From the desk of Pierre Beaudry

HOW THE GREAT PYRAMID WAS BUILT.

by Pierre Beaudry, September 2004

One of the most stubborn fallacies of composition on the subject of ancient Egypt that naive and unprincipled people generally have is that the pyramids of Egypt were erected by masses of enslaved beasts of burden, to serve as burial mausoleum erected to the vanity of Pharaohnic tyrants. This is one of the most despicable and enduring lies of the entire span of recorded human history. The truth of the matter, as I have reported earlier in *21st Century Science and Technology,* summer 2004, is that the pyramids of Egypt, and more specifically, the Great Pyramid of Giza, Khufu (Cheops), were astronomical observatories that reflected the most advanced form of civilization known as the People of the Seas whose culture ended around approximately 3,000 BCE.

The construction of those pyramids was developed based on a unique principle known as the Principle of Ma'at, that is, the principle of the *Feather of Truth*, otherwise known in ancient Egypt as the principle of social justice and of harmonic ordering of the universe. I intend to show, here, how the principle of the *Feather of Truth*, was a self-conscious principle of economic and technological development whose impetus and dynamic was given by the Leonardo Da Vinci of ancient Egypt, Imhotep, who came to represent the high point of Egyptian civilization of the Old Kingdom, that is from the beginning to the end of the pyramid building Dynasties III and IV. (1) However, the validity of such a discovery of physical principle by Imhotep cannot be established simply by showing how he, and his grandsons, built the Step Pyramid of Sakkara and the Great Pyramid, block by block. More fundamentally, we must communicate to the reader how Imhotep, and his grandsons, proved to be uniquely creative

individuals when they demonstrated their ability to apply, as a cause does to its effect, that such a physical principle as the *Feather of Truth* was the proof of principle, which showed that when man operates from the standpoint of sufficient reason, the universe is forced to obey. Thus, the purpose of the Great Pyramid is to demonstrate that man is not an animal but a creative individual, conceived in the image of God the Creator, and that humanity should be proud to live in its shadow for all time.

RECIPROCITY IN THE BALANCE OF MA'AT

Throughout history, the most asked question about the Khufu [Cheops] Great Pyramid of Egypt has been: "How did they do it? What kind of technology did they use? How were the Egyptians able to move such massive blocks of stone, and elevate them to such heights without any modern technology? “An appropriate answer to that question would require a treatise on Ancient Egyptian Economics, which we are not competent do. However, the shorter answer to these questions is that the Prime Minister of King Djoser (C. 2630-2611 BCE), Imhotep, initiated a golden age of wisdom which inspired all of the pyramid projects, based on the principle of Ma'at, which represented the principle of balance, reciprocity, and social justice among all human beings.

This ancient principle was not a religious principle, as such, but a scientific principle that had been attributed to a divinity. It is important to make this difference because this principle does not require that someone believe in it, for it to be effective; it simply requires that someone be able to relive it, cognitively.

Ma'at was the ancient Egyptian divinity which was generally associated with the perfectibility of human beings through the practice of the seven cardinal virtues of TRUTH, JUSTICE, ORDER, BALANCE, PROPRIETY, RECIPROCITY, AND HARMONY. The Ma'at principle was often represented by an ostrich feather in a balance being weighed against a human heart. If a deceased individual had lived his life in accordance with the principles of Ma'at, and his heart was devoid of envy and rage, the balance would show justice by demonstrating RECIPROCITY between his heart and the feather. From the standpoint of the universe as a whole, Ma'at was primarily the expression of the ordering principle of the stars and the planets which maintain harmony and balance in their repeated cycles within the heavenly sphere, as can be exemplified by the Egyptian dodecahedron. Ma’at represented the principle of the tensor in the universe as a whole.

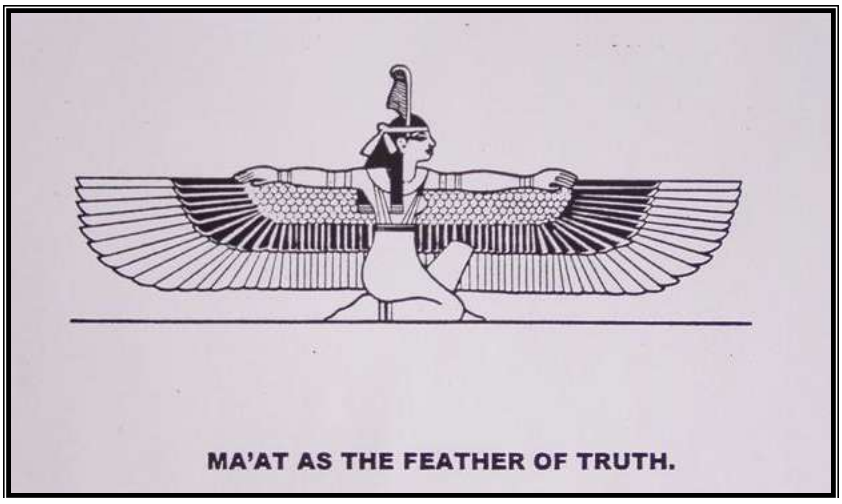


Figure 1. Ma'at as a winged angel.

HERODOTUS ON THE TWO METHODS OF BUILDING THE PYRAMID.

The ancient Greek historian, Herodotus, deliberately gave two very different and opposite stories of the techniques employed in the construction of the Great Pyramid. In doing so, he forced the reader to make a distinction between two types of society: an oligarchical society, and a republican type of society. Furthermore, the reader should also be aware that Herodotus attached much more importance to the thinking process of people, than to facts and events that he reported on, or that were reported to him. Just before he began to describe the accounts on the pyramids, he chose to give this warning to the reader: "As for the stories told by the Egyptians," he said, "let whoever finds them credible use them. Throughout the entire history it is my underlying principle that it is what people severally have said to me, and what I have heard, that I must write down" [2-123]. Herodotus gave the two following reports about the construction of the Great Pyramid.

"{***2-124. Now, till the reign of King Rhampsinitus, what the priests had to tell of was nothing but the rule of good laws and the great prosperity of Egypt; but after him, Cheops (Khufu) became king over them, and he drove them into the extremity of misery. For first he shut up all of the temples, to debar them from sacrificing in them, and thereafter he ordered all Egyptians to work for him. To some was assigned the dragging of the great stones from the stone quarries in the Arabian mountains far away from the Nile; to others he gave orders, when these stones had been taken across the river in boats, to drag them again, as far as the Libyan hills. The people worked in gangs of one hundred thousand for each period of three months. The people were afflicted for ten years of time in building the road along which they dragged the stones - in my opinion a work as great as the pyramid itself; for the length of the road is more that half a mile, and its breath is sixty feet, and its height, at its highest, is forty eight feet. It is made of polished stone, and there are figures carved on it. Ten years went to this road and to the underground chambers on the hill on which the pyramids stand.***

These chambers, King Cheops made as burial chambers for himself in a kind of island, bringing in a channel from the Nile. The pyramid itself took twenty years in the building. It is a square, each side of it eight hundred feet long, and the same in height, made of polished and most excellent fitted stones. No stone is less than thirty feet long."

