A painting depicting a view through a dark, narrow cave opening. In the distance, a grand Nabatean temple is visible, featuring a portico with columns and a pediment. The temple is illuminated by a warm, golden light, contrasting with the dark, shadowy interior of the cave. The foreground shows the rough, dark rock walls of the cave.

Rediscovering  
the lessons  
of the  
Nabateans:

Luke Evans  
405797

Unit 320

# Rediscovering the lessons of the Nabateans:

## Contents:

Introduction	02
The Precedent	03-04
Who were the Nabateans	05
First Impressions	06
Religion	07-08
What was Al Khazneh for and who built it	09-10
How it was built	11-12
Water and Location	13-14
Conclusion	15-16
Bibliography	17-18

# Rediscovering the lessons of the Nabateans:

The Lost kingdom of Petra remains to this day relatively unknown to the general public. Despite half a million tourists fuelling Jordan's economy every year, most fail to reference the unique rock carved (figure 1) cliffs until you prompt it's appearance in Indiana Jones' adventure in the Last Crusade. The Crusader's , along with Sultan Baihars in 1276, would have been few of the last to see the monumental Al Khazneh in its original, un-vandalised state. The Swiss explorer Johann Ludwig Burckhardt rediscovered the lost city by tracing the steps of the 5,000-year-old frankincense trail (figure 2), which follows the river bed of the Wadi Musa in the Arabian Desert. We have Burckhardt's diary to thank for allowing us to witness what it would be like to be the first to discover a society, and with it, its secrets.

The aim of this project is one of appraisal and reflection of the achievements of the Nabateans. This once pastoral nomadic people were and still remain the only settlers to have survived permanently in this inhospitable (figure 3) landscape. It is remarkable that the Nabateans not only survived, but flourished despite settling in such an unforgiving desert. They mastered its terrain and harvested in barren conditions. Having mastered water management dynastic king Aretas IV commissioned Al Khazneh. This was a huge scale project which demonstrates how they metaphorically conquered the desert as all craftsmen were sustained by Petra's harvested water. I hope that this project can be more than a piece of historical research, instead a study where we in the 21st century can apply the ancient wisdom learnt by Petra's caravan people.

figure 1



figure 3

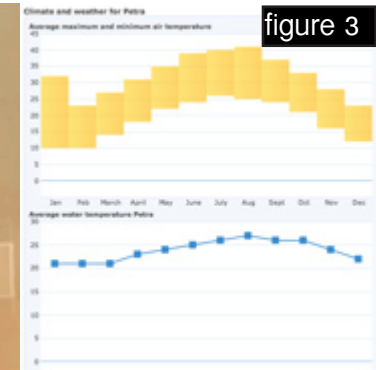


figure 2



### The Precedent:

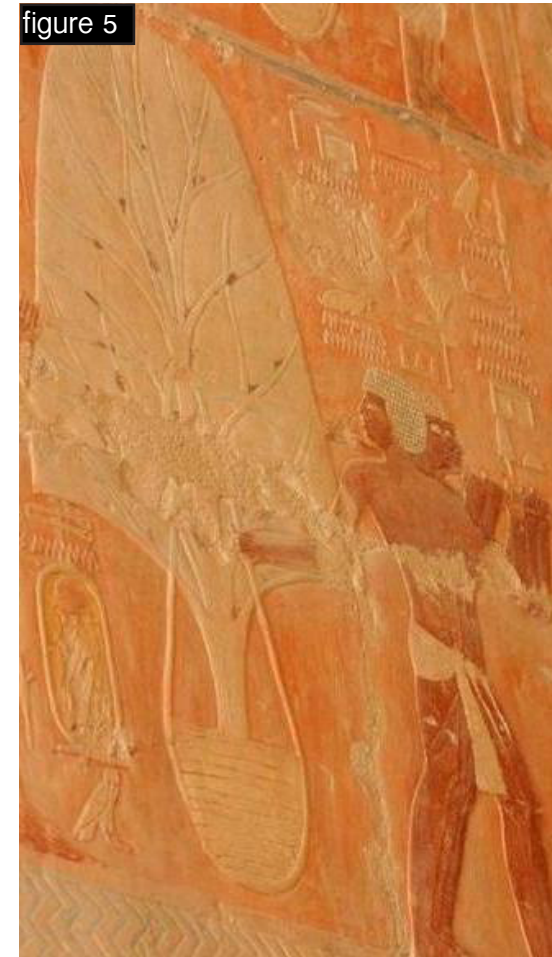
October 3000BC, a mass harvest of Frankincense in Dhofar insured the beginning of a 5000-year-old tradition upon which societies thousands of years later would form. It is estimated that 150 to 400 camels and their tradesmen travelled from Sumhuram to Shisr, through the Yemeni Hadhramaut mountains descending into the ancient town of Marib. From Marib the direction veered northwards and forked towards Najran. The route north-east would take the travellers to the Arabian peninsula to the Persian Gulf and Mesopotamia. However the route that we will follow is the Journey that traced the Red Sea into what became the ancient capital of Jordan, Petra.

