His conclusions were the following: on the plate advanced knowledge about the visible movements of the star sky is fixed, which is the result of exact long-term observation of the sun, moon and visible planets. The precision of registration and representation of the information is quite enough for the sure prediction of the lunar and solar eclipse! Larichev has detected the following main elements on the plate:

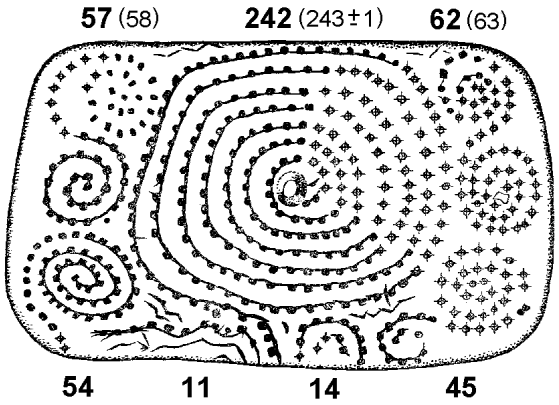

Figure 1. Malta plate with "life/world tree" and quantitative characteristics of elements of the drawing

- solar year: 243+62+45+14=365 days;
- four-years cycle: (242+63+45+14+11+54+58)x3=365.242 x 4 = 1461 days;
- lunar year: 243+57+54=354 days;
- sidereal form of the saros: 242x27,2122=6585.35 days =18.61 solar years = 19 sidereal years;
- synodic form of the saros: (54+57+63+45+4)x29.53=6585.35 days;
- synodic cycle times for planets:
  Jupiter: (63+45)x29.53=8 cycles;
  Saturn: (57+54+11) x29.53=9.5 cycles;
  Venus: (54+11+14+45) x29.53=5 cycles;
  Mars: (62+57) x29.53=4.5 cycles.

Additional analysis of the plate as simulation tools has allowed to determine the following:

1) The Malta plate model permits besides the exact "scientific" simulation of dynamics of the sky sphere, the simplified "calendar" simulation for wide use:

- ≈1/6 of the solar year: 62 days;
- ≈1/8 of the solar year: 45 days;
- ≈double sidereal month: 54 days;
- ≈double sinodic month: 58 days;
- ≈synodic cycle time for Mercury (four internal points of the element "14"): 4x29.5=116 days;
- ≈synodic cycle time for Venus (ten external points of the element "14"): 10x29.5x2=590 days.

2) The element "14" can be easily used for observation of the female reproductive cycle:
Stage 1: 10 "external" days of the barren period followed by menstruation.
Stage 2: (4+4) "internal" days of the fertilizable period, followed by the ovulation.
Stage 3: 10 "external" days of the barren period before menstruation.

Stage 4: If the menstruation has not come in time, then it is necessary to make test pass of the whole cycle (10+4+4+10).

Stage 5: In case of delay of the menstruation the cycle must be corrected.

Stage 6: If during the test pass of a cycle the menstruation was away, then go to the central spiral "242".

General term of pregnancy is 10+28+242=280 days.

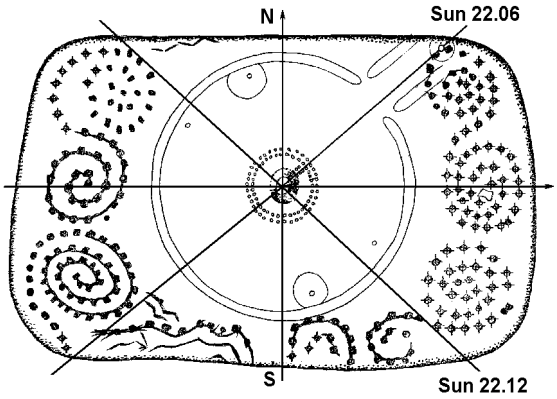

Figure 2. Malta plate and Stonehenge-II: main solar directions

3) It is rather remarkable, that the ten external points of the element "14" correspond to the synodic cycle time for Venus — the goddess of love. Four internal points of the element "14" correspond to the synodic cycle time for Mercury — the messenger of the gods, god of gain, profit and so on! This four points are also image of seed for the "life tree" "242". Then, Malta plate is probably the ancient computer prototype for the famous mythological concept.