2-125. "This is how the pyramid was made: like a set of stairs, which some call battlements and some altar steps. When they had first made this base, they then lifted the remaining stones with levers made of short timbers, lifting them from the ground to the first tier of steps, and, as soon as the stone was raised upon this, it was placed on another lever, which stood on the first tier, and from there it was dragged up to the second tier, and on to another lever. As many as were the tiers, as many were the levers; or it may have been that they transferred the same lever, if it were easily handleable, to each tier in turn, once they had got the stone out of it. I have offered these two different stories of how they did it, for both ways were told me.}" (2)

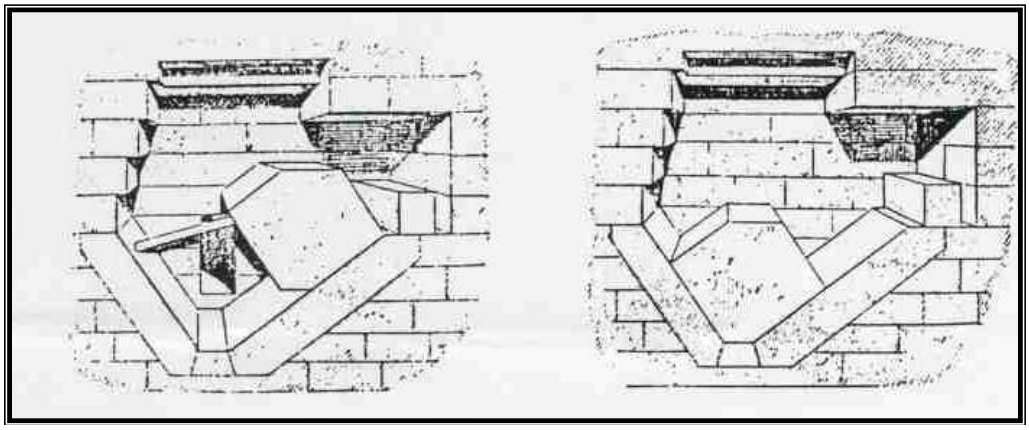
Think of the Ma'at principle again, in light of what Herodotus just wrote. What does it say? {The heart of a just and truthful man can be weighed in a balance against the feather of Ma'at.}. How can a Pharaoh like Khufu be so cruel to his fellow man and, at the same time, erect a pyramid reflecting such great genius? If you think about this paradox for a moment, you will discover that the idea behind this paradox is the beautiful metaphor of the *Feather of Truth*, which implies that something light can be balanced with something heavy, or that a great weight can be leveraged by a lightweight. This is the principle of the weak force in the universe. If you were an ancient Egyptian engineer, how would you go about applying this general principle to the building of an Egyptian pyramid? How could you apply this principle to a lifting machine? What would be the significance of such a newly invented technology with respect to your labor force? What is the economic significance of replacing brute force by some other kind of power?

There seems to be several questions and paradoxes here, which would need to be addressed, but Herodotus did not raise these questions. He simply put the paradox, or the anomaly, before the reader who cannot but be distraught and perplexed by his contradictory historical statement.

It is clear that the first interpretation that Herodotus gave of the construction of the pyramid in History 2-124. identified that slave labor was enforced by an evil Pharaoh who treated his people like animals, like cattle or beasts of burden. However, quite to the contrary, his second interpretation in History 2-125. indicated a form of construction which is based on what we would call today a republican outlook, implying that man is not an animal but a creative individual seeking to discover physical principles leading to the mastery of some sort of labor saving technology. This opposite view implies that the Pharaoh treated his people as human beings, and with dignity. Why would Herodotus give his reader precisely those two diametrically opposite options, one bestial and the other human? Is there a way to discover which of those two stories is true, or is it just a matter of guessing and believing? Also, can both of these stories be true, at the same time?

THE TECHNOLOGY OF THE SHADOOF.

Aside from the two contradictory accounts by Herodotus, there is also an interesting account given by the student of Eratosthenes, the Greek geographer, Strabo, who related the fact that in different pyramids, and especially in the Pyramid of Queen Sebek-Neferu-Ra, there were stones weighing in excess of 42 tons that could slide sideways like a trap door. In 1990, Egyptologist engineer, J.P. Lepre, made the hypothesis that the pyramid of Khufu had a swivel door on its northern entrance, and implied that the pyramid may have had another purpose than that of burying the dead. He wrote that the Great Pyramid might have had a flap-door, which "could be opened and closed at will by priests in charge of maintenance." My question is: "Why would a tomb require a flap door and regular maintenance?" On the other hand, if astronomy classes are given in the Grand Gallery, as I showed it was used for during its construction, then an easily maneuverable flap door to the pyramid is quite appropriate. During the late nineteenth century, Another Egyptologist engineer, William Petrie, also mentioned the fact that the pyramid of Hawara was gained entrance through huge ceiling sliding stones. The Step Pyramid of Djoser, built by Imhotep, had a round 3-ton plug of granite, which sealed the ceiling of the King's chamber.



Figures 2- [Bent Pyramid of Sneferu. Drawings by G. Perrot and C. Chipiez of an open and closed oblique five-ton sliding door. Reported by J.P. Lepre.]

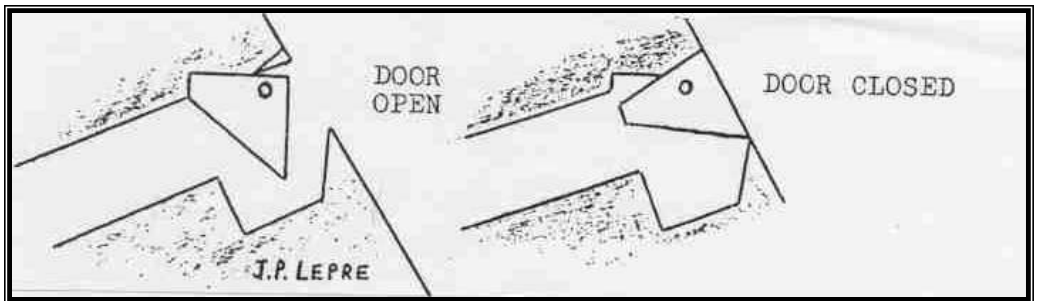


Figure 3- The perfectly balanced flap-door at the entrance of the Bent Pyramid of Sneferu and Khufu, which could be opened by a push of the hand. Drawing by J.P. Lepre.

