



ANCIENT SKIES

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CONSTRUCTION LOGISTICS OF THE GREAT PYRAMID

BY TED POWELL*

Towering over the Sahara sands near Cairo, Egypt, looms the most remarkable and enigmatic known stone-block structure ever erected by the hand of man - The Great Pyramid of Cheops. In terms of mass and volume alone, it is exceeded only by one or two gigantic Western United States poured concrete hydro-electric power dams. Its construction in an as yet undetermined remote past; the purpose of its alien-like design; the incredible precision of much of its block assembly; and the enormity of the construction logistics; all leave many unsolved mysteries which have baffled archaeologists for centuries.

As is well known, the ancient Greek historian, Herodotus, was informed by Egyptian priests and scribes that the pyramid's base half-perimeter to height ratio equalled the circle's Pi ratio; and the area of any one of its near-equilateral triangular slant sides was equal to the pyramid height squared. We shall pursue this key point, while avoiding the familiar far-fetched rationalizations and so-called "metaphysics" aspects - and there are many mysterious aspects to the Great Pyramid, as we shall see.

In 1799, Napoleon Bonaparte's invading army's engineers and accompanying civilian "savants" made a thorough survey of the Great Pyramid. The Frenchmen, Col. Coutelie and Mons. LePere, uncovered two of the remarkable, sand-buried, base anchor-sockets, which were cut into the Giza Plateau bedrock. This for the first time permitted an accurate determination of the pyramid's structural dimensions and angles. Their surveyor, Jomard, transit-measured the pyramid's rough, casing-stripped, slope angle, perhaps with some difficulty, at $51^{\circ}49'14''$. Subsequent researchers arrived at angles ranging from $51^{\circ}49'$ to $51^{\circ}52'$, by various measuring and dimension-calculation methods. Their most surprising discovery, however, was the square base alignment with the Earth's N-S spin-axis to within an incredible $5'$ of arc, or roughly to within a 1 part in 4,320, or .00023%. An Egyptian government survey conducted in 1925 measured the base alignment at $4',0''$ N-S and $2',12''$ E-W. Jomard also discovered the $37''$ concavity "mirror" deviation at the four side bases.

In the late 19th Century, British writers as well as some American, discussed the work of two British investigators, Col. Richard Howard Vyse in 1837 and Prof. Piazzzi Smith in 1865; and a subsequent British laboratory measurement of some lower casing blocks, where a mean value of $5^{\circ},51',14.3''$ was obtained for the massive slabs uncovered by Col. Vyse. The discovery of the casing blocks created something of a sen-

sation because their existence had been hitherto unsuspected. For some strange reason, the precision block inboard vertical sides and right-angle corners were not precisely aligned, hence the more easily measured outboard upper obtuse slope angle of $128^{\circ},8',45.7''$ subtracted from the trapezoid sum of 360° , minus 180° , resulted in minute variations in the lower outboard acute angle. But what was even more remarkable than this precise slope angle, was the fact that these white limestone blocks were flat finished to near optical tolerances of $0.01''/75''$!

Assuming the British laboratory data to be reliable, a geometric drawing of a hypothetical pyramid with this precise slope angle and a height of 1.000000, produces a value of Pi out to some six decimal places - and some rather surprising geometric and trigonometric relations. Again, as in the case of the precise base alignment, merely "pure coincidence"? I would be most happy to have such "coincidences" at my disposal while picking the state lottery numbers!

As pointed out by so-called "pyramidologists" and antiquities experts, why did some ancient engineering genius choose such an awkward slope angle instead of the more easily surveyed equilateral-faced 60° pyramid, if not to deliberately "square the circle" with its dimensions? When one considers the 5 or 6 decimal-place data, and 1 part in 4,320 relations, the platitude arguments of the "professional debunkers" seem more like over-rationalized hokum than logic. The key mystery here, however, is how the ancients were able to measure such precise angles - with crude wooden or brass transits, or with knotted 3-4-5 "rope stretching"? How were they aware of the Earth's true shape, rotation spin-axis and true north to within seconds of an arc - by eyeballing the Pole Star between the partially constructed pyramid's entrance-tunnel lay-out lines and past two nearby "bench mark" obelisk apexes?!

Antiquities experts such as Prof. Gunther Rosenberg, have asked many such pyramid questions. Where, for instance, were the pharaohs able to hire the necessary surveyors, architects, engineers, construction gang bosses and highly skilled artisans and workmen of such a high technical calibre in a technically primitive (though highly civilized) Egyptian society of the supposed construction date of 3500 BC, with a population of less than that of some of our states? How could an army of illiterate and unskilled "slaves" have possibly executed such incredible precision block construction and such artistry - by means of witchcraft and mass hypnotism?!

