ON THE MOVE IN THE LATE NEOLITHIC



Understanding the nature of exchange and the organisation of transport at the site of Tell Sabi Abyad (Syria)

Rizwan Ahmad

Cover: Image of nomadic community from the Rajistan province of India (from http://www.trekearth.com/gallery/ Asia/India/West/Rajasthan/Jaisalm er/photo789500.htm) Accessed on 08.04.2014

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MA Thesis

1044WY

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Leiden, 16 June 2014

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Acknowledgments |

This thesis would not have been possible without the continual guidance and direction of my supervisor, Dr Olivier Nieuwenhuyse, who happily consigned hours and hours of discussion in his office to shape and outline the content of which is contained within. I also thank my family and parents to whom I remain indebted, and whose unwavering belief in me provided continual motivation and solace throughout. I cannot end without mentioning my newly adopted Leiden family, who made this a truly unforgettable year.

Rizwan Ahmad, Leiden, June 2014

| CHAPTER 1 |

INTRODUCTION



Figure 1.1- Syria in the Late Neolithic, with Tell Sabi Abyad circled in red. (After Akkermans 2013b, 18)

Trade, exchange, diffusion, networks of communication, reciprocity and the like represent a selection of the terminology commonly used in reference to the longdistance movement of materials in prehistory. Yet despite the implicit acceptance of this activity, minimal attention has been paid to the manner in which these systems functioned (Adams 1992, 143; Connan *et al* 2004, 112). This is particularly relevant in conversations of the Late Neolithic of the Near East where a myriad of raw and processed materials changed hands from distant origins. Thus we observe the presence of obsidian, bitumen, cedar wood, precious stones, copper ore, marine shells, nonindigenous pottery and other such items across the Near East, some of which are separated by hundreds of kilometres from their point of origin, but little effective research on what systems facilitated this movement.

At the Late Neolithic settlement of Tell Sabi Abyad in northern Syria for example, obsidian and bitumen remains have been determined to be some 300 and 500km from their source of extraction respectively (Astruc *et al* 2007; Connan 1999; Copeland 2000). The frequency and widespread nature of these items suggests the acquisition of 'foreign' or distant belongings was important to Neolithic peoples. It is somewhat surprising, therefore, that few attempts have been made to retrace the passage of Neolithic exchange networks and the material used to carry items from point A to B. Who carried out this material exchange? What level of organisation was involved in this activity? Were there dedicated traders or did material simply trickle from site to site, ultimately reaching its final point of deposition? And specifically in the context of this research, what evidence can we rely on from the archaeological record to identify this activity?

This thesis will attempt to address the aforementioned issues through examining the site of Tell Sabi Abyad, argued to have been a regional exchange centre in the late Neolithic (Akkermans 2013c, 72-3; Akkermans et al 2006, 123-4; Duistermaat 2012; Nieuwenhuyse 2006, 33). I will attempt to calculate, based primarily on distance and weight, how long an expedition to the source of raw material would have taken. Through the estimation of figures and determining the potential number of days a journey could have lasted, a far more nuanced understanding of the scope of organisation within late Neolithic communities can be understood.

1.1 | Presenting the dilemma

Late Neolithic peoples were capable of covering vast distances, transporting specialised materials and doing so without the technological capacity that we commonly assume must be associated with long-distance exchange. There were no purpose built roads, no mechanised assistance and crucially, no help from the beasts of burden – camels, donkeys, horses and other such sturdy companions – which were yet to be domesticated. Even so, by the onset of the Halaf (ca. 6200 BC) the appearance of both raw and secondary products across the Neolithic spectrum becomes overly apparent, originating from distant lands. It therefore becomes necessary to explain the infrastructure which supported this material exchange so that the interconnectedness of Neolithic communities can be greater established.

Before continuing however, it must be stressed that the appearance of 'foreign' material at sites in the Late Neolithic should not be overemphasised. Despite a few exceptions, the assemblage of items from far-fledged sources is undeniably small and should not be considered in terms of a constant supply. The representation of extraneous items is not equivalent to emerging market economies or elite control of exotic goods, such assumptions have been conclusively deposed elsewhere (see chapter 2). That said, the presence of goods separated by over 500km in some examples is remarkable at this period of prehistory. Attempts have been made to establish theoretical models for how this distribution could have enacted in precapitalist societies, but nowhere has this materialised into a definitive, practical study of establishing what a direct journey could have constituted.

With this in mind, I will attempt to produce such an example through the redistributive node of Tell Sabi Abyad, a Late Neolithic settlement in northern Syria. The site is well situated in the Balikh valley and appears to have been a second-tier regional centre of sorts, a place where ceremonial activities and an extended settlement history would have brought populations together allowing for an effective exchange of materials (Nieuwenhuyse 2006, 25; Verhoeven 2002, 10). In essence, channels of trade could have existed through three primary methods; 1) direct acquisition of the material from its source, 2) obtaining finished products from a workshop or 3) redistribution of material between settlements. There is, of

course, potential for significant overlap between these options, and within both systems exist several other possibilities (discussed in detail later), but these three form the overarching mechanisms for redistribution. I will focus on the first option, positing the ability of groups of individuals to endure an expedition which could have lasted months in duration. At first the trepidations and burdensome nature of such a journey appears unproductive, but when broken down it is clear that the ordeal was perhaps not as overwhelming as it seems.

1.1.2 | Methods of transport

The next issue involves positing the nature of such journeys and the material repertoire which would have aided the carrying of items. The introduction of modern machinery and transportation systems has made the lifting of heavy weights for prolonged periods by humans increasingly rare – if not a recreational activity reserved for the gym – but prehistoric communities would have relied upon their individual capability, which, when analysed in greater detail, is astonishingly abundant. Once again, effective research on such transportation methods in prehistory is unmistakably limited, instead focusing on provenance studies or models of exchange relative to quantity of material represented at a site (e.g. Earle and Ericson (Eds.) 2010; Khalidi *et al* 2013; Neff 2010). In doing so, fundamental questions related to the function of economic activity are overlooked. Were individuals carrying things by hand, on their heads or back, or all three? How much were they capable of carrying, and for how long? Was the necessary subsistence for the journey prepared beforehand and carried or would wild resources and small game have been exploited instead?