It is very likely that both the Great Pyramid of King Khufu, at Giza, and the Bent [Rhomboidal] pyramid of his father, King Sneferu, in Dahshur, had perfectly balanced giant swinging flap-doors, which used to close their passageways. Thus, when you witness such extraordinary engineering accomplishments, you are immediately prompted to ask in awe: "How did Imhotep build and lower a 3 ton plug in the roof of King Zoser's chamber? How could it be possible to build such perfectly balanced doors, and lift them into positions onto their ball-and-socket mechanisms? How can ordinary people lift a 21/2-ton stone block five feet up in the air, without doing any strenuous work, and without the benefit of modern technology? The answer is: "Angular measurement of balance and proportionality: Ma'at." (3)

Is it so amazing to discover that the practice of lifting a heavy weight by using a lighter counterweight had been a common daily occurrence throughout the Egyptian countryside, for thousands of years? Yet, when we contemplate the pyramids, why is it that no one, except the builders themselves, and a few engineers of the twentieth century, thought of applying this very same underlying principle to the lifting of heavy blocks?

Egyptian farmers, everywhere along the Nile, have been using a simple lever device for the purpose of watering their fields since the most ancient times. The device, called a Shadoof, is a beautiful example of a "least action" gravity device capable of lifting water for the purpose of irrigating fields without strenuous work, providing that the right angle of leverage was applied, and the handler had a good book to read.

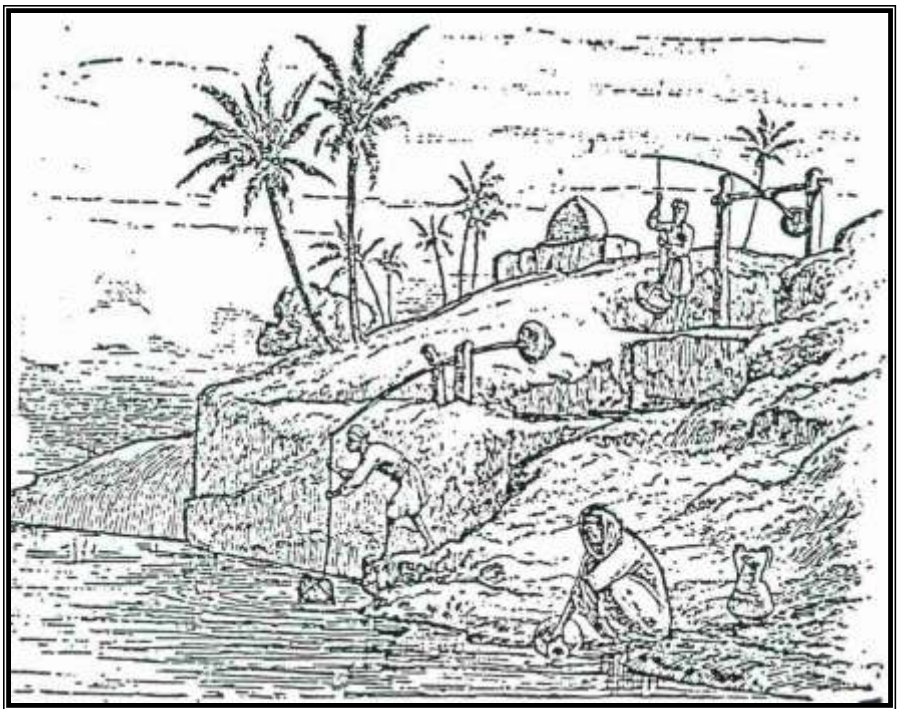


Figure 4. The SHADOOF (SHADUF).

First of all, look at the Shadoof as a simple application of the Ma'at principle of balance and reciprocity. Note how this ancient technology is made up of a simple ten-foot pole at the ends of which, a weight, and a counterweight, swivel around a pivot, or a fulcrum, and its purpose is to bring water from the lower level of the Nile River to a higher level of the land. Nothing could be simpler, and that was the idea that Imhotep and his associates studied and applied to facilitate the lifting of heavy stones for the construction of the pyramids. In fact, when this Ma'at principle is conceived properly, and applied correctly, a two man team is easily capable of lifting, and swiveling a weight of 5,000 pounds in balance with a counterweight of 500 pounds, providing that the proportionality of the weight and the counterweight is located appropriately along the lever.

