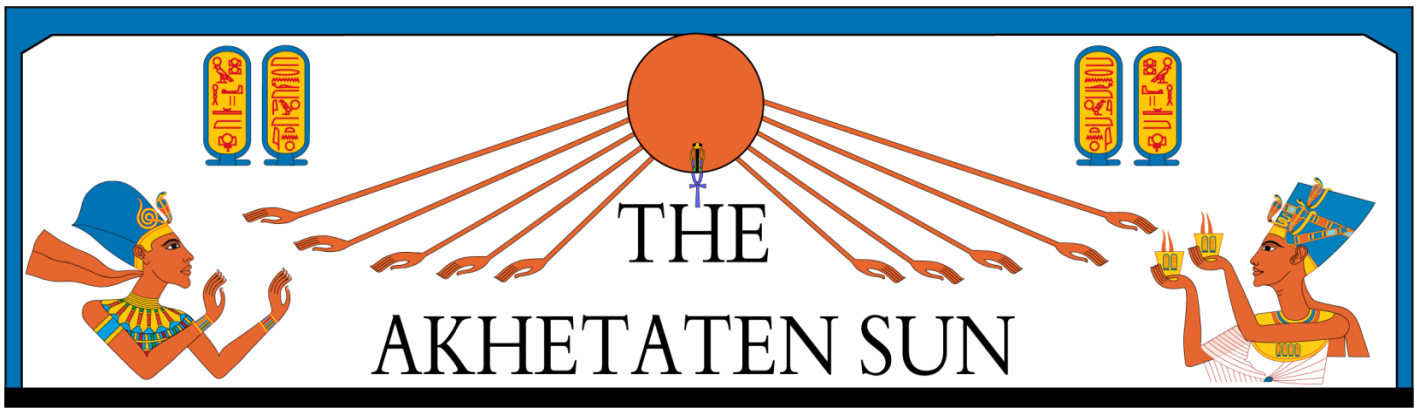

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Officers and Directors

The President's Papyrus

Greetings Amarnaphiles,

Well it is now summer again and the heat is on.

Once again, we are able to provide three very interesting articles in this issue.

Barry's article is a fascinating but a sad tale how great discoveries in archaeology are sometime damaged or lost, through political and/or bureaucratic rivalries or mismanagement.

What we have of the painted floor design in the Great Palace are drawings and painted copies that Petrie's painstakingly produced, instead of the original. I guess something is better than nothing, but when it comes to Amarna art, a great treasure was mostly lost. The whole story is a fascinating read.

Likewise, the following two articles are also very interesting as well. I can only say that I think that the subjects presented through the Sun newsletter only get better and better.

Furthermore, I am very excited to announce that in the next Sun we will have a fascinating article by Lyla Pinch Brock about the blue painted pottery found in the Amarna tombs at Saqqara.

All of this is only possible because of your interest and continued support. Thanks!!

Floyd

Petrie's 'pavement house' at Amarna

Barry Kemp

A guide book to Egypt from 1909, after describing the highlights of the rock tombs at Amarna, says: 'Very little remains of the ancient town and temple. But Mr. Petrie found in 1892 a beautiful **Painted Pavement**, which is now covered by a little house. This is not far from the river. The realistic treatment of the animals and birds is unlike that of any other period, and the colouring is charming. The pavement was in the *harîm* of the palace.' (*Macmillan's Guides: Guide to Egypt and the Sûdân*, 6th edition, London, Macmillan 1909, 103.)

The story behind this now lost attraction is fairly well documented, partly by what Petrie himself published at the time, and partly by weekly letters he wrote home (primarily to his mother who passed them to colleagues), which were eventually published in 2009. There are, however, no photographs of the excavations, pointing to the likelihood that Petrie worked without a camera. In one of the letters (3–9 April 1892) he remarks: 'I took three excellent plates of Khenuaten's (i.e. Akhenaten's) head, 6 inches high, with Sayce's camera', one of Petrie's many visitors. A few glass-plate negatives of the interior of the pavement house have survived (**Figure 1** is from one of them) but who took them and when is not known.'

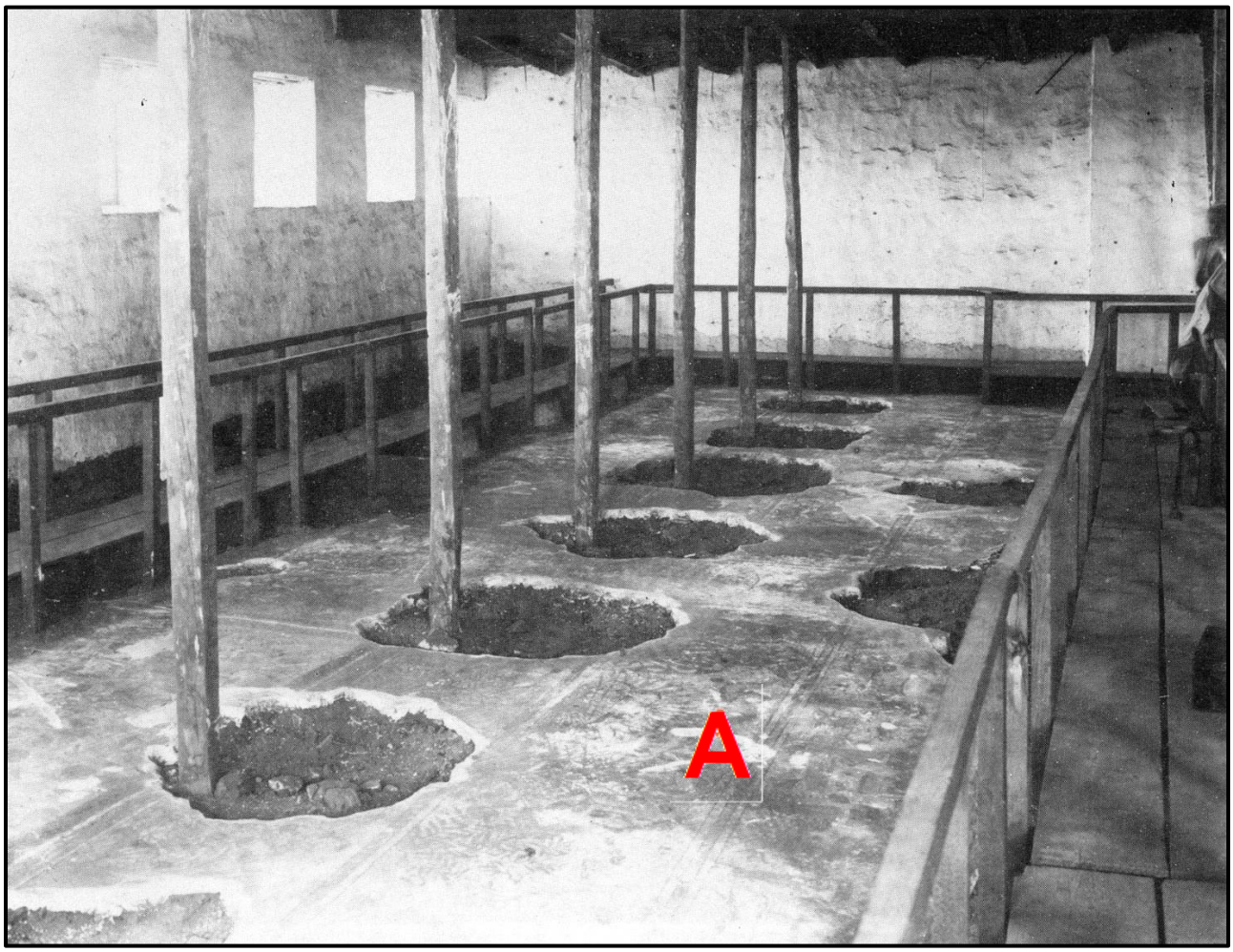

Figure 1: A photograph of the interior of the pavement house where pavement P2 was displayed. The wooden gangway on the right had been built over one of the original mud-brick walls. The portion of the pavement shown in Figure 6 is identified by the letter 'A'. The date and photographer are not known. The view is towards the east. After Weatherhead, *JEA* 78 (1992), Pl. XXIV.1.

One of Petrie's stated aims at Amarna was to discover Akhenaten's palace and that he accomplished straight away, by digging at the site that has since been called the Great Palace in the Central City. Within a week of starting he reported:

'22–29 November 1891'

'A great novelty has been found. A large room or hall in the palace had a painted floor, the colours laid on gesso. The subjects are groups of plants and birds: with a border of alternate lotus bouquets and dishes of offerings. It is astonishingly fresh and clear considering its situation. I have written to Sir F. Grenfell about it, and asked if the Committee will give me a credit of £50 to enclose and roof it as a sight of the place. If left for a few weeks it will go to ruin, as the people think there is an inscribed stone under it, and will dig it up. If it is not decided to preserve it in a few days, I shall peel off the gesso of the best parts, and leave the rest to destruction. I am making a coloured copy of it on a scale of $^{1}/_{10}$; but I can only take 3 or 4 hours a day, and it will occupy me for weeks at this rate.'

[The 'Committee' referred to was the Committee (later Society) for the Preservation of the Monuments of Ancient Egypt which had been set up in Britain in 1888 to raise funds to assist the Egyptian government in the task of preservation. It ended its activities in 1910. Sir Francis Grenfell, a senior military figure in the British occupation of Egypt, would have been one of its officers. See https://www.ees.ac.uk/a-society-of-its-time-the-society-for-the-preservation-of-the-monuments-of-ancient-egypt]

'29 Nov–5 Dec 1891'

'I am slowly getting on with my copy of the pavement. It is I think, the only entirely unfettered piece of design that we have of ancient Egypt; all the other known paintings are of tomb or temple subjects.

I wrote to Sir F. Grenfell, urging that it should be properly preserved at once. He is afraid to move apparently, and instead of the Committee authorising me to take steps to preserve it, Grenfell sent my letter to Moncrieff, who wrote to Major Brown at Minia 35 miles off to ask him to consider the matter, which Moncrieff writes and puts it in Grebaut's hands! So instead of my at once walling it in and safeguarding it, it is to go into an interminable official mill and very likely be destroyed before it is preserved. Such is the power of French obstruction here! As it is the only thing of the kind known, and about as good as the hundreds of Pompeian paintings which are so carefully preserved, there can be no question of the necessity of attending to it. I have just finished copying a tank of lotus and fishes about 11 ft x 3 ft; and there is a long border of prisoners and bows. This which seems to have been about 30 ft square and about half of that remains in patches.'

[Eugène Grébaut was, at that time, the French head of the Egyptian antiquities service (Département des antiquités égyptiennes) towards whom Petrie felt hostility on account of what he considered obstruction of his plans. It is the familiar story of the driven researcher encountering bureaucracy, to which was added nationalistic sentiment reflecting a long history of antagonism between Britain (or at least England) and France, now being played out in an attempted joint control of Egypt. Major R.H. Brown, of the Royal Engineers, was Irrigation Inspector for the Fayum, an appointment which followed the British invasion of Egypt in 1882, less than ten years before.]

'6–13 Dec. 1891'

'We have cleared the limits of the painted floor which was about 30 x 40 feet. Of this about half remains; the rest has been broken up by plunderers extracting the bases of the stone columns of the hall. No one has yet appeared to see about preserving it, as I proposed; and Moncrieff and Co. have not given me authority to spend a piastre toward it for the Govt.; so it is all at a standstill, and left to the mercy of the natives.'

'13–19, Dec. 91'

'At last a young English engineer came over from Major Brown, to see about the pavement. The instructions from Cairo were to take temporary measures for its preservation till Grebaut acted. But very sensibly, he

said that as it was such a large affair it was best to do it at once, rather than let it spin out. So he agreed to put up the room over it and settled the details with me, and then gave orders and a plan to a native engineer, who is to see to doing it. I am to give an eye to it, and to do the final cleaning out of the place, and try fixing the colours, by sprinkling it with very thin tapioca-water, as I inspect. I must experiment on bits of it to begin with.'

'The engineer is here, and the house over the pavement is begun, with 50 or 60 boys and men ravaging all over the place to get stone and brick from the ruins. I have my own way with them, but have [to] keep a constant look out to avoid mischief. We found an ancient well in the palace, close by where the water is wanted for building, so they cleared it and use it now.'

'21–27 Dec. 1891'

'Our further excavations have brought out parts of two more rooms with painted floors. One is in rather poor state, like most of the first room, but the other piece is as firm and bright as the day it was done, over 3000 years ago. The whole amount now known here is:

(1) Room of 128 square yards, of which about half remains painted,
(2) Part of room with about 40 sq yds,
(3) Part of room with about 85 sq yds in fresh condition.

Considering that a single square yard of this work would be honoured in a museum in Europe it will be seen what a large find this is, nearly 200 sq. yds. [167 sq. m] of painting in all.