Answering these questions may seem inherently difficult in terms of how to address the archaeological record in this respect. Thus far, models of exchange have remained purely theoretical, but I will attempt to apply this theoretical background to a robust case study, that of Tell Sabi Abyad. Evidence of basketry, stone vessels and pottery, the latter appearing more gradually in a functional context, provide an insight into the assemblage of items which could have helped bringing things such as obsidian, bitumen, precious stones and the like to the site. In tandem with strong ethnographic examples, the ability to tentatively reconstruct methods of transport can be realised.

1.2 | Research questions

In line with the above, this thesis revolves around two primary research themes; 1) the nature of exchange in the Late Neolithic and 2) the organisation of transport. The following research questions aim to elucidate both these themes in an attempt to better understand the extent of this activity.

What is the evidence for long distance trade and exchange in the Late Neolithic?

This, in essence, forms the basis for undergoing further research into this aspect of Late Neolithic society. Without establishing the evidence for long distance exchange networks in the archaeological record, the remainder of this thesis becomes obsolete. Therefore, the first criteria to acknowledge is the presence of non-indigenous items at a particular site; non-indigenous meaning items which originate from beyond the regional perimeters of a particular settlement. In this case, it refers to items obtained beyond the Balikh valley in Upper Mesopotamia.

What is the premise necessary for the facilitation of trade and exchange?

This represents the vital prerequisite for exchange to take place, namely surplus. Without surplus, the ability to exchange and trade becomes non-existent beyond a certain degree, although this is not an a *priori* relationship. Certainly for the Late Neolithic, as will be outlined, there must have existed adequate additional surplus for effective networks to have existed, and for the wide spectrum of material we find to be traded.

What were the mechanisms involved in this exchange?

Here we are reliant on a mixture of archaeological and ethnographic evidence to ascertain the infrastructure of exchange networks. 'Mechanisms' can be defined as the '*how?*'. How did A (A being either an individual or group) obtain material B from either at its source or another party elsewhere? This is pivotal in progressing the insight into Late Neolithic organisation and structure. If deliberately tailored products were manufactured for the sole purpose of extending or improving

networks of exchange, we can begin to develop a broader insight into contact between various communities.

Where does the material originate from?

This is based on provenance studies, for which we are particularly well informed for obsidian and bitumen. Other items have similarly been subject to source studies, but these two form arguably the best researched materials of exchange in the Late Neolithic.

How long would an expedition have taken?

For this question, a number of variables are of course involved. These are addressed in detail later but here it can be said that dependant on distance, weight, modes of transport, terrain and seasonal fluctuations, the ability to assume the number of days it would take to reach a particular destination can be addressed.

What can the results determine about the nature of exchange and organisation of transport in the Late Neolithic?

Ultimately the above questions will feed into this final question, one which holds great relevance to the makeup of Later Neolithic society and economy. It has been suggested that the Halaf tradition emerged from the increased activity of trade and exchange which preceded it, and that exchange networks increased during this period. This research body can help provide some understanding into the accuracy of this statement, and attempt to establish the inter-connectedness of communities bounded by relationships of exchange.

1.3 | Issues of Chronology

Until now I have made reference to the periods such as the 'Late Neolithic' and the 'Halaf'. There remains a lack of synthesis in the chronological terminology of periods within the Neolithic of the Near East, both from a local and regional perspective. Add to the mix the site-relative chronological categorisations that are often used and the bewilderment of cross-referencing key events and periods across the Near Eastern Neolithic becomes evident. Here I will use the most commonly attributed terms used for the Neolithic of Upper Mesopotamia and for the site of Tell Sabi Abyad, for which this study is concentrated on. These, particularly when referring to Balikh periods, apply only to a limited geographic expanse. For generic terms commonly used for subdividing the Neolithic, the table below provides a good starting point.



Figure 1.2- Broad chronology of the Near Eastern Neolithic (from Banning 2003, 5)

This should by no means be taken as a standard however, as variations and subcategories exist in abundance. The pre-pottery levels can be considered safe, and the categorisations of Natufian, PPNA and PPNB (Pre-Pottery Neolithic A and B) are used throughout the Near East. It is following these pre-pottery periods that the departure from standardised chronological periods begins, and is instead replaced with more region-specific categories. Figure 3 below is an example of this subcategorisation, and will form the basis of terminology used in this thesis. It is the chronology specific to Tell Sabi Abyad, but certain terms are used throughout the Neolithic of Upper Mesopotamia.

Date	Period		Tell Sab	i Abyad I - o	Tell Sabi Abyad II	Tell Sabi Abyad III		
cal. BC		1	Ш	Ш	IV	V		
5700	Middle Halaf			D-Seq.				
5800 5900	Early Halaf	level 1 level 2 level 3 level 4	level 1 level 2	C-Seq.				
6000	Transitional	level 5 Burnt Village level 7	level 3 level 4	level B-1 level B-2 level B-3		phase III		
6100 6200	Pre-Halaf	level 8 P-15 - 8 P-15 - 9 P15 - 10		level B-4 level B-5 level B-6 level B-7 level B-8		phase II		
6200		110.10		level A-1				
6400 6500	Early Pottery	P-15 - 11		level A-2 level A-3 level A-4 level A-5 level A-5	level 1 level 2	phase I		
6600 6700	Neolithic			level A-8 level A-9 level A-10			level 1	trench H7
6800	Initial PN			level A-11			level 2	trench HR
6900				AND THE REAL				tion of the
7000							level 3	trench H9
7100	Late PPNB						level 4	

Figure 1.3- Chronology for Tell Sabi Abyad (from Bernbeck and Nieuwenhuyse 2013, 24)

As figure 1.3 above shows, Tell Sabi Abyad encompasses a lengthy and continuous occupational sequence from the late PPNB through to the Middle Halaf period (ca. 7100-5700 BC). It is in this period that this study will focus, a period which noticed shifting settlement patterns and economic emphasis. Trade noticeably increases also, with the representation of foreign items steadily growing in representation. Nonetheless, reference should be made to the above two graphs if any confusions in terminology appear. I will outline the chronological periods I refer to periodically throughout, but a high level synthesis is presented here.