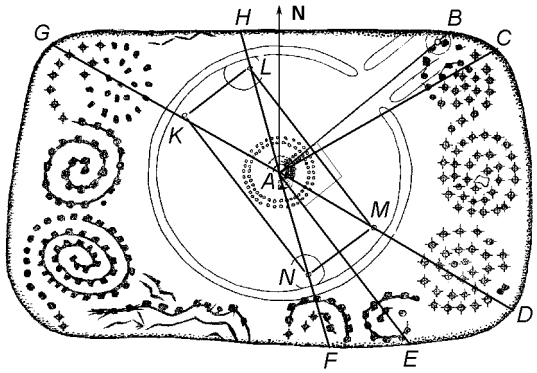

Figure 3. Malta plate and Stonehenge-II: main lunar directions (extreme rise directions for the "high" and "low" moon)

4) This model was interactive. Baikal located on same latitude as the Stonehenge. Main solar and lunar directions for the Stonehenge and for the "mammoth plate" coincide. The plate could be used also as "the personal Stonehenge" or a microobservatory (Fig. 2, 3).

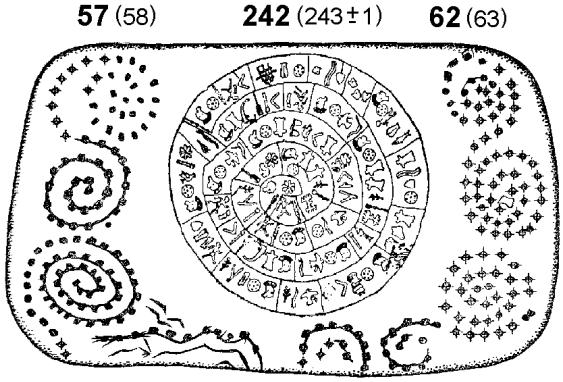

Figure 4. Malta plate and the Phaistos disk as element "243"

5) Such form of fixing and transfer

of the information has allowed at the initial stage of the history of civilization (25000 years ago!) to accumulate, apply and transmit knowledge without the alphabet and writing. This plate is not a unique model. Other ones, the age of which is only a little less, are known. Similar subjects, the purpose of which by the modern researchers was frequently determined incorrectly, are known for other civilizations. There are two good examples. First is the famous Phaistos disk, which can be easily entered in the system of the Malta plate as the structuralized spiral "243" (Fig. 4).

