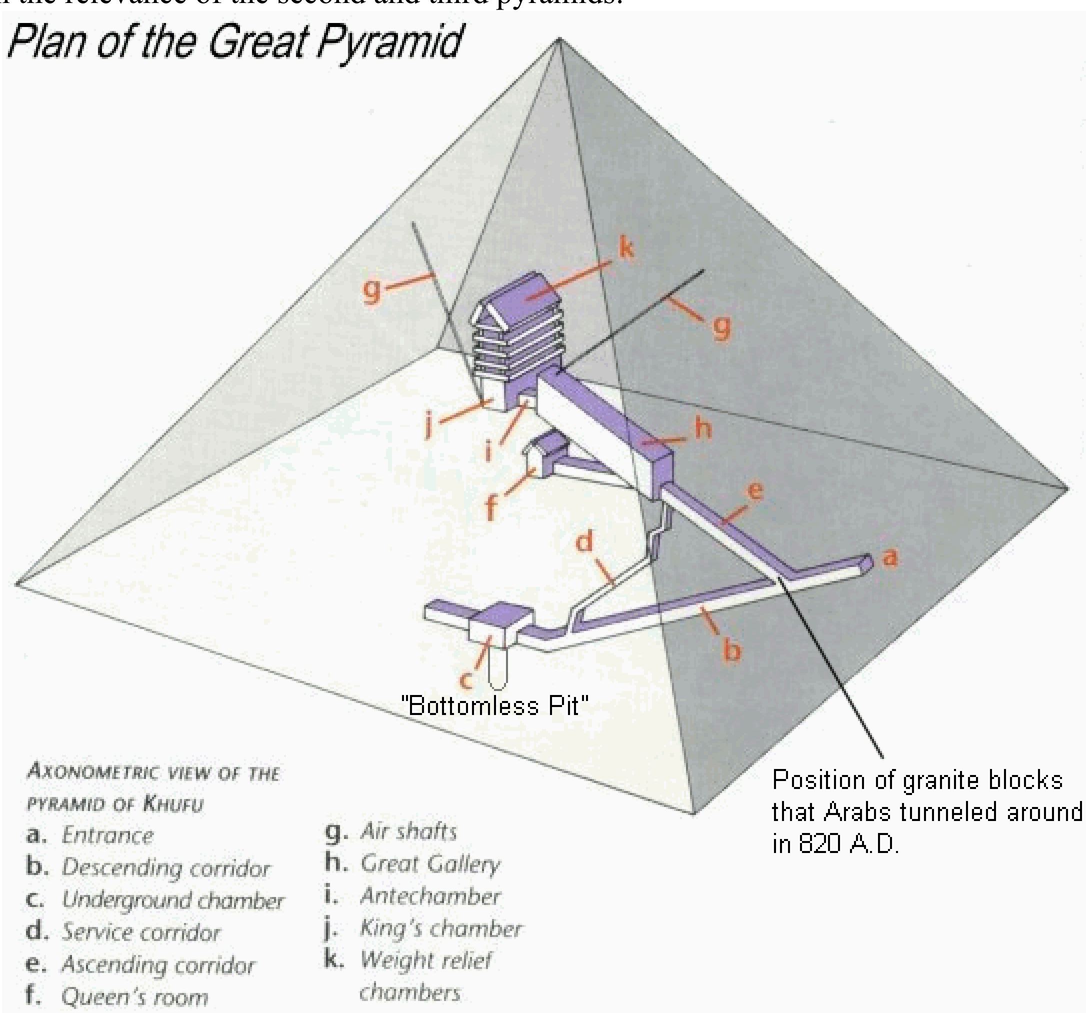
This paper was originally reviewed and published in the Meta Research Bulletin, Volume 12, Number 1, March15, 2003 by Meta Research, Inc, a scientific non-profit corporation dedicated to supporting promising but unpopular alternative ideas in astronomy.