1.3.1 | Arbitrary boundaries

It is necessary to emphasise that chronological boundaries are arbitrary and should not be considered definitive. There is a tendency to associate transitions from one period to another as abrupt, the most common of which being the change from the pre-pottery to pottery Neolithic (or PPNB to Late Neolithic). Even the categorisations of PPNA and PPNB are based upon the presence, or lack of presence, of pottery. It immediately creates the assumption that the introduction of pottery automatically introduced radical socio-economic upheaval, when the true story is completely different. Similarly the naming of periods by cultural entities is also somewhat troublesome, such as 'Halaf' 'Hassuna' or 'Samarra', suggesting a unified entity without much variation (Bernbeck and Nieuwenhuyse 2013; Campbell and Fletcher 2013). Whilst similarities undeniably exist, creating such presuppositions has the ability to detract from identifying any differences. All in all, chronological distinctions should be considered loosely and it is necessary to emphasise the significant overlap which commonly existed between periods.

1.4 | Tell Sabi Abyad: centre of exchange?

Tell Sabi Abyad lays in Syria, near the border with Turkey and within the Balikh valley – the Balikh River being a tributary of the Euphrates. It is a unique site for two reasons. Firstly, it occupies the period from before and after the emergence of pottery, whilst spanning an incredible unbroken sequence from around 7000-5400 cal. BC (Plicht *et al* 2011). Paired with this it is perhaps one of the most extensively excavated and published sites in the entirety of the Near Eastern Neolithic, certainly in the Mesopotamian region (see Akkermans 2013a for summary). Work has been carried out since 1986 and was only recently halted due to the unfortunate outbreak of civil war and increasingly toxic political climate. Its selection criteria for this particular piece of research is based on these two prerequisites, but also in that it has continually been posited as a regional centre of sorts (Akkermans *et al* 2006, 123-4; Akkermans and Duistermaat 1996, 24; Duistermaat 2012; Nieuwenhuyse 2006, 33;-4 Verhoeven 1999, 228-9; 2002, 32).

Of the sites in the Balikh valley, only this and Tell Mounbateh could be considered as regional settlements of note based on continual occupation and prominence in the landscape (Akkermans *et al* 2006, 126). Links between the Balikh and further regions have similarly been suggested (Akkermans and Verhoeven 1995, 24; Hole 1995). The continual acknowledgment of Tell Sabi Abyad as a prominent node of exchange warrants further insight into the manner in which this redistribution functioned. Therefore the vast array of published material grouped with the perfect sequence of activity amidst shifting settlement patterns makes Tell Sabi Abyad the ideal selection for further study of trade networks in the Late Neolithic.

1.5 | Notes on Methodology

To establish the lengths of a potential journey it was necessary at first to determine the capability of human capacity in carrying materials over long-distances. For this the ethnographic record provides intriguing insights into the modern day practice of human 'porters', individuals who deliver luggage to destinations unreachable by land based transportation. Similarly the movement of pastoralist groups was examined, in an attempt to postulate the ability of trade based systems along with the herd. Two models were created based on two scenarios, transportation by foot and transportation with the assistance of animals. The latter refers to the available domesticates at the time, so predominately sheep and goat, and their ability to share some of the burden. Several scenarios were adopted depending on the average weight carried per person and average distance travelled per day. The assumptions which underpin this model are noted in detail later.

1.5.1 | Obsidian and bitumen

Two raw materials were focused on in this study, the acquisition of obsidian and bitumen. These two represent two of the better studied material and more importantly, provenance studies have been performed for them. The distance to each available resource origin was then mapped and determined. This included establishing both the linear distance, as well as the distance including topographic difficulties such as mountainous peaks and other such impasses. Whilst the provenance of both these materials at Tell Sabi Abyad is known, all of the available localities for extraction were included in the study to determine which site was preferred, and why? More importantly, whether distant sources were exploited when closer alternatives were present. This has additional implications which could be bounded by relationships with certain communities, preference for certain types of raw material or even the avoidance of territorial zones inhabited by others.

I will focus this methodology on the assumption that individuals or larger groups were travelling directly to the source to acquire the desired material. To determine exchange between regional centres and other sites requires a separate study on its own, synthesising the congregation of foreign materials, the direction it originated from and plotting potential sites it could have visited along the way. Instead, I present a simplistic starting point, playing with just two well-known materials and trying to establish the journey involved. Of course it is hoped that this could provide a springboard towards similar studies and mapping the inter-relationships between commodities, communities, and the associated networks which functioned in between.

1.6 | Structure of thesis

Based on the above, this thesis will assume the following outline from hereon in. Chapter 2 will present the theoretical background in the dialectic of prehistoric trade and exchange. The substantivist school, pioneered by Polanyi, has held great influence over the understanding of early economic systems and the concept of exchange, therefore a discourse on this background is fundamental in any conversation of prehistoric trade and exchange.

Chapter 3 will turn to the archaeological evidence and portray the evolution of trade and exchange from the Early to the Late Neolithic. More specifically, I will attempt to synthesise the conversations between storage and trade, and show the correlation between the two. Developments in storage are closely linked to developments in trade, indeed the increased evidence for the former in many cases provides the basis for archaeologists to interpret the inception of the latter.

Chapter 4 will subsequently introduce the mechanics of Late Neolithic trade and exchange, focusing on the question of *how*. How did it all take place? Here the

three systems mentioned briefly above will be assessed in further detail, with assistance from the ethnographic record. Transportation by foot, with the assistance of animals and maritime travel will be postulated as to how these three potentialities could have materialised in this stage of prehistory. Networks of exchange acting through regional centres will additionally be discussed, in an attempt to understand how communities could have interacted on an 'international' scale.

Chapter 5 will concentrate on the application of this theory, and positing the length of journeys for the acquisition of obsidian and bitumen in particular. Other items of 'foreign' provenance will be discussed briefly, but the focus will remain on the above two desirable items. How many days would it have taken for individuals setting off from Tell Sabi Abyad to reach the Bingol region, a common source of obsidian in Central Anatolia, or to Hit Abu Jir in northern Iraq, a commonly visited area for bitumen? Such examples form the basis of this chapter.

Chapter 6 will present the discussion on the aforementioned chapter and discuss the wider implications of the results on our understanding of the Late Neolithic world. Interestingly, the movement of material did not appear to be in two directions and indiscriminate. The acquisition of raw materials was not confined to any territorial boundaries, and communities were free to exploit whatever natural resources they wished. This chapter will discuss this, and other such generalisations which could surface from the findings of this study. Finally, chapter 7 provides some overall conclusions.

| CHAPTER 2 |

PREHISTORIC EXCHANGE SYSTEMS: FORMALISM, SUBSTANTIVISM AND 'PRIMITIVE' ECONOMIES



Figure 2.2- Artistic representation of exchange within pre-modern economies (from online source, see list of figures)

This chapter will present the theoretical premise concealed within the dialectic of exchange systems and human behaviour. Two prominent positions perpetuate conversations in this context, the substantivist and formalist, both of which are introduced below.