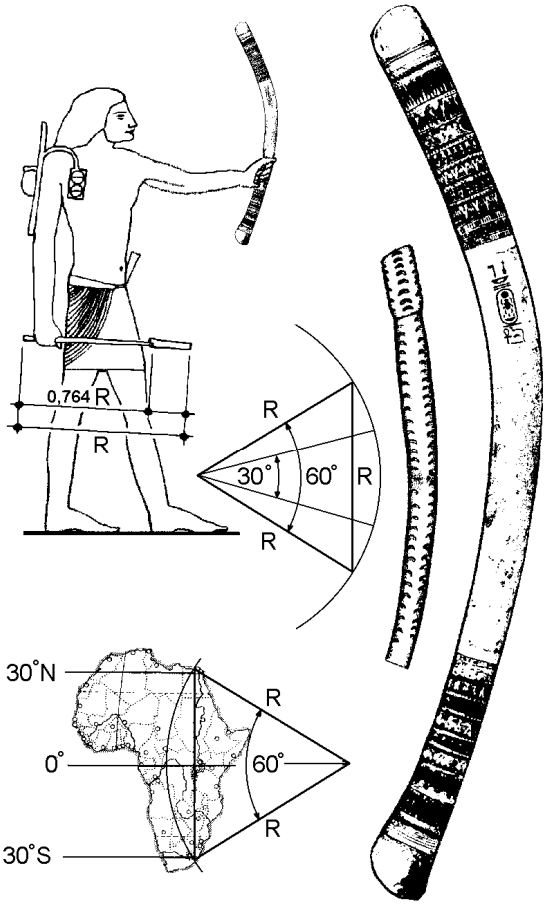

Figure 5. Ancient measuring tools for supervision of sectors 30 and 60 degrees

The second example is the so called "Boomerang of Tutanhamen" (big baton on Fig. 5). The ancient prototype of such "boomerang" (small baton on Fig. 5) was found there, where the above described plate was found earlier (Larichev 1993). Such measuring tool was, probably, an important part of the equipment of the ancient observatory. It is difficulty to believe that the temporary distance between two presented on Fig. 5 tools is more than 20 thousand years!

ANCIENT SYSTEM OF PYRAMIDS: THE GREATEST FROM KNOWN MODELS

It is possible to assume that long history of accumulation and analysis of knowledge in the form of refined computing models has allowed (long before the invention of writing in all its forms) to define real parameters of the cosmos. By creation of various models and their

coordination long before the beginning of the Greek antique science such parameters as the sizes of the earth, moon and sun, as well as distance between them and five known planets could be determined. In the first approximation it was made before the beginning of the pyramids era.

Such assumptions and the hypothesizes have been already stated (see, for example, Saunders 1980). Now there is the basis to approve that the majority known today megalithics were scale computing models, which not only continued the tradition of ancient knowledge fixing, but also were tools of further researches. The significance of megalithics in ancient civilizations was equal to the significance of supercomputers in the modern world. From this point of view the whole number of other similar ancient structures can be productively analyzed, not only Stonehenge.

Most interesting is the analysis of the ancient pyramids in Egypt as the simulation system. We have now a large collection of hypothesizes, the majority of which are unacceptable for a modern science and society (Mendelssohn 1993). Consideration pyramids as the scale computing model permits to explain many things.

On the basis of the analysis of the initial period of the ancient Egypt in the context of the archeosimulation the following hypothesis can be formulated:

1) In ancient civilization, as well as now, the exact knowledge and tools for their production and distributions played the leading role in development of society. Myths, symbols and the religions (minimum partly) occurred in the popularization process of the intelligent achievement in the field of natural sciences. A typical example is the so-called "lunar man": the anthropomorphous image on the moon surface becomes a source for many legends, but for informed persons it serves first of all as the reminder that the radius of the moon million times exceeds the growth of the person (Fig.6). The pyramids can also serve ss such characteristic example.

2) The idea of sectoring of the earth surface according to star patterns of the sky not only has deep philosophical and religious sense, but also is rather practical: each night a map can be before eyes! It was rather convincingly proved that the mutual arrangement of the Great Pyramids and the ancient city Heliopolis corresponds to the constellation Orion and the star Sirius (Bauval and Gilbert 1994). From the archeosimulation point of view the "star map" of the ancient Egypt can be essentially specified (Fig.7). The most interesting and important elements on this map are the center of precession and ecliptic. Thus the system of pyramid can be interpreted as scale computing model, which not only reliably fixed the major of earlier achieved results, but also was a magnificent tool for further researches of the sky dynamics.