The whole will be preserved: the house over the first room is nearly built, and has to be roofed. I have had to constantly attend to small points, such as the positions of the pillars to allow of gangways for visitors, etc., etc. I am arranging so as to have a complete circuit for visitors to view all the pavements, which are adjoining: as when 50 or 100 tourists come off a boat, they must not crowd the place or be tempted to turn on to the painting. The gangway will therefore be continuous, from the entrance round the rooms and back. This is the most important discovery artistically, that there has been since the Old Kingdom statues of Mariette. The style of the vegetation, as all agree, is better than anything known in Egyptian or classical work.'

'3–9 Jan 1892'

'At the painted pavement the second room is now finished: and the posts and roofing and windows are next required. After it is all done, I shall have a long job to see after cleaning out the inside, fixing the colours, fitting gangways, etc. Very possibly I shall stay on in Ramadan (April) drawing the floors, as I could do that comfortably during the heat in those large rooms, and have no work going on outside.'

'1–7 Feb. 1892.'

'We are now cleaning up the pavement, and it will before long be on show.'

'8–13 Feb 92.'

'I am using tapioca on the pavement to fix the colours; and so long as it is thin enough to soak in and leave a dry face there is no danger of its peeling afterwards.'

'28 Feb 5 March 92'

'I have had a lot of company. Mr. and Mrs. Clayton, Ian, her bro. Mr. Ogle, Mr. and Mrs. Charlton in one boat. They went over the pavement and tombs here, we dined with them two nights they were here. Then came an American Mr. Dorr, wife and son, Bostonians; they were so captivated with the pavement that they spent hours over it; and to them follows their companion boat with Lord and Lady Waterford. Mr. and Mrs. Gaskell and Canon Mac Coll (of Athenaeum) who were also greatly taken with the pavement. Everyone agrees with me that it is unlike any other work in Egypt, and of a higher naturalistic style than anything known until a century or two ago.'

‘26th March 1892’

'My days are occupied largely with putting in the wooden gangways for visitors in the pavement house. The work cannot possibly be trusted to Arab carpenters, so I have to do it all myself. I have been five days, and expect to be on many more at it.'

‘28 March–3rd Apr. 1892’

'I have been going on putting the pavement house in order. It was a long day's work getting in a piece of stele, weighing about 12 cwt. Only one lad beside myself could work at it, as the place is too tender to let a gang of men drag things about; and I had to lift it over obstacles and roll it along on rollers to get it into a spare place in the room.

[What was this 'stele'? In his monograph, *Tell el Amarna*, p. 8, Petrie writes how: 'A hard white limestone one (stele) in the great temple enclosure is inscribed on both sides (now placed in the pavement house)'. One candidate is the indurated limestone balustrade block on display in the Egyptian Museum, Cairo. It bears the temporary number 30/10/26/12, meaning that it was registered in 1926, although this might not mean that the piece arrived at the museum in that year. What, if anything, is on the reverse side of the block seems not to be recorded. It is displayed flush against a wall and thus invisible. Whatever the stele was, it is to be assumed that it was taken to Cairo after the destruction of the pavement in 1912 (see below). One British hundredweight (cwt.) was roughly the same as 50.8 kilograms. 12 cwt is more than half a ton.]

'I have nearly finished the wooden gangways round the rooms, and have next to plaster over the breaks and then to do my drawings.'

‘3–9 April 1892’

'I have finished the wood on the gangways of the pavement house at last, there is 270 feet run of the staging this supported 9 inches from the floor, and with handrail and posts on each side. It had to be all planned in to fit the room, and to avoid resting on the painting as far as possible. Of course it could never have been trusted to a native carpenter, so I was obliged to do it all myself. Now my lad has begun the stopping and plastering of the broken parts under supervision, and I shall do the copying meanwhile.'

‘11–16 April 1892’

'I have been all the week copying the pavement on $^{1}/_{10}$, in outline; and though I have gone on as quickly as I could with accuracy, I find that barely a third of the large room is done in five days. At least 8 days more is needed for that, beside the coloured full size copy of parts of it. I shall abandon copying the two damaged rooms I think: the subjects are the same and the state is much worse. Probably I shall complete a $^{1}/_{10}$th coloured copy of one room, which is mostly done. Meanwhile Ali is busy all day plastering up the broken edges of the floor; and with some supervision he does it very fairly, so that I need not give any time to that affair.'

This is the last mention of the pavement. Petrie left Amarna for Cairo on May 29th and seems never to have returned.

Elsewhere Petrie enlarged on the tapioca episode. ‘I took daily with me bottles of thick and of thin tapioca water over to the pavement, tried on each part of the paving what thickness would just sink in without leaving any glair, and then spread that over the surface, entirely with the side of my forefinger. Any brush would have swept up the loose blue frit paint, but the finger could just glide or roll over the tender parts without shifting anything. There were 250 square feet to do, but it could not be done every day, or the skin wore away too quickly for renewal’ (Petrie, *Seventy Years in Archaeology*, 149–50).

The source of tapioca is a large brown conical root vegetable with a slightly shiny surface, cassava or manioc, which, having originated in South America, is cultivated extensively in Africa and south-east Asia. In Britain tapioca has somewhat negative culinary connotations, at least to older people, having for years

been used as a cheap form of dessert in school meals. It is not necessary, however, to imagine it as a staple of Petrie's diet. As a major and easily obtainable form of starch it has industrial uses as well, including in the manufacture of textiles. I presume that Petrie bought it under this guise, probably by the sackful, and it proved to be effective in binding the paint to the plaster.

Petrie's initiative in building the house and creating a tourist attraction had unforeseen consequences. Its popularity amongst tourists led to local ill-feeling and, on 1 February 1912, men (some of those charged with looking after it according to one account) broke into the museum and hacked the main pavement to pieces. Staff from the Egyptian Museum, Cairo subsequently collected many of the pieces and relaid them on the floor of the central hall of the museum, filling in the gaps with new plaster on which they painted copies of the missing areas. Beneath a wide glass and wood-frame cover it remains in this condition to this day (**Figure 2**). It has, however, become discoloured (**Figure 3**).

Figure 2: The painted pavement as displayed in the Egyptian Museum, Cairo. The date of the photograph is 5 May 2016.

Figure 3: A section of the painted pavement, photographed through the roof of the display case. The right section of the picture is occupied by part of the pathway of foreign captives and groups of three bows. The captive at the top is clearly a modern replacement, but most of the area underneath is a portion of the original pavement. It depicts an 'Asiatic' and three bows. The left section of the picture shows an area of vegetation and flying birds. It is probably modern reconstruction although a small area of original plaster can be identified in the top left corner. The date of the photograph is 5 May 2016.

The visitor to the Egyptian Museum sees a single area of pavement but Petrie had discovered three separate pavements, each in a different room of the palace.

'The first painted pavement, which was found a few days after beginning work, is, P. 1, in the south-east hall of columns in the *harem*, where I was digging to search for the pieces of glazed tile from the columns, which I found lying about there. So soon as I knew the limits of that room, I applied to the Government to protect it by a building; and while that building was in progress we found the second chamber, P. 2, near it, after clearing the cubicles and advancing southwards. This was then included in another room, along with the remaining part of pavement 3. It was well that the discovery was made so early in the season, as the various operations of building, roofing, &c., took some months, and needed constant watching to prevent the men injuring the buried pavements over which they worked. The wall between pavements 2 and 3 was levelled down to afford a platform space for visitors to walk along. I made and placed a continuous platform of wood, raised from the floor, so that visitors on entering the building at 1 can circulate around both chambers, and view the whole without retracing their way. As the moving of wood, and carpentering, over such a delicate surface could not be trusted to any native, I did all that work myself; but I set the best of my boys—Ali Suefi—to put plaster necking round all the broken edges, which he did excellently' (Petrie, *Tell el Amarna*, 13).

It is to be expected that someone in the Egyptian antiquities administration wrote a report on the gathering, transport and reconstruction of the fragments but, to my knowledge, no such report has been published. The pieces were given the temporary museum number 27/1/16/1 (meaning that it was the first item to be entered on the day of January 27th, 1916) and amounted to 22 in number. Were they all from the main pavement? Even this is not clear but, given the extent of the whole find (167 sq. m), 22 fragments seem a small number.

Figure 4: The ruin of Petrie's pavement house in 1934, sitting over the walls of the North Harim. The EES Pendlebury expedition has excavated the surrounding ground but left the interior of the house alone, preferring to fill it with the spoil from the excavations. View to the south-east. EES negative A23a.

Once the fragments had been removed, Petrie's pavement house was left derelict, its valuable wooden roof also taken away, perhaps at the same time as the rescue of the fragments. The roofless ruin appears on an aerial photograph taken in 1932. This was two years before John Pendlebury, director of the Egypt Exploration Society's Amarna expedition, began a re-excavation of this part of the Great Palace, eventually referring to it as the 'North Harem' (Harim is the preferred modern spelling).

Pendlebury chose not to examine the debris which remained inside the pavement house. He admits: 'It should be mentioned that the two large rooms marked 'Painted Pavements', which had been built up to protect Petrie's discovery, were not re-excavated, nor were the small rooms immediately to the east of them.

The plan of these given here is therefore taken direct from Petrie, with a correction of 1.5 metres in the overall measurement' (Pendlebury, *Journal of Egyptian Archaeology* 21 (1935), 132, note 1). Instead he heaped the spoil from his excavations of the surrounding structures inside the walls of the two rooms (**Figure 4**)). We do not know, therefore, whether any fragments of the paintings still remained. Moreover, we also do not have an accurate plan of the walls and any other architectural features, Petrie's report relying on an incomplete plan made at a small scale. As Fran Weatherhead discovered in her detailed comparison of the sources, including the recorded dimensions of the three areas of painting, it is not actually possible to reconstruct a reliable plan, despite the detailed version made by Ralph Lavers (Pendlebury's architect) and published in *City of Akhenaten* III.

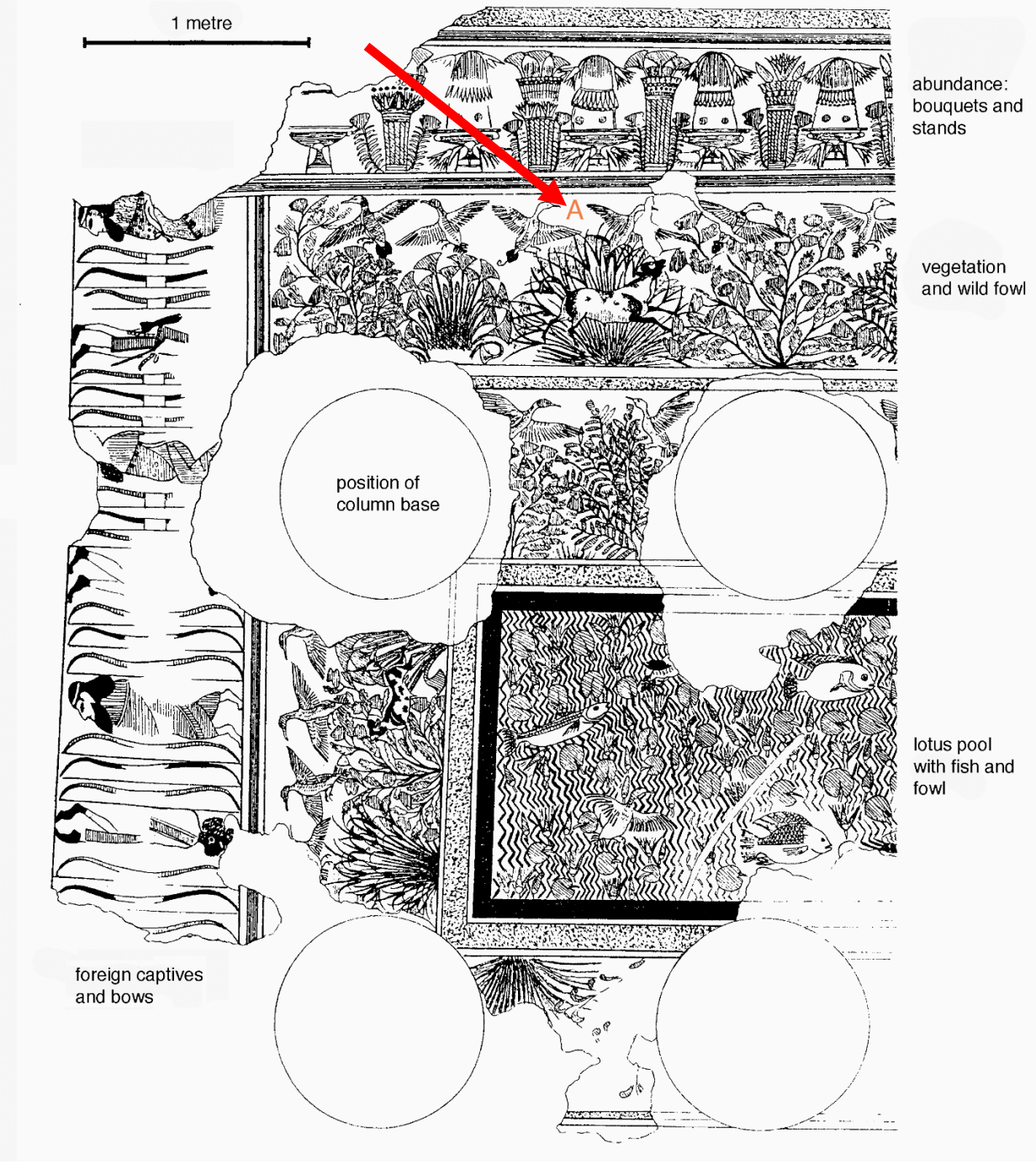

Figure 5: Part of the western portion of the painted pavement P2, as copied and published by Petrie. The letter 'A' identifies the portion copied in colour and at a larger scale shown in Figure 6. After Petrie, *Tell El Amarna*, Pl. II.