2.1 | Issues with terminology

Several terms are continuously interchanged in responding to the question of nonlocal materials which appear in the archaeological assemblage of the majority of sites pertaining to the Near Eastern Neolithic. In other words, material which is not of local provenance immediately falls into the category of trade and exchange. Trade and exchange are the most commonly used terms, but other examples include transaction, networks of communication, transfer of materials, diffusion, reciprocity, barter, free-market economies and the like (Dogan 2008; Renfrew 1969).

There is another distinction which is necessary to note and is subconsciously included, namely the need to refrain from modern conceptions of trade and commerce. Words such as 'middlemen', 'merchants', 'imports' and the like immediately incite a modern pretext to a diametrically opposing concept than that which would have been present (Hodder 1980, 151). This heed to prevent contemporary notions of market economies within past societies is stressed by the substantivist economic school of anthropologists, historically inspired by Polanyi (1957), in response to the formalist stance of Adam Smith, the prominent 18th century economist. The principles of both in relation to Late Neolithic economies are outlined later in this chapter, but first I will take this opportunity to succinctly clarify the terms which form the backdrop of this entire discussion.

2.1.1 | Trade

It is important to understand that the concept of trade is not accepted in a universal context, but instead dependent on the discipline in which it is mentioned. As such archaeologists referring to trade often imply something completely different than the mention of it by economists, anthropologists, and historians or otherwise (Adams 1992; Klejn *et al* 1970; Renfrew 1975). According to Polanyi, trade refers

to the 'method of acquiring goods that are not available on the spot' (Polanyi 1975, 133). This generic categorisation is somewhat vague. Taken to the latter, almost everything would fall under its remit given that very few items are immediately available. How far does the proverbial 'spot' extend; beyond the household, beyond the settlement or in the case of the Balikh region – in which Tell Sabi is situated – beyond the valley? Polanyi continues in his explanation to refine his interpretation by suggesting, 'trade is the movement of goods on their way through the market, that is, an institution embodying a supply-demand-price mechanism' (*Ibid*). This definition immediately shifts the very use of the term into the formalist category (see below), implying a more 'free market' based ideology. Given this pretext, I found myself hesitating to use the word trade at all given the danger of assimilating modern 'market' conditions to prehistoric societies, but the word is unavoidable.

Instead I looked elsewhere, looking for an archaeologically sound definition which would provide a more suitable account of this activity, and allow me to use the term without fear of inadvertently creating a misleading premise to the reader. Fortunately Renfrew's research into prehistoric trade systems provided an outlet. His work on ancient economies and exchange created the first systematic account of prehistoric exchange networks, of which further mention is made to later, but his definition of the word 'trade' still holds account and is often cited, that of 'reciprocal traffic, exchange or movement of materials or goods through peaceful human agency' (Renfrew 1969, 152). The peaceful nature of this exchange is key in distinguishing trade from forcible acquisition of goods through aggressive action. Hence, I emphasise the definition of trade as the peaceful, reciprocal exchange of materials as opposed to the entrepreneurial profiteering concept which perhaps holds sway today.

2.1.2 | Exchange

The word exchange, often used synonymously with trade, is perhaps more fitting in portraying the image of prehistoric activity which was apparent. The emphasis in this context shifts from commodity based networks to agency based networks, or interaction between different social relations. Renfrew suggests that exchange implies a balance in importance or prestige between items transferring hands (Renfrew 2008, 145). In anthropological conversations, 'exchange' remains the favoured option, if only to underline the societal nature of interaction instead of an economically motivated emphasis. In truth, the economic emphasis is not necessarily mutually exclusive from society based relations, but can often have a direct effect on the other. That said, 'exchange' goes beyond the definition of trade in referring to all interpersonal contacts as opposed to simply the exchange of commodities (Renfrew and Bahn 1991, 307).

This interpretation shares connotations with the system of gift-exchange, or sometimes referred to as social storage (Dogan 2008, 38). Gift exchange, a wellknown concept in anthropology (Mauss 2002), describes the process of presenting material items to another party voluntarily, but contains an underlying reciprocal obligation. This could be manifested through physical objects gifted to another society or even the reemphasis of communal relations through marriage and other bonds. I will return to this issue later in reference to the economic development of such theories in the field of archaeology and systems of trade and exchange.

Translated for prehistoric societies, all that is necessary to reiterate is that all of the above terms can be used interchangeably as long as their omission from modern analogy is stressed, and the loose interpretations of both definitions discussed above are emphasised. The following will present the schools of thought which surround prehistoric archaeology.

2.2 | Prehistoric economic systems

Four types of material acquisition from foreign sources are available on a generic level; market transactions (commercial), gift exchange, theft and plunder. We have no evidence for the latter two developments in the late Neolithic, allowing us to swiftly move on to the former options. The division between the two boils down to the creation of two prominent schools of thought. The first is 'formalism', for which Adam Smith can be considered its custodian. This, in short, forwards the individual, profiteering incentive for entrepreneurial activity and plays on the dichotomous relationship between limited resources and unlimited needs. The second logic emerged from the economist Karl Polanyi, countering the above model by emphasising the role of relationships in pre-capitalist societies. Polanyi argues that these pre-modern economies were not 'formal' and instead embedded transactions through social relations.

It is necessary to explore these two constructs in the context of the Neolithic and ascertain which economic model, if any, can best be suited to explaining the function of trade and exchange in this period. In essence, neither model sits perfectly in exploring the economic basis of later Neolithic society, but aspects of both can be inherited to explore the best possible outcome. Several important follow-up studies have since critiqued Polanyi's 'Great Transformation' (1957) which equally merit further study. The most important of these – the concepts of reciprocity, gift-exchange and alienable versus inalienable goods – are explained below.

2.2.1 | Formalism

The formalist stand point emerges from economic anthropology, emphasising the innate desire of individuals in the accumulation of things. Things are not confined to economic prosperity but can entail coveting power, prestige and the like. Maximisation is the key, or to strive towards a particular culturally expressed value goal. How would this mechanism of thought relate to prehistoric society? In essence, not very well. The first issue we are confronted with is the overwhelmingly egalitarian ethos which pervades over the Late Neolithic, and indeed for the entirety of the Early Neolithic (Frangipane 2007; Woodburn 1982; Zeder and Smith 2009). The evidence forwarded for the emergence of hierarchies is poor, and is generally based on social mechanisms such as thought to have been associated with challenging the communal ethos such as feasting and even long-distance trade (Belfer-Cohen 1995; Kuijt 2000; Kuijt and Goring-Morris 2002).