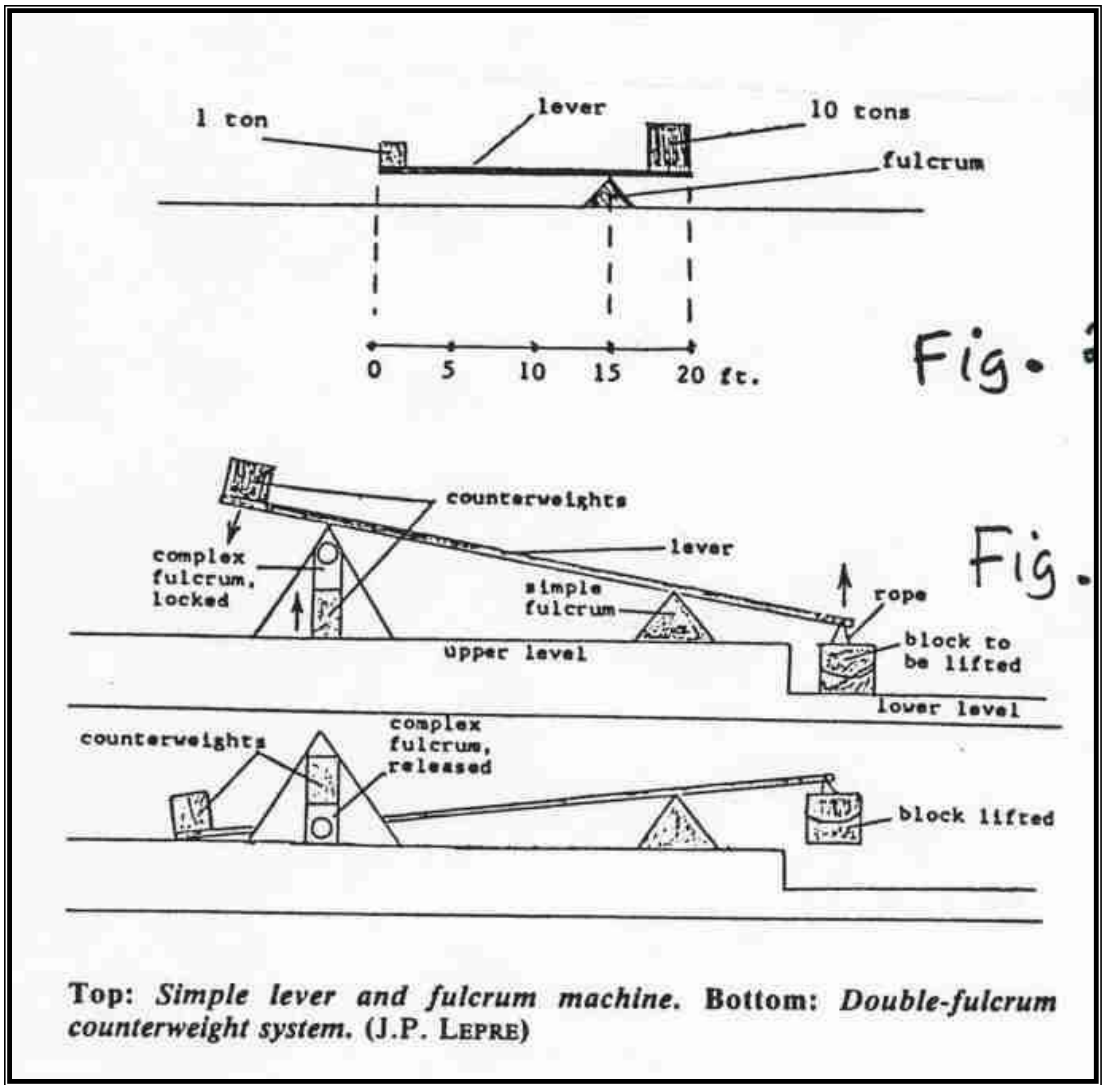


Figure 5. Relationship between a weight of 20,000 pound bloc (10 tons), and a counterweight of 2,000 pounds (1 ton), a ratio of 10/1. A simple fulcrum will balance this weight and counterweight, if it is properly placed at the 3/4 mark of the lever. Drawings by J.P. Lepre.

This is the type of device that Herodotus was reporting on when he wrote that the builders of the pyramids "{then lifted the remaining stones with levers made of short timbers.}" In point of fact, more evidence is provided by the hieroglyphic text of the Palermo Stone which reports the fact that Pharaoh Sneferu had sent 40 ships to Lebanon, charged with the task of bringing back loads of cedar trees from that country. It is reported that short cedar beams have also been found in both the Maidum and the Bent pyramids, which were the two immediate precursors to the Great Pyramid. If we consider that the {short timbers} that Herodotus speaks of were used to build {lever machines}, and that each pyramid course required one machine, then, the amount of cedar beams that 40 ship loads represent would be sufficient to build the few hundred machines, or so, required to do the work for both the Sneferu, and the Khufu pyramids.

Several contemporary engineers, namely, Olaf Tellefsen, L. Croon, William Petrie, and J.P. Lepre, following the prescription of Herodotus, have described this idea.

THE PRINCIPLE OF THE *ADVANTAGE OF LABOR* OR THE EGYPTIAN ZERO GRAVITY LEVER MACHINE

Of all of these modern day engineers, J.P. Lepre is the one who had the highest conception of the underlying principle of labor power that was involved in the building of Egyptian pyramids. He described how the ancient Egyptian engineer conceived of his machine, essentially, as a *labor saving device*. "In employing the basic lever technique, it is probable that the pyramid builders would have used a somewhat more complex design in order to reduce the amount of raw manpower to be used, for here they were dealing with very heavy material. A lever system consistently used for heavy stone would have to contain a counterweight of a sort. If not, the energy of the workmen would be unnecessarily taxed. Therefore, the Egyptians may well have utilized a double counterweight along with a double fulcrum. This would elevate the nature of the machine from simple to complex. The principle would be the same, but the pattern would be more sophisticated, being, in a sense, parallel to the ability of modern machinery, where the machine does the actual lifting, with the manpower merely operating and maneuvering the machine."

The first thing that the chief architect had to do, in order to properly apply the principle of Ma'at to the pyramid, was to establish the squaring of the monument's base, and locate precisely the subterranean passageway and chamber, in accordance with a perfect East-West and North South alignment, on the day of equinox. This is the first angular measurement needed to establish a leveled ground base. The purpose of this was to obtain, at a perfect right angle, the meridian position for the northern entrance of the pyramid, in line with the celestial True North, and thus elevate the pyramid as an astronomical observatory. This angular measurement, between the position of True North and the rising of the sun due east, was essential to ensure the determination of a right angle with the leveling of the base of the pyramid, which was verified by enclosing the entire foundation with water, and building trenches all around the square foundation, as Herodotus reports: "These chambers King Cheops made as burial chambers for himself in a kind of island, bringing in a channel from the Nile." (3)

Lepre states, quite appropriately, that the use of the Shadoof "illustrates that the ancient builders did not employ complex or mysterious devices or techniques for their manipulations of heavy stones, but executed their grand task by use of the most simple and practical methods available to intelligent men." [Op. Cit. p.235] This is a very important point that reveals implicitly the lies of the leading British Egyptologists in their attempts to obfuscate historically the true history of the pyramids. Contrary to what the British oligarchy would have you believe, the builders of the Pyramids were intelligent people, and they made use of their powers of reason to make their discoveries. If we do the same and internalize how they must have been thinking, based on the *Advantage of labor*, we have a good chance of discovering their not so hidden *cognitive powers.*