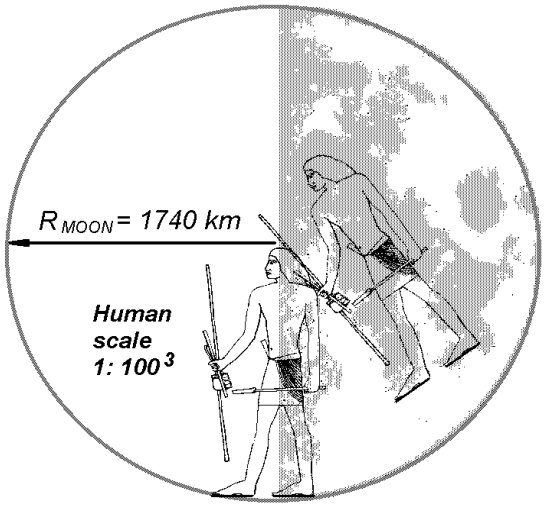

Figure 6. Moon and man

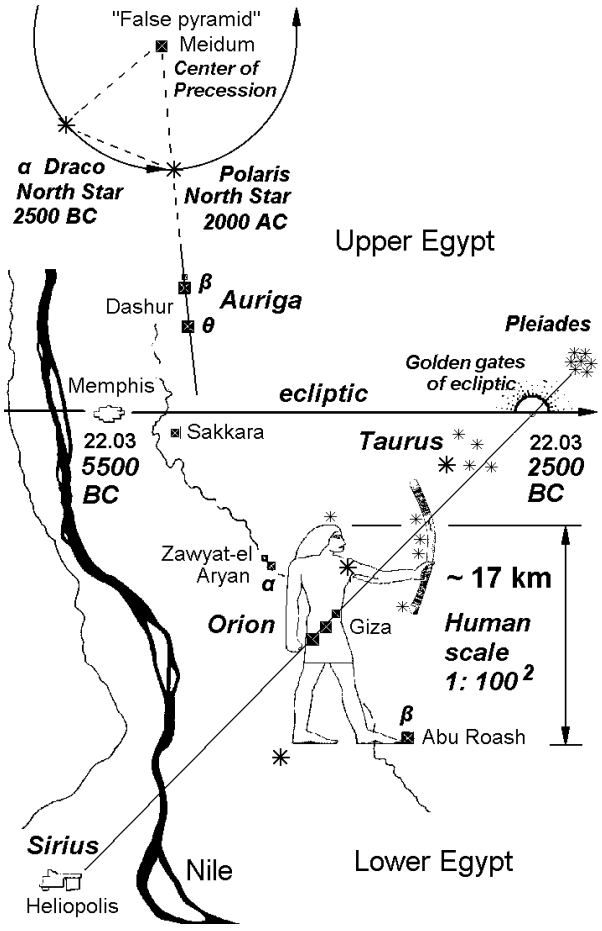

Figure 7. "That is on the sky, is also on the ground"

3) A key word for understanding of the Great Pyramids is "parallax". The correct understanding of the Great Pyramids is possible only in interrelation with the system of ancient measures of the "Hesi-Ra" wooden plates (Shevelev et al. 1990), which also can be interpreted as the model of cosmos. The main items of information on

the sizes of solar system during construction pyramids were already known (considerably more precisely, as is attributed for antique science), and one of the purposes of this system was the current check and refinement of this parameters. It was impossible without exact knowledge about daily and year parallax, which was reliably fixed at the proportions of pyramids (Fig. 8): R_E - earth radius (daily parallax), D_S - solar diameter, R_{ES} - distance from Earth up to sun (year parallax). It is necessary to note that factors 1.08 and $\sqrt{5}$ have acquired the sacral significance in ancient world.