It is important to note that egalitarianism does not equate to complete equality. Indeed individual competition and household level conflict were undoubtedly existent, even more so in the development of early settlements as individuals attempted to live next to one another and in one place for an extended period of time (Akkermans and Schwartz 2003; Chagnon 1968; Sahlins 1968). Communality, nonetheless, remains the norm with settlements fluctuating in size, but no evidence for the flaunting of wealth or imposition of dominant individuals, as would commonly be expected in a competitive society.

Where, then, does the role of formalist thought enter the field of prehistoric research, and how can we correlate this to Late Neolithic trade and exchange? Formalists push the anthropological argument as universal, suggesting that maximising individual benefit is an in-built human mechanism and is apparent in all societies and behavioural forms (Firth 1971; Schneider 1974). This is not necessarily contrary with the archaeological evidence and the notion of egalitarian societies. Individual accumulation or prestige may well have been sought by certain individuals, but what appears to have remained central is the concept of communality. Strong evidence suggests that this was central to all else, an example being the forced removal of certain belongings or themes which may have disrupted this ideological position (Zeder and Smith 2009, 685). A further example comes from the Halaf period at Tell Sabi Abyad, where aggregates of households are comparatively larger for a single generation, after which they are replaced, emphasising the lack of continual dominance to one family or extended unit (Akkermans and Verhoeven 1995; Campbell and Fletcher 2013).

Trade and exchange networks could be interpreted as the furthest extension of this ethos where communities were apparently free to exploit and obtain raw materials at their wish, evident by the fact that rarely does the presence of foreign materials at any site accelerate beyond a steady level. Similarly, there is no evidence for the capitalisation of raw materials by certain communities, or the presence of territorial hostility in relation to foreign intruders and acquisition of resources. In sum, the formalist model is not necessarily an accurate reflection of Neolithic economic interactions, or is at least supressed by the perpetuation of social relations over all else. We can only rely on the archaeological evidence available which is limited in its ability to penetrate the motives of the individual.

2.2.2 | Substantivism

Substantivism relates to the whole. Every interaction, no matter how small or perceptively individual, is embedded into the social structure. This approach was conceived by Polanyi in his book 'The Great Transformation' (1947), and was born out of anthropological discussions of pre-modern economies. Polanyi disagreed with the classical model in reference to ancient societies, and interpreted the dialectic between individualistic and holistic as inaccurate in this early context. For Polanyi, prehistoric economic activity could solely function in a societal context and only through the acceptance of this prerequisite can the debate move forward. This school, or the school of substantavist thought, has permeated deeply into the field of social anthropology and archaeology, and particularly within discussions of trade (Earle and Ericson (Eds.) 2010; Hodges 1988; Hudson 2004; Parry and Bloch 1989). In particular, Polanyi forwarded three systems of distribution; reciprocity, redistribution and barter/market exchange (Polanyi 1963).

These developments were also important in the understanding of networks of exchange in the Neolithic. The debate began to drift towards interpreting patterns of long-distance trade as equivalent to cultural homogeneity and overarching patterns of similarity, endorsing the similarities between perceived 'cultures' such as the Halaf (LeBlanc and Watson 1973; Watson 1995), without assessing differences and recognising regional developments. Polanyi's interpretation has since come under criticism for implying modern economies are not embedded, without perhaps realising the construct of religious, cultural or power relations which remain ever present. His positioning in reference to early economic systems, however, remains strong, and has since been developed – primarily in anthropological debate – by the introduction of several concepts which are central to conversations on trade and exchange. All in all, the substantavist model remains fairly common in presenting the economic, or rather socially centric, strategies which governed cultural interactions in prehistory.

2.2.3 | Gift exchange and alienable versus inalienable goods

With the substantivist position established, several authors – predominately in the field of evolutionary anthropology – built upon its foundations and introduced a number of important concepts which hold particular account in the dialogue of exchange networks. Gift exchange perhaps represents one of the most commonly cited examples, conceptualised by Marcel Mause, a French sociologist, in his book 'The Gift' (originally 1954, republication used from 2002). It relies on the foundation that the exchange of gifts between traditional economies represents the most important economic transaction of all. For these 'primitive' societies, there was no concept of market based exchange, but instead an underlying acknowledgment that gifting was not a unilateral proposition. It was obligatory for the recipient party to return the gesture in some form and dependent on the gravity of the gift received (*Ibid*).

The concept of gifting is not refined to material commodities, instead it could be manifested as an occasion such as a feast or the strengthening of bonds through marital rites. Based on this premise, exchange networks and the acquisition of materials should intensify as socially orientated competition escalates, or rather the need for 'prestige' goods to facilitate this exchange becomes necessary (Redman 1978). Prestige goods refers to highly desirable items, desired either for its scarcity or some other artificial value, such as aesthetic or cosmological. The functionality of the object is not necessarily important, but rather its conceived value. It was this premise that heralded the conception of elites and chiefdoms suggested to have coincided with sedentism and the domestication of agriculture in the Neolithic (for summary see Earle 1991; Earle and Earle 1993). These 'elites' controlled the exchange and flow of these items of prestige, either to legitimise their position or to assert authority. The problem with such assumptions was the idealistic 'tick list' system which emerged from this construct. Typologies were created to present which, paralleled from ethnographic social models, attempted to categorise political and economic structures into limited stages (for critique against this position, see Campbell 2000; Pauketat 2007; Yoffee 1993; 2005).

Finally, and crucially in any conversation involving prehistoric trade and exchange, was the development of alienable and inalienable goods (Weiner 1992). Both refer directly to the above gift related scenario and how to determine the significance of certain objects over others. Alienated objects are commodity based, objective relationships, enacted between independent transactors with no personal connection with one another. Inalienable represents the opposite, and refers to subjective, personal relations and exchange of objects between two or more related parties. Sacred objects are also referred to on occasion, those which cannot be removed from the possession of a particular group or place based on theological grounding. But the two former terms should be noted in any discussion on ancient trade. The above concepts relate directly to the tiers of exchange and multiple layers which recurrently take place.