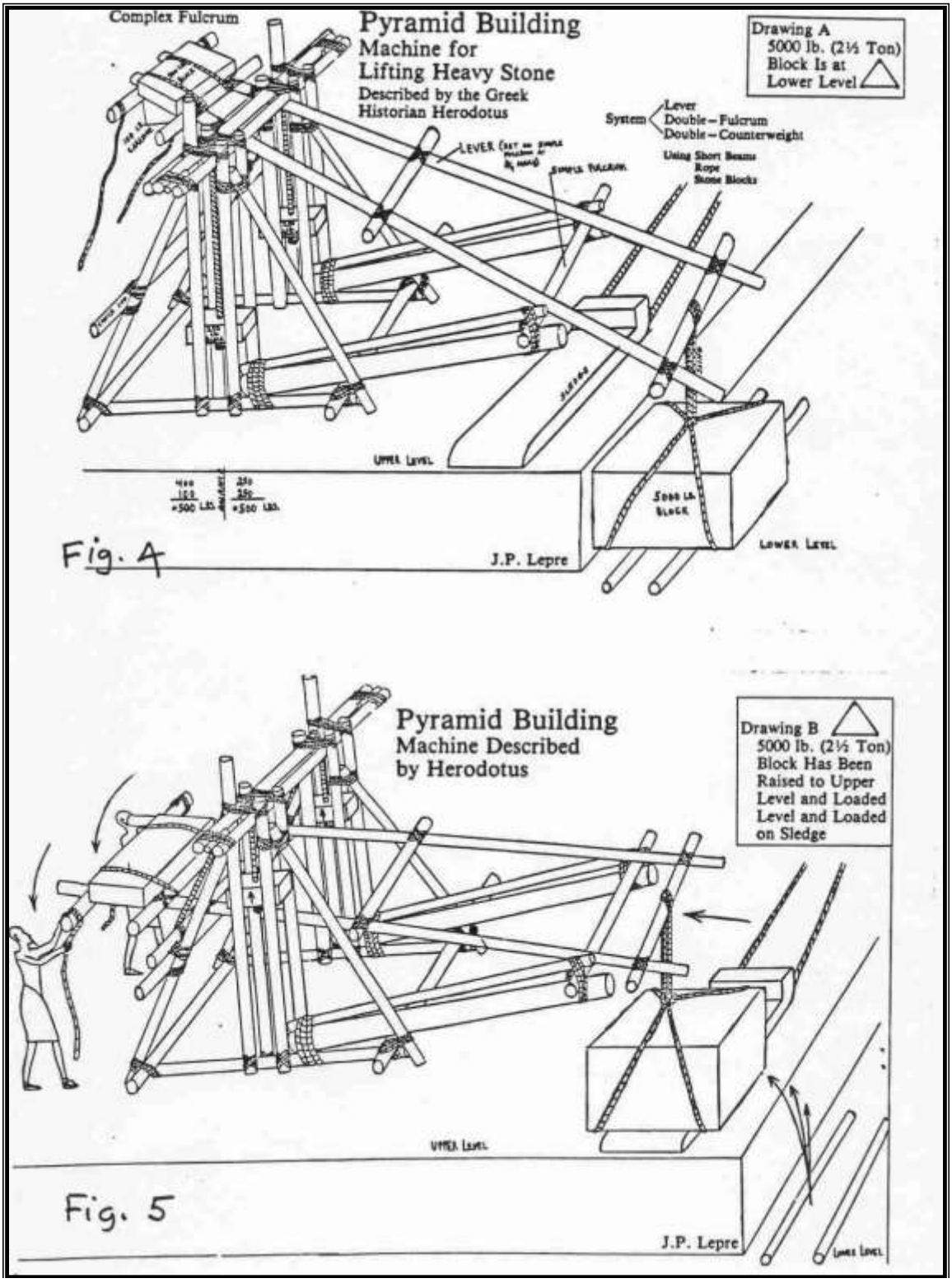


Figure 6. The pyramid Building Machine following the description of Herodotus. Drawings by J.P. Lepre.

The working Lepre model shows how to lift a heavy stone of 5,000 pounds (2 1/2 tons) from a lower level to the next higher level of the pyramid by using a minimum of labor power. This is the average weight of the pyramid stones. The key feature of the model, and the crucial discovery of its purpose, resides in *the double fulcrum and the double counterweight*, both of which have the basic purpose of lifting and pulling the weight of 5,000 pounds without any significant human effort. Note how the two counterweights become even, at the check log, when the weight is raised at the same height on the second level; and observe how the 45 degree diagonal braces of the rear fulcrum serve as two gliding rails which pull the lever and the weight toward the back, while the lever slides over the first fulcrum.

Thus, the *cognitive power* behind the construction of the pyramids is revealed, and the so-called "mystery" dissipated, when reason discovers that the essence of the question lies in the *Advantage of labor*: that is, in the fact that the two counterweights cancel each other! Then, where the Ma'at principle is applied, there is really nothing for the men to lift, or to drag. The technology is made to work for their advantage. The Ma'at principle then represents an ancient expression of the principle of the Peace of Westphalia, the *Advantage of the other* and the *least action principle* of Gottfried Leibniz. The workers only need to operate the machine and grease the sliding parts occasionally.

THE GREATEST ECONOMIC WORKFORCE IN ANCIENT HISTORY

A closer study of the social conditions of labor, and of the technological capabilities that were developed by the Egyptians show that the work was done only during the three months of the flooding season, the coolest period of the year. The workers were, for the most part, farmers who were idle during that period, for obvious reasons, but, who were otherwise busy during the other nine months of the year with planting, cultivating, and harvesting. These farmers, and others who came from all over the country, and from surrounding nations as well, were conscripted and paid in kind, with food and lodging. Just imagine the youth of the Near Eastern countries invited to participate in building the greatest wonder of the world, for a period of three months, all expenses paid. This begins to give you a true sense of what went on during the construction of the Great Pyramid.

According to the report of Herodotus, the great work was accomplished with 100,000 people working three months a year, during a period of twenty years. If we assume correctly the estimate that the Great Pyramid contains approximately 2,500,000 stones weighing in average, about 2 1/2 tons each, then it is reasonable to assume that the task required a manpower that could be broken down into teams of 8 men each doing ten blocks from start to finish, and working together during a period of three months.

The stones were cut from their quarries with iron or copper chisels, and dolerite mallets. Wooden wedges were soaked in water, then inserted into slots chiseled in the limestone, or granite stones, in order to split the stones when the wood expanded, again, reflecting another

application of the *Feather of Truth* principle and the use of water technology. The stones were then shaped and finished with copper saws and drills, and then loaded onto boats with these lever machines, and shipped to the construction site, where they were then unloaded with similar wooden machines from the barges into the channel that was managed from the rising Nile waters to the proximity of the pyramid. Lastly, the stones were unloaded from the boats with similar lever machines, or with wooden swing cranes and brought to the base of the pyramid, or near the base where they were swung into position, then lifted onto the different levels, as described by Herodotus, and lastly, fitted into position with iron bars. The finishing was done from top to bottom with swing cranes.