The Other Two Pyramids at Giza

Abstract: *The premise that the Great Pyramid was a plutonium mill is briefly reviewed. The practical uses of the plutonium are examined. The internal geometries of the second and third pyramids are related to the known fabrication and assembly steps of making nuclear fission thermal engine cores.*
The speculation that the Great Pyramid at Giza was a nuclear mill for breeding and then extracting plutonium was presented in Great Pyramid at Giza in the September 2001, Meta Research Bulletin. Based upon additional reflection and analysis, it is now proposed that the Second Pyramid and Third Pyramid were also engaged in the same enterprise.

A brief review of the Great Pyramid�s internal design and its alleged operations is needed to establish the relevance of the second and third pyramids:



The King�s Chamber, j, would have contained uranium oxide plus other components within the granite sarcophagus. The nuclear breeding was activated by passing water down the southern �air� shaft, g, and heat was removed by expelling steam through the northern �air� shaft, g, and by letting hot water pass around the granite blocks in the Antechamber, i. The water then flowed down the Great Gallery, h, down through the Service Corridor, d, and then down the Descending Corridor, b, to the Bottomless Pit below the Underground Chamber, c. Besides heat, the water also carried away �waste� radioactive isotopes down into the sand layer beneath the �Bottomless� Pit. Because a complete, intricate stone foundation consistent for a hydroelectric water turbine currently exists in the Underground Chamber, it is proposed that such a turbine would have been turned by the down flowing water, subsequently producing a modest amount of electrical energy for operations within the pyramid. This electrical system would have provided lighting and power for equipment in the Queen�s Room. The water would have then flowed down the �Bottomless� Pit into a highly permeable sand layer in the substrata. The Queen�s Room would have housed the equipment for the chemical extraction and purification of plutonium metal from reacted uranium oxide. The final product would have been very small �buttons� of metallic plutonium/uranium. Humans have stripped any artifacts of interest or value from the pyramid over several thousand years, **including** the facing stones on the outside, which weigh 5 to 7 tons. Therefore, the modern discovery of artifacts within the pyramid has been limited to a small iron plate, a stone ball and a wood stick hidden within an airshaft in the Queen�s Room.

What was the purpose in making plutonium? The September 2001 article placed a value of one million dollars for a pound of plutonium, based upon the competitive cost of electrical power in the year 2001 � as produced by coal, oil, natural gas, hydroelectric dams, nuclear reactors, etc. But, thousands of years ago, of what practical use was plutonium to a civilization of humans or �aliens�? There is no archaeological evidence of large power reactors and electrical grids. There is no evidence of large metal smelters or metal fabricating mills. This leaves three possibilities, which are not necessarily mutually exclusive to one another: nuclear weapons, nuclear propulsion or export of nuclear fuel off this planet. There is only one Giza complex on Earth. No other, functionally equivalent site has been found. Therefore, without any apparent opponent or competition, no rational motivation for creating nuclear weapons would seem to have existed. If export of nuclear power off of this planet actually took place, then the creation of nuclear engines for propulsion was automatically a part of that enterprise. If this civilization did not leave Earth, then nuclear engines still remain the most probable use of the nuclear fuel.

Let�s consider the practicality of nuclear fission thermal engines. A conventional jet engine carries a fuel, such as kerosene, to burn with the air entering the engine assembly. The thrust created depends on the exhaust gas temperature, which sets the exit velocity of the exhaust gas. With current technology, and the limit of energy released by chemical oxidation, the exhaust temperature approaches 3,000 degrees Fahrenheit in a conventional jet engine. Engine thrust is a major determinant in the amount of fuel an aircraft can carry, which in turn determines it range. A �best� performance of a jet aircraft would be to travel possibly 14,000 miles or about 28 hours. A nuclear jet engine�s fuel is the fissionable nuclear core, which would be very small. Given the current limits on materials, the exhaust gas temperature can be about 5,500 degrees Fahrenheit. This produces a much higher thrust. The nuclear core material is not expelled out the engine with the exhaust gas. The only gas involved is the entering atmospheric air. How long or far can such an aircraft travel before refueling? Ignoring maintenance, a nuclear aircraft would only need to refuel every 3 to 5 years. The difference between a nuclear fission jet aircraft and a conventional jet aircraft is as profound as the difference between a nuclear submarine and a conventional submarine. A diesel-powered submarine can travel under water for less than a day. A nuclear submarine can travel under water until the crew runs out of food. If the crew stored enough food, the nuclear submarine could remain under water for more than twenty years.

The difference between a nuclear fission rocket ship and a conventional rocket ship is not as great as it is for jet aircraft. The nuclear rocket ship must carry a �propellant�. That is, a substance which can be vaporized and raised to very high temperature, and then discharged at high velocity. On paper, a simple nuclear rocket will have about twice the performance of the very best conventional rocket. Actual nuclear fission rocket engines were designed, fabricated and tested during the 1960s. Their monitored performance exceeded expectations. Rocket engineers believe that their performance can be substantially improved. What is the practical significance? A manned mission from Earth to Mars and back, by chemical rocketry, would require a monumental amount of fuel and equipment, with no margin for error. By comparison, the same trip with nuclear rocket engines is much shorter, much easier and could be accomplished with a huge margin for error.

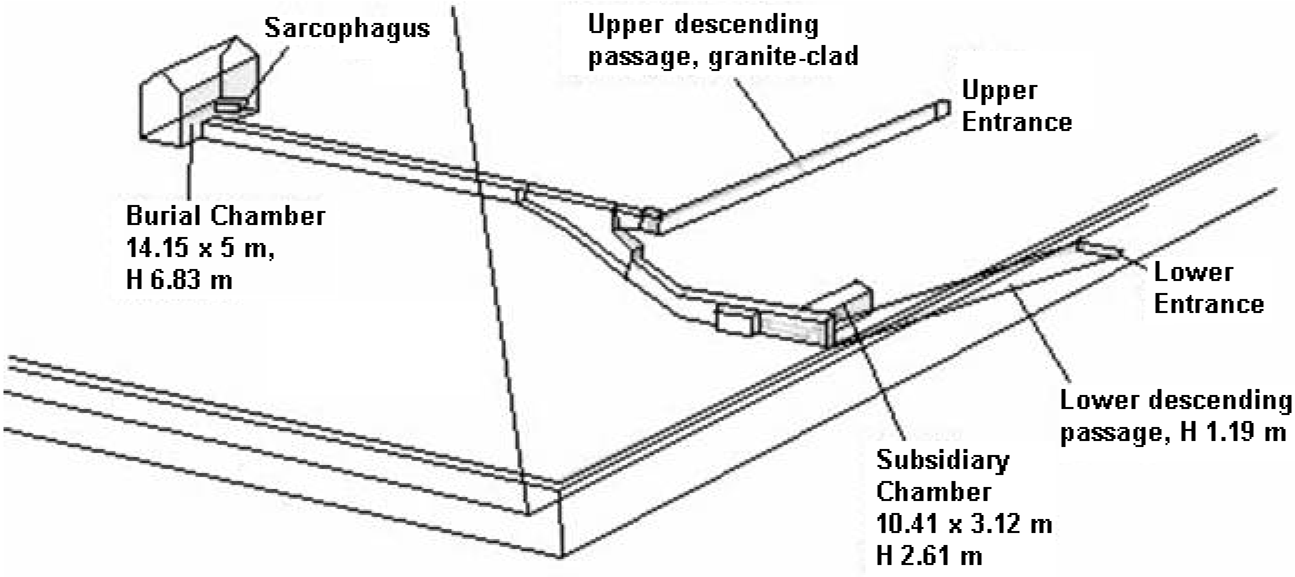
Do nuclear fission thermal engines release radioactive isotopes? Yes, a tiny amount, which is dispersed. Such engines would be politically incorrect but, in reality, this minute radiation would have almost no additional effect on biology, in comparison to natural sources of radiation.

Calculations for water flow and steam flow through the airshafts of the Great Pyramid system indicate a very modest level of plutonium production. (An attempt at a larger production rate would raise the pressure of the King�s Chamber high enough to stop all water flow.) Nothing like what was accomplished by the United States or the Soviet Union. In terms of bombs or engines, it produced probably less than ten per year. This implies that the population size of this �nuclear� civilization was very small, perhaps consisting of no more than a thousand persons of advanced nature. This scenario presents a logical problem. Our progress from the Stone Age to the nuclear age has required a continually growing population base, which by the 20th century necessitated hundreds of millions of persons. There is no evidence of such a population base and a technology growth for the Giza Pyramids. It is as if someone arrived in Egypt already possessing all the knowledge required to design, build and operate the pyramids but lacking many materials such as metals. We have the peculiar combination of Stone Age plus nuclear age. This makes the idea of beings coming from another planet more consistent with this paper�s premise.

In the September 2001 article, the Second Pyramid was dismissed as being irrelevant because its internal geometry was not similar to the Great Pyramid. This author asserted that it could not have operated as a reactor, and therefore was a failed attempt to emulate the Great Pyramid. In hindsight, this was a complete misjudgment. Given that the Great Pyramid was very well built and made total sense as a nuclear mill, why wouldn�t the Second Pyramid also have been intelligently built and functional, but perhaps intended for a different purpose?

This brings us to the plutonium �buttons� produced in the Great Pyramid. These buttons must be kept separated from one another. If they were piled together, that would cause a criticality � a self-sustaining, high intensity, neutron flux. In other words, they would constitute a nuclear reactor that has been turned on. There would be no explosion but the neutron radiation would be lethal to any nearby person in less than a second. As is done today, the buttons would have been placed and immobilized in a large, mostly solid, box with guaranteed geometric separation between buttons. Such a box would be very heavy, on purpose, and would rest upon a wagon. Maneuvering the wagon would have been done by ropes with a considerable distance between persons and the box. In reality, the buttons would emit all types of radiation, because one cannot achieve absolutely pure Pu-239.

Let�s look at the internal geometry of the Second Pyramid:



The fabrication of plutonium into useful forms for a bomb, or a nuclear module for an engine requires the following steps:

- Melting plutonium buttons.
- Pouring the melt into molds.
- Removing the plutonium from the molds.
- Machining the molded plutonium to achieve exact dimensions for plutonium parts.
- Tack welding plutonium parts together to form larger geometric structures.

In all of the above steps, there must be:

- Protection against criticalities.
- Protection of the workers from expected radiation.
- Protection against fires.
- Good geometric separation of the various steps so that any one accident would endanger as few steps of the process as possible.
- A means for workers to suit up before operations and a way to decontaminate after operations.

These steps and protections can be addressed by the internal geometry of the Second Pyramid:

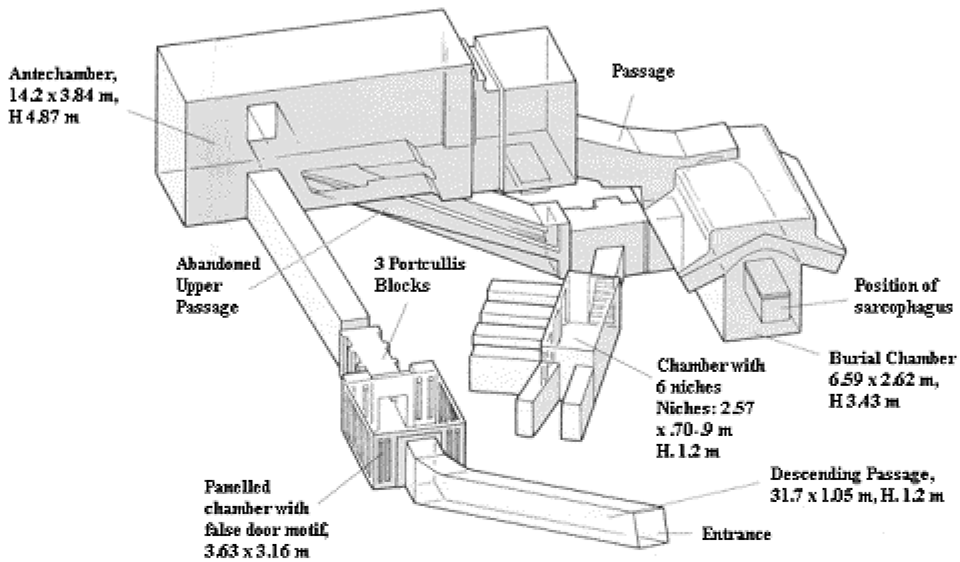
- The Upper Entrance and Upper Descending Passage would allow for lowering the plutonium wagon into the Second Pyramid.
- The level corridor gives good distance to the Burial Chamber.
- The massive granite sarcophagus provides a stable, long lasting chamber for melting and casting plutonium. Limestone blocks would disintegrate, giving off carbon dioxide and leaving calcium oxide dust, under such high, radiant temperature.
- The cooled plutonium moldings would be brought by heavy wagon, out of the Burial Chamber, along the level corridor, down to the lower corridor, and then into the Subsidiary Chamber.
- The machining and tack welding of plutonium parts would have been done in the Subsidiary Chamber in a stretched out, assembly line fashion.
- The parts would have been loaded in a heavy wagon and taken out via the Upper Descending Passage and out the Upper Entrance.
- Workers would have entered and exited the pyramid by the Lower Entrance and Lower Descending Passage. This route would have been kept radiation free.

- The offset area close to the Subsidiary Chamber would be the logical position for protective suits and for decontamination.

There would have been blocks of carbon and the equivalent of plexiglass, to isolate the plutonium and to protect the workers. Significant amounts of these materials would have been in both chambers. Unfortunately, though these materials are excellent protection against neutron radiation, they are flammable. The American equivalent to this operation has had two accidental fires in the past half century. Both came very close to being disasters and one of the fires almost caused a criticality.

Conventional theory grants symbolism to the internal geometry, with even the idea that the slopes of the passageways have some numerical meaning or message. The nuclear speculation gives a utilitarian purpose to every passage, slope and chamber, and it is consistent in theme with the Great Pyramid speculation. The interior floors, walls and ceilings have a very drab, industrial appearance.

Let�s now view and consider the internal geometry of the Third Pyramid:



This interior is highly complex and very different from the other two pyramids. There are sloping passageways, which are consistent with moving a heavy wagon. Quite a number of chambers are present.

In our civilization, what has evolved in the design of complex apparatus over the past half century? It has been found that when there is failure of parts, by accidental damage or simply wearing out, that intricate repair work, in place, becomes far too time consuming or dangerous or even �impossible�. Consider the level of effort and risk of failure for astronauts to make repairs to such entities as the Hubble Telescope. Design has gravitated over to the concept of modules. When a particular piece of equipment has failed, we simply extract the entire module it is within and replace it with a fresh module. The entire process is quickly returned to service and the module with damage or worn out parts can be worked on separately or simply thrown away. Consider a nuclear fission thermal engine. The nuclear core module would be a small portion of that engine. It is proposed that such modules were loaded, and perhaps reloaded, with the plutonium fuel inside the Third Pyramid. The loading of these modules would have been conducted in the Burial Chamber. Fresh modules would have been stored in the Chamber with 6 Niches. Note that the niches are separated from one another by a moderate distance and limestone. They are also pointed away from the Burial Chamber, where a new or used module would be reassembled. Limestone does absorb neutrons to a moderate extent. It makes a great deal of sense to have identical nuclear modules and to have an inventory of them in a secure location.

When needed, a fresh nuclear module would be taken from a niche, loaded into a wagon in the small chamber adjacent to the Burial Chamber, brought up the first sloping passage, passed through the security portcullis, and on up and out the Descending Passage. A used module with spent fuel might have been brought to the Third Pyramid for reprocessing or it may have been abandoned. If such a module were brought to the pyramid, it might have been brought to the Antechamber and taken around the sloping passage where it could have had spent fuel removed in the small pit within that room. The emptied module may then have been taken down the sloping passage to the Burial Chamber for refitting with fresh fuel. The spent fuel could then have been taken to the Great Pyramid for processing. The spent fuel would have enough remaining plutonium (less than 30%) to boost the nuclear breeding in the Sarcophagus in the King�s Chamber. This recycling is only a possibility.

If the Giza pyramids were a nuclear production complex, they were completely disabled when the granite blocks within the King�s Antechamber of the Great Pyramid were moved to the bottom of the Ascending Corridor. The blocks remain there to this day. History states that the Arabs tunneled their way around these blocks in 820 AD. This digging was 20 to 30 feet in distance. Prior to that, there is no positive evidence of any intrusion into the upper portion of the Great Pyramid. It is extremely doubtful that **any** pharaoh **ever** had access to the Ascending Corridor, the Great Gallery, the Queen�s Room or the King�s Chamber of the Great Pyramid. Some writers have claimed that the Service Corridor, d, was dug by the Pharaoh Khufu�s men to either gain access to the upper portions of the pyramid or to escape from these upper portions after they placed the granite blocks at the bottom end of the Ascending Corridor. The narrowness, complexity and vertical length of this shaft make this a huge, unnecessary effort in comparison to what the Arabs dug to get into the Ascending Corridor. The Service Corridor�s precise geometry implies that it was a part of original construction and design.

A lack of knowledge of the upper internal geometry of the Great Pyramid by the ancient Egyptians is reflected in the internal geometries of the Meidum Pyramid, the Bent Pyramid and the Red Pyramid, which, according to ancient Egyptian records, were built by the pharaoh Sneferu in the 25th century BC. Their internal geometries lack the upper internal geometry of the Great Pyramid.

Could the original builders have made bombs? The answer is yes, but the bombs would have been of very poor quality. Modern breeding reactors rely upon many different, high purity materials � mostly metals. Their structure is geometrically intricate and they are closely monitored. In contrast, the Great Pyramid reaction bed and chamber are relatively simple. Its nuclear product would have contained many isotopes of plutonium. This is fine for engines but very detrimental for bombs. Nuclear bomb cores made from this material would have to be unusually large, the nuclear detonation would be very inefficient and the radioactive fallout would be extreme. One would anticipate more deaths from fallout than from the explosion.

In summation, the internal geometries of the three pyramids can be matched to the process of creating plutonium, extracting it, fabricating it and finally making nuclear engines with it. Conventional theory insists that all three pyramids were simply tombs of three, successive pharaohs � but they have wildly different internal geometries. The nuclear speculation gives the pyramids an economic justification. What practical benefit were the pyramids to a living population, if they were only tombs. Prior writers have proposed that the pharaohs Khufu, Khafre and Menkaure, adopted the already existing pyramids for their personal aggrandizement.

Appendix. Methodologies for Scientific Proof of Plutonium Processing in the 2nd and 3rd Pyramids

The speculation about the second and third pyramids at Giza is centered on plutonium isotopes. The trace presence of uranium isotopes within the pyramids would not establish, by itself, that they were used for plutonium processing. Uranium is a natural trace component of granite, and to a much lesser extent, a trace component of limestone.

However, the trace presence of **any** isotopes of plutonium would be an artificial signature of processing because natural, trace levels of uranium within rock do not lead to the production of plutonium. The most likely candidate location to look for plutonium contamination would be the granite sarcophagus in the Second Pyramid, where it is proposed that plutonium was melted and cast. If the premise of this paper is correct, some minute but detectable level of deposition of plutonium onto the granite would have occurred there.

Further, if spent nuclear cores were disassembled in the Third Pyramid, we should be able to detect plutonium, as well as the presence of the final dead-end fission products, Barium-137 and Zirconium-90, in the assembly areas of that pyramid.