2.3 | Putting it all into context

Numerous terms, schools of thought and theoretical positions have been presented above which can perhaps appear baffling at first glance. Transposing this entire conversation into studies of Late Neolithic exchange is not necessarily as straight forward as it may appear. How do we separate an assemblage of foreign material at a particular site into alienable and inalienable goods? Does certain evidence fit into the formalist or substantivist model? What indications for reciprocal gifting are noted in the archaeological record? It is not necessarily a case of slotting a data set into one perspective or another. Just as with arbitrary chronological boundaries mentioned in the previous chapter, the boundaries between alienable and inalienable, gift and market based exchange are not definitive. Items can transfer status dependant on time and space, individual and community. All that is necessary to take from the discussions forwarded above is that material and social transactions in prehistory operate within a broad spectrum of ideas and values, and that social and economic interactions are subject to fluctuation, just like architectural preference or cultural traits. Most importantly, that each interaction between two or more parties would have involved multiple layers of interaction, dependent on social relations.

| CHAPTER 3 |

SYNTHESISING STORAGE AND TRADE: DEVELOPMENTS IN THE NEOLITHIC



Figure 3.3- Artistic representation of Neolithic dwelling (from Kuijt 2011, 507)

3.1 | Storage, surplus and trade

Developments in trade and exchange are directly related to developments in storage practices. The two develop in tandem, reliant upon one another in an intricate relationship which ultimately proliferates the ability to amass and redistribute surplus. The Neolithic heralded a period which allowed for the circulation of distant items to become far more common and visible, as opposed to earlier prehistory such as in the Upper and Epi-Palaeolithic where items including feathers, ostrich egg shells, marine shells and the like were reserved for special ritual traditions and few in number (Peresani *et al* 2011; Zilhao *et al* 2010; Texier *et al* 2010).

What we find though is an amalgam of literature attempting to understand storage processes within a specific context, i.e. feasting (Hayden 2009; Goring-Morris and Horwitz 2007; Twiss 2008), demographic increase (Bellwood and Oxenham 2008; Bocquet-Appel and Bar-Yosef 2008; Kuijt 2008), ritual significance (Cauvin 2000) or otherwise. The rudimentary elements of storage containers, or rather its bare functionality, is often overlooked. Various studies have highlighted the correlation between the tripartite of the Neolithisation process; that of agriculture, sedentism and storage (Ingold 1983; Kuijt 2008; 2009; Testart 1982). The link between the three is undeniably apparent, but few have extended this intimate association to the sphere of exchange networks and its impact upon them.

Furthermore, the link between sedentism and storage is not always clear cut. Numerous ethnographic accounts present semi-nomadic and semi-pastoral communities who deposit their belongings within the confines of a village or town only to periodically visit whenever necessary (Ayoub and Le Quellec 1981; Duistermaat 2012; Jacques-Meunie 1949; Suter 1964). These communities continue their mobile lifestyles but accumulate their produce in one confined and designated space. A similar practice existed in the Neolithic, culminating in the late Neolithic with the presence of clay sealings to administer the increasingly versatile and diverse storage systems which emerged in the Halaf (Akkermans and Duistermaat 1997; 2004; Duistermaat 2012). This chapter will present the evolution of storage systems from the early to Late Neolithic and posit the frequency and quantities of trade which would have transpired as a result. Storage as a term constitutes an awkward topic on account of the difficulty and lack of standardisation of its classification in archaeological excavations (Kuijt 2009, 642). Despite this, three common architectural features are widespread throughout the Near East and used for this purpose. The first are storage bins which are rectangular in shape, commonly plastered with clay and connected to a wall or some structural feature (Akkermans and Schwartz 2003, 52; Bar-Yosef et al 1997; Kenyon and Holland 1981; Kuijt 1998, 230). Rarely are they noted standing alone or isolated outside of a building, unless in a courtyard (Bar-Yosef et al 1997). Second are storage silos, circular in shape and highly variable in size. These can be found in isolation as independent structures both in and out of houses (Bar-Yosef and Gopher 1997; Garfinkel et al 2009; Kuijt 1998; Umurtak 2007). Third are purpose built storage rooms within structures, generally defined by their lack of features or are too difficult for an individual to move within, and are therefore assumed to be for storage (Bogaard et al 2009; Byrd and Banning 1988; Kuijt 2008).

Other storage features include granaries, subterranean compartments, storage chests, but also innovative solutions in the later Neolithic coinciding with architectural changes such as storage on roofs, between houses and within circular tholoi (Akkermans 2010; Akkermans and Schwartz 2003, 62; Banning 2003; Finlayson *et al* 2011; Kuijt and Finlayson 2008; Kuijt *et al* 2011; Moore *et al* 2000). What is clear though is the three mentioned structures (bins, silos and rooms) are the most common sedentary storage units associated with settlements, although not necessarily associated with sedentary living. Finally, it is necessary to stress that overarching generalisations of Neolithic entities should be taken with extreme caution. There was simply no homogenous and uniform developments, but instead a high degree of variability and differential patterning dependent on each region. Even within region specific studies, variability is noted at local levels. Therefore this section will primarily focus on developments in Upper Mesopotamia, whilst making reference to developments in other regions.
3.1.1 | Agents of mobility: portable storage in the Neolithic

The movement of goods creates an industry of efficiency. Our hands alone are limited in the size and shape of material they are capable of carrying. To enhance this deficiency, a mixture of products are created to redistribute the load onto more sturdy regions of our body, such as our shoulders, back and even head. Clothing would have been modified to accommodate this requirement through the tailoring of pockets, straps, hooks and bags. For the Late Neolithic, organic and stone made items would have formed the basis for containers used within such a context. Organic based units were likely to have been the most abundant and easily created, but naturally suffer taphonomically as a result of decomposition and poor preservation consistency. Nonetheless secondary evidence, meaning impressions and traces of survival from other sources, are present for us to ascertain their existence. Basketry is one example of a skill which was adopted throughout the Fertile Crescent, with several sites displaying variations such as coiling and plaiting (Adovasio 1977; Bar-Yosef 1985, 9; Hole et al 1969, 220-223; Stordeur et al 1996). At Tell Sabi Abyad, over 100 basketry impressions have been recorded and provide a glimpse into the range of techniques employed in the construction of roofs and baskets (Berghuijs 2013).