Petrie's letters reveal that he intended to copy a large part of the painted areas but ran out of time. By the end he had made a detailed, finished outline copy of only the western half of the pavement P2 (**Figure 5**), full-sized colour copies of a few details (**Figure 6**), no copy of what was left of P3 and, for P1, unfinished copies of parts which remained unpublished until Weatherhead's 1992 paper. Weatherhead's research allowed her to offer a critique of the restored pavement in the Egyptian Museum:

> 'one notes that the restorers did not always follow Petrie's drawing of the design. Areas of pavement have been incorrectly positioned, and in some cases new designs have been included, possibly from the eastern half. Perhaps most unfortunate of all is the dislocation of the surviving area of captives moved south and reversed, so that the figures are in the wrong order and the bows are upside down. Other obvious mistakes are a new area of duck-and-marsh border and bouquet-and-stand border to the west of the pond. In the pond a circular area of water with a fish snout and the rear of a duck is moved considerably to the west, and a very large fish now lurks where there was once other subject matter at the north-west corner of the pond' (Weatherhead, *Journal of Egyptian Archaeology* 78 (1992), 183).

Figure 6: One of the sample areas copied in colour by Petrie. It is the portion identified by the letter 'A' in Figure 5. After Petrie, *Tell El Amarna*, Pl. III.3.

The remains of Petrie's pavement house, deeply buried in Pendlebury's spoil, stand beside the road which runs southwards from El-Till. Local people call it the 'kenisa', a colloquial word not only for 'church' but more generally for an obviously old and ruined building. This year the Amarna Project added it to its list of places of interest and, hence, its list of projects authorised by the Ministry of Antiquities. This does not mean that a decision has been taken to proceed to the removal of soil, the exposure of ancient walls and their conservation. It is a call to assess the condition of the site and what might be done for it.

The first step was to compile a series of digital overlays of the original building, the walls of Petrie's house and a balloon photograph taken in 2003 (**Figures 7, 8**). Also available is a set of scans of 18 photographic negatives in the Egypt Exploration Society archive taken during Pendlebury's 1934 season (two appear here as **Figures 4 and 9**). On June 4th, in the company of inspector of antiquities Mohammed Ibrahim (and one of his small daughters), Miriam Bertram and myself spent an exceedingly hot morning at the site. We took a series of spot heights using an optical surveyor's level; Miriam then took 865 digital photographs from a spread of locations intended to provide full coverage from many angles. From these Paul Docherty, an expert in photogrammetry and 3D presentation, has developed both a contoured map and 3D point cloud representations. He explains the process in the next article in this issue. One thing they reveal is that the basic survey data need improvement, which we hope to accomplish in the autumn. This can be fed back into the digital model to improve its accuracy.

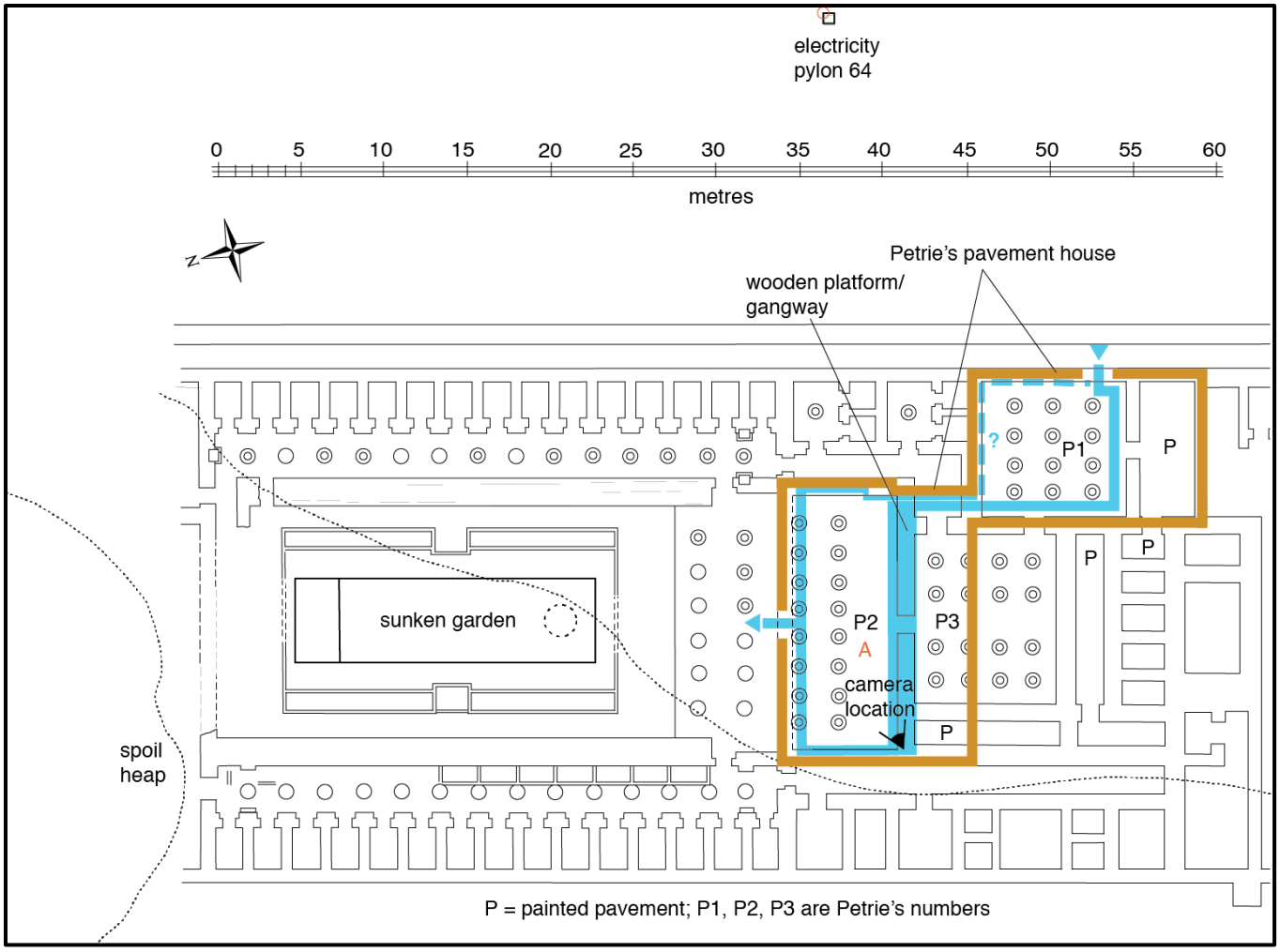

Figure 7: Composite plan of the North Harim. It is a compromise between the plan of Ralph Lavers in *COA* III, Pl. XIIIA, aerial photography and photogrammetry; but requires further checking in the field.

Figure 8: Aerial photograph of the North Harim and the pavement house taken by the expedition's helium balloon in 2003. Photo by G. Owen.

Figure 9: View of the northern part of the North Harim immediately after excavation in 1934. The photographer had perched himself on top of the spoil heap inside the pavement house, the northern wall of which appears at the bottom of the picture. View to the north. EES negative A25.

Figure 10: View of the same area shown in Figure 9, taken on 4 June 2019. The square modern building beside the road is for the antiquities guards and was built by the Amarna Project.

The northern part of the North Harim building looks as one expects a mud-brick ruin to look after exposure for 85 years to the weather and the daily foot traffic of farmers and their animals (**Figures 9, 10**). The fact that many of the visible column bases have been turned upside down also shows that people have continued to dig for treasure. Over the southern part, by contrast, Pendlebury's spoil heaps still reach a height of 3 m above the surrounding desert and have kept lengths of Petrie's house walls standing for up to 2 m high. The same fill will have preserved the remains of the original building in whatever state it was when Pendlebury began. One should not be too optimistic about the chances of pieces of painted pavement being still buried though. The years between 1912 and 1934 would have given the villagers ample time to turn this area over, too, in the search for buried treasure.

Just supposing that the site was cleared of its fill, Petrie's walls would overshadow all else. What should one do with them? As the plan shows, they obscure the original wall pattern of Akhenaten's day. Yet they belong to a historic building in its own right. Petrie's letters provide a snapshot of the lives of the archaeologist and his admiring visitors that can be fitted to a precise place. Their walking the wooden gangways and leaning over the railings to take in the details of the paintings are a layer of experience from the past that has a validity of its own.

It makes a case for treating the remains of the pavement house to the same level of care as the walls of Akhenaten's building and thus for preserving them.

Further reading:

The principal first-hand sources are:

W.M.F. Petrie, *Tell El Amarna*. London, Methuen 1894, 8–9, 12–14, Pls. II–IV, XXXVI.

W.M.F. Petrie, *Seventy Years in Archaeology*. London, Low, Marston & Co. 1931, 144–56.

J.D.S. Pendlebury, 'Preliminary report of the excavations at Tell el-'Amarnah, 1934–1935.' *Journal of Egyptian Archaeology* 21 (1935), 129–35.

J.D.S. Pendlebury, *City of Akhenaten* III. London, Egypt Exploration Society 1951, 38–44, Pls. XIIIA, XIV, XV, XXXIII3–6.

Petrie's letters written from Amarna are fully transcribed, with annotations, in:

P. T. Nicholson, '"Keeper of the House of the Desert."' In S. Ikram and A. Dodson, ed., *Beyond the Horizon; Studies in Egyptian Art, Archaeology and History in Honour of Barry J. Kemp*. Cairo, Supreme Council of Antiquities 2009. Vol. I, 275–323.

For the Committee (later Society) for the Preservation of the Monuments of Ancient Egypt, see https://ucldigitalpress.co.uk/Book/Article/3/20/93/

The painted pavements are the subject of a meticulous study:

F. Weatherhead, 'Painted pavements in the Great Palace at Amarna.' *Journal of Egyptian Archaeology* 78 (1992), 179–94. A summary is included in F. Weatherhead, *Amarna Palace Paintings*. London, Egypt Exploration Society 2007.

Photogrammetry at Amarna

Paul Docherty

During the autumn 2018 season it was decided to test out the possibilities in using photogrammetry to survey locations at Amarna. The first test was conducted around the site of the Great Aten Temple front with a second test in the spring 2019 season at the site of the North Harim. Both tests show promise in recording the sites using this method but before we look at the outcome let us first take a moment to understand, what is 'photogrammetry' and how is it implemented.

Photogrammetry is the process of deriving measurements from an image and has a very long history with a proven record beginning shortly after the invention of photography. Early uses involved simple survey measurements of buildings or sites within a photograph by means of one or more reference scale bars placed within the scene. The introduction of two cameras positioned a fixed distance from each other saw the development of 'stereo photogrammetry' which increased the accuracy of measurement and introduced a wider range of uses. By placing the cameras onboard an aircraft it was possible to map an environment with much more detail than before, particularly through the creation of 2D orthophotographs; flat plane images where all perspective has been removed. This results in a view of an area where precise measurements can be taken from one point to another without any lens distortion; invaluable when it comes to surveying. Modern computing power has now taken over the processing of these photographs to the point where we are able to introduce more cameras and consequently more viewing angles of the subject. This is what is presently termed 'multi-view stereo photogrammetry' and allows us the ability to reconstruct environments and objects as detailed 3D models. The results can be disseminated digitally on-line or physically through 3D printing. The term 'photogrammetry' is effectively an umbrella term used to cover all these capture methods.