A detailed construction logistics analysis by the above antiquities expert only deepens the Great Pyramid mysteries. In order to quarry, size up, precision finish and transport some 2,300,000 massive $2\frac{1}{2}$ ton stone blocks from distant quarries, with some blocks weighing up to 90 tons and a few as much as

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600 tons, would have required at least two heavy hemp ropes per small block, with the number of ropes correspondingly ratioed upward for the more massive blocks. Assuming a rope-stretch and abrasion-wear rate of about 40% or so, that would mean approximately 5 1/4 million ropes!

Now, to log-roll a small 2 1/2 ton block over a causeway and up ramps (and over a rocky terrain, no less), would have required an estimated 10 logs per block, again with the number of logs up-ratioed for the heavier blocks. With an estimated mangle-grind wear rate of 50% or so, it would have required something like 26 million roller logs!

To freely quote Prof. Rosenberg, with some journalistic elaborations, where would the ancient Egyptians have obtained the necessary endless miles of hemp rope? From the "Abdul el-Assam Rope Works, Inc.", or from the other side of Memphis town? Where would they get the mountains of roller logs? From "Zeers-Rhobukk, Inc." just outside of Cairo? Where were the vast forests in an arid desert country to supply all the lumber? Where were the armies of camel caravans, fleets of river and seagoing vessels and masses of support manpower to transport the mountains of construction supplies, requiring still more miles of rope for tie-downs? What kind of ancient power machinery was then available with which to precisely erect and position the massive blocks within the Great Pyramid's structure - ropes and wooden levers?!

Further, it has been estimated that in order to process and erect some 2,300,000 stone blocks by means of primitive manual labor and equipment, at 10 blocks per day, it would have required an army of 1 million men and some 600 years to complete the gargantuan project! At 100 blocks per day, it would have taken nearly 75 years, long after an impatiently waiting and frustrated pharaoh passed away and was interred in a substitute underground tomb.

To go on with the logistics absurdities, how and where would such a vast labor force be housed, fed and watered and sanitation protected in a hot, dry and dusty desert environment? It would have required a vast and sprawling housing city; plus an army division barracks to police and protect it and the mountains and warehouses of construction equipment and supplies. How could the limited civilian population of only about 20 million of ancient Egypt and its economy have possibly functioned under such a massive manpower, materiel and transport logistics drain over such an extended period without a complete economic collapse?

Ancient Egyptian murals portray labor gangs rope-hauling massive stone figures on huge sleds over lubricated causeways, but this was at ground level. They also display pyramid blocks being rope-hauled over log-rollers and up ramps, but this applied to later, much smaller and inferior pyramids. According to this same antiquities researcher, this typical "Hollywood" scenario of "whiplashed slaves" as applied to the fully-encased 8 5/6 million-ton Giza colossus, degenerates into an exercise in amateurish absurdity. Yet, if Herodotus's historical data is accurate, the ancient Egyptians completed the stone mountain with only 100,000 paid, trained and skilled artisans and workers in only 20 years, working in 3-month shifts in the harsh desert environment. How were they able to complete such a colossal project in such a short time with primitive manual labor and equipment? What, for instance, would it require a modern industrial nation just to replace the missing casing stones with white, water-proofed and hardened concrete blocks in terms of cost and manpower and equipment?

Another antiquities expert also pointed out that in moving priceless temples and monuments from the Aswan Dam flood region, European heavy-construction firms were unable to move the massive temple blocks and stone figures with their hugest power cranes and were ignominiously forced to cut them up with

giant power saws before attempting the relocations. The most massive temples and monuments had to be abandoned to the Nile flood waters, regretfully. Then how in the world did the ancients manage it? The expert also flatly maintains that not one single heavy construction firm in the world today has either the experience, equipment or capability to duplicate the Great Pyramid! In poured concrete blocks, yes, but in cut and finished natural stone blocks, never!

Shifting to construction details, a close examination of the Great Pyramid's interior blocks reveals still more mysteries. While some of the later construction sections show evidence of unfinished and at times, even slipshod workmanship, most of the interior blocks display perfectly flat finished surfaces and precise angles, with signs of evenly spaced, smooth and fine grooves, as if cut by giant power saws or some other unknown high-technology method. Some of the block seams, especially on the decorative, polished ornamental-stone blocks of the interior passages and chambers, are so precisely fitted that the seams are invisible to the naked eye. Others that are visible, are so accurately fitted that a calling card a few thousandths of an inch thick, cannot be inserted into the seams. How did the ancients manage to finish blocks to a flatness of 1/10000th of an inch and angles to seconds of an arc - with copper hammers and chisels and by friction dressing? To dress down hard marble, granite or diorite blocks, engineers estimate that it would have required a pressure of some 2 tons for the larger blocks. How did the ancients obtain such a massive working force without the aid of powered machinery - with ropes and wooden levers?!