Figure 3.4- a-e: exterior and interior views of Native American basketry from various cultural traditions. f: Native American weaving patterns g: motifs typically applied on Samarran painted ware (from Wengrow 2001, 180)

Similar negatives are noticeable in the Zagros region (Vandiver 1987; Morales 1990, 26), but perhaps more crucial in this context is the emergence of basket moulds for vessels around the period in which pottery begins to emerge. Although some authors have suggested the close relationship between early basketry moulds in the creation of pottery (Arnold 1985; Wengrow 2001), the link between the two remains ambiguous and far from clear cut (Nieuwenhuyse 2006; Nieuwenhuyse et al 2010). The adaptive functional benefits of ceramics are only recognised in hindsight, but there is little doubting pottery gradually emerged as important commodity in the facilitation of storage several centuries after its inception (Campbell and Fletcher 2013; Carter et al 2003). Leather pouches and bags are other examples of easily moveable items which could have carried material for sustenance, but just as easily for the redistribution of desired and distant goods (Akkermans and Duistermaat 1996). All of the above are highly limited in the archaeological record, naturally considering their organic composition. Very few, if any, fragments of wood, leather or plant survive for the archaeologist to recover and record, let alone in complete form. This can at times create a disproportional bias towards the presence of pottery versus other non-surviving materials.

Whilst we have difficulty tracing the above directly, other non-organic forms of containers are easily recognisable. Stone vessels are noted throughout the Near Eastern Neolithic and would have provided a light weight, durable and sturdy companion in a mobile context (Weinstein-Evron 2001). Bitumen and plaster also survive well comparatively and are waterproof, an additional benefit when compared to the previously mentioned examples. The former is well recorded in the lining of baskets for this very purpose (Adovasio 1983; Bader 1993, 34; Braidwood and Howe 1960, 42; Kirkbride 1972; Noy 1989; Schick 1988). The latter is similarly documented in high frequencies and shows the development in pyrotechnology by the PPNB, although in Upper Mesopotamia, and certainly at Tell Sabi Abyad, plastered vessels are commonly associated with the Early Pottery Neolithic period (Nilhamn 2003; Nilhamn *et al* 2006). Plaster provides a smooth, hard and crucially insoluble material for covering floors, walls, or creating bowls and vessels (Gourdin and Kingery 1975; Kingery *et al* 1988). The Levantine PPNB is testament to some of the earliest lime plastered vessels (Garfinkel 1999, 12-13).



Figure 3.5- Examples of some of the non-organic vessels used. (Left) Open lime plastered bowl from the Early Pottery Neolithic of Tell Sabi Abyad (from Nilhamn 2009, 67). (Right) Clay sealing and associate stone bowl, also from Tell Sabi Abyad (from Akkermans and Schwartz 2003, 141)

What is apparent from the above is that Neolithic communities played with and were capable of producing an eclectic mix of portable storage products using a variety of organic and non-organic material. These vessels would have accompanied individuals for the duration of an expedition, allowing for the effective storage of sustenance and tools on the way. It is likely the carrying of exchangeable goods were also included in this function.

The following will present the stage-by-stage evolution of Neolithic storage systems and display how the complexity of this practice continually adapted to the economic requirements necessary at the time. Both sedentary and portable storage units continually moulded to facilitate the increasingly sedentary – or in the case of the Late Neolithic, the increasingly non-sedentary – socio-economic fabric of society. Architectural innovation brought about new manners of storage which seemingly become more individualistic over time, personified in the development of sealing practices (Akkermans and Duistermaat 2004; Duistermaat 2012). Portable storage appears to follow a similar pattern, represented by the elaborate and highly decorative vessels which begin to appear somewhat simultaneously with sealing practices in the Halaf (Carter *et al* 2003; Nieuwenhuyse 2006).

3.2 | Storage in the Natufian

The Natufian, sometimes referred to as the Epi-Palaeolithic, spans from ca. 10,000-9600 BC. It represents a transitional period, one where the socio-economic makeup remained overwhelmingly hunter-gatherer and mobile, but architectural prominence began to surface. It is not until the Natufian period that purpose-built storage structures emerge, where seasonal encampments were occupied for longer periods, but not all year-round (Akkermans 2004; Kuijt 2008; 2009). This period consists of, in sum, expert hunter-gatherers, who were highly adapted to the increasingly warm climate at the onset of the Holocene (for summaries, see: Bar-Yosef and Valla 1990; Bar-Yosef 1991; Byrd 2005; Delage 2004; Goring-Morris 1987; Goring-Morris and Belfer-Cohen 2010; Kuijt 2009). Loosely defined, this era represents the first flirtations with extended sedentism and it is from these small scale, ephemeral enclaves that the earliest evidence for purpose-built storage facilities emerge, albeit limited in scope (Perrot 1988).



Figure 3.6- Plan and reconstruction of building XLVII at Mureybet showing areas reserved for living, cooking and crucially, storage (from Akkermans and Schwartz 2003, 51)

In Syria the number of sites are scarce for the entirety of the prepottery Neolithic, let alone the Natufian, with just over 15 in total (Akkermans & Schwartz 2003, 47). Undeniably more sites exist, but they remain to be discovered as yet. For the Natufian, we notice the occasional, small-scale building compartmentalised for multiple functions including living and cooking, but not necessarily storage 2004, 284). (Akkermans What exactly was stored, and to what extent, remains to be understood. To the west in the Levantine region, the number of recorded and excavated

Natufian settlements are far higher, but this is more a reflection of the increased quantity of dedicated projects targeting this early period in this region, as opposed to an actual disparity. Interestingly, it has been suggested that the Levantine Natufian was entirely devoid of storage features, barring the exception of Ain Mallaha (Boyd 1995), although this is of course dependant on one's interpretation of a storage feature. I would suggest that given the general trend of activity within the Natufian complex, the very concept of structures devoted to storage was steadily being realised, against the backdrop of the emergence of agriculture and a semi-sedentary lifestyle. It must also be remembered that negative features such as pits would have acted as storage, although difficult to detect in isolation in the archaeological record (Testart 1982; Ingold 1983; Stropp 2002).

3.2.1 | Portable storage and trade in the Natufian

Portable storage in the Natufian, indeed in the entirety of the Pre-Pottery Neolithic, is inherently difficult to detect on account of poor preservation. That is assuming the items used for mobile storage were all organic. This would seem logical given that stone would have provided the only non-organic component available to create containers at this early period, prior to the inception of the necessary pyrotechnology for plastered and ceramic vessels (Vandiver 1987; Rice 1999). Even if animals were used to carrying such material, leather pouches and wooden baskets would have easily served the purpose, as has been attested in ethnographic accounts (see chapter 3 for detailed discussion).