The modern photogrammetric process begins by capturing the subject through a series of overlapping images taken from different viewpoints, ensuring that every surface is present in at least three images. This can lead to a considerable number of photographs taken in order to fully capture the subject. In the case of the Great Aten Temple entrance this amounted to 1200 photos and the Northern Harim 865 photos. Photogrammetry is an extremely accurate method of reconstructing environments and objects but in order to do so we need to ensure the photographs include some form of scale measure. This ensures the resulting model is oriented correctly in 3D space and has the right scale in real-world measurements. It is also important to ensure the photographs are exposed correctly and that there is no noise present. Images need to be sharp from foreground to background and the scene needs to have as little ambient movement as possible in order to prevent incorrect camera alignment later in the process. This can be difficult if there are people or vehicles moving around, even clouds can cause problems particularly on a windy day.

Once the images have been taken, they are processed using specialist photogrammetry software. Several commercial options are available, with Agisoft Metashape (formerly PhotoScan) and Reality Capture being the most widely used. Of course, there are also a few open-source options with Visual SfM (Structure from Motion) developed by Changchan Wu being one of the most popular. Irrespective of which software is used all processing follows the same general workflow in order to convert the images into 3D models and 2D orthophotographs.

The capture images are loaded into the software and all physical markers are manually identified and tagged within each photograph to ensure the resulting 2D and 3D outputs are scaled and oriented correctly. Fortunately, in Agisoft Metashape this is a semi-automatic process reducing the time taken. Each image is then checked for identifying features which are indexed and compared with those in all the other images to find the corresponding overlaps and initial camera orientations. Once the camera locations have been determined in 3D space a sparse point cloud is generated from all the feature points used to tie the images together. This is our first indication as to the success or failure of the capture.

Some adjustments may be needed at this stage but following on from this is the generation of a dense point cloud which effectively fills in the spaces between the sparse points and creates the 3D detail. After this dense point cloud is produced, we can either generate a 2D orthophotograph from the height data (relative to a flat plane) or a 3D model by effectively joining the dots with geometric faces (an oversimplification of the process). The whole processing time can range from a few hours to a few days depending on the number of photographs used to capture the subject. This time can also be affected by the level of detail required, which can be adjusted within the software. Photogrammetry may seem a little longwinded, but apart from the capture time most of the processing is done automatically within the software, with periodic user input.

Under normal conditions a photogrammetric survey would be achieved by means of a drone which would capture overhead images of the site using a grid flight path. Unfortunately, this is not an option at Amarna, so the capture was done at ground level by hand by Miriam Bertram. In order to capture the site Miriam utilised a point-to-point panorama photography method. This involves standing at one point and taking a series of photos facing multiple directions as if to create a 360-degree panorama, before moving on to another point and taking another series of photos. Care must be taken to ensure that enough points are used to capture the whole area with adequate overlap between images.

Several issues arose when taking the photographs at Amarna with the most problematic being the exposure variation between images and the lack of enough detail in the sandy areas to enable a good feature detection within the software. For the North Harim, unfortunately, there were no scale bars present during photography which meant that, in this instance, the resulting 3D model could not be oriented or scaled accurately resulting in a very slight tilt to the model. The introduction of physical ground control points (GCPs) will be implemented in future captures along with the addition of survey spot measures to increase the accuracy of the results.

Figure 1: A 3D point cloud of the northern part of the North Harim generated by photogrammetry. View to the north.

Photogrammetry is not meant to replace traditional surveying methods; however, it can enhance them by providing additional data in the form of in-between points and subtle undulations found in the surrounding surface which are not normally recorded. By viewing a site in 3D, it is also possible to make out features not readily visible at ground level and allows for a more holistic view of the site.

This is one area where photogrammetry outdoes aerial photography in that, because it is 3D, we can strip back overhanging features to reveal other detail more clearly, for example at the North Harim we can see the column bases underneath the shrubs (see **Figure 1**).

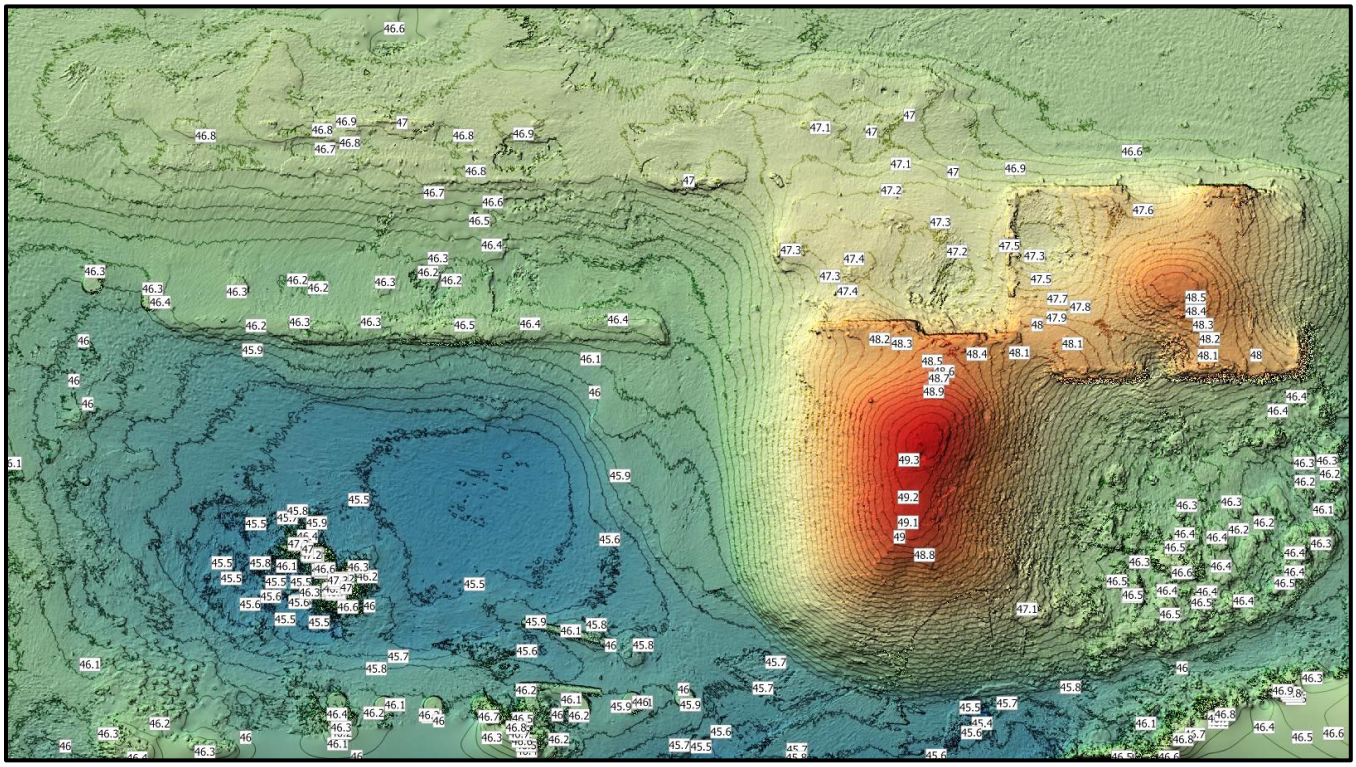

Figure 2: A contour map of the northern part of the North Harim generated from the point cloud data and post processed in Quantum GIS.

The 3D point cloud of the North Harim clearly shows the remaining wall structure of Petrie's Museum and the positions of the column bases. There is some colour variation in the ground surface due to the afore-mentioned exposure differences between photographs, however, much of this can be compensated for within software if necessary.

By taking slices through the point cloud we can generate a series of height contours which can be exported along with a digital elevation model (DEM) for use in other software such as Quantum GIS (open-source mapping software) to produce a contour map as can be seen in **Figure 2**. In this instance the map has been given a colour shift and hill shading to help identify height changes and features more easily. We also have the option to re-project contours back onto the original photographs as a 3D overlay giving yet another way to visualise a site (**Figure 3**).

Photogrammetry goes beyond regular photography, by enabling a unique 3D record to be kept of any excavation stage, whether this is before, during, or after completion; particularly given that excavation, by its very nature, is an inherently destructive process. It is hoped that future seasons will continue to allow photogrammetry to be implemented in this way so that we can refine it further and enhance the data already gathered from Amarna.

Figure 3: One of the photographs used to create the photogrammetry with the contours (at 10 cm intervals) draped over it. A problem with this technique is that there is no depth masking, so that features on the reverse of a wall or mound, for example, show through.

Further information regarding the photogrammetry software mentioned in this article can be found at:

Agisoft Metashape. Available at: http://www.agisoft.com

RealityCapture. Available at: https://www.capturingreality.com

Changchang Wu (2011) *VisualSFM: A Visual Structure from Motion System*. Available at: http://ccwu.me/vsfm/

Quantum GIS. Available at: https://qgis.org

Offering scene in the tomb of Ipy

David Pepper

Amarna tomb TA10 (**Figures 3, 4, & 5**) was constructed for Akhenaten's Steward, Ipy (sometimes transliterated as Apy). Ipy may have begun his career as Steward of Amenhotep III's Memphis household, succeeding his father Amenhotep-Huy who had previously held this position [1]. That Ipy attained the position of 'Steward of Memphis' sometime after Amenhotep III celebrated his first jubilee in the 30th year of his reign, at which time Amenhotep III's son. Amenhotep IV, may have been named co-ruler. When Amenhotep III died, probably in the 38th year of his rule, Ipy continued on as Steward of Memphis, under Amenhotep IV (who, of course, later called himself Akhenaten).

In the early years of Amenhotep IV's reign, Ipy may have constructed a tomb, now designated TT136, in the hills west of Thebes at Sheikh Abd el-Qurna. The owner of TT136 called himself Royal Scribe and Steward, but there is controversy over the reading of his name, and several Egyptologists speculate that the owner of this tomb was not Akhenaten's Steward Ipy, as there is no other evidence that 'Amarna Ipy' ever resided in Thebes. TT136 shows four images which have been reported as Akhenaten in an Osiride pose, but this too is disputed [2].

In the 5th year of Amenhotep IV's rule, on the 19th day of the third month of *prt*, Ipy – Steward of Memphis – wrote a report, found at Gurob, to the king detailing the condition of the royal estate after its inspection. This was the last recorded mention of the king's name as Amenhotep IV before he changed his name to Akhenaten [3].

According to Aidan Dodson, "A stela of 'Memphis Ipy', offering to his father Amenhotep Huy, is known from Saqqara (**Figure 1**), and a stela, now in St. Petersburg (**Figure 2**) and a pair of canopic jars, now in Leiden (**Figure 3**), have been found at the same site, belonging to a Chief Steward named Ipy. However, it is unclear whether this Ipy, who can be dated stylistically to around the time of Tutankhamun, was the same man" [4].

Figure 1:Stele of Amenhotep-Huy and his son Ipy, now in the, Rijksmuseum van Oudheden, Leiden, Netherlands [5]

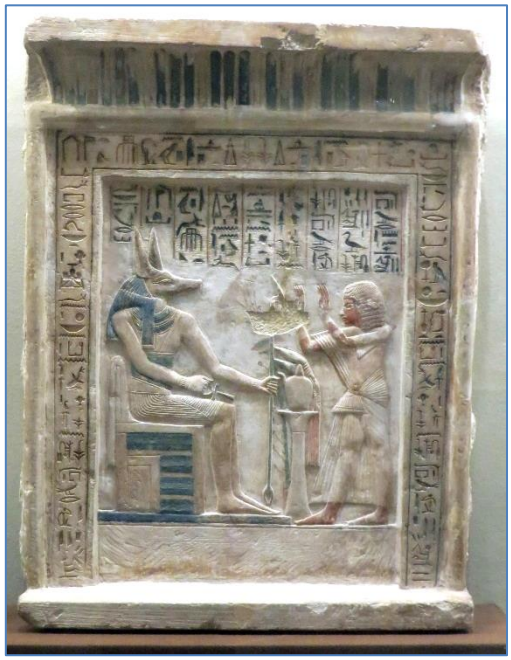

Figure 2: Stele of Steward Ipy now in the Hermitage Museum, St. Petersburg, Russia [6]

Figure 3: Canopic Jar of Ipy now in the Museo archeologico nazionale, Florence, Italy [7]

Regardless of whether or not Akhenaten's Steward Ipy had previously built and abandoned tombs in Thebes, or later had one at Saqqara, TA10 was built for him in the noble's Southern Rock-cut Tombs at Amarna, however it was only partially finished. Among Amarna Ipy's titles in this tomb is *imy r pr wr*, "Steward of the Great House of the King."

Additional titles found for someone named Ipy are 'Door keeper of the Gleaming Aten' [8]; 'Chief of a vineyard', 'Guardian' and 'Captain of a boat [9]; 'Overseer of works of Hatnub (quarry)', and 'Mayor of Medum' [10]. Since the Ipy of tomb TA10 did not list these titles in his tomb, they probably do not refer to the same person.