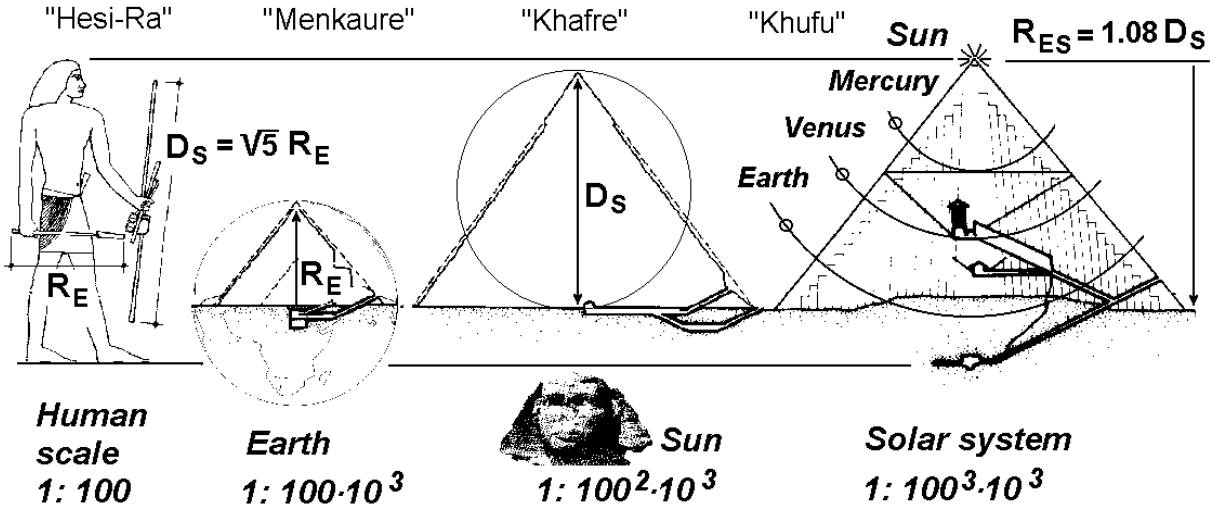

Figure 8. Great Pyramids as “model of universe”

4) It is also interesting to note the following fact. The time of the pyramids construction fixed the especial moment of the evolution of the sky: the point of the sunrise during the spring equinox was on the one of the most remarkable situations of the ecliptic — in the region of so-called gold gates. Moreover, the world has acquired a visible axis of rotation in the shape of the star α Draco. The present period of the history is also “axial”.

5) The construction of pyramids was the first great effort of the mankind in creation of objects, commensurable and real comparable with cosmos scales. The pyramids were for the ancient society not only important part of human scales in the universe (Fig. 9), but also a

real tool of development of the universe on the way of intelligent development of the mankind.

Other examples, which show that the system of pyramids in Egypt was not unique "supercomputer for supermodels" of the ancient world, can be indicated. The items of the information received as a result of their use were practically unknown to main weight of mankind, but their vestiges can be found in all subsequent culture. It is possible to note, in particular, their influence on architecture and main sizes of the most known churches (Fig.10).

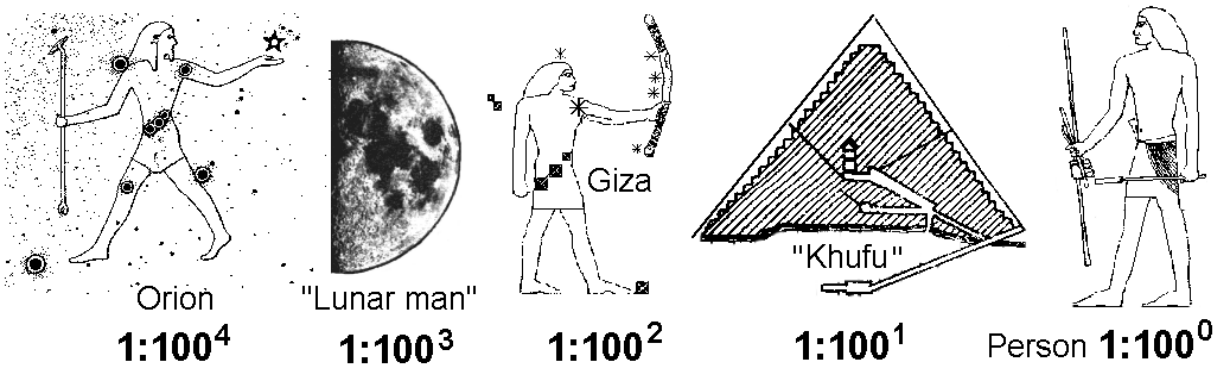

Figure 9. "The person is a measure for all things in the universe"