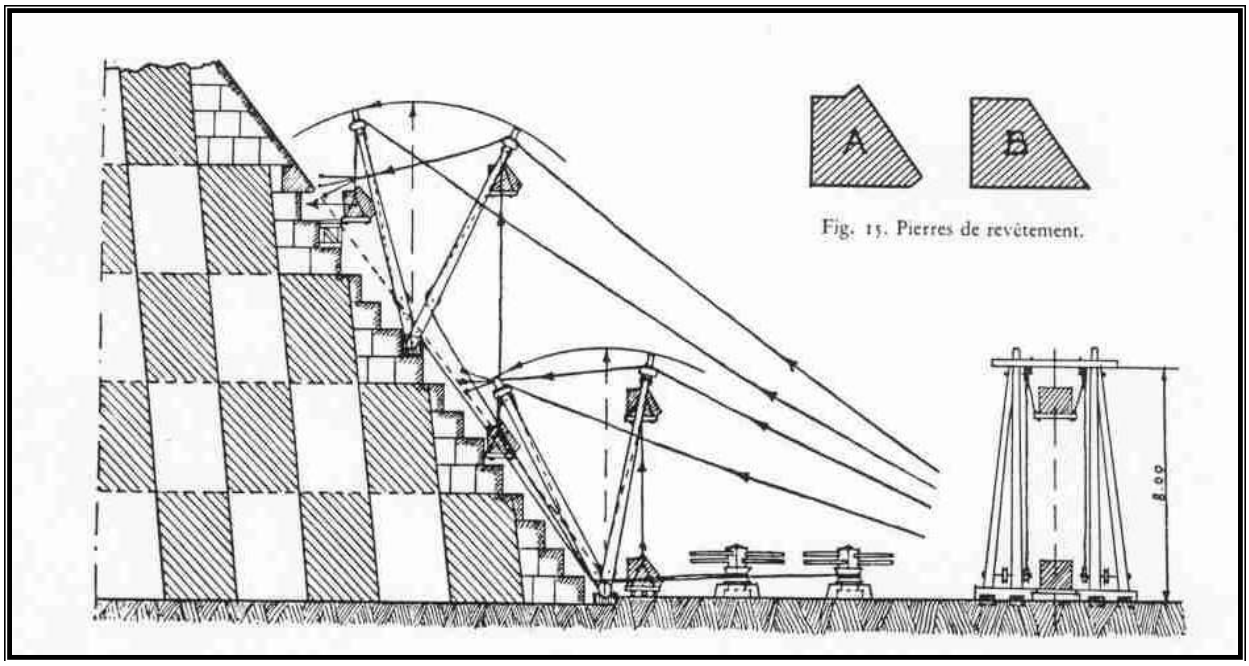


Figure 7. Swing cranes for raising casing stones drawn by H. Straub-Roessier. Source Peter Tompkins*, Secrets of the Great Pyramid.*

If the water was high enough, as it probably was during the three months of the flood period, then, an engineer would have been stupid not to take advantage of the natural situation, and bring the stone blocks directly from the boats onto the pyramid which would have been partly submerged. Such a canal had to be built like a trench with stones in order to buttress the moving sands, and facilitate access directly to the pyramid. This evidence simply disproves categorically all of the slave labor theories which make believe that the pyramids have been constructed by dragging blocks of stones from the quarries to the Nile, then from the Nile to the pyramid, on a 1/2 mile long inclined ramp that took ten years to build. Now, you get a taste of the irony of Herodotus when he wrote, tongue in cheek: "As for the stories told by the Egyptians, let whoever finds them credible use them."

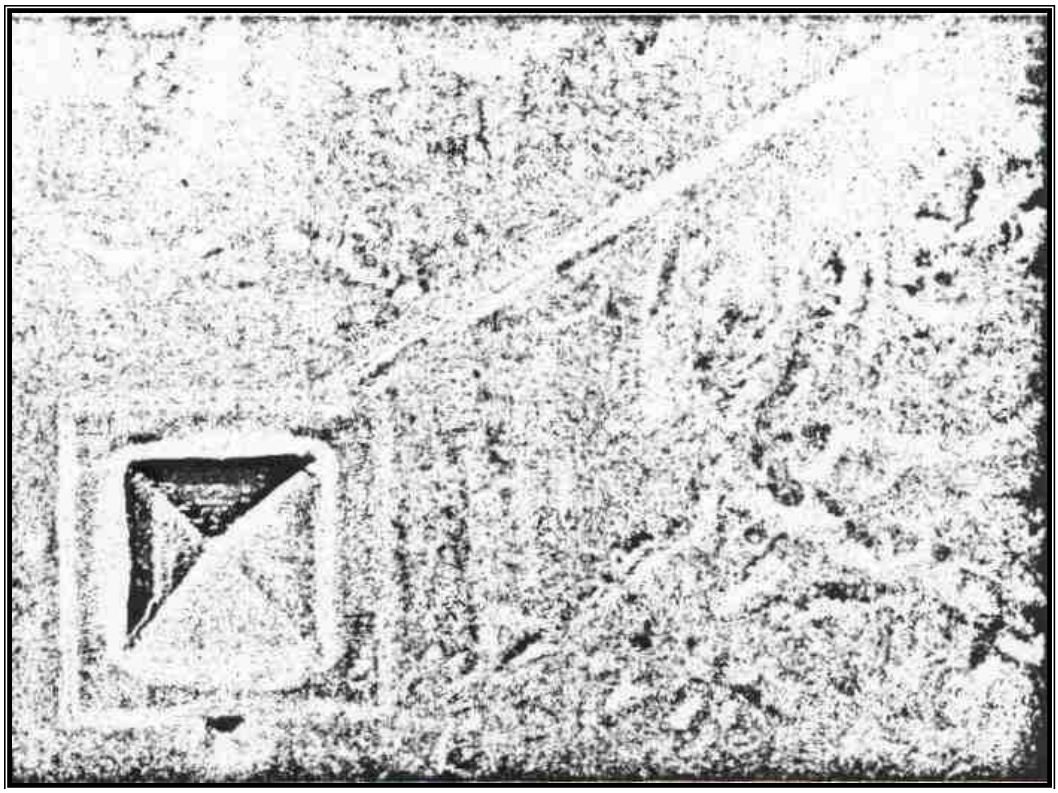


Figure 8. Aerial photography is showing the ancient channel under the sand leading to the Bent Pyramid of Dahshur. These are the visible traces of an ancient canal, and causeway, which were used to bring the stone loaded boats into the trenches that were dug all around the foot of the pyramid. Source Peter Tompkins*, Secrets of the Great Pyramid*.