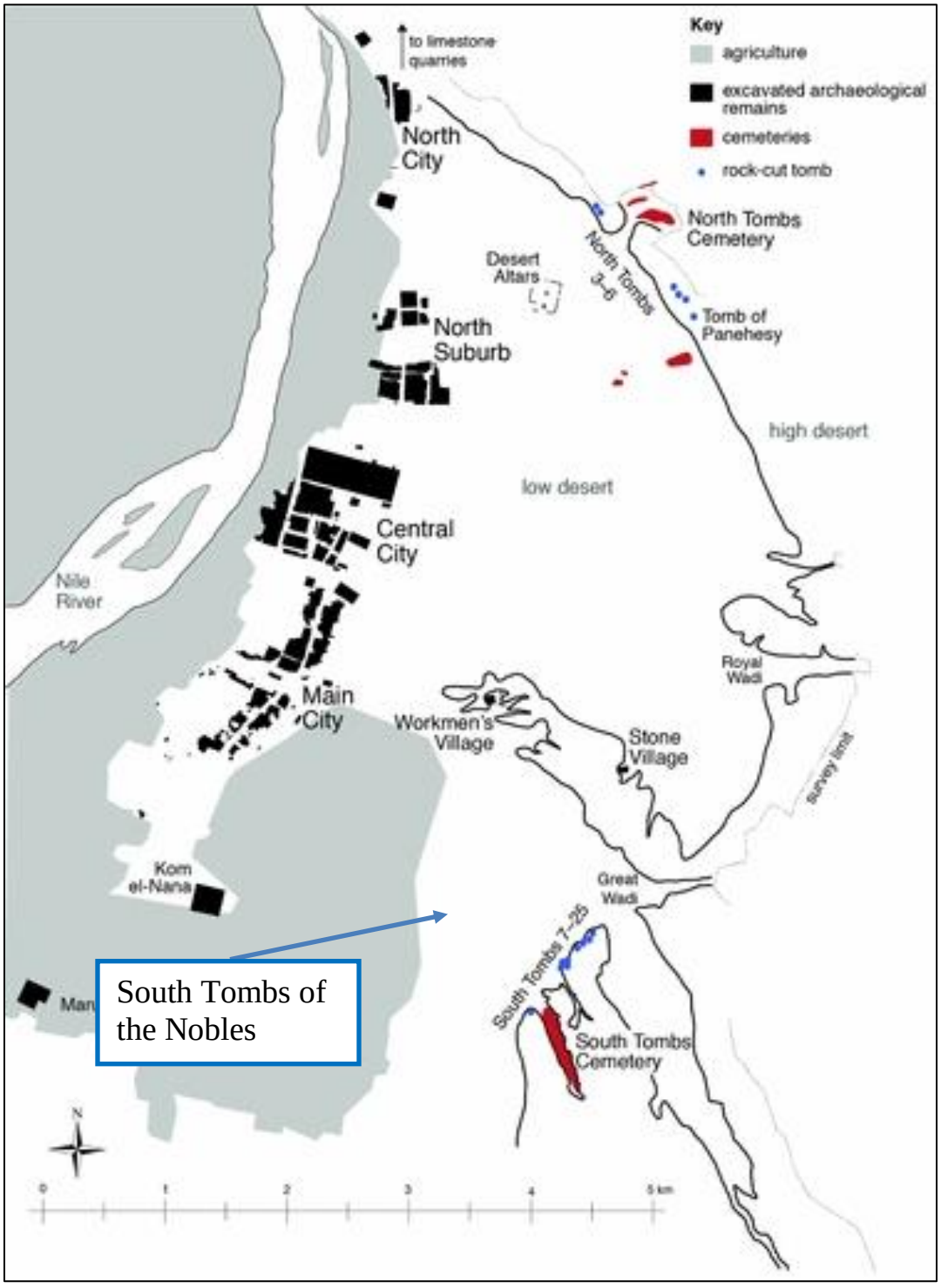

Figure 4: Map of Amarna [11]

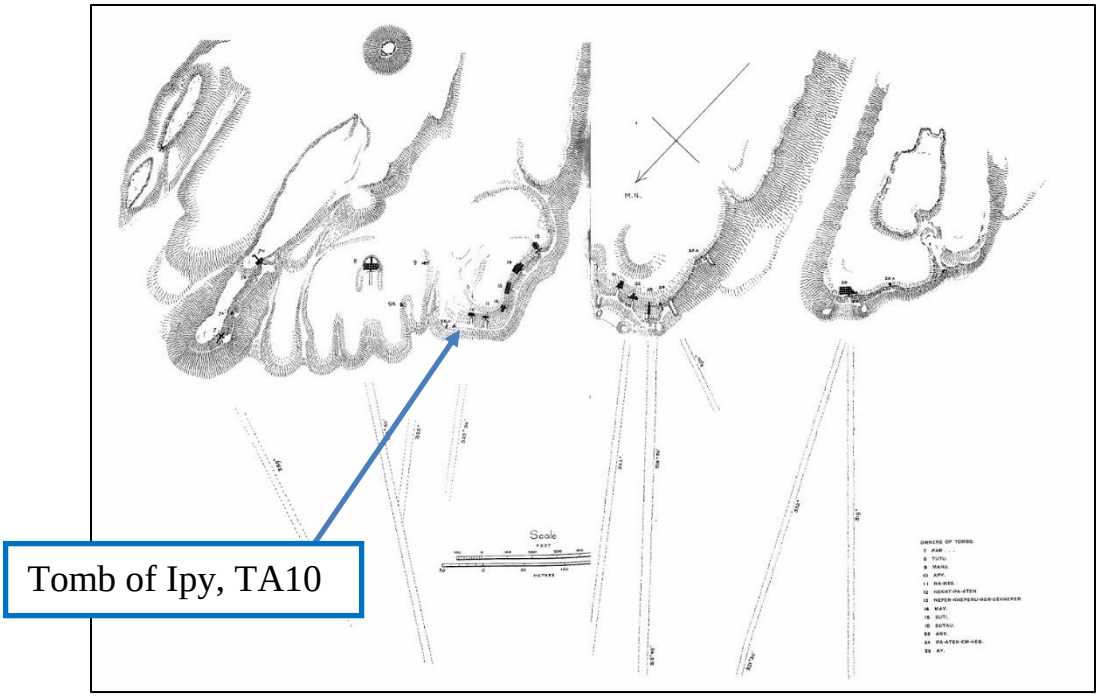

Figure 5: Southern Rock-Cut Tombs, Amarna [12]

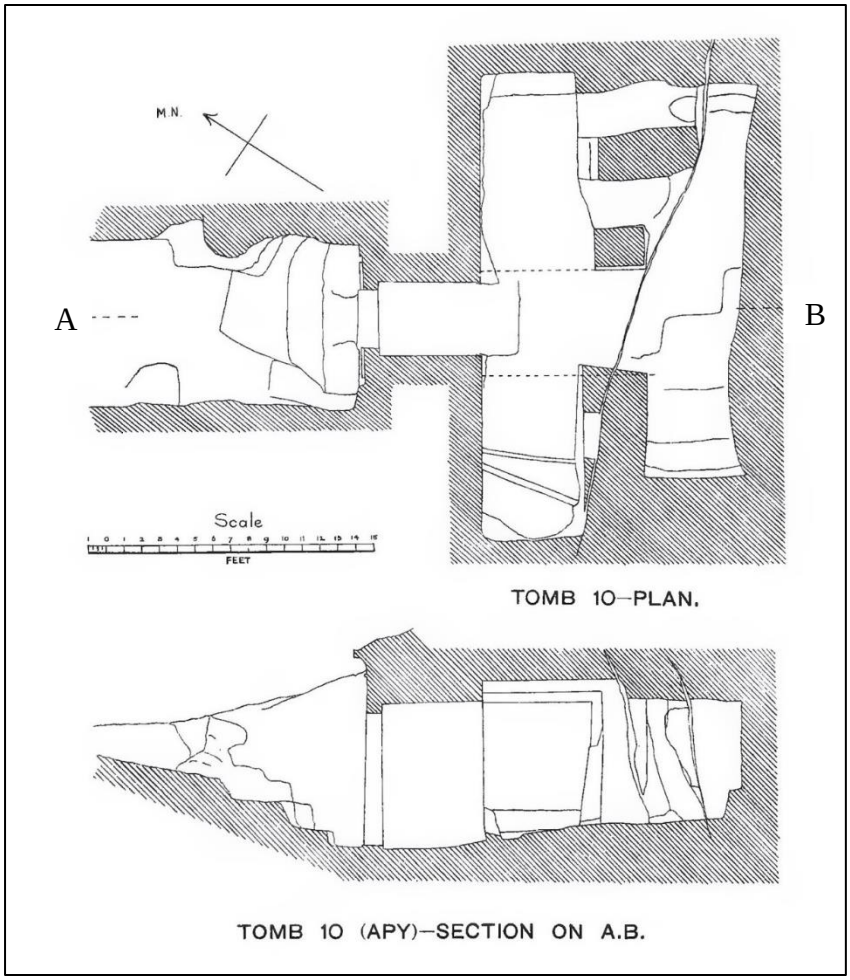

Figure 6: Plan and section of Tomb of Ipy, TA10 [13]

The location and plan of Ipy's partially finished tomb TA10 is shown in **Figures 4, 5 and 6**.

On the right-side wall of the entrance is the Shorter Hymn to the Aten (**Figure 7**).

The Hymn to the Aten, alleged by some modern scholars to have been written by Akhenaten himself, may have been intended to be chanted during ceremonies in the Aten's temples. The Hymn is written in two versions, the Great Hymn inscribed in Ay's Amarna tomb, and the Shorter Hymn inscribed in the tombs of Meryre, Any, Tutu, Mahu, and Ipy.

The Shorter Hymn states that 'at dawn, the first rays of the Aten fill the earth, animate all beings, and show the sovereignty of the god. At night, the earth and all beings approach the state of death, but on the next sunrise, life is reborn again, with the worship of the Aten at Akhetaten, the center of the universe. The Aten shapes Akhenaten in his image each day, and only he knows the God. The Aten, the eternal creator of heaven, contemplates his creation and sustains it with his rays. All beings, through their appropriate behavior, praise him with thanksgiving' [14].

Psalm 104 in the Old Testament, supposedly written by King David about 350 years later may have been based on the Hymn to the Aten [15].

Below the presentation scene to the Aten in Ipy's tomb (**Figure 8**), was also a prayer to the Aten written in ink. It is now badly faded [16].

The god Shu and his sister Tefnut were the offspring of Atum, the first god who sprang out of the primordial waters. Shu represented air and Tefut represented rain. Shu and Tefnut are usually depicted in scenes with their children, Geb and Nut. Geb is shown as land rising up out of the primordial waters. Shu is depicted as the air which holds up the sky, represented by Nut. Tefnut brings water down onto the earth to create rivers and make the land fertile. Akhenaten seems to have originally associated himself with Shu, and Nefertiti with Tefnut to symbolize their mythological connection with Aten-re, a manifestation of the solar sky god. However, in regnal year 9 the name and titles of the Aten were altered to exclude the name of the old gods Shu and Re-Horakhty [17], and to emphasize Akhenaten's association with Re [18].

The only other surviving scene in Ipy's tomb is the offering scene **(Figure 8**) which shows Akhenaten and Nefertiti presenting the names of the Aten (inside cartouches) to the god (symbolized by the sun with rays ending in hands). As previously stated, the tomb was unfinished, and like the other nobles tombs at Amarna, it had been open and empty since antiquity.

