Ancient Landscapes of the Amuq: Geoarchaeological Surveys of the Amuq Valley: 1999–2006

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Abstract:
Using a combination of technologies including surface sherd collecting, magnetometry, core samples and Corona Satellite photographs, the Amuq Valley Regional Project (AVRP), led by researchers from the University of Toronto, the University of Chicago and Mustafa Kemal Univeristy, Antakya, have undertaken a geo-archaeological survey and analysis of a 30 x 30 kilometre area of the Amuq Plaines stretching from north-western Syria and into south-eastern Turkey. The goal of the project is to put into proper geo-archaeological context the changes in the landscape and the use of this landscape over time. To date, results of research carried out by the AVRP indicate that from the Chalcolithic through the Bronze and Iron Ages tell-based settlement hierarchies dominated the region, but in the Seleucid and subsequent periods occupation was dispersed into small villages, hamlets and farmsteads. An increase in the number of settlements led to environmental degradation and deforestation of the region. This continued into the 1st millennium AD causing significant soil loss which resulted in several metres of silt being deposited in the Amuq Valley. Layers of silt, up to three metres thick, have been detected in the Amuq Valley including the Lower Town at Tell Ta'yinat.

Résumé :
En combinant différentes technologies incluant la collecte de tessons en surface, le magnétomètre, le carottage et des photographies satellitaires Corona, le Amuq Valley Regional Project (AVRP), regroupant des chercheurs de l'université de Toronto, de l'université de Chicago et de l'univesité Mustafa Kemal d'Antakya, a entrepris une prospection et une analyse géo-archéologique d'une zone de 30 x 30 km de la vallée de l'Amuq, au nord-ouest de la Syrie et au sud-est de la Turquie. Le but de ce projet est de replacer dans un contexte géo-archéologique les changements survenus dans le paysage et l'utilisation du paysage dans le temps. À ce jour, lès résultats de la recherche menée par le AVRP indiquent que depuis le Chalcolithique jusqu'aux âges du Bronze et du Fer, une hiérarchie d'établissements basée sur des tells domine la région mais que durant la période Séleucide et les suivantes, l'occupation du territoire fut marquée par de petits villages, des hameaux et des fermes isolées. Une croissance du nombre de d'établissements a conduit vers une dégradation environnementale et une déforestation de la région. Cette situation s'est continuée au 1er millénaire de notre ère, causant une importante perte de sols qui résulta en l'accumulation de plusieurs mètres de limon dans la vallée de l'Amuq : jusqu'à trois mètres ont été détectés dans la vallée, incluant la Ville Basse de Tell Ta'yinat.

The Amuq Plain (**Fig. 1**) is situated on the border between south central Anatolia and northern Syria. It consists of a roughly triangular alluvial plain 30x30km in size, which forms the northern extension of the Orontes river valley. The plain is fed by three major rivers, the Kara Su from the north, the Afrin from the east, and of course the Orontes River flowing from the south. Where this river enters the plain, between the Jebel al-Aqra and al-Ala mountains, it veers abruptly west across the southern portion of the valley and drains into the Mediterranean Sea. The Amuq Plain is where the Levantine coast, the Anatolian Highlands, and northern Mesopotamia meet and this region has been a nexus for the various cultural groups of the Near East since at least the Neolithic period.

Our current understanding of the archaeology of the region stems from the seminal work of Robert and Linda Braidwood in the 1930s (Braidwood and Braidwood 1960), as well as the excavations undertaken by the Oriental Institute at the sites of Çatal Höyük, Tell Judaidah, and Tell Ta'yinat (Haines 1971). Excavations were also undertaken by the British Museum under the direction of Sir Leonard Woolley at the sites of Tell Atchana (ancient Alalakh), Tell esh-Sheik, Tabarat al-Akrad, Sabuniye, and al-Mina, all of which greatly supplemented our understanding (Woolley 1953). Textual data uncovered at these early sites have identified this region as the Kingdom of Mukish in the Late Bronze Age, and the Neo-Hittite/Aramaean Kingdom of Patina/Unqi in the Iron Age.

Almost sixty years after the initial work by Braidwood, investigations were re-initiated in 1995 by teams from the University of Chicago, University of Toronto, and Mustafa Kemal University of Antakya and continue to the present day.