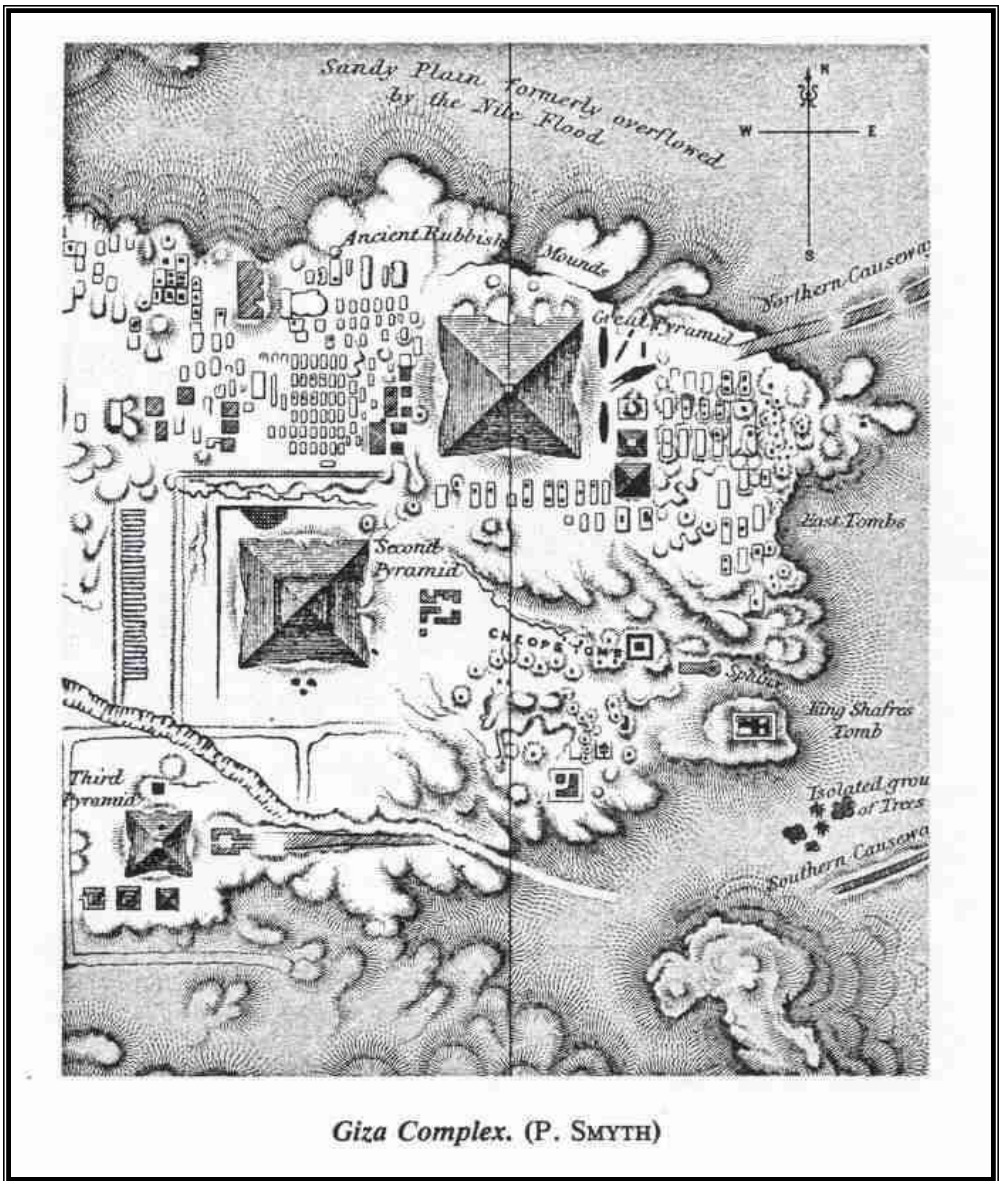


Figure 9. Giza complex. (P. Smyth) This drawing shows how the overflowing of the Nile reaches the foot of the Great Pyramid. Source J.P. Lepre.

Lepre showed the absurdity of using destructive methods of slave labor such as an immense ramp. Lepre wrote:

> "The volume of a long, single ramp placed against the east face of the Great Pyramid would have been approximately 25 million cubic feet. After the completion of the pyramid, this type of ramp had to be dismantled. Thus, the workers would have been charged with the manipulation of approximately 50 million cubic feet of earth, mud-brick and stone - more than half the volume of the Great Pyramid itself, and the exact volume of the massive Bent Pyramid at Dahshur. Not only this, but the length of that single ramp would have been well over 1,000'. Whether it had a gradient of 1 to 8 or 1 to 12, it still

had to present a long, hard haul for the laborers whose task it was to pull the blocks upward.

"If a multi-ramp was used by the builders, one that zigzagged up the east face of the pyramid, it would have been cut into the monument rather than external to it, and thus would not have required dismantling afterwards. But the total length of the connecting of a multi-ramp system -- that is the distance over which the stones would have to be dragged - would have been approximately 1,500' or 500' more than the length necessary in the single ramp theory. With this design, the topmost stone would have to be hauled well over 1/4 mile up a steep gradient before being set into place.

"Another multi-ramp design calls for ramps which are once again cut into the pyramid, but this time on all four sides in a circuitous pattern; the ramp begins at the east face of the pyramid, then turns to traverse the north face, then the west, and finally the south. If only four individual yet connecting ramps were employed in this fundamental design, the total distance that each of the topmost stones would have to be transported is an incredible 3,000'. It is more than likely, however, that this ramp pattern would have encircled the pyramid twice in order for the gradient to be adequately reduced to a working level, thereby increasing the total haulage distance to an astonishing 6,000'. Would it really have been feasible for the ancient builders to pull heavy stones over a mile's distance up steep grades in order to achieve this purpose?

"The ramp theories, at a casual glance, appear to be practical enough, but as one can clearly see, when certain elementary measures and computations are taken, major flaws are evident. Could the ancient Egyptians, so brilliant and adept in the field of engineering, have resorted to brute labor to manipulate heavy stone? ...Was it practical for the builders to assign hundreds of men to pulling such weight up such a great distance? ...Surely, the architect of the first built and last remaining of the Seven Wonders of the Ancient World was capable of devising a more sophisticated system than we give him credit for - one where heavy stone and minimal manpower is used to lift other, heavier stone. For an architect whose stamp of genius is so artfully contrived in the dimensions and symmetry of the Grand Gallery and King's Chamber complex, it would all be in the balance, rather than in the struggle." (4)

For our purpose here, the proof that invalidates the use of ramps does not lie at all in the raw measures of stone weight, or in the hauling distance required to raise them on top of the pyramid, but in the principle of *agape* that is implied in such a grand project; that is, in the application by an ancient architect like Imhotep of the discovery of a higher principle of scientific knowledge whose purpose was to create advances in the knowledge of human beings and increase the power of their labor by improving their mastery over nature.

The idea of organizing the workforce into teams implies also that every man was required to be cognizant of all aspects of the work, from beginning to end, and that they were mutually teaching one another in the complexities of their new trades. This means that ancient Egypt had the most cognitive economic workforce in the world at that time; knowledgeable in the fields of astronomy, agriculture, canal building, stone building, lever technology, iron and copper

machine tool making, all aspects of stone cutting masonry, from quarrying, extraction, squaring, dressing, hollowing-out, and polishing. It is for those reasons that some proud teams, were identified as the "Vigorous Team", or as the "Enduring Team," as demonstrated by the marks left behind inside the pyramid.