Figure 7: Ipy's Shorter Hymn to the Aten [19]

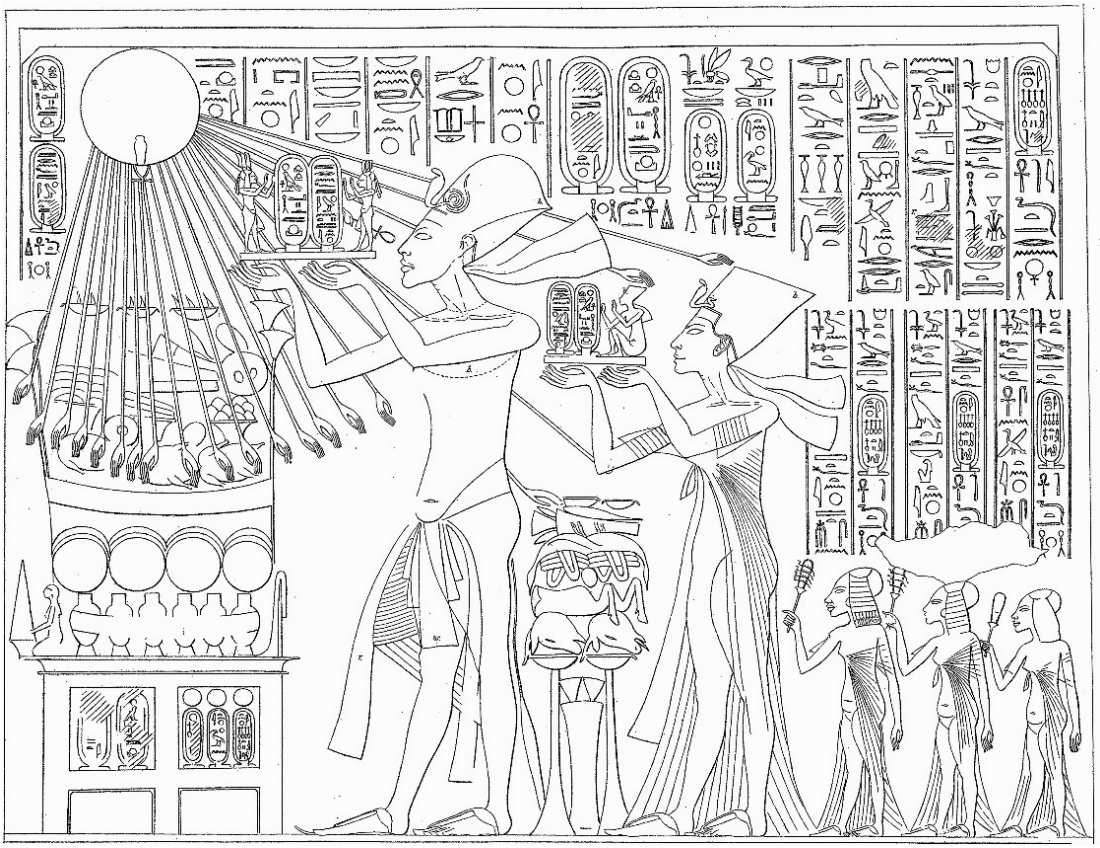

Figure 8: Offering scene from tomb of Ipy, TA10 [20]

OTHER AMARNA PERIOD OFFERING SCENES:

Ancient Egyptian Kings are frequently shown presenting offerings such as incense, perfumes, and flowers to various gods. **Figure 9** shows Akhenaten and Nefertiti holding bouquets of flowers to the Aten and its life-giving rays. Other examples are shown in **Figures 10, 11, 12, 13 & 14.**

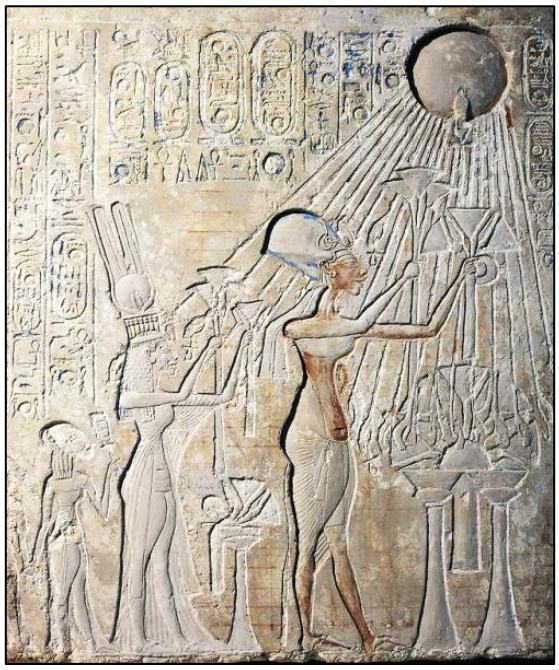

Figure 9: Offering bouquets to the Aten, from Amarna, now in Cairo [21]

Figure 10: Akhenaten offering unguent jars, from Amarna, now in Cairo [22]

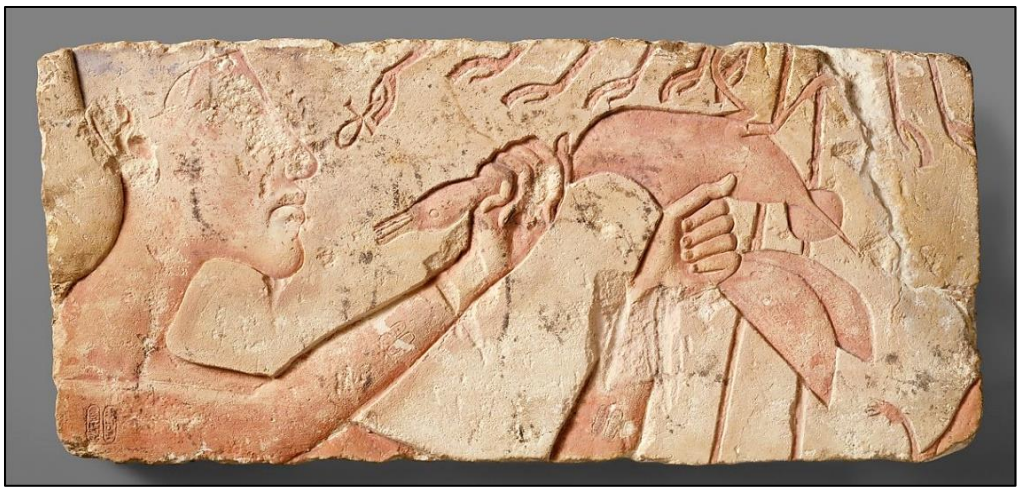

Figure 11: Akhenaten offering a duck, from Ashmunein, now in the Metropolitan Museum of Art, New York; an adjacent block showing Kiya is now in the Carlsberg Glypyotek, Copenhagen [23]

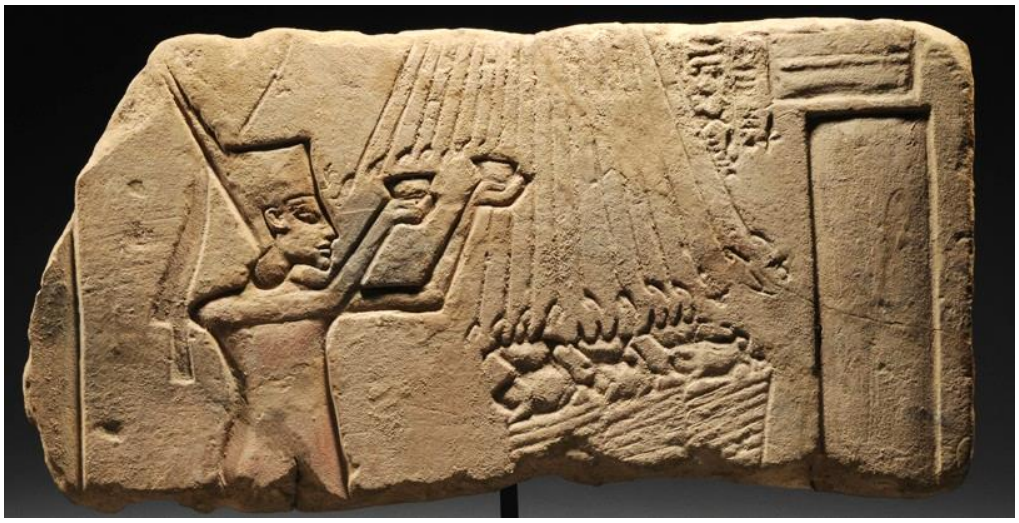

Figure 12: Akhenaten offering (wine?) to the Aten, Private Collection [24]

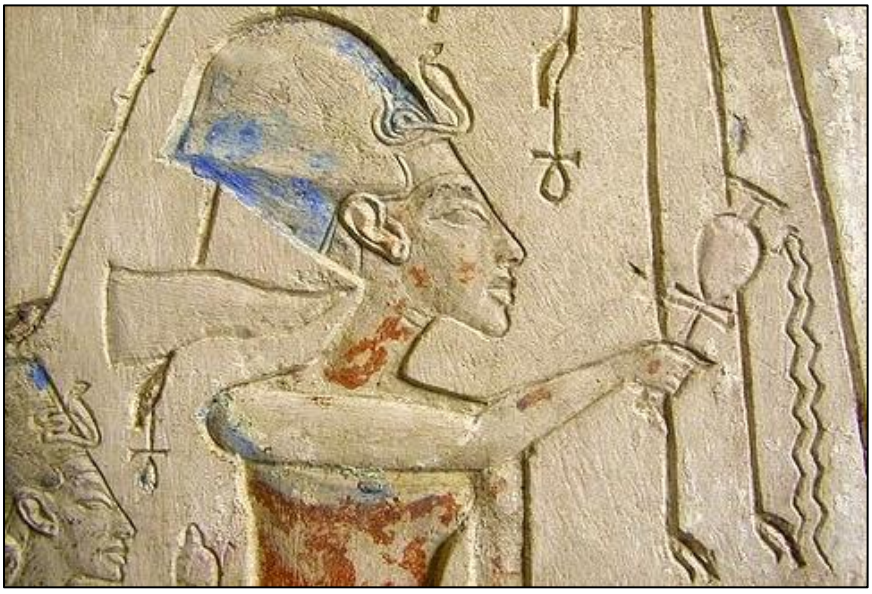

Figure 13: Akhenaten pouring a libation to the Aten, from an Amarna household shrine, now in Cairo [25]

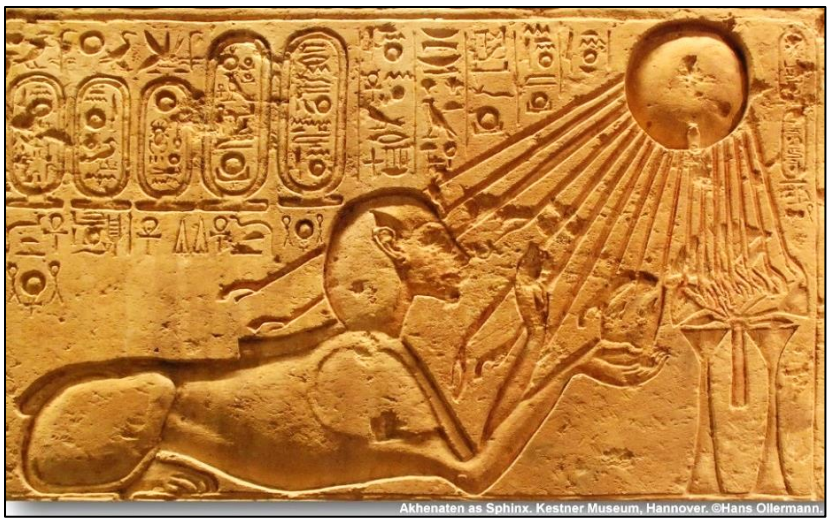

Figure 14: Akhenaten as a Sphinx offering to the Aten,
Museum August Kestner, Hannover [26]

Sometimes the offerings are presented by an intermediary figure, such as the sphinx shown in **Figure 15**, and the goddess Maat shown in **Figure 16.**

Figure 15: Nefertiti presenting a sphinx holding a bouquet, Luxor talatat [27]

Figure 16: Akhenaten presenting Maat, University of Pennsylvania
Museum of Archaeology and Anthropology [28]

THE NAMES OF THE ATEN

Perhaps uniquely, Akhenaten enclosed the names of the Aten in Cartouches, followed by the epithet, "given life forever." This was seldom done by any other pharaoh for any other Egyptian god [29]. (another example is the god Seth on the Stela of 400 Years of Ramses II)

The early version of the cartouche enclosing the Aten's names seems to have appeared in year 5, when Amenhotep IV changed his name to Akhenaten and founded his new city at Amarna. Then, these names were modified in the 9th year of Akhenaten's sole rule, by deleting the references to the gods Re-Horakhty and Shu. It is not known why this was done. **Figure 17** gives a translation of both the Early and Late Names.

The name change can be used to date scenes of Akhenaten and Nefertiti, when the cartouche names of the Aten are shown. In Ipy's tomb scene (**Figure 8**), the Early Names are shown, both in the text, and in the cartouches being offered to the Aten's rays by both Akhenaten and Nefertiti. This dates the scene in Ipy's tomb to between year 6 and 9.

Similarly, in two other scenes (**Figures 18 and 19**), Akhenaten is shown presenting the Early Names of the Aten.