The Pharaoh Queen Hatshepsut benchmarked staggering amounts of frankincense in the eighteenth dynasty (1515BC). On the 26th day of the first month of the inundation (figure 4) season she created the festival of Amun (Jacquet-Gordon, H. (2000) *The festival on which Anum went out to the treasury*. Institut Francais d'Archeologie Orientale. pp.1-4.). Involved in the holiday was the burning of huge piles of frankincense night and day. The festival is clearly depicted in fresco (figure 5) on the walls of Karnak Temple in the Valley of the Kings. To this day Coptic Christians and Muslims throughout the world consider the white smoke of frankincense an essential aid to their communication with God, just as Hatshepsut did 3,500 years ago. The Pharaohs believed that the better the offering, the more likely it was that their sacrifice would be accepted, and in return, the Gods would enrich them with blessings of power. Although there had been a demand for frankincense prior to Hatshepsut, the competitive nature of the Egyptian rulers meant that antecedent ('meagre') amounts would be continually dwarfed by the demands of the subsequent Pharaoh. For this reason incense traders throughout the Mediterranean and Asia-Minor grew in wealth extremely quickly.

### figure 4:

"The Season of the Inundation' was the first season in the ancient Egyptian calendar. The ancient Egyptians marked the beginning of their year by the rising of the Nile. This event was vital to the people because the waters left behind fertile silt and moisture which was the cause of the fertility of the Egyptian nation."  
[http://en.wikipedia.org/wiki/Season\\_of\\_the\\_Inundation](http://en.wikipedia.org/wiki/Season_of_the_Inundation) viewed 17/12/09

figure 5



As the Nubians (figure 6) were to the Nile so became the Nabateans of the Wadi-Rum. Jane Taylor has primarily researched Petra and its people in the book, *Petra and the lost kingdom of the Nabateans*. "The Nabateans' use of camels as long-distance carriers and their control of water sources had given them a unique command of desert travel". (Taylor, J. (2005). *PETRA and the LOST KINGDOM of the NABATAEANS*. London: I. B. Tauris. pp. 37)

She goes on to say that the use of camels, in conjunction with local knowledge of shorter routes and understanding of the desert, allowed the Nabateans to deliver spices and incense faster than any other caravan traders. This allowed for more trade to occur within a shorter space of time, making the Nabateans very wealthy very quickly, just as it had for the Nubians.

With popularity grew demand. Although frankincense was originally only used for rituals, it was not long before it was adopted for more diverse uses, including medicine, preserving food, deterring insects and masking noxious odours.

**figure 6:**

The Nubians controlled the monopoly of the Nile run of the frankincense route, this was due to the fast, lightweight palm-tree constructed boat the 'felucca'. Nubians were able to export their cargo far quicker than any other traders operating on the river. Kate Humble in the BBC documentary *The Frankincense Trail* makes a nice connection, observing that the Nubians continue to ferry precious cargo up the Nile, however the route no longer frankincense, instead tourists.

Lynch, M (Director). (2009). *The Frankincense Trail* [Motion Picture]. United Kingdom: BBC Documentary's.



## Who were the Nabateans:

Gecko Roman manuscripts talk about the desert being the home of the Nabateans. The Nabateans originated from North-West Arabia, in today's Hajar region of Saudi Arabia. "They followed well worn routes as season succeeded season, staying in familiar camping grounds while conditions were good in that area; as the supply of food for them and their animals diminished, they moved to other places where long usage told them they would again find pasture and water". (Taylor, J. (2005). *PETRA and the LOST KINGDOM of the NABATAEANS*. London: I. B. Tauris. pp. 10) Originally the Nabatean people were very inconspicuous and known of but never seen. This was for security reasons; a man would be outcast for leaving evidence of the tribe's stay. Today the Bedouin continue some of the ancient traditions of the Nabateans: For instance when pitching a tent at night, the camels stand affront the tent with the donkeys hidden at the rear. This is to allow the camel to behave as a guard dog might, raising the alarm of any movement on the horizon.

The turning point for this Nabatean tribe was its wealth. Wealth gave the people power and with power the Nabateans were able to settle in the desert rather than constantly covering their tracks. They were just one of many Nomadic tribes in the region but it was their quest for survival that made the Nabateans immortal in history as opposed to many other tribes that we unfortunately have no record of. Continually searching for water and shelter, the Nabateans soon discovered the place that Burckhardt would re-discover some 1700 years later. Aptly named Petra, from the Greek meaning City of Rock, its jewel Al Khazneh is carved from the cliff. This is also true for many of the city's tower tombs and the city's largest building the monastery.

### First impressions:

Today tourists personally discover the steps that Johann Ludwig Burckhardt would have taken in his attempt to discover the rumoured lost city. The route leads deep into a 120 meter fissure that descends into the core of Petra. As the path winds it yields glimpses of the city's crowning jewel, Al Khazneh. Carved directly into red sandstone the cavernous structure guards the entrance of the city.

The city contains an amphitheatre, a temple, many tombs and dwellings. However the craftsmanship and condition of Al Khazneh far supersedes that of any other building, as such this will be my primary study.

The Bedouin people know it as Treasury Pharaoh, quite unwittingly they believed Al Khazneh to be the resting place of Pharaoh's riches. You need not look closely to realise it's late Hellenistic characteristics, this and Al Khazneh's date of construction disproved the Bedouin belief. i.e. Corinthian Capitals, a broken pediment, a tholos (drum like structure in the centre) and the pediment above the entrance (figure 7). In order to understand the importance of such detail an investigation into the religion of the Nabateans must be undertaken.



## Religion:

Al Khazneh is Petra's expression of power and wealth. However, the facade demonstrates two separate kinds of wealth; on the one hand is the logistics and expense of such a commission and on the other is its evident wealth of knowledge through its striking decoration. Being traders in the east Mediterranean, minds would have been expanded through art and religion. This led to new cultures being adopted into Nabatean life which were reflected in the facade. Animals, fronds and flowers are still visible despite being defaced in the middle ages.

To the side of the building six Amazons can be seen, the great warrior women from Greek legend performing 'deaths dance' with customary axes.

The head of Medusa fills the space where the pediment is classically broken; she looks down upon all visitors. One hopes that when looking at the sculpture you will be pardoned, saved from turning into Medusa's ironic stone.

The crown of Isis the Egyptian Goddess sits above Medusa.

Four eagles perch high on the facade, their purpose is to take the souls of the dead to heaven.

Similarly the two smaller sculptures at the bottom are thought to be that of Castor and Pollux (the Dioscuri) the Roman twins to escort the souls of the dead into the underworld. This vast array of cultural exhibition and acceptance of other religions is the element that makes Al Khazneh unique. It's facade is the first in recorded history to incorporate images and representations of another nation's culture or religion. We must not forget that in this period of time gecko roman culture was very dominant and as such became very fashionable.



By sculpting Roman, Greek and Egyptian mythology/belief the Nabateans secured that their eggs were carefully placed in separate baskets. If we were to pursue the idiom we could say that Nabateans genetically modified their eggs to make them better as they had a tendency to mash together several Goddesses: "The figure in the centre of the tholos presents the contemporary tourist an interpretive exercise. The figure clearly holds a cornucopia in her left hand. These symbols combined suggest that the figure may be a fusion of three goddesses: the Greek goddess Tyche (Fortune), the Egyptian supreme goddess Isis (later identified with Aphrodite), and the Nabatean goddess al-Uzza. Al-Uzza was the goddess of Petra, a goddess of fertility, a deity concept bringing together earth and water, the two resources most important to the Nabateans". ([www.phoenixdatasystems.com/prexpl/petra/Res/Text/khazneh.htm](http://www.phoenixdatasystems.com/prexpl/petra/Res/Text/khazneh.htm) visited 10/12/09) This incredible facade is in stark contrast to its surrounding tombs and dwellings. Traditionally the Nabateans decorated in an Arabic style using floral and geometric patterns. Prior to the construction of Al Khazneh (c.80BC) the depiction of their God was symbolised with a rectangular block (figure 8), this can be seen in many of the houses in the valley. In a very real sense, (and in all probability due to the construction of Al Khazneh) the Nabateans reformed themselves! They converted their outdated and fairly square God to a more contemporary, fashionable God.

figure 8



What was Al Khazneh for and who built it:

Inside the portico, on the floor is a basin (figure 9). The basin has a hole into a channel, which flows out of the building (figure 10). The culture of the day suggests this drainage system would have allowed for public sacrifice. The use of incense and perfume in these offerings were responsible for driving the economy and making the city of Petra possible. But what or who were these offerings for?

Al Khazneh's facade and it's portico contains very strong religious references, it's message has very strong connections with the dead, honouring the dead and the after life. This, you would assume, gives an indication of what the building was? For year's archaeologists struggled to identify what the building was used for, until Archaeologist Suleiman Farajat made an obvious but profound observation.

Speculations that it may be a temple were dismissed as it's geometry both internally and externally do not contain the correct numerical divisions. Historians suggested that it is a tomb. This idea was also dismissed as no signs of burial had been discovered. We have already learnt that it's not Egyptian, and that it's certainly not the treasury of the Pharaoh. With no definite answer academics generally agreed that it must simply be monument. The mystery remained unexplained until 1996; Farajat observed that the stone path (figure 11) leading to Al Khazneh disappeared under the sand 80 meters before it reached the entrance (figure 12).

figure 9



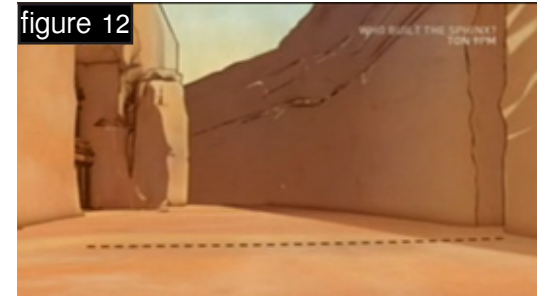
figure 10



figure 11



figure 12



His hypothesis was that if the stone path continued on its downward projectory the ancient floor would be meters below (figure 13) the current ground level. Permission to dig was given and in 2003 a major excavation began (figure 14). Six meters below the sand level archaeologists discovered four burial chambers (figure 15) containing eleven bodies. Today the links between monument and facade make sense. This discovery not only allows us to understand Al Khazneh as a mausoleum with a crypt beneath but it has provided us with an identity of the dynastic king who built it. Before this discovery the credit could have been given to any one of seven kings within the space of a hundred years (figure 16). Artefacts from inside the crypt were carbon dated and confirm that it was Aretas IV who commissioned Al Khazneh. The first century AD was the height of Nabatean wealth and power, 80% of all coins found are minted with Aretas IV's profile (figure 17). He is known as Petra's greatest developer, he commissioned many temples and created the great streets. Al Khazneh was his masterpiece.

figure 13



figure 14



figure 15

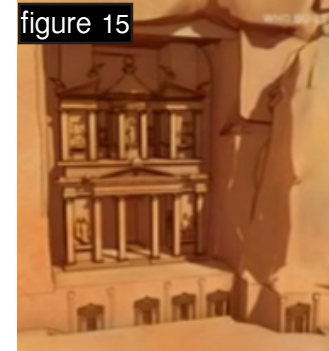
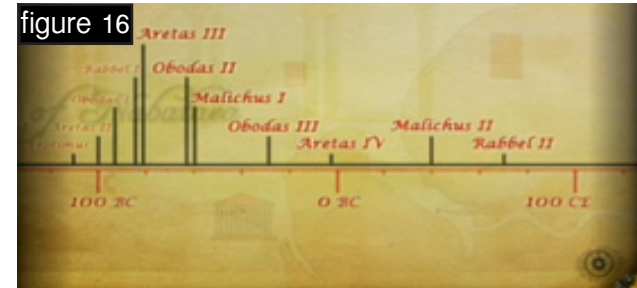


figure 17



figure 16



How it was built:

'Nomadic' and 'tradesmen' are words not often associated with 'engineering' and 'masterpiece' but in the case of the Nabateans it was their humble origins that allowed such a multicultural impossibility to be made possible. When compared to other buildings in Petra Al Khazneh is a shock. The people that constructed basic crow-step dwellings seem to be separate to those who engineered Al Khazneh. What was the turning point that allowed this Nabatean industrial revolution? Even today such ambition would be a logistical nightmare. The Nabateans had proved themselves to be masters of the desert and it was this knowledge and environmental consideration that allowed the completion of such a project (this will be discussed further in the next topic).

To the right of the facade are multiple rectangular slots (figure 18), they are irregular and not in keeping with Al Khazneh's ornament. Historians for a long time have assumed that these were holds in which scaffolding sat. A 39 metre scaffolding structure would consume a forest full of timber, an unlikely feat in an arid desert where trees are sparsely found. Dr. Shaher Rababeh (author of *How Petra was built*) believes that the resourceful Nabateans wouldn't allow the use of such a rare commodity. Rababeh discovered that the rectangular slots are simply footholds carved by Bedouin people who used the holds to climb the cliff in order to deface the representations of living things which they considered to be offensive. This was a common belief in the medieval period.

Luckily for us, but not it's client, an unfinished tomb exists. This tomb is important in unlocking the secrets of how tower-tomb and highly carved construction was achieved.

From studying the unfinished tomb Rababeh realised that the craftsmen used a top-down technique. Climbing up a narrow path into the cliff the craftsmen would create a natural platform, a ledge (figure 19) on which they would stand to skilfully cut into the face of the rock with crude iron chisels. This approach was completed in two stages: firstly the face of the rock was hacked back to create a rough edge on which to work; the artist's blank canvas. From this the stone was worked into a smooth working surface, after which stage two would begin. The second stage simply involved going back to where they had left off to carve the decoration. Effectively the cliff face was dropped like a stone curtain (figure 20).

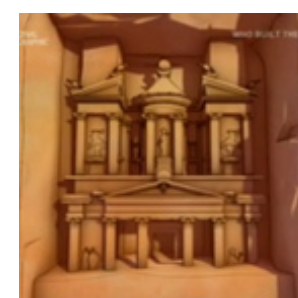
figure 18



figure 19

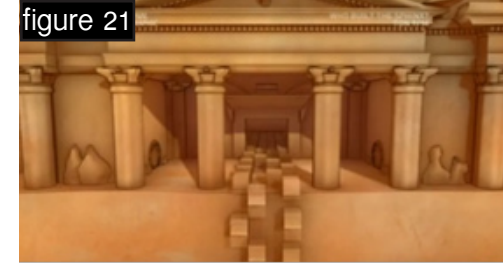


figure 20



The dual purpose of this method is particularly interesting. The Nabateans being brilliantly resourceful transformed what would have been masses of debris into a quarry (figure 21). 5000-6000 stone blocks (figure 22) from the face and internal space of Al Khazneh were cut and pushed off the ledge; the stone was then hauled away into the city to develop freestanding buildings.

The work of an Architect is evident through the demonstrated knowledge of structure. The stone lintel spans the entire distance of the building, beaming the +100 tonne weight back into the cliffs edge and then down into the ground. We know that the columns are not load bearing because of the photo's taken during the 1960 restoration and paintings by the royal academician David Roberts (figure 23) (1850) which clearly show only half of a column remaining. The central two columns are completely freestanding. The architect wisely calculated that the main chamber should be no larger 13 meters high by 12 meters square. The craftsmen used exactly the same approach when carving out the rooms (figure 24), as they had to create the decoration on the facade. i.e. to first create a natural platform, cutting down. National Geographic's 'Mega-Structures' engineer Ed McCan points out that had the loads been forced to span further the volume would collapse in on itself due to excessive weight from above. (Haddock, K (Director). (2007). Ancient Megastructures - Petra [Motion Picture]. United Kingdom: National Geographic Films)





## Water and location:

It was no fluke that the Nabateans built their city in the location they did. They used every part of their remote surroundings to their maximum advantage, they thought of everything. The narrow gorge that we know as the Siq was formed through constant water bombardment (rain and flooding) over millions of years. The mountainous cliffs surrounding the chosen valley cast cooling shadows across the city (figure 25), giving respite from the scorching sun.

In the 1st Century flash flooding was erratic and destructive due to the speed of the waters and the debris it carried. It would be very disappointing after labouring the point of how great the construction and ingenuity of the Nabateans was to then simply conclude that they failed to think of one thing, flooding. Thankfully they also happened to be accomplished hydraulic engineers. One can only imagine the skills listed on a Nabatean CV! In 2002 tunnels were discovered (figure 26), these tunnels were a way of directing the threat of flooding into a contained dam (figure 27). This use of surrounding landscape provided a man made reservoir, which was then used for surplus water. *Surplus!* In the desert? The Nabateans water management system was so efficient that they could supply 50,000 inhabitants and additional traders all year around. Charles Rortloff (a leading hydraulic engineer) describes Petra's location as a basin into which water flows from all quarters. Rortloff goes on to say that as well as harvesting rainwater the Nabateans 'tapped' every spring within a 15-mile radius.

figure 25

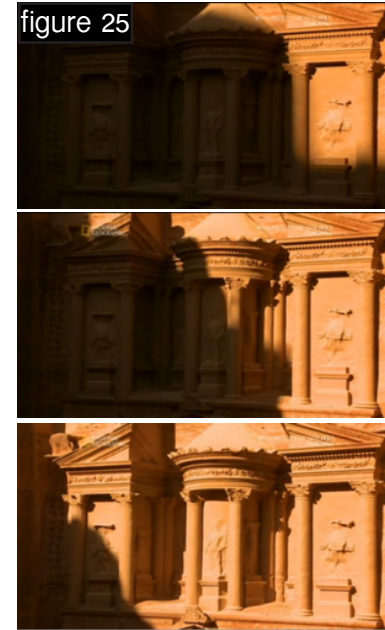


figure 26



figure 27





They achieved this by manufacturing short sections of terracotta pipes (figure 28), which were placed into rock cut groves (figure 29) and sealed with a watertight plaster (figure 30). The potential problem with this ancient piping system is its lack of strength. If put under significant pressure from fast following water the joints would break and the pipes would burst. Whether through trial and error or calculation we don't know. What we do know is that the Nabateans avoided any drought by getting the physics right: the solution was to start the pipeline high up in the cliffs to reduce the pressure through a constant gradient. By controlling the flow of the water they controlled the forces acting on the pipes. The angle was crucial: Too little = No water, Too much = No water and No pipes. They worked out what is referred to by modern engineers like Rortloff as the 'open channel system', of which, optimum flow is achieved through a ratio of 1 part air to 4 parts water within the pipe (figure 31). Rortloff goes on to say that this precision is equal in standard to ours today.

In the dry season the Nabateans relied upon purpose built underground water cisterns. There are 200 cisterns within the city itself (figure 32). These cisterns supplied water to 50,000 inhabitants and 1000's of tradesmen. The historian Nicole Douek describes the water levels as not only sufficient but an "Oasis in the desert with gardens, fountains, cisterns and cascading water". She goes on to say that this very much reflects the ambition of the Nabateans, they were indeed trying to create a city that everybody would remember.



figure 28



figure 29



figure 30

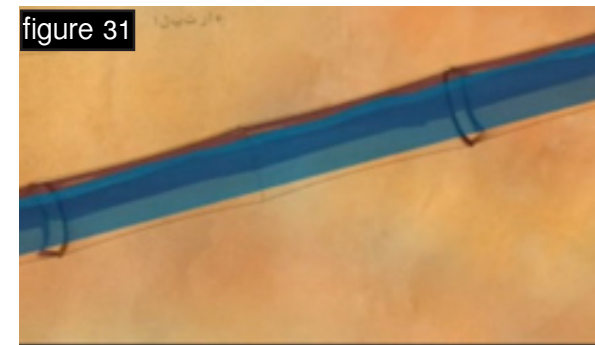


figure 31



figure 32

## Conclusion:

After re-reading the previous sentence I find Nicole Douek's quote sadly ironic in reference to my question. Being a lost and hidden city certainly adds to the magic of what we can discover today. But what is sad is that the Nabateans were working in perfect harmony with their environment, which is what now seems to be the lesson that is lost. Whilst studying for this project I have constantly pondered whether it is still possible that a society like Petra could exist today. I have wondered whether we would solve the same problems in the same way. I think the answer is no. For example: The irrigation system the Nabateans used would have taken much effort to perfect. Would we worry about the optimum angle or would we simply develop a stronger pipe to allow as much water as we wanted? Take for instance, a contemporary neighbour, a civilization that has also been founded on wealth; Dubai. With no context in which to design, architects and engineers have boarded the hi-tech boat with no consideration of it's surroundings or utilization unlike the Nabateans. Of course there are exceptions to this statement, for instance Burj al-Taqa which is famous for being a zero energy building. But more common are projects such as the Versace Hotel, currently under construction (figure 33).

figure 33



In December 2008 the Daily Mail published an article that continues to shock the public regarding what the 'super-rich' think they should call luxury. Plans were and still are to install "a system of heat-absorbing pipes built under the sand and giant wind blowers, designed to keep tourists cool in the searing 40-50C heat. In the attempt that the filthy rich holidaymakers don't burn their feet on scorching sand" (ANON. (2008, December 17). World's first refrigerated BEACH to be built next to luxury hotel in Dubai. Daily Mail, pp.24) Rachel Noble, of Tourism Concern, said: "Dubai is like a bubble world where the things that are worrying the rest of the world, things like climate change, are simply ignored so people can continue destructive lifestyles. Each person living in Dubai has a carbon footprint of more than 44 tons of CO2 a year". The Nabateans were also ahead of their time, but in a more sustainable way. Rather than trying to override the arid conditions the Nabateans were able to use their environment to harvest a city to live in, as well as maximising water extraction for livestock and it's inhabitants. This is in stark contrast to the aforementioned article. Building Al Khazneh and the entire city of Petra would have required hundreds of craftsmen, not one of these was a slave. This was another revolutionary standard set by the Nabateans.

Sometimes in the pursuit for the future we forget the past and the lessons it can teach. In a rapidly developing city like Dubai it seems not many are concerned in studying their ancestors heritage and what made their achievements remarkable. If we are to follow in the footsteps of Versace Hotels surely we will be walking into an unremarkable future opposite to the mystery of the lost kingdom, Petra. A city that worked in harmony with it's environment.

Word Count: 3650.

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figure 16

Credo Online Dictionary's

figure 17

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figure 33

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