If you account for the work being done only during the months of the flooding season, and take advantage of the flood waters to float the stones downstream from the quarries to the foot of the pyramid, that is without the use of an inclined causeway, then mechanical engineer, William Flinders Petrie, was probably right in estimating that "with approximately 36,000 workers 1,200 blocks could have been easily and cheerfully dragged into position in a few hours, without confusion and without any of that sweating and straining under the taskmaster's lash which is so often supposed to have been a painful feature of the work." (5)

Since all of the workers were so trained, it is easy to understand how the entire nation would have been keyed up to a high level of mobilization and efficiency, and where everyone shared in the knowledge that they were building an everlasting monument to the glory of the most advanced civilization in the world. From that vantage point, I would invite the reader to think back and, internalize for a moment, the true pride and joy of the workers of the Great Pyramid, as they went through the process of accomplishing this incredible task, and in realizing that when it is finished, it will forever send awe and respect in the hearts of any future visitor who will think that the Egyptian people have accomplished a great Wonder of the World.

However, this joy is not merely reflected in the fact that the workers all recognized that the use of their Shadoof had been transformed into anti-gravity lever machines. The joy that they experienced was of the kind that lasts forever in such discoveries of mind over matter. From that standpoint, the true wonder of the Great Pyramid is not its imposing stature as such. The true marvel of the Great Pyramid is how human reason has been able to tip the balance to the *Advantage of the other* by using the proportionality of angular measurements from whence it was capable of producing a maximum amount of work with the application of an early form of the Leibnizian least action principle. Imhotep had proven, as did every worker of the Great Pyramid of Khufu that you can create a miracle with the idea of accomplishing more with less.

NOTES

(1) According to Egypt historian, Michael Rice, Imhotep was the son of Kanofer (Ka-Nefer) a commoner who became the director of works during the Third Dynasty. Because of his exceptional genius Imhotep was brought quickly into the service of King Djoser. His extraordinary capabilities rapidly made him the "chief minister, advisor, companion physician, sculptor to the King, a high priest, and a hereditary noble. The recital of his titles and offices are impressive: 'Chancellor of the King, of Lower Egypt, First after the King of Upper Egypt, Administrator of the Great Palace, Hereditary Nobleman, High Priest of Heliopolis, Builder, Sculptor, and Vase-maker in Chief.' “(Michael Rice, *Egypt's Making*, London and New York, 1990.)

His greatest works were the Step Pyramid and the complex of Sakkara (C. 2,630 BCE). As an architect and a chief astronomer, Imhotep became the spiritual guiding light behind the construction of all of the pyramids, especially the Bent Pyramid of Sneferu (C. 2600 BCE) and the Great Pyramid of Khufu (Circa 2550 BCE), both of which were built by his son and grandsons. Records from the Pharaoh's architect Khnum-Ab-R'A (C. 490 BCE) show that all of the royal architects of the Pharaohs of Egypt, including himself were grandsons of Imhotep.

Between the years 495-491 BCE, the architect KHNUM-AB-R'A, who was Chief minister of works for Upper and Lower Egypt, was given the responsibility for public works being done in the valley of Wadi Hammamat. On one of the public monuments, located there, he has left an inscription showing the records of all of his family ancestors, a total of 24 predecessors leading back to Imhotep, and to his father Kanofer. This Amazing pedigree covers about 2,000 years of Egyptian architecture, thus, covering the entire duration of Egyptian civilization.

The period of KHNUM-AB-R'A corresponds to the reign of Darius, the Persian King who had his architects and engineers build a canal from the Nile to the Red Sea, which the Cyrenaica people of the sea, led by the astronomer-navigator Maui, used to navigate to the Indian Ocean, and from there to the Pacific Ocean, in the period of 232 BCE. All of the names on the list of that architect are said to be consecutive fathers and sons.

The family tree of KHNUM-AB-R'A is reported as follows: "1] KANOFER: Architect of South and North Egypt. 2] IMHOTEP: Architect, of South and North Egypt; chief burgomaster [Governor of the town or Vizier], a high functionary of King Z'a-sar (lived in the time of the IIIrd Dynasty). 3] R'A-HOTEP: Prophet of Amon-ra, king of the gods; secret-sear of Heliopolis; architect of Upper and Lower Egypt; Chief Burgomaster. 4] BOK-EN-KHUNSU: Chief burgomaster. 5] UZA-KHUNSU: Architect; chief burgomaster. 6] NOFER-MENNU: Architect; chief burgomaster. 7] MI (or AI): Architect; chief burgomaster. 8] SI-UER-NENEN-HIB: Architect. 9] PEPI: Architect; chief burgomaster. 10] AMON-HIR-PI-MESH'A: 2ND, 3RD, 4TH, prophet and high priest of Amon, king of the gods; chief burgomaster. 11] HOR-EM-SAF: Chief burgomaster. 12] MERMER: Architect; commander. 13] HOR-EM-SAF: Architect; commander. 14] ZA-HIB: Architect; commander. 15] NASSHUNU: Architect; commander. 16] ZA-HIB: Architect; commander. 17] NASSHUNU: Architect; commander. 18] ZA-HIB: Architect; commander. 19] NASSHUNU: Architect; commander. 20] ZA-N-HIBU: Architect of Upper and Lower Egypt; commander. 21] NASSHUNU: Architect. 22] UAH-AB-R'A-RAN-UER: Architect. 23] 'ANKH-PSAMTHIK: Architect of Upper and Lower Egypt. 24] A'AHMES SI-NIT: Architect of Upper and Lower Egypt. 25] KHNUM-AB-R'A: Chief minister of works for the whole country; architect of Upper and Lower Egypt in the 27th to 30th years of King Darius I (about 490). " This amazing pedigree was originally published by Lepsius, *Denkmaler*, iii, Pl. 275a. Also in Couyat and Montet, *Les Inscriptions hiéroglyphiques du Quadi Hammamat*, 1912-13, Pl. xxii, Nos. 92-93.

Imhotep was also famous for his astonishing medical and scientific accomplishments, as well as for his outstanding skills as an advisor, and scribe of the King. At his death, Imhotep received the greatest of honors, and became immortalized as the Egyptian god of medicine, whom the Greeks later came to identify, and worship as Asclepius. Temples were erected to his

memory and his medical cures became famous throughout antiquity for 2,000 years. Socrates himself, in his famous last words, recalled Imhotep by asking Crito not to forget to "offer a cock to Asclepius," the Greek god of medicine. During the whole of antiquity, Imhotep had been characterized as having lived his life in "*The image and likeness of Thoth*."

(2) Herodotus, *The History*, translated by David Green, University of Chicago Press, 1987, 2.124-125.

(3) Herodotus, Op. Cit., [2-124].

(4) J.P. Lepre, *The Egyptian Pyramids, A Comprehensive, Illustrated Reference*, McFarland & Company, Inc. North Carolina, 1990, p.256.

(5) J.P. Lepre, Op., Cit. p.253-54.

(6) Quoted by Lepre in, Op. Cit., p.252

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