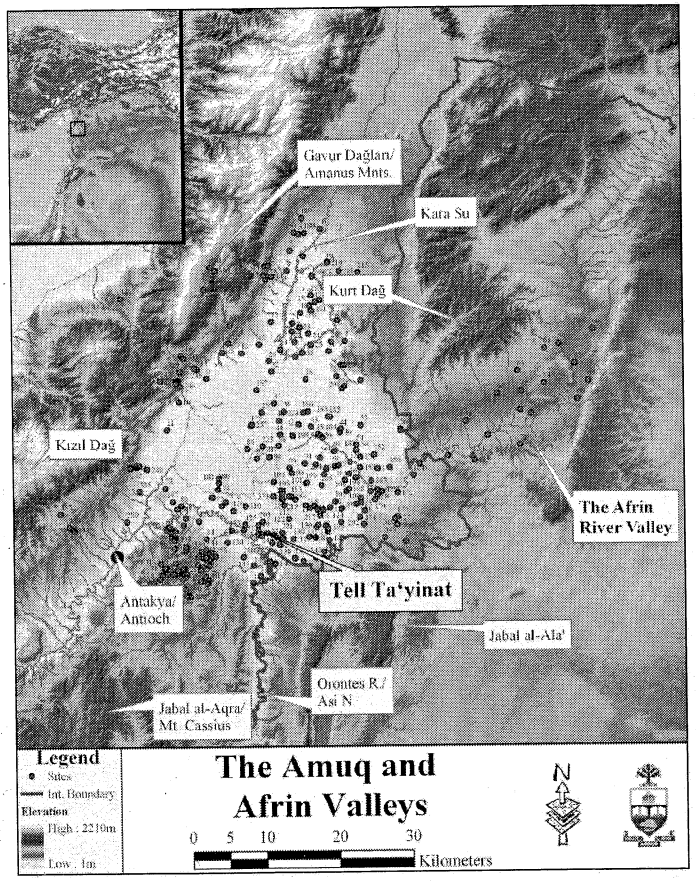

Fig. 1: Map of the Amuq Plain

The goal of these renewed investigations, called the Amuq Valley Regional Project (AVRP), was to create a more detailed database of the sites in the region by examining off-site settlements and the surrounding uplands and putting this information into a geo-archaeological context in order to examine changes in landscapes and land use over time (Yener *et al.* 2005). A large and diverse dataset has emerged from over a decade of work in the region; the number of sites from Braidwood's original 178 has increased to 349 sites—at last count—with a significant change in our understanding of the settlement history of the valley. Given time and space restrictions, the following paper will only touch on some of the more salient features of the geo-archaeology and settlement history of the region.

Older maps of the Amuq valley have it dominated by the large central Lake of Antioch, which was drained in the 1950s and 60s. Geomorphological work has shown that the lake was a more recent phenomenon and that it dates to sometime after the first millennium BCE. In the Chalcolithic through to the Iron Age, the plain is better characterized by a diminutive lake, or more probably a patchwork of marshes and smaller bodies of water that changed in size and shape over time due to both natural and human-induced stimuli (Wilkinson 1996).

Occupation in the region is dominated by tell-based settlements for the Chalcolithic, Bronze, and Iron Ages, with clearly defined settlement hierarchies. But from the Seleucid period onwards, occupation is dominated by a dispersed settle-

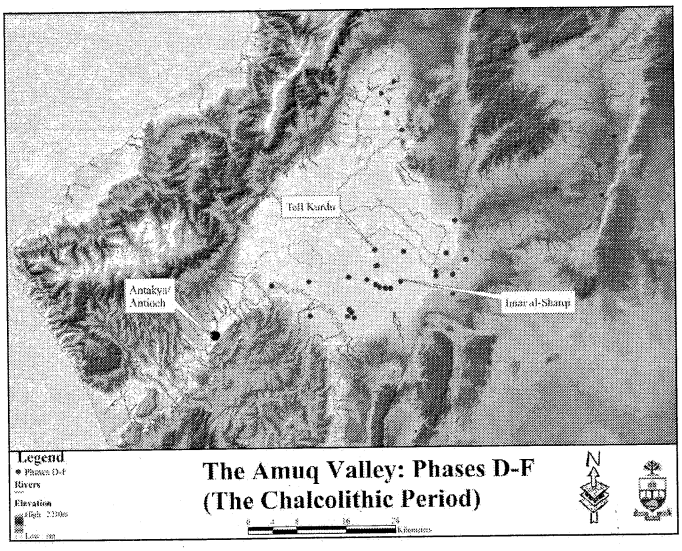

Fig. 2: Chalcolithic (5th-4th Millennium) occupation of the Amuq.

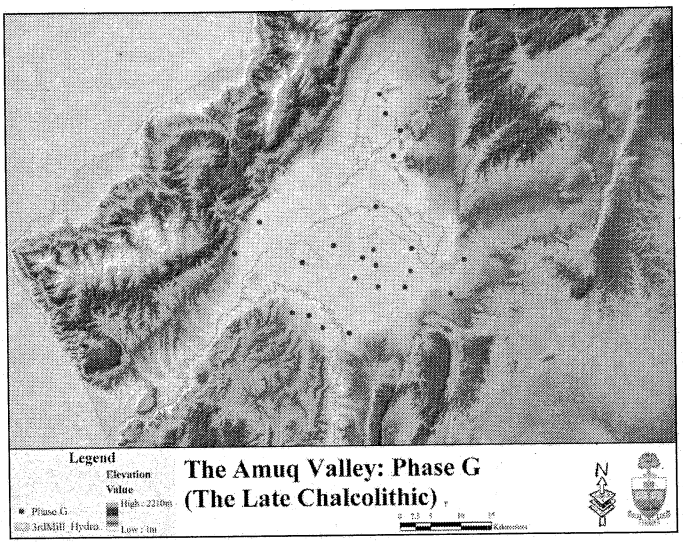

Fig. 3: Late Chalcolithic (Late 4th / Early 3rd Millennium) occupation of the Amuq.