What is clear is that the increased archaeological visibility, brought about through early attempts at semi-sedentism, has also brought to light the level of trade and exchange already apparent at this early stage. In other words, long-distance trade would have already existed, but was only detectable once archaeologists had basic settlements to excavate. This, of course, has implications for portable storage as presumably systems of mobile storage were already in place to facilitate this practice, but on a small scale. Hence we find evidence, albeit limited, for a plethora of items (including beads and ornaments of limestone, basalt, greenstone, malachite, bone, teeth as well as obsidian, flint, molluscs and exotic minerals) were traded over a wide geographic expanse (entailing the river Nile, the Red Sea, the Sinai, Jordan, Syria and as far as the western Zagros), requiring an extensive network of knowledge and exchange (Akkermans 2004; Bar-Yosef and Valla 1991, 170-171; Weinstein-Evron et al 2001). How exactly this exchange operated does not become fully clear until the onset of the PPNA.



Figure 3.7- Importation of raw materials during the late Pleistocene/early Holocene in the Near East (from Wilcox 2005, 539)

3.3 | Storage in the PPNA

The PPNA period spans from ca. 9600-8700 BC and sees the gradual prominence of architecture and the development of settlements occupied all year round, but still surviving off of wild cereals and a mixed hunter-foraging economic program. Storage develops in gradual importance in the PPNA where dedicated rooms, silos, bins and other such architectural inclusions are adopted. This prominence is relatively consistent with the expansion of settlement size, albeit the demographic appears to have remained fairly mobile at this point. Storage once again bears testament to the change in economic values, specifically changing patterns in ownership. In the preceding Natufian period, storage was reserved almost entirely outside the domestic realm – or at least not within structures in general – but from around 8500 BC food storage placements exist within houses (Kuijt and Finlayson 2009, 10966). This has been noted to suggest increasing competition and individual accumulation, as part of Hayden's feasting theory (Hayden 2009). This theory has a direct impact on the notion of trade and its relative importance in the Neolithic world. If societies indeed gradually shifted towards prioritising material surplus, be it agricultural or otherwise, then the acquisition of foreign and distant items would provide an additional stimulus to extend and strengthen trade networks. Hayden goes further and forcefully argues the importance of luxury foods, proposing these products to have been amongst the first domesticates (see Hayden 2009), but agricultural produce alone may not have been the only luxury desirables. The evidence during the PPNA, particularly the case of Cyprus discussed below, presents ample examples of PPNA communities undertaking novel and experimental techniques in an attempt to proliferate their geographic outreach and create novel relationships. I see this concerted effort as a clear indication of PPNA Neolithic communities visibly widening their scope of activity within the Fertile Crescent expanse, an expanse which was increasingly becoming interconnected and known even beyond its superficial boundaries.



Figure 3.8- Artistic reconstruction of structure 4, phase 1 at Dhra in Jordan showing the increased dedication towards purpose-built storage units (from Kuijt and Finlayson 2009, 10986)

A handful of sites have been recorded for the Mesopotamian PPNA such as Jerf el-Ahmar, Tell al-Abr, Tell Qaramel, Tell Aswad, Skeikh Hassan and Mureybet (Akkermans & Schwartz, 49-50). Continuity must be stressed here once again as the change from one abstract period to another, i.e. Natufian to PPNA, can often conjure images of an abrupt transition. The Levant and Anatolia provide a greater representation of PPNA sites, some of which include fairly substantial communal structures such as at Gobekli Tepe and at Wadi Faynan 16 (Schmidt 2005; Mithen et al 2011). In terms of storage, the investment in larger silos and storage bins is noticeable. At the site of Dhra, the appearance of what has been described as large scale granaries have been noted (Kuijt and Finlayson 2009, 10966). Storage bins are similarly noted at Nativ Hagdud (Bar-Yosef, Gopher and Baruch 1997) and are occasionally constructed of stone at Jericho (Kenyon and Holland 1981). The site of Jarmo, located in the Zagros, consisted of multi-roomed structures which included bread ovens as well as storage areas (Banning 2003, 6). What is clear is that storage was increasingly permeating into everyday life by the PPNA, and that surplus of food and planning for extended periods were regarded as necessary. The assumption could be made that the move towards individual storage, and larger concentrations of storage in general, would constitute the emergence of hierarchical systems and inequalities, yet there is not much by way of convincing archaeological evidence by this period to suggest this was the case. Instead, the emphasis on community and relative egalitarianism (beyond the nuclear household) remains the norm.

3.3.1 | Portable storage and trade in the PPNA

Portable storage is as limited to define in the PPNA as in the Natufian for the same reasons as outlined above. Distance exchange networks remain intact, but the frequency and diversity of objects transferred across vast geographic expanses increases in the archaeological record (Gopher and Orelle 1989, 91; Paltenburg *et al* 2000, 851). We begin to notice asphalt from the Dead Sea, malachite from the southern Levant, sandstone from southern Edom as well as greater obsidian production from Anatolia circulating across the Early Neolithic (Goring-Morris and Belfer-Cohen 2010, 17; Perles et al 2011). Aside from the items which are seen

to have changed hands in this period, the technological capability to explore new horizons is most prominently noted by the arrival of Levantine communities at Neolithic Cyprus. The use of maritime technology and the associated technology is presented in the following chapter, but here I will briefly mention the movement of the so called 'Neolithic package' (plant and animal domesticates) to Cyprus.



Figure 3.9- 160km of open water separates Cyprus from the Levant

The island of Cyprus is separated by over 150 km of sea from its closest contact to the western coast of the Levant. To prove existence of contact or presence of human activity alone is not sufficient to suggest complex maritime capacity, as movement across considerable distances over water was common from the Upper Palaeolithic. Instead we notice concerted efforts to deliver specialised goods and the movement of considerable weight via the sea. Vigne has undertaken extensive research on the island and has shown the continual visitation by PPNA peoples bringing a specific set of material and even animals by this early stage (Vigne *et al* 2011; 2012). This includes the introduction of cereals, architectural designs and domesticated mammals onto this territory, all of which closely resemble that of the Levantine Neolithic (*Ibid*). Furthermore, to maintain genetic diversity and prