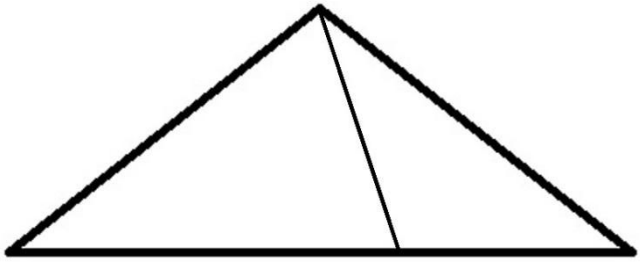

KHUFU'S

COUNTERWEIGHTS!

BUILDING PYRAMIDS THROUGH DOCUMENTARIES

KURT BURNUM

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DEDICATION

This book is dedicated exclusively to my one and only big brother, Donald Burnum. A man who after serving 23 years with The West Wendover Nevada Police Force committed suicide in the early morning hours of July 2nd, 2015.

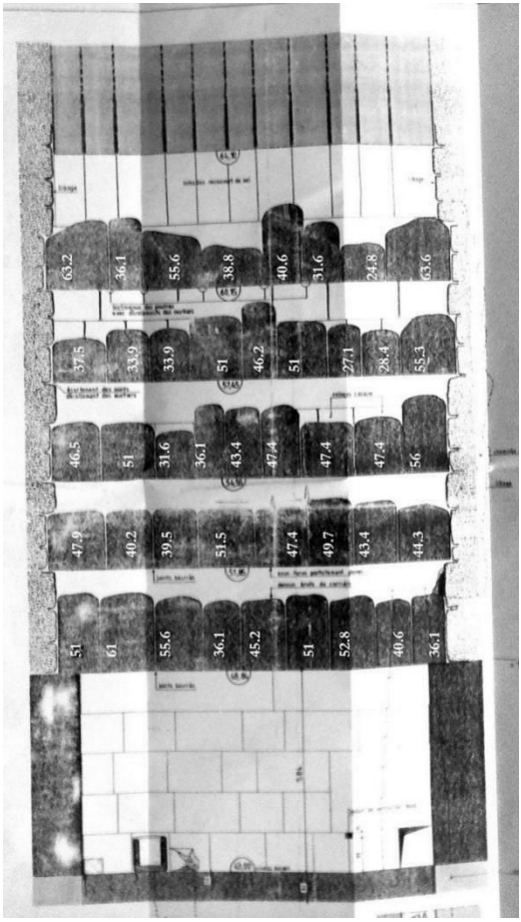
My thoughts and prayers along with all of his family will be there for him in all of his endeavors regardless. Forever, and in all ways. As for the many people whose lives that have been touched by him along the way, he will always be remembered by us for that.

That means that this book, "Khufu's Counterweights!"" is dedicated by me solely as a memorial to him. Maybe now he will rest with the knowledge of being ever so loved? Even up until this very day. We will carry his memories with us forever, and he will always be missed and never forgotten by us. His friends and family of whom he so hastily has left behind.

And, for whatever reason he deemed necessary to take his own life, one that was so dear and precious to all of us, and to so many others regardless of what their needs may've been at that time. I hope that all of this has the same meaning to us as it does to all of them, and that whatever pain he may've been in is now over with.

But, I will miss you until the day I see you again Big Brother. But, until that day comes, please carry on in good faith and in good hope for the future. Whatever, and however you see fit for it to be. What-ever it is that God still holds in store for all of us we will be well. But until then, in good faith and in good time until the day that I can see you again! "May the Blessings Be?

THE KING'S BURIAL CHAMBER



INTERVIEW JEAN-PIERRE HOUDIN

At the very beginning Jean-Pierre' said, "There were two stages of construction that the Ancient Egyptian workers would've used during construction of the five different relieving chambers built directly above The King's Burial Chamber located in the very heart of Khufu.

The Ancient Egyptian workers who had built this ancient monument would've used two stages of construction to raise gigantic beams and rafters that were needed to support the tremendous amount of weight above the flat ceiling. The same one that still rests above this incredible chamber up until this very day! In turn, these granite beams and rafters have supported the flat ceiling that is constructed directly above The King's Burial Chamber for four thousand five hundred years now."

In order for them to have done this, The Ancient Egyptian stone haulers of the day would've had to move each and every beam or rafter for The King's Chamber upwards from the port on The Nile River to the top of The King's Burial Chamber in a single trip! All the way up from

where they were stored down at the trade port on the pyramid building site resting on The Nile.
So, for the Great Egyptian Architect of that time, Hemiunu who designed and oversaw the construction of the great pyramid to complete such a remarkable stone hauling task in time for the pharaoh's funeral, he must've given his best workers the full use of two separate counterweight lifting systems. According to their rope configurations they would've been made to be readily available at the disposal of the workers at any time during the day, or night. One of these counterweight systems was dug into the surface of the Giza Plateau at the top of the port ramp. Later on there would've been two more counterweight systems that were used by the stone haulers of the day.

One of these counterweights systems was made to be located inside a trench that was built to be inside south side of the unfinished pyramid itself at a forty-three-meter level. Another one of these counterweights was designed to operate inside The Grand Gallery itself. Which even up until this very day is still located in the very heart of The Great Pyramid. Both powerful counterweight systems were readily used to lift the beams and rafters to the top of the higher levels of the unfinished relieving chambers.

All of these separate counterweights would've had the same length in their glide path of forty-seven meters for a counterweight run of about forty meters. While at the same time, once the beams and rafters had been stored safely on the 43rd meter level the counterweight sliding in the port ramp trench with all its materials, and devices linked to it. After that, it was dismantled and used again in the second stages of raising the beams and rafters up from the forty-third-meter level storage area into their

respective places in the ceiling above The King's Burial Chamber!

Jean-Pierre' says, "The first of these two stages was divided into two secondary steps. Two secondary steps consisted of moving sixty-five beams and rafters in an upwards, and westerly direction from the shipping port on The Nile River, (Which was located at the foot of The Great Pyramid.) all the way to the top of the port ramp, (Which was located at the base of the external pyramid ramp.) From the foot of the external pyramid ramp the beams and rafters were then going to be moved upwards in a northerly direction to the top of the external pyramid ramp. They were then stored at the forty-third- meter level on the pyramid itself! Two secondary stages were successive.

All the beams and rafters had to travel upwards from the port on The Nile River to the top of the forty-third-meter level in one trip. Once all the beams and rafters had been stored there the second stage could follow. The construction of the ceiling above The King's Burial Chamber. At the same time when the stone haulers working above the trenches were still using counterweights to help them move the monolith beams and rafters up to the higher levels of this unfinished pyramid's construction.

The Egyptians also wanted slow momentum of the counterweight loads. The ones that weighed over fifty tons! And on the way back down to the bottom of the slopes again, they did do this for the safety of the workers, but also because of the fact that they didn't want to have any damage done to the pyramid either. The beams and rafters that weighed more than fifty tons were pulled upwards by the counterweights directly and by the stone haulers themselves.

Jean-Pierre' said,

"A traction of a load is equal to a counterweight run in its glide path. It would've been around forty meters in its glide path then the counterweight's would've been reloaded."

Then he talked about the rope configurations. In the first stage of construction and that there were three separate sets of ropes that The Ancient Egyptian workers would've used to operate the counterweights in the port ramp trench, and in The Grand Gallery. All of these ropes would have worked independently of one another." Although all of the ropes were about an inch and a half wide and didn't stretch very much they were all twisted before each traction to get tension."

After that, Jean-Pierre' went on to say that, "These granite beams and rafters The Ancient Egyptian workers would've needed to support the tremendous weight of the pyramid above The King's Burial Chamber quarried in Asuan which was located over eight hundred kilometers to the south of The Giza Plateau on the Nile River. These same beams and rafters were all transported to their final destination on the grounds of the pyramid's building site by way of wooden barges that sailed south using The Nile. These large vessels were made up of cloth sails and wooden planks that were tied together with ropes, and knots."

The Ancient Egyptian ship builders would've tied barges together like this because they didn't have nails to hold them together. On their way down The Nile to the working port at the pyramid construction site at Giza, the captains of these barges would've used the downward current of The Nile to sail north and complete their final journey back to the building complex. Once the beams and

rafters had all been delivered to the building site they were stored at the port until workers were able to raise them up to their final places in the five relieving chambers built above The King's Burial Chamber. The second stage of the ceiling's construction involved transporting sixty-five of the beams and rafters directly above the flat ceiling made inside The King's Burial Chamber. In doing so, they were utilizing a brand new type of pyramid architectural design.

One that would've involved the use of a room with a flat ceiling, and at the time it had never been used before nor has it ever been used since. The new type of burial chamber was used singly, standing by itself and would've been built into the center of The Khufu's Pyramid itself in order for it to be used half way up in the pyramid which at the same time it would've started out at the base of the forty-third-meter level storage area until they were able to be lifted up and put into place in the ceiling above the constructions five different relieving chambers. At the top of the final relieving chamber, the pyramid rose up to be at the height of a sixty-fourth- meter level. The last level in the construction of the room's ceiling above the relieving chambers, the rafters, and the roof. While at the time the stone haulers of the day were working on the ceiling's relieving chambers that day, they also would've wanted to implement a brand new type of a counterweight system.

A counterweight system that standing alone would've been made completely of the reused trolley, building materials, and devices of the former counterweight that was previously located in The Port Ramp Trench. This second stage Counterweight system was able to raise a monolith beam or rafter anywhere from between ten to forty meters above the forty-third-meter level storage area

all the way up to the sixty-fourth-meter level located at the level of the 22, 21 ton rafters that would cover the ceiling and its relieving chambers. Only this time the new counterweight would've sat directly across from The Grand Gallery itself a hundred and eighty-degree angle facing The South Side Slide Lifting Platform to the north in order for it to have raised them to the higher levels of this newly built Egyptian Pyramid.

KURT BURNUM

LOGISTICS AND STRUCTURE

Jean-Pierre' says, "All of these beams and rafters were raised up in one run of the counterweight's pull, but not all in one traction. They were raised in several split up tractions." Meaning that the counterweights in The Grand Gallery only had to be lowered just enough to raise one of the beams or rafters on the other end of the ropes on the south side slide up to the level in the ceiling where it was going to be used.

So, they raised them on the south side slide lifting platform anywhere between ten, and forty meters and the more they needed to rise the deeper the split up tractions became. The extra effort to raise a beam or rafter could be diluted on a full day and the haulers would have time to breathe.

Jean-Pierre' says, "On a fifty percent slope, you need 575kg/if to pull one ton. The weight of the beams, and rafters for The King's Burial Chamber ranged from twenty-seven to sixty-three tons. You have sixty-five beams and rafters in all, but fifty-four weigh less than fifty tons. So the counterweight was calculated depending on the ratio of weight and slope!"

KHUFU'S COUNTERWEIGHTS!

Once the stone haulers had successfully completed a traction or a full contraction of the counterweight's load." That would mean that the Architectural Engineers of the day who designed The Great Pyramid on The Giza Plateau would've had to come up with a good, real world solution to this brand new engineering problem. How were they going to reset the powerful monolith stone lifting counterweights once they were located back down at the bottom of the twenty-eight percent grade of the counterweight slopes again? While working without assistance of the full strength of a forty-ton counterweight to back up the stone haulers logistically! An engineering feat that's gone unbeknownst even up until this very day but still, The Ancient Egyptians had an answer with a good solution to fit this problem!

During this same time period when the stone haulers were busy working on the flat ceiling above The King's Burial Chamber, any one of the pyramid's three counterweight trenches that needed a full counterweight reset there would've been two more secondary steps that the workers would've used. First the pyramid workers would've used a technique to cut force completely in half. In order for them to have implemented this new technique for pyramid construction there were six ropes anchored to the top of each one of the slides. In the trench above the port ramp they were anchored in the bed rock, and in The Grand Gallery anchored into the portcullis Chamber. Which was located at the upper corner at the top of The Grand Gallery counterweight slope.

From that anchor these ropes would have traveled down the slides, taken a U turn on the front of their respective counterweights, and from that counterweight

the ropes would've traveled backwards up, and out of their slides to workers facing west in front of the trench above the port ramp, and to the south of The Grand Gallery facing to the north. The workers would've then pulled on these ropes while the counterweights rose in their slide. The port ramp workers had to pull south, while the workers above The Grand Gallery would pull to the west.