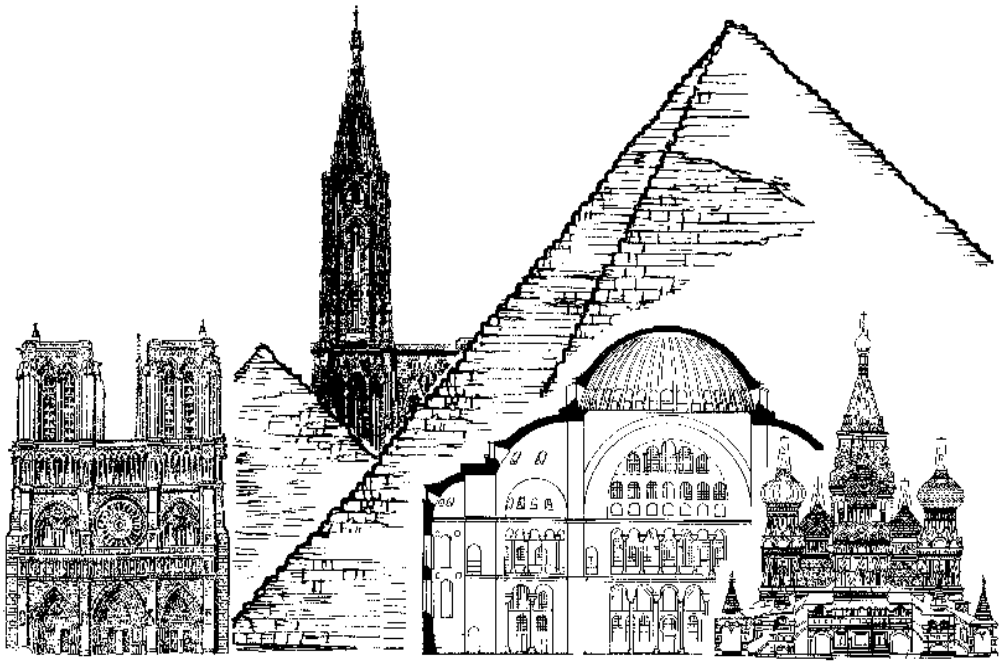

Figure 10. Great Pyramids and Churches in one scale

CONCLUSIONS AND FURTHER RESEARCH

- The chaos of the star sky during almost all history of the mankind was the major intelligent challenge for the persons, who searched in this chaos the order and stability. Archaeosimulation was one of the most efficient answers to this challenge. It is possible to generalize that the computing simulation was used as one of the major tools for intellectual and cultural deveopment of the mankind during all history of the civilization.
- Moreover, some of ancients models for the variety of characteristics (scales, significance for society, universality...) have remained unsurpassed and in the epoch of modern computer technologies. The main lesson for computer era is the following: having huge computer superiority (in comparison with ancient) modern simulation has too little impressive results and too inconsiderable influence on daily life of the majority of people. We can make much more.

- The history of the computer simulation can be lengthened to almost 25 thousands years. In this connection, without strong exaggeration, it is possible to assert that the history of the civilization is first of all the history of tools and methods for simulation — as indicators of intelligent development of the mankind.

The main direction of further researches in archaeosimulation is the search and decoding of other artifacts for reconstruction of the real development of the human knowledge last 30 thousands years with wide use for these purposes of the modern simulation tools.

REFERENCES

Bauval R. and A. Gilbert. 1994. *The Orion Mystery, Unlocking the Secrets of the Pyramids.* Read Consumer Books Ltd., London.

Hawkins, G. S. 1966. *Stonehenge Decoded*. Souvenir Press, London.

Larichev, V. E. 1989. *Wisdom of the Snake: Ancient Man, Moon and Sun*. Science, Novosibirsk (Russian language).

Larichev, V. E. 1993. *Creation of the Universe: Sun, Moon and Sky Dragon*. Science, Novosibirsk (Russian language).

Mendelssohn K. 1993. *Das Rätsel der Pyramiden.* Weltbild Verlag GmbH, Augsburg.

Saunders M. 1980. *Planetarium Stonehenge*. Caterham, Surrey, U.K.

Shevelev I.; M. Marutaev; I. Shmelev. 1990. *Gold Section: Three Sights on the Nature of Harmony.* Moscow, (Russian language).

Wood J. E. 1978. *Sun, Moon and Standing Stones*. Oxford University Press.

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