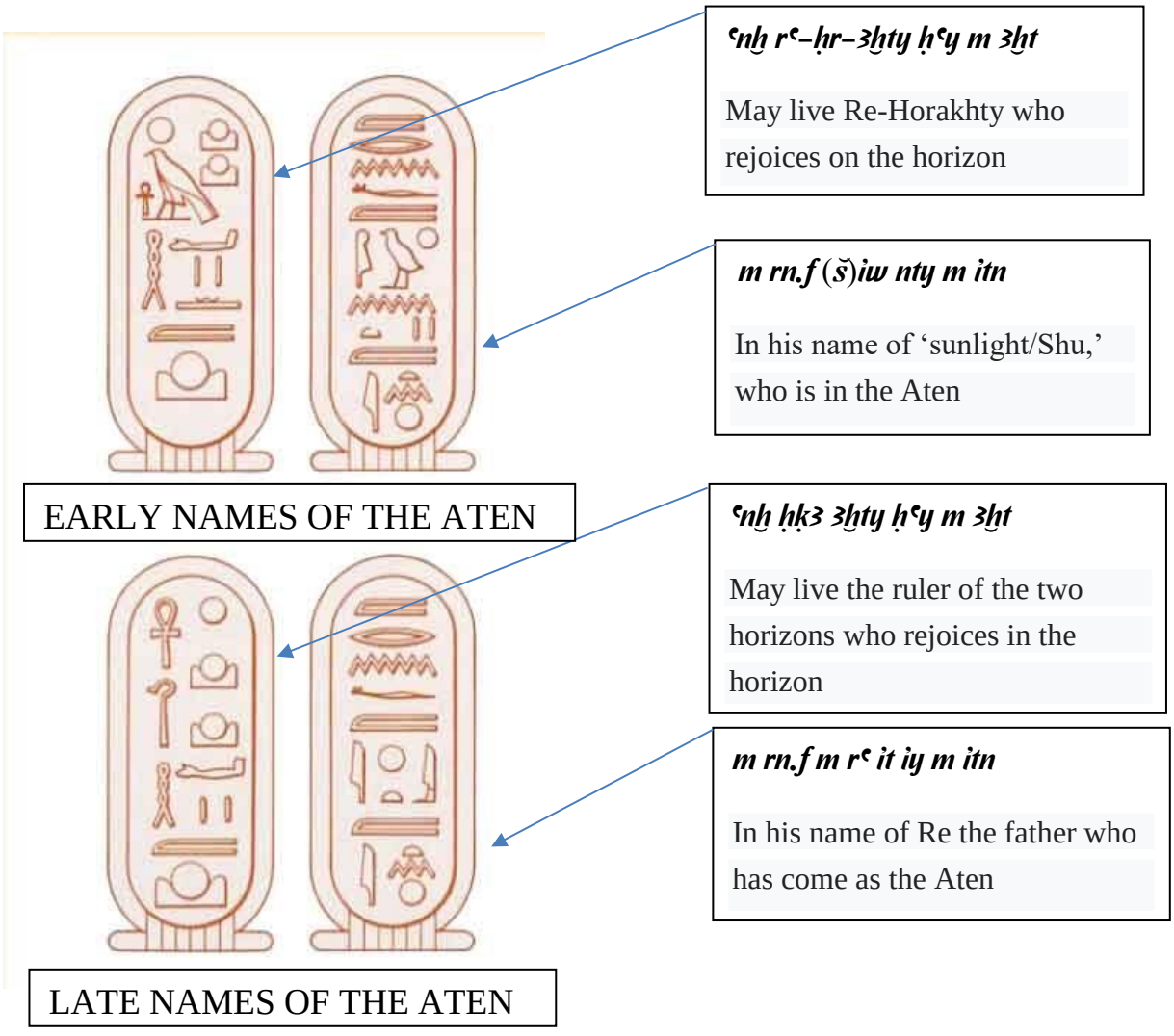

Figure 16: The Early and Late Names of the Aten [30]

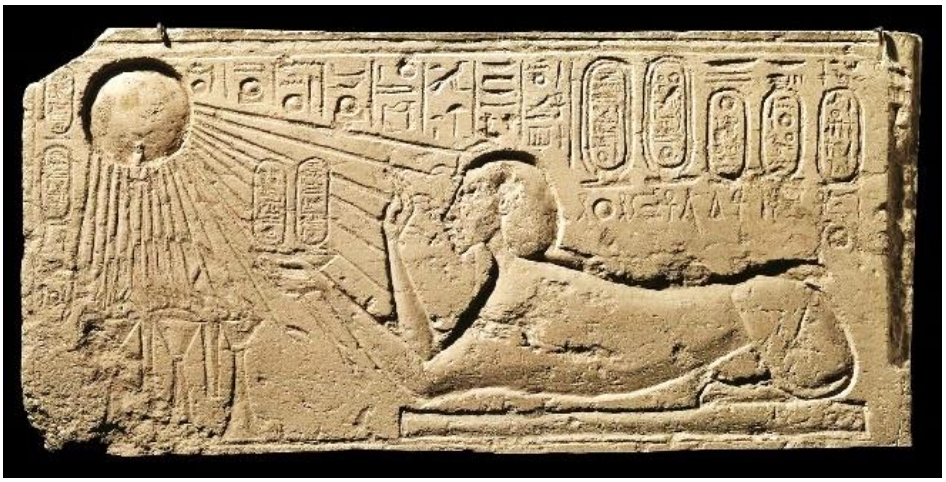

Figure 18: Akhenaten as a sphinx, offering the Early Names of the Aten, probably from Amarna, now in the Boston Museun of Fine Arts [31]

Figure 19**:** Early Names of the Aten, presented by Akhenaten portrayed as the god *Heh*, the personification of eternity, now in the Egyptian Museum of Berlin [32]

ANALYSIS OF IPY'S OFFERING SCENE:

In the scene from Ipy's tomb (**Figure 8**), both Akhenaten and Nefertiti are presenting cartouches containing the Royal Titulary of the Aten. The presentation cartouche Nefertiti is holding is being praised by a small female figure wearing the blue "cap crown" [33], and the cartouches held by Akhenaten are being praised by two small male figures, who appear as children crowned by a three-feathered headdress. The figure on the left is (perhaps) portrayed taller than the figure on the right, and both have uraeus cobras sticking out of the headdress.

The cartouches are similar to a fragment at the Metropolitan Museum of Art in New York, from a statue with hands presenting the later (after year 9) versions of the names of the Aten (**Figure 20**).

There exist several other surviving scenes showing both Akhenaten and Nefertiti presenting intermediaries who offer to the gods.

Figure 20: Hands offering Aten cartouches, from Great Aten Temple, now in Metropolitan Museum of Art, New York, no. 21.9.431 [34]

Figure 21: Brooklyn Museum, Nefertiti presenting cartouches of the names of the Aten [35]

In the Brooklyn Museum is the fragment of a parapet (a low protective wall along the edge of a ramp, staircase, or platform) carved on both side which shows two figures of Nefertiti offering cartouches bearing the (early) name of the Aten. It was found by Flinders Petrie in the Broad Hall of the Great Palace [36]. On both sides Nefertiti is holding up a *nb* sign (incense bowl?), perhaps signifying "lord". On one side, Nefertiti holds the cartouche names of the Aten directly (**Figure 21**). On the other side (**Figures 22 and 23**) of the fragment, Nefertiti holds a figure sitting in the *nb* sign, who in turn holds the cartouches of the names of the Aten. The female figure sitting in the bowl has four 'feathers' on her headdress. Cyril Aldred speculated the figure was the goddess Maat, but she is usually shown with a single feather on her head.

Figure 22: On The flip side of the Brooklyn Museum block, Nefertiti holds a figure presenting the cartouches

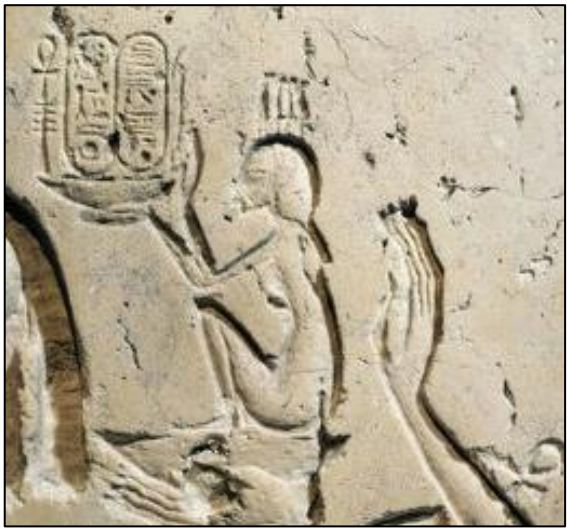

Figure 23: (detail from **Figure 22**)

Some Egyptologists have speculated that the cartouches presented by the king and queen are cartouche 'boxes', similar to the ones found in Tutankhamun's tomb (**Figures 24 and 25**). Dominic Montserrat concludes that the cartouches that Akhenaten and Nefertiti are presenting are small boxes containing scented oils [37]. Montserrat says:

"Perhaps more striking evidence of deities integrated into Aten-worship were the god Shu and the goddess Tefnut … The intermediary quality of Shu and Tefnut between earth and heaven, and their role as worshippers of the rising sun, made them perfect divine figures for Akhenaten and Nefertiti to identify with. With the Aten, Akhenaten-Shu and Nefertiti-Tefnut, perhaps act as a replacement for the traditional family triads of gods who were worshipped in Egyptian temples. In the tomb of Ipy at Amarna, Akhenaten and Nefertiti are shown offering to the Aten small boxes containing scented oils. These boxes are shaped like the earlier form of the Aten's cult name and adorned with statuettes of Shu and Tefnut; they take up the middle of the composition … Shu, of course, was honoured in the formal name of the Aten. It may be that the Akhenaten-Shu and Nefertiti-Tefnut analogy became less symbolically important after year 9, c. 1343 BCE, when the names of the Aten were altered to exclude the name of Shu." [38]

Figure 24: [39]

Figure 25: [40]

Cartouche-shaped boxes from tomb of Tutankhamun, Egyptian Museum, Cairo

Strangely, the figures who are presenting the early Cartouche Names in **Figure 8** (photo details in **Figures 26, 27, 28, & 29**), do not look like other images of gods (such as Shu and Maat) who are offering to the Aten (depicted, as usual, as the sun disk with rays, ending in hands). The figures presented by Akhenaten (**Figures 26 & 27**) are both male, and each wear a kilt and sport a triple feather crown with a uraeus headband. The left figure shows his right side, and has a sidelock & kilt above his knees, whereas the right figure appears slightly shorter, shows his left side, his kilt is below his knees, he's stockier, and his sidelock is not showing.

I have found no other similar depictions of male child gods in Egyptian art.

The figure Nefertiti is holding (**Figures 28 & 29**) is an adult woman wearing the blue "cap crown" that Nefertiti is often depicted with. The female figure appears to be naked, and wears the blue "cap crown." I'm also not aware of any other illustration of an Amarna female wearing the same crown.

So, who are these figures supposed to be?

One possibility is that they are the children of Akhenaten and Nefertiti. Since the Early Cartouches of the Aten should not have been depicted after year 9, the only known male child that may have been old enough to have been shown in this form is Smenkhkare (assuming Smenkhkare was a son of Akhenaten, and not his brother, as some have proposed). Since the male figures have uraeus cobras it is likely they were royal children. In year 9, Tutankhaten would have been just a baby and probably not old enough to be shown as a standing child. If the left figure represents Smenkhkare, the right male figure could be a younger (unknown) brother who predeceased Akhenaten (thus leaving Tutankhaten as the crown prince). But carefully measuring the height of the two figures shows that both are about the same height, the right figure is just depicted a bit lower than the one on the left. Could they have been twins? Or, if Smenkhkare or someone else is shown here, perhaps he is shown twice?

But they could also be representations of Akhenaten as 'beautiful child of the Aten', as speculated by Barry Kemp [41]. The answer to this will probably never be known, unless additional evidence is discovered.

Figure 26: Akhenaten offers the Cartouche Names of the Aten to the Sun Disc [42]

Figure 27: Detail of Akhenaten's presentation of the Cartouche Names in **Figure 26** [43]

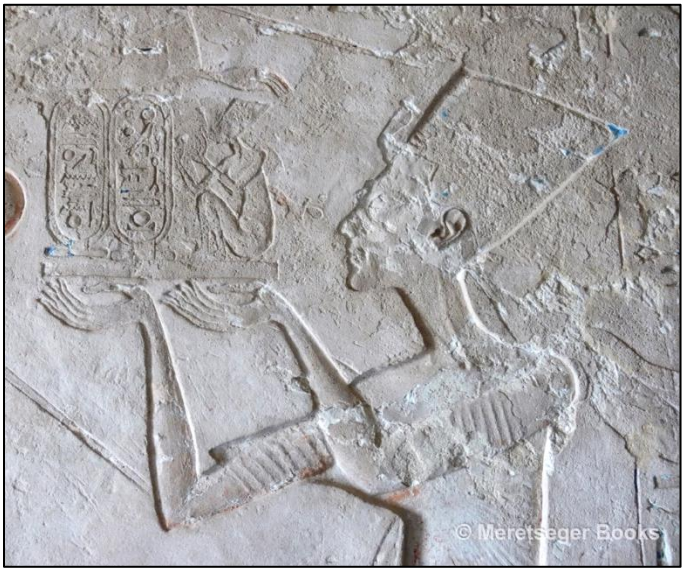

Figure 28: Nefertiti offers the Cartouche Names of the Aten to the Sun Disc [44]

Figure 29: Detail of Nefertiti's presentation of the Cartouche Names in **Figure 28** [45]

MY TRANSLATION OF IPY'S OFFERING SCENE:

In Ipy's offering scene (**Figure 8**) Akhenaten and Nefertiti are presenting royal titulary to the Aten, who is blessing the royal couple with his life-giving rays.