Jean-Pierre' commented about this again saying that, "To be more efficient the stone haulers would've leaned backwards using their own weight like fishermen on a beach pulling a net. Because of that, the counterweight stopped after each pull on the ropes and thanks to the ratchets in the slides this is a fractional reloading pull. To move just one Beam or rafter from the port on The Nile to the top of the port ramp that beam or rafter needed to travel six hundred and fifty meters with sixteen tractions and sixteen reloads. Moving them from the top of the port ramp up the external pyramid ramp up to the forty-third-meter level storage area on the pyramid itself that beam or rafter would've had to travel three hundred and twenty meters requiring eight tractions and eight reloads."

That comes out to be somewhere around a thousand meters for each lift or the equivalent of moving them to a distance of nine football fields from the Port on The Nile to the top of The King's Burial Chamber! During the second stage of construction, in order for the pyramid workers to reset the system so that they could use the lifting platform once again. They anchored a set of six ropes indirectly around the front of the south side lifting platform and then routed them back over to the top of The King's Burial Chamber directly to the back of The Grand Gallery Trolley. During the second stage of construction there was

no need for ropes to be anchored in the portcullis chamber of The Grand Gallery anymore.

Because when the stone haulers of the day had needed complete reset of The Grand Gallery counterweight they just indirectly connecting the ropes around the front of The Grand Gallery Trolley. After that, they connected the ropes directly to the back of the south side lifting platform instead. These workers would've connected the ropes indirectly to the front of the south side lifting platform. Once the pyramid workers had done all of that the only thing left to do next was to use the south side lifting platform as a counterweight to The Grand Gallery counterweight.

Jean-Pierre' went on to say, "During the second stage of the ceiling's construction the workers would've also used the same technique they had used to halve the amount of force needed to raise the beams and rafters as they did in the first stage of construction. When lifting, a third set of ropes, they would've also added directly onto the sledge or sledges that were carrying the beams and rafters that weighed over fifty tons. About the same lifting technique that the Ancient Egyptians had found of using a counterweight to help pull the beams and rafters upwards.

Jean-Pierre' also commented, "The force resulting from the weight of the Counterweight, and the slope of the slide on which the trolley runs along with the friction from the sleds on rollers, and the Ropes a one-ton load will give only around a 575kg/f Restitution force when the slope of the slide is 50% =26.57°. The logs below the sleds of the counterweight were lowering the friction. That said, when you pull a sixty-ton beam or rafter on a sloping ramp, the Force needed depends on the slope on which the beam is

pulled. You have five slopes on the pyramid building site. The first slope was a twenty- six degree angled slope facing the port ramp at a hundred and eighty- degree angle which was located inside a trench that was dug into the Giza Plateau beneath Kafre's Pyramid.

The second was the port ramp of 8.5% (4.87°) to the west. The third was the external pyramid ramp which was also an 8.5 (4.87°) slope, but to the north. The fourth slope was in The Grand Gallery itself with a twenty-six-degree angle slope to the south, and in the second stage there was a fifth slope also at a twenty-six-degree angle, but this time facing to the north at a hundred and eighty degree angle to The Grand Gallery. On a 4.87 degree (Or 8.5%) slope, you need 320kg/f to pull one ton. Jean-Pierre' says, "The great advantage of controlled traction of the load is that workers were able to easily slide rollers under the sleds, and the sledges while moving at low speed."

The counterweight that was still located inside The Grand Gallery would've been reset after each time one of the beams or rafters had traveled up the south side slide and had been unloaded at the same level in the pyramid's ceiling's construction.

KHUFU'S COUNTERWEIGHTS!

CONFIGURATIONS

Jean-Pierre' says, "It's possible to raise these gigantic granite beams and rafters up to the higher levels of the pyramid using a wooden portico, because the counterweight blocks were small granite blocks supplied a forty-ton counterweight. Enough weight to reload the counterweight in the Grand Gallery one time."

So loading the south side slide lifting platform with sixteen two-and-a-half-ton granite blocks was enough weight to reload the twenty-five-ton counterweight located inside The Grand Gallery on its trolley, and the south side slide lifting platform's run downward would've been slowed just enough by haulers from above.

Jean-Pierre' went on to say, "Everything was just a question of balance."

In the Meantime, at the rear of the trolley there were wooden pieces that were connected as a brake that they would've used to stop the trolley when necessary. When the trolley ran up, a brake would've followed the ratcheted guide beams that lined the walls of the slides and the driver would've stood ready to stop the trolley at any given moment. In the event that something should go wrong like a rope should break.