Some of the pyramid internal hard-stone blocks are core drilled out to 3" to 5" with perfectly smooth edges and profiles in some unknown manner. Some of the best modern-day diamond tipped core drills will leave roughened edges and walls in such hard stone. Again, how could the ancients have accomplished this with hammer and chisel? Some of the drill holes show signs of fine and smooth grooves. What did they use?

The outer casing blocks are so precision-fitted that most of the fine-cement joints are less than 1/32nd of an inch thick. How were these massive 16 ton blocks erected and manipulated and at the same time such fine cement joints filled in - again, with ropes and wooden levers?!

The British investigator, Col. Vyse, not only found iron tools in the interiors but in obtaining permission to remove two tiers of small blocks, found a malleable iron construction bracket inside the wall structure. It was witnessed by a co-worker and shipped off to a British museum, with signed statements. The Egyptians also used copper tools hardened in some still unknown manner. Where did they obtain such latter-day metals - from some ancient Egyptian "Merlin"?

Mystery piles upon mystery in a seemingly endless parade in a study of the Great Pyramid. Why was the pyramid's square base so precisely aligned with the Earth's spin-axis? Some authorities are of the firm opinion that it was once precisely aligned with no error and is now off by only a few minutes because of geological disturbances; or slight Earth angular momentum and axis shifts. Was it so positioned so as to induction pick up an etheric medium Earth-spin vortex energy via a dielectric radar corner-reflector effect and concentrate it at the upper 1/3 of its volume by internal reflection, with the original capstone of a giant quartz crystal and later copper-brass-gold alloy acting as a booster-reflector? Was this the reason for the derangement of Dr. Luis Alvarez's physicist team's cosmic-ray computerized ray-trace attempt at locating hidden crypts and vaults in a giant pyramid? Why are the pyramid's four triangular slant sides concaved 37" at the base,

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equally and symmetrically? Was it to produce a concave mirror effect upon the polished white limestone casing it originally possessed, so as to intensify the tropical sun's "fire" effect which enabled it to be visible for some 25 miles as a navigation beacon?

To further add to the pyramid mysteries, an archaeologist who recently studied some of the outer sandstone block crystalline material under a microscope, maintained that it was not natural stone but a reworked synthetic material - in short, a form of ancient concrete.

This brings us to a final mystery, why was the upward-slanted main north tunnel passage aimed in the direction of what was then the Pole Star? Was it for some unknown dielectric waveguide communication and navigation beacon, and for an astronomical observation purpose connected with that star, or one near or in line with it? Why was the pyramid located so that its apex axis passed directly under the center Pleiades star at that section of the Earth's precession cycle at the time of erection?

To summarize this construction analysis, in the opinion of many antiquities experts, not only was the enormity and precision of the Great Pyramid beyond the capabilities of ancient Egypt, remarkable civilization though it was, but that some unknown outside agency's advanced technology had to be involved. Many of the hundreds of writers on this fascinating subject have concurred on this conclusion, and have hinted at mysteries beyond Egypt and beyond the reach of conventional science.

A technically trained visitor's reactions at the sight of this gigantic legacy from a remote past, with its weather and sand-storm beaten, mutilated exterior so beguilingly simple; and an interior so bewilderingly complex and alien-like in design, might be summed up as follows: By whom? How? When? and Why?

The answers to these riddles may lie hidden in sealed tunnel crypts deep in the upper third of the structure, or hidden some 250 feet below the pyramid in tunnel rooms, vaults and temples; in a sealed off tunnel crypt at the base of the nearby Sphinx's skull; in buried temples below the Sphinx's left paw channels leading to the pyramid; in sealed stone vaults deep in the Valley of Tombs; in traces of ancient inscriptions on the casing stone slabs which were stripped from the pyramid by the Arabs in order to rebuild the Cairo buildings shattered by an earthquake in the 1350s; and in a long-forgotten pre-history which lies shrouded in the mists of a remote past, far beyond the 7,000-year, hard-evidence reach of modern-day archaeology.

References: Hundreds of volumes have been written about the Great Pyramid of Egypt. A few of the works the author consulted are:

1. Papers on the Great Pyramid, by S.V. Day, 1870.
2. A Miracle in Stone, by J.A. Seiss, 1877.
3. The Egyptian Pyramids, by E.W. Fish, 1880.
4. The Great Pyramid of Egypt, by S.H. Ford, 1882.
5. The Great Pyramid, by B. Stewart, 1927.
6. The Great Pyramid in Fact and Theory, by W. Kingsland, 1932.
7. Miracle of the Ages, by W. Smith, 1948.
8. The Pyramids of Egypt, by I.E.S. Edwards, 1972.

Note: Some of the 19th Century out-of-print books can be obtained from Health Research, Inc., P.O. Box 70, Mokelumne Hill, CA 95245 USA.

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BUILDING THE SCIENTIFIC PALEOVISITOLGY

BY DR. VLADIMIR V. RUBTSOV*

I read with great interest the article by Dr. Stuart W. Greenwood in Ancient Skies 12:6 in which he points out quite reasonably that the lack of financial support prevents many scientists from participating in paleovisitological research, and proposes to establish "one or more Scientific Investigative Committees on a trial basis" to see whether it will stimulate scientific investigations.

In Ancient Skies 11:4, I stressed the need to introduce the paleovisit problem into science. In this connection I would like to offer here a somewhat more detailed examination of this question.

Why does modern science as a whole reject the study of extraterrestrial visitations to Earth in the remote past (paleovisitology)? There are, I think, several main reasons for such a reprehensible attitude:

First, the problem of paleovisits is a profoundly interdisciplinary one. To solve it, we need to unite methods and achievements of the sciences so much different as, for example, astronomy and history, cosmology and philology, astronautics and archaeology, engineering and mythology, and so on. But modern science has a highly differentiated structure, with a scientific discipline as its main element. A monodisciplinary problem may be difficult to solve, but nonetheless it will be formulated and posed quite rigorously. An interdisciplinary problem, arising inside a "homogeneous" group of sciences (only natural, or only social, etc.) is more difficult to pose and solve. But a problem requiring the joint efforts of a "heterogeneous" group of sciences is a real stumbling block for the science of this day and age. To put it briefly, the paleovisit problem is somewhat too hard for our science.

Second, the problem is quite insufficiently developed even in those scientific aspects which are within the methodological limits of modern science. There is at present no theoretical model of a paleovisit or its traces. We do not know how to clear the information contained in the traces from various distortions, or how to distinguish extraterrestrial artificial objects from terrestrial ones. Therefore, any conclusion about a supposed paleovisit evidence, either positive or negative, has no scientific persuasiveness at the present time.

Third, the paleovisit problem in its current state has little (if any) in common with "usual" problems of history, philology, archaeology, mythology, and hardly more in common with those of astronomy, cosmology, astronautics and engineering. Instead of trying to take into account the experience of specialists in these disciplines and discuss with them the possibilities to broaden this experience, some Ancient Astronaut theory proponents try to turn the main principles of these disciplines upside-down. Naturally, the specialists remain in the best case, totally disinterested in the paleovisit problem and in the worst case, they become hostile to it.

Fourth, there is, certainly, a very considerable anti-paleovisit prejudice among many scientists. This prejudice seems to be partially justifiable, if we understand the modern state of the problem, but in many respects it is irrational and unscientific in the strict sense of the words. It is, however, the epistemological irrationality, not the social one. The vast majority of professional scientists are like ordinary people, not only in respect of money (as Dr. Greenwood rightly noticed), but also in that they must take into consideration opinions of their seniors and colleagues. It is not seldom that they begin after all to regard these opinions as their own.

What needs to be done in order to alter radically this situation? As a strategic outlook, a great

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thing is to set up a community of specialists (especially in history, philology, archaeology, etc.) who are recognized members of their professional communities and at the same time are actively studying the problem of paleovisits. This community would develop the problem as an interdisciplinary scientific one, that is, establish the scientific paleovisitology in its methodological and special aspects. It would also be intended to apply the (modern) tasks and the (future) achievements of paleovisitology to the tasks and needs of recognized scientific disciplines. As a result, paleovisitological works would gradually become a legal part of disciplinary publications. Certainly, the community should also form its own system of special paleovisitological publications included as a subsystem into the publication system of science as a whole. In this case, the anti-paleovisit bias could be gradually dissolved, if not eradicated.

Of course, such a community cannot spring up overnight, but may only grow little by little from the group of scientists and engineers who are bold enough to study the problem of paleovisits even now. This group (rather small for the time being) bears the full responsibility for the future development of the problem. It is only its research activity that may some day draw the attention of the general scientific community to the idea of paleovisits, provided it is elaborated and the results of the work are presented in the strict scholarly manner.

Certainly, these are rather far-reaching, strategic aims. What can we do now? I think that Dr. Greenwood's suggestion of the Scientific Investigative Committee (SIC) is of great interest and value. To realize it, it would be desirable, in my opinion, to propose to those members of the Ancient Astronaut Society (AAS) who are graduate scientists or scholars and who are wishing to participate in the SIC, to send their propositions on the SIC's activities and working plans to the world headquarters office of the AAS. Then the list of the SIC's members (including their addresses to promote direct contacts), as well as a summary of their propositions would be published in Ancient Skies or photo-copied and sent out back to them. The SIC's (or SICs', if the specialists consider desirable to establish several committees, according to their professional branches of knowledge) members would elect, one way or another, the Chairman and scientific editor. It would not be reasonable to turn the logbook of the AAS into a scientific bulletin, for the not-quite-scientific character of Ancient Skies is in a sense its merit, not defect; besides, the majority of the AAS members are not scientists and would not be interested in reading nothing but special scientific papers. But it would be quite reasonable to allocate for SIC's information and publications a special section or a page of Ancient Skies. The scientific editor would arrange reviewing and selecting of submitted manuscripts. Such filtering, however, in an interdisciplinary field is much more difficult and requires more caution than in a monodisciplinary one. This seems also to be in favor of the idea of more than one SIC.

The creation of the Scientific Committees cannot certainly solve by itself the main research problems of our field, only some part of organizational problems. Individual efforts will probably remain for a long time the main form of scientific research in the field of paleovisitology. But the SIC(s) and the "scientific page" of Ancient Skies would provide a first center of the research co-ordination and of the exchange of ideas and information. Members of the SIC(s) will be able to meet personally at AAS World Conferences, and this is a very important possibility.

As a SIC develops its activity, it would establish relations with "usual" scientific societies and periodicals (especially with historical/archaeolog-

cal/philological ones, on the one hand, and with SETI [Search for Extraterrestrial Intelligence] ones on the other hand), as well as with the scientific bodies dealing with anomalistics (such as, the Center for Scientific Anomalies Research, Ann Arbor, Michigan, or the Society for Scientific Exploration, established at the University of Maryland).

Certainly, there will be problems and difficulties the Scientific Investigative Committee will deal with (especially if there will be only one SIC, since mutual understanding between naturalists, engineers, humanists and philosophers is not always easy to reach), but it is most important to start this work.

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SCIENTIFIC STUDY REVEALS THAT SCIENTISTS ARE BIASED

In its May 30, 1986 issue, the Chicago Tribune reported that despite the ideals of objectivity proclaimed by scientists, they are as prone to bias and self-deception as are non-scientists. This conclusion was reported to the annual meeting of the American Association for the Advancement of Science by Michael Mahoney of the University of California at Santa Barbara. Mahoney described a study which he conducted whose purpose was to determine whether social scientists or physical scientists were more prone to self-deception, and the study revealed, to Mahoney's surprise, that non-scientists were more scientific in their approach to solving a given problem than either physicists or psychologists.

The study involved 15 Ph.D. physicists, 15 Ph.D. psychologists and 15 conservative Protestant clergymen. The clergymen were designed to serve as a control group representing the nonscientist. All participants were given a series of numbers and told that they were generated from a mathematical rule. They were asked to determine that rule and then announce it when they were satisfied they had a correct answer. Mahoney reported that the clergymen did two to three more experiments to test each hypothesis than did the scientists, and that they were three times as slow to announce an answer and only half as likely as the scientists to return to a hypothesis already shown to be false. Mahoney concluded that scientists, like anyone else, tend to stick to their preconceived notions, even when facts indicate they are wrong.

Mahoney reported on another experiment that demonstrated the fallibility of scientists. He sent phony studies to reviewers for publication in scientific journals and found that the reviewers praised the work and accepted it for publication when it produced positive results that agreed with their positions. But when he changed the figures so that the studies disagreed with the hypothesis, the reviewers criticized the methodology and rejected the study.

In another experiment, Mahoney said, a group of researchers took 12 studies that had already been published in scientific journals, changed the names and opening statements but nothing else and submitted them to the same journals for publication several months after they first appeared. Mahoney reported that nine of the studies were rejected for publication merely as being inadequate. Only three of them were spotted as phonies.

When it became clear that Mahoney was submitting phony studies to journals to test the publication system itself, Mahoney said "several angry people called the university and tried to get me fired." He concluded that "it's okay to experiment on college sophomores, but not on other scientists."