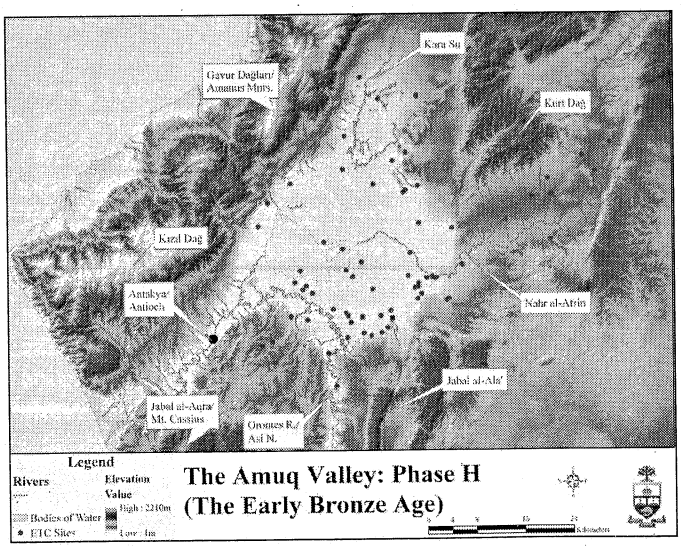

Fig 4: Early Bronze (3000–2300 BCE occupation of the Amuq.

ment pattern consisting of small hamlets or villages. In the Chalcolithic period (Amuq Phase D–F, 5th and 4th millennium), the plain is dominated by the site of Tell Kurdu; settlement is generally concentrated in the center of the plain, with some settlement alignment up the Afrin valley (**Fig. 2**). In the Late Chalcolithic (Amuq Phase G, 4/3rd millennium), Imar al-Sharqi becomes the dominant site, but with settlement still concentrated in the center of the plain (**Fig. 3**). With the Early Bronze Age (3rd millennium), there is a complete re-orientation of the settlement system, with a significant number of small sites dispersed along the outskirts of the valley, outside the original Late Chalcolithic settlement system (**Fig. 4**). There appears to be greater orientation along the major east-west corridors throughout the plain, suggestive of a well structured and intensively utilized inter-regional route system (Batiuk 2005). It is at this point that we have the major introduction of foreign cultures from eastern Anatolia and the Transcaucasus, presumably along this axis of communication. Concurrently, the focus of settlement shifts from the center of the plain, where Tell Kurdu and Imar al-Sharqi were situated, to the south along the major east-west transit corridor across the plain, dominated by the site of Tell Ta'yinat, the current the focus of the University of Toronto's renewed archaeological investigations. Throughout the latter part of the Early Bronze Age, settlement appears to decline—especially in the Afrin Valley—as a result of settlement agglomeration and possibly the result of a shift in focus of the inter-regional contact; redirecting contact from east-west to the south down the Orontes river valley .

With the onset of the Middle Bronze Age (first half of the 2nd millennium) there is a shift from Tell Ta'yinat as the dominant site in the region to that of Tell Atchana, some 750m to the southeast (**Fig 5**). The site was excavated by Sir Leonard Woolley and produced a long sequence of occupation that spanned the Middle and Late Bronze Ages (later part of the 2nd millennium). This site was known as Alalakh, capital of the Kingdom of Mukish (Woolley 1953). Alalakh was known to have extensive contacts with north Syria and Mesopotamia, as well as the Aegean. Settlement data shows that settlement continues to decline in the Afrin valley, which might be reflective of a focus more down the Orontes valley and the Mediterranean coast, where the port site of Sabuniye in modern Samanda was established and was believed to be the port town of Alalakh (*ibid.*).

Throughout the Late Bronze Age, although settlement numbers increased overall, there are the beginnings of settlement dispersal that will characterize the later periods of the Iron Age. We see the development of many smaller farmsteads on the plain, which is reflected in the textual data from Atchana (Casana 2003). This settlement pattern remains stable until the collapse of the Late Bronze Age kingdoms c.1200 BCE. What follows in the Iron I has been poorly understood for a very long time, however, our recent work at Tell Ta'yinat has begun to throw light on these dark ages (Harrison, this volume).