The couple's three oldest daughters, Meryetaten, Meketaten, and Ankhesenpaaten, celebrate this offering by waving sistra. Their names and tiles are given above the figures of the daughters.

The inscription above the king and queen is in two parts from the center towards the right, and from the center towards the left.

Left hand inscription:

Above Akhenaten (**Figure 30**), is listed a pair of (early) cartouche names of the Aten, and a list of the Aten's epithets.

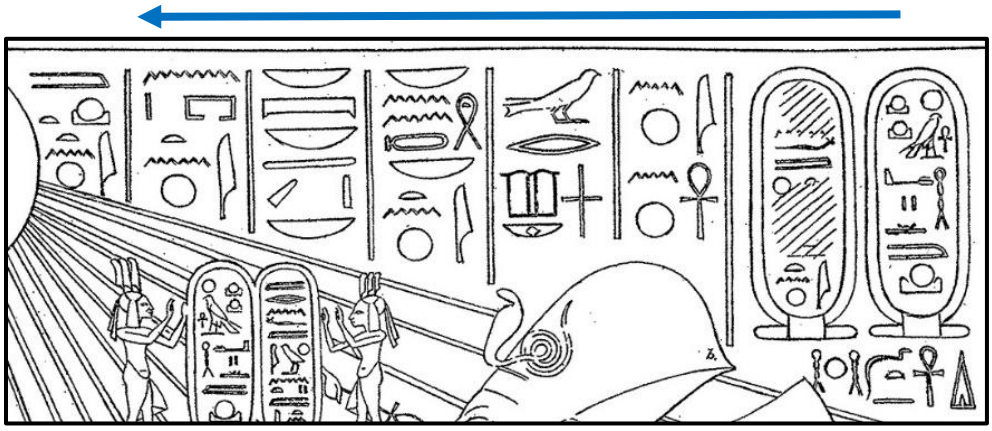

Figure 30: Left hand inscription

dj ꜥnḫ ḏt (r) nḥḥ,	- (Akhenaten) living for ever and ever.
i(t)n ꜥnḫ,	- the living Aten,
wr imy ḥbw,	- great one who is in festival,
nb šnn nb itn,	- lord of all that the Aten encircles,
nb pt,	- lord of heaven,
nb tꜣ,	- lord of earth,
nb pr itn	- lord of the house of the Aten
m ꜣḫt-itn	- in Akhetaten.

Right hand inscription:

The inscription above Nefertiti **(Figure 31**) lists Akhenaten's name, then Nefertiti's name and her titles.

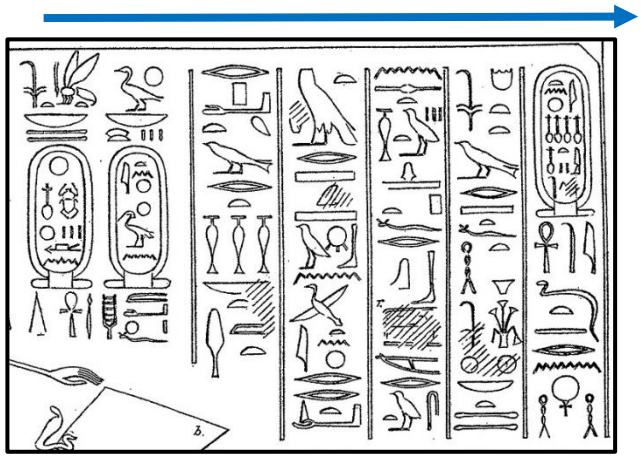

Figure 31: Right hand inscription

nsw bity,	- King of Upper and Lower Egypt,
nb tꜣ.wy,	- lord of the Two Lands,
nfr-ḫprw-rꜥ wꜥ-n-rꜥ,	- Neferkheperua Waenra (Akhenaten's throne name),
sꜣ rꜥ,	- son of Ra,
nb ḫꜥw,	- lord appearing,
ꜣḫ-n-itn,	- Akhenaten ('birth name' changed from Amenhotep IV in year 5),
dj ꜥnḫ,	- given life,
ꜥꜣ m ꜥḥꜥw.f	- long in his lifespan.

(i)r(i)-pˁt,	- Hereditary princess,
wrt ḥswt,	- great of praises,
nbt ỉmɜt,	- mistress of charm,
ḫnmt rš̆w,	- endowed with joy,
wbn pɜ ỉtn r rdit n.s(t) ḥswt,	- the Aten rises to give her praises,
ḥtp.f r ḳɜb mrwt.s,	- he sets in order to double her love,
ḥmt nswt wr(t) mrt.f,	- great wife of the king, whom he loves,
ḥnwt š̆mˁ (tɜ)-mḥw nbt tɜwy,	- mistress of Upper and Lower Egypt, lady of the two lands,
nfr-nfrw-ỉtn nfrt-ỉity,	- Neferneferu-Aten, Nefertiti,
ˁnḫ.ti ḏt r nḥḥ	- living for ever and ever.

Bottom right inscription over the three daughters:

The three oldest of Akhenaten and Nefertiti's daughters are shown in Ipy's tomb scene (**Figure 32**).

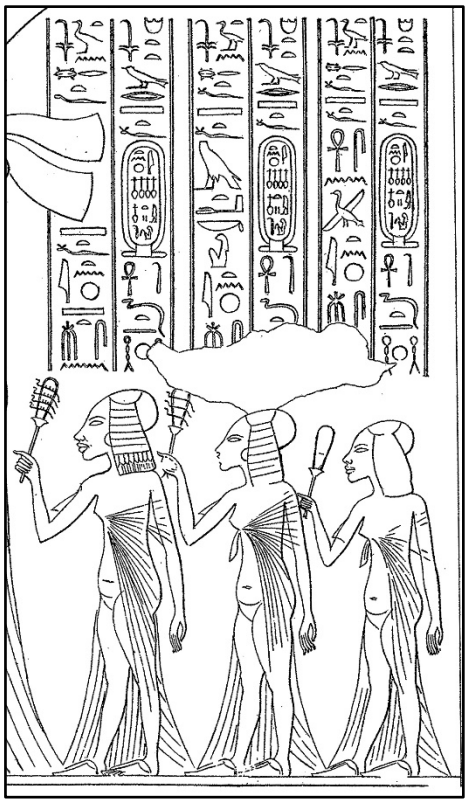

***Figure 32*:** Akhenaten & Nefertiti's three oldest daughters

Above the left-hand daughter:

sɜt nsw n ḫt.f,	- Royal daughter of his body, whom he loves,
mrt-ỉtn,	- Meryetaten,
ms n ḥmt nswt wr(t) mrt.f,	- born of the great royal wife, whom he loves,
nfr-nfrw-ỉtn nfrt-ỉi.ty,	- Neferneferu-Aten Nefertiti,
ˁnḫ.ti ḏt (r) nḥḥ	- living for ever and ever.

Above the center and right-hand daughters:

Daughters Meketaten and Ankhesenpaaten are named with same epithets as Meryetaten above. For a more detailed discussion of Akhenaten and Nefertiti's daughters, by this author, see *The Akhetaten Sun*, Vol 24, No. 2.

FURTHER READING:

The Rock Tombs of el Amarna, by Norman de Garis Davies
The City of Akhenaten and Nefertiti: Amarna and its people, by Barry Kemp
Amarna Sunrise, by Aidan Dodson
Texts from the Amarna Period in Egypt, by William J. Murnane

ENDNOTES:

[1] Amenhotep-Huy was the elder brother of Ramose, a vizier of Amenhotep III and Akhenaten. Amenhotep-Huy and Ramose were the sons of Heby, mayor of Memphis. *Amarna Sunrise*, Aidan Dodson. p 48.
[2] Following Osiris: *Perspectives on the Osirian Afterlife from Four Millennia*, Mark Smith, p. 285-289
[3] Ibid. Dodson, *Amarna Sunrise*, p 102
[4] Email from Aidan Dodson, July 2019
[5p] Photo: https://s523.photobucket.com/user/egyptiandreams/library/RMO%20Leiden?page=1
[6p] Photo: Aidan Dodson, July 2019
[7p] Photo: Florence, Museo archeologico nazionale, Nizzoli coll., Inv. n. 2567.
[8] R. Hari, *Répertoire onomastique amarnian*. Geneva, Editions de Belles-Lettres 1976, Fiche 30.
[9] Ibid,. Fiche 32
[10] Ibid, Fiche 33
[11p] Photo: https://www.cambridge.org/core/journals/cambridge-archaeological-journal/article/death-and-the-city-the-cemeteries-of-amarna-in-their-urban-context/DBD79DE7272127369D22A805525D3D08/core-reader
[12p] Photo: *The Rock Tombs of Amarna*, Part VI, by N. de. G. Davies, plate XIII
[13p] Photo: Ibid, plate XXX
[14] https://www.osirisnet.net/docu/akhenaton/e_akhenaton_02.htm
[15] https://projectaugustine.com/biblical-studies/ancient-near-east-studies/parallelism-between-the-hymn-to-aten-and-psalm-104/
[16] http://www.amarnaproject.com/images/downloadable_resources/Guide%20Book,%20South%20Tombs.pdf
[17] *Akhenaten: History Fantasy and Ancient Egypt*, Dominic Montserrat, p 38
[18] *Akhenaten and Nefertiti*, by Cyril Aldred, p 24
[19p] Photo: https://www.meretsegerbooks.com/gallery/358/tomb-no10-apy/
[20p] Photo: Ibid, N. de. G. Davies, plate XXXI
[21p] Photo: https://i.pinimg.com/736x/2c/4f/0b/2c4f0b98e2c54d59bb4da318a5bfe468.jpg
[22p] Photo: https://www.sciencesource.com/archive/Akhenaton-with-Aten--Egyptian-Sun-God-SS2274643.html
[23p] Photo: https://www.metmuseum.org/art/collection/search/544056
[24p] Photo: http://royalathena.com/media/Egyptian/Stone/BH1247C.jpg
[25p] Photo: http://2.bp.blogspot.com/-_98ji2At3nY/U_3cO8Grq8I/AAAAAAAABLk/I0nZvULWZq4/s1600/Akenat%C3%B3n.jpg
[26p] Photo: https://i.pinimg.com/originals/36/ed/06/36ed06717b09e3e054218b7f561d0d7b.jpg
[27p] Photo: http://heritage-key.com/blogs/owenjarus/nefertiti-and-aten-colour-16000-amarna-art-talatat-blocks-luxor-original-pigment-pre
[28p] Photo: https://www.penn.museum/blog/museum/anatomy-of-the-book-the-sunshade-chapel-of-meritaten-from-the-house-of-waenre-of-akhenaten/
[29] *Notes on the Aten and his names*, Battiscombe Gunn, JEA Vol. 9, No 3/4, 1923, p. 168
[30p] Photo: http://ancienegypte.fr/musee_lyon/page6.htm (in French)
[31p] Photo: https://artsandculture.google.com/asset/relief-of-akhenaten-as-a-sphinx/WwFF5J0q98AfOQ
[32p] Photo: http://egy-king.blogspot.com/2013/04/ancient-egypt-cartouche.html
[33] For a discussion of the origin and meaning of the blue "cap crown" see *The Cap-Crown of Nefertiti: Its Function and Probable Origin*, Earl L. Ertman JARCE vol 13 (1976) pp. 63-67
[34p] Photo: https://www.metmuseum.org/art/collection/search/549821
[35p] Photo: https://www.brooklynmuseum.org/opencollection/objects/126512
[36] Ibid, Aldred, p 104
[37] Ibid, Montserrat, p 38
[38] Ibid, Montserrat, p 15
[39p] Photo: http://www.touregypt.net/museum/tutl39.htm
[40p] Photo: http://www.ancientegyptianfacts.com/ancient-egypt-cartouche.html
[41] Email from Barry Kemp, July 2019
[42p] Photo: https://www.meretsegerbooks.com/gallery/358/tomb-no10-apy/
[43p] Photo: https://www.meretsegerbooks.com/gallery/358/tomb-no10-apy/
[44p] Photo: https://www.meretsegerbooks.com/gallery/358/tomb-no10-apy/
[45p] Photo: https://www.meretsegerbooks.com/gallery/358/tomb-no10-apy/

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