With the beginning of the Iron Age (**Fig. 6**), there is a shift

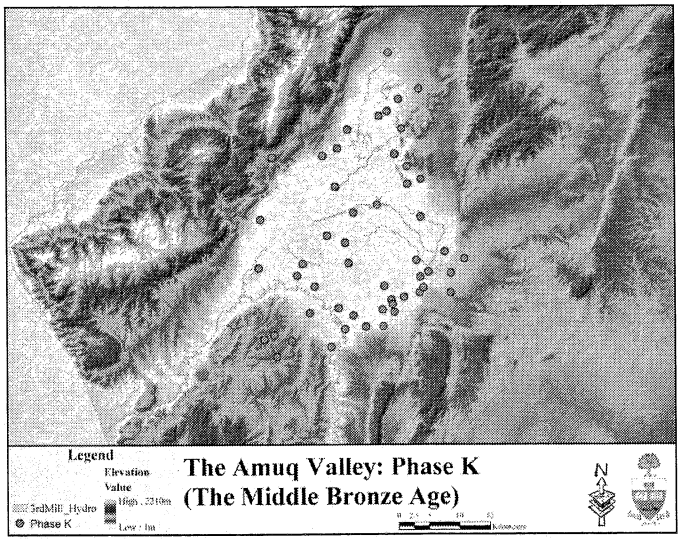

Fig. 5: Middle Bronze (2nd Millennium) occupation of the Amuq.

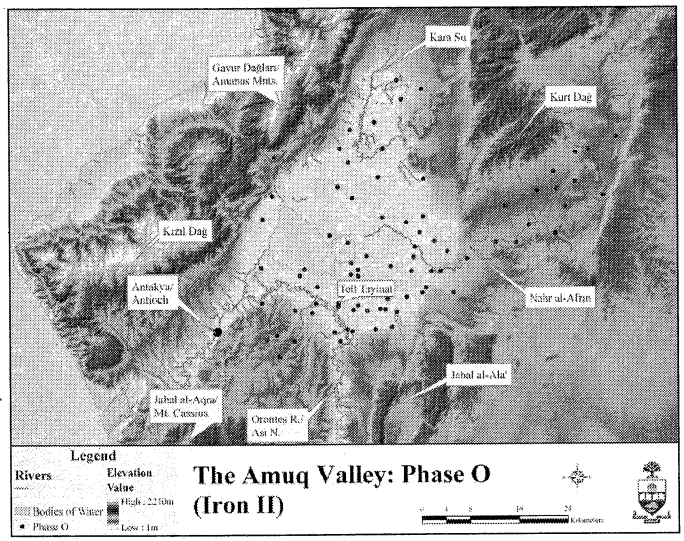

Fig. 6: Iron Age (1st Millennium) occupation of the Amuq.

back to Tell Ta'yinat as the dominant site in the region, and in the Iron II period, Tell Ta'yinat is the capital of the Neo-Hittite Kingdom of Patina/Unqi. Extensive mound settlement throughout the plain returns, however, there is a dramatic shift in the settlement patterns as one moves further into the Iron Age. In the later part of the first millennium, the original tell-based settlement is abandoned in favour of a more dispersed one. Between the late 1st millennium BCE and the 1st millennium CE, the Amuq reaches its highest settlement density, not only covering the plain, but expanding significantly into the surrounding highlands (Casana 2004). This expansion led to significant environmental degradation as tree cover on the hill slopes was removed. The result was a tremendous loss of soil cover on the hill slopes, and a rapid infilling of the plain that covered many of the settlements, but more importantly, it covered the lower towns with alluvial deposits (Yener *et al.* 2000: 169-74). This infilling of the plain has caused significant alteration to the landscape and has obscured many elements of

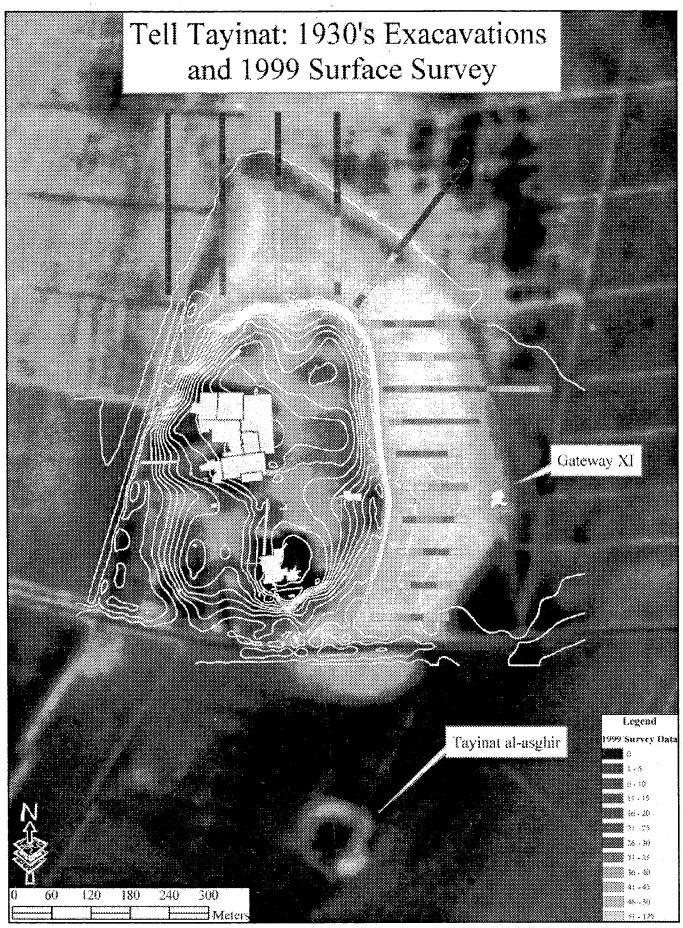

Fig. 7: Corona satellite image with 1930's excavation areas and 1999 surface survey data.

ancient settlement, particularly in and around the site of Tell Ta'yinat, which we are now only beginning to understand with the renewed excavations at this site.

Large-scale excavations at Tell Ta'yinat (**Fig. 7**) were originally conducted by the University of Chicago as part of the Syro-Hittite Expedition and spanned four field seasons, between 1935 and 1938 (Haines 1971). Although these excavations focused primarily on the upper mound, areas were also opened on the eastern and southern edges of the lower mound. Overall, the excavations achieved large horizontal exposures of five distinct architectural phases, or "Building Periods," dating to the Iron Age (Amuq Phase O, ca. 950-550 B.C.E. A series of isolated soundings below the earliest Iron Age floors produced remains dating to the third millennium, indicating that two occupation periods predominated at the site: Early Bronze and Iron Age, with a lengthy period of abandonment for the Middle and Late Bronze Age when Alalakh was the capital of the region.

The soundings undertaken in the lower mound, directly east of the main tell, produced what appears to be a city gate in Area XI (Haines 1971: 59-60), which suggests a lower city dating to the Iron Age is present. This lower city's exact size and extent were never fully determined, but this has been one of the primary goals of the University of Toronto initiative.

Beginning with the 1999 season, we undertook a surface collection survey consisting of transects across the surface of the mound, as well as areas to the north, east, and west of the main mound. Cursory examination of the west side of the mound showed no evidence of any sherds, while the north and east showed the greatest potential. A simple plot of the sherd concentrations (**Fig. 7**) started to produce an image of the general shape of the lower town. This was greatly enhanced the following year when we were provided with a Corona satellite image of the area which showed a large discolouration in the area to the east of the mound. When the corona image was overlaid with the topographic and survey data, it began to produce a coherent picture of an 18 hectare upper mound at Tell Ta'yinat and a lower town that extended an extra 20 hectares around the main tell and was surrounded—in theory—by an extensive city wall (Harrison *et al.* 2005).

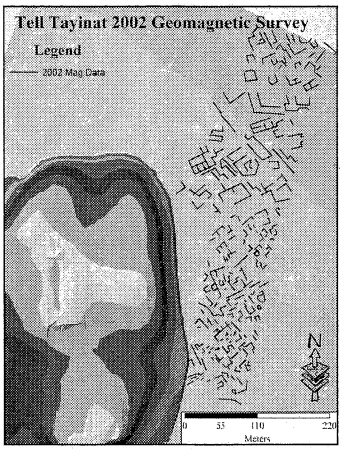

Fig. 8: Linear anomalies detected in the Geomagnetic survey of the Lower Mound of Tell Tayinat.

During the 2002-2003 field seasons, a magnetometry survey was undertaken to gain further insight into the layout of the lower mound at Tell Ta'yinat. A 6 hectare area northeast of the Tell was examined in 2002. A further 3 hectare area in the southeast plus 2 hectares on the top of the main mound were examined in 2003. The processing of the data is ongoing due to the complex nature of the magnetic contrasts recovered in the survey. Other sites that have a thin veneer of sediments over bedrock and residues of stone architecture more easily lend themselves to clear magnetic contrasts. However, the Iron Age levels of Tell Ta'yinat's lower city are primarily constructed of mud brick walls with very little stone. Furthermore, they are covered by between 2.5-3m of alluvial deposits, the result of the infilling of the plain, as well as deposits from the Orontes river. Therefore, one must look for more subtle variations in the magnetic contrasts than would be observed with stone constructions. This subsurface environment has been confirmed by the coring initiative undertaken in the same area as the magnetic survey (Harrison *et al.* 2005), and from the data recovered from excavations carried out in the 1930s, which also show that Iron Age levels were found at depths of between 2.5–3m.

Additionally, the magnetic data suggest that the subsurface environment represents multi-componentcy because different structural elements come into focus when particular data ranges are being examined, suggesting that there are multiple phases of occupation in the Iron Age lower mound. This observation is consistent with the coring results that indicate an average of between 3.5m and 4m of Iron Age occupational debris in the surveyed area.

The magnetic survey uncovered a number of linear anomalies (**Fig. 8**) which ran at a relatively steep angle to the transects. When plotted out they appear to form a dense network of structures running at what appeared initially to be a curious angle, but when the micro-topography of the site was factored in, we could see that they were following the subtle contours of the mound (Harrison *et al.* 2005). The crowded arrangement of dwelling units is reminiscent of other contemporary Iron Age settlements, the best parallel being found at the nearby site of Çatal Höyük some 20km to the east (Haines 1971, Plate 24-25). This large, crowded Iron Age village located on top of the tell bears a striking resemblance to the patterns emerging from the magnetic data at Tell Ta'yinat.

One of the more problematic items to locate with the remote sensing data is the city wall. The Corona satellite imagery and the surface sherd collections provide a fairly reliable idea as to its location. However, the magnetometry has been less instructive, with more linear anomalies found extending over and past where the wall should be. Even when one stands on the lower mound today, any evidence of a lower city wall has, for the most part, been eliminated by modern agricultural practices; essentially it has been ploughed away. Furthermore, the city wall is not easily visible in the magnetic data. In theory, the wall should be visible in the area surveyed in 2002, and there are subtle indications in places, but it cannot be traced in its entirety. Instead we find the continuation of rectilinear anomalies across the area of the wall and outside the proposed lower city. It can be suggested that these structures extending out past the proposed city wall are of a later phase of occupation when the lower city expanded beyond its original confines. Nevertheless, the presence of the city wall has been established through coring, resistivity surveys, and micro-topographic surveys (**Fig. 9**). The wall is found not only to the north of the tell, but also in the area to the southwest of the mound, providing us with a better understanding of the general layout of the upper mound settlement, and the lower town surrounded by a city wall that fits well within the model of other Iron Age settlements[1].

This pattern can be seen in a number of Iron Age sites throughout northern Syria and Mesopotamia. That being said, Tell Ta'yinat does display a curious deviation which is of particular interest. Whereas the general pattern of the wall layout is replicated in most of the sites, including Tell Ta'yinat, the key difference is in wall width. Most other Iron Age sites examined seem to have a regular width of 5m for the outer city wall. The coring work conducted over the area of the city wall in the northern section of the lower town conclusively demonstrated the presence of a city wall through the discovery of a series of 20cm laminated bands of clean, silty, bricky clay frequently of different colours. Resistivity work conducted to verify the wall's presence clearly demonstrated that a wall was constructed in this area, but with a surprising thickness of only 2-3m—significantly thinner than the 5m found at other sites. This width also appears to be confirmed in the small section of the city wall excavated by the Chicago team in the 1930s, which shows a section of the wall just north of the excavated gate in Area XI, with a thickness of 2.5m (Haines 1971, Plate 110B). A wall with a thickness of 2.5m can only support a height of approximately 5m, a surprisingly meager defensive system for such a large city. An explanation for this narrower wall can be provided from our other coring data. Another important feature of Neo-Hittite and Neo-Assyrian cities is that each city is situated on a river course, always on the side of the main mound opposite to that of the lower town. In contrast, Tell Ta'yinat appears to be conspicuously land-

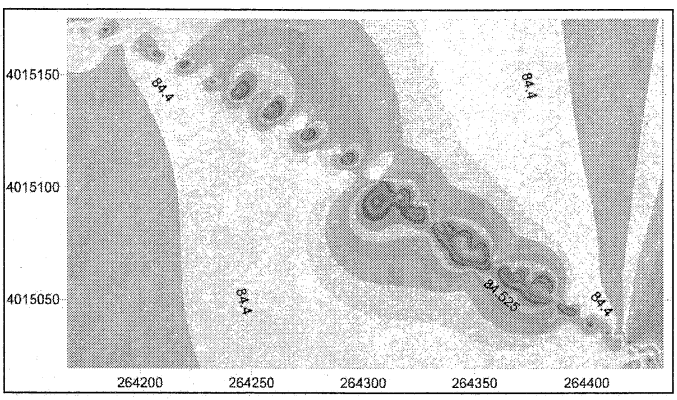

Fig. 9: Microtopographic map of NE section of the proposed lower city wall showing a subtle rise in elevation in its hypothesized location.

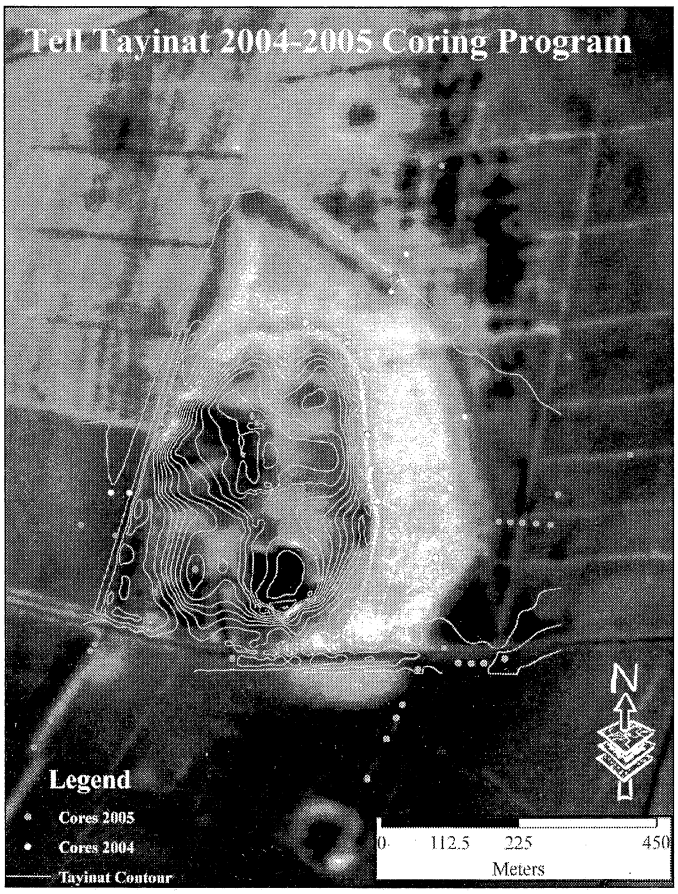

Fig. 10: Map showing the location of the coring conducted in the 2004-5 seasons.

locked. It has long been noted that the Orontes river, which today flows a mere 650m to the southwest of Tell Ta'yinat, has altered courses regularly throughout history (Yener *et al.* 2000: 169-73). The patterns of Iron Age city planning would suggest that the Orontes river would have flowed on the west side of the mound of Tell Ta'yinat during the Iron Age. Over the past two seasons we have tested this theory by undertaking an extensive coring program around the site to facilitate our understanding of the local geomorphology.

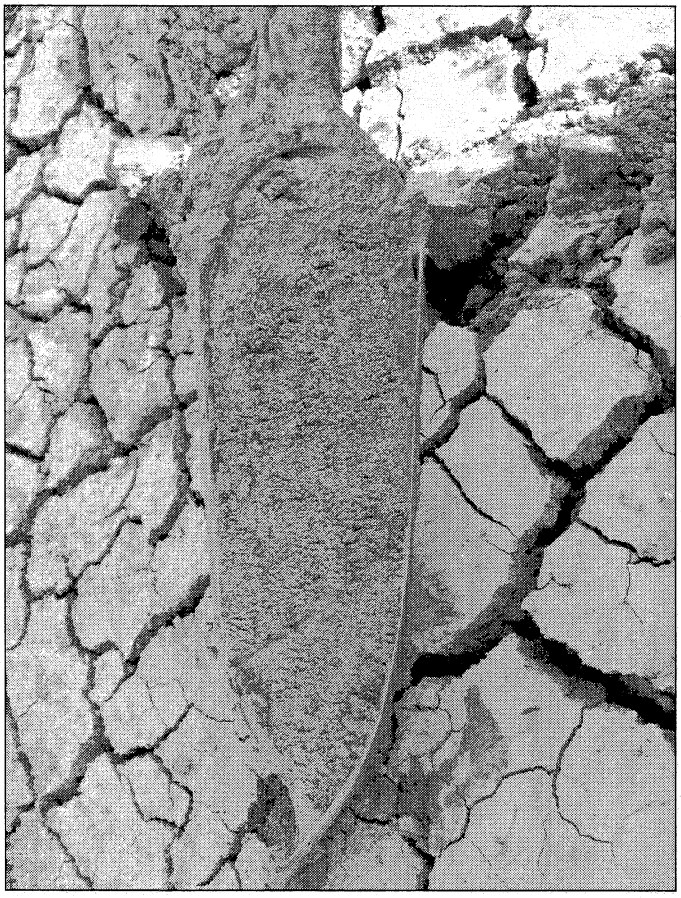

Fig. 11: Photo of core with sand layer uncovered on west side of tell.

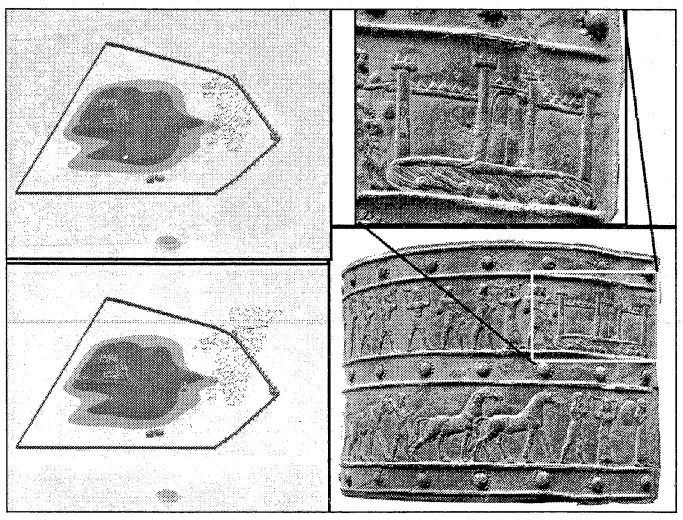

Fig. 12: Reconstruction of the two phases of the lower city and the scene from the Balawat Gate of Shalmaneser depicting a city in the Kingdom of Pattina/Unqi surrounded by water.

A series of 50 cores (**Fig. 10**) were drilled on and around the main mound of Tell Ta'yinat using a manual Dutch core with a diameter of 7cm. This medium sized core diameter allowed for an efficient drilling speed with good sediment profile visibility, and was still large enough to be able to transport sherds to the surface to aid in the dating of strata. First millennium BCE Iron Age sherds were consistently uncovered at elevations around minus 2.5-3m below the present surface of the plain. This would suggest a steady sediment aggradation rate of approximately 1cm per annum, or 1m per millennium for the area around Tell Ta'yinat. This elevation for the Iron Age levels is also confirmed by the excavations of the 1930s, which uncovered Gateway XI of the lower town at approximately 2-3m below the ground level (Haines 1971, Plate 110B).

By far the most startling surprise lay on the west side of the tell where we consistently uncovered a band of coarse-ground sand grains at a depth of 3m (**Fig. 11**). This band, however, was not isolated to the west, but was also found further to the north and east of the tell, and southwest running down to the site of AS 127, Ta'yinat al-Saghir. Soundings were made in this small mound at the same time as the excavations at Tell Ta'yinat in the 1930s. What the Chicago team uncovered was a small man-made mound of alternating bands of river sand and brick debris which they suggested might be related to Iron Age Tell Ta'yinat (Haines 1971: 64). The aforementioned band of sand appears to end in line with Ta'yinat al-Saghir on both the east and the west side of the mound.

The band of sand extends too far around the mound and the grains were too large to have been deposited by river sediments, rather they appear to be the result of a body of still water: a small shallow lake. This is not to suggest that the lake of Antioch was located in the south central part of the plain during the Iron Age, rather *a* small lake was located here. Instead of a large central lake, it is more likely that the Iron Age Amuq could be described as Tony Wilkinson has done: "a mosaic of marsh interspersed with localized expanses of open water" (Yener *et al.* 1996:67). In fact, such a geo-archaeological reconstruction fits well with the historical reconstructions, as Olmstead has described Shalmaneser's campaign in the area:

> "For the collection of this tribute, it was necessary to penetrate the great swamp of Unqi, access to which could only be gained by flat-bottomed boats that could pass anywhere in the shallows. Shalmaneser did not trust himself to their uncertain protection, but contented himself with a position on the shore across from where, on a low mound in the midst of the swamp, stood the capital, a double-gated fortress with battlements on its walls" (1951: 127-8).

More dramatically, the geomorphology fits well with the images of the city of Patina/Unqi depicted on the Balawat Gates in Assyria, dating to the time of Shalmaneser.

Based on the data recovered from our work at Tell Ta'yinat over the past seven seasons, we have managed to recreate a picture of an Iron Age tell and lower city that fits the historical picture, quite literally. We can hypothesize (**Fig. 12**) there to have been two main phases of occupation in the lower town; one in the early 9th century where the town was contained by a thin 2.5m city wall and was encircled for extra protection by a small body of water, and a second phase of occupation where the water had been drained and the city had expanded beyond its initial size. It is tempting to suggest that this second phase was the result of the Assyrian conquest of Patina/Unqi in 858 BCE after Shalmaneser III's defeat of the Kingdom of Samal and its coalition, which included the city of Kunulua, believed to be the ancient name for Tell Ta'yinat. Standard military practice at the time entailed the dismantling of a conquered city's defenses, and the body of water surrounding Tell Ta'yinat would undoubtedly have been a prime target for draining. After this point, the lower city expanded outside the meager city wall as demonstrated by the geomagnetic data.

The impressive results of the current research in the Amuq have shown the value of a mutli-pronged approach to survey and remote sensing in gaining the 'bigger picture' of an ancient settlement. Despite the limited area covered at the site of Tell Ta'yinat, the research undertaken there has solidly established the existence and general layout of an extensive lower settlement in an area heavily aggraded with sediments, and not easily conducive to traditional archaeological techniques. Furthermore, it has painted a picture of a settlement in keeping with Assyrian descriptions, confirming its identification with ancient Kunulua, capital of the Neo-Hittite kingdom of Patina/Unqi.

ENDNOTE

1 Even a cursory glance at contemporary sites produces obvious parallels with other Neo-Hittite sites, the best example being Carchemish on the Euphrates, but also Ain Dara, Tell Halaf, and Til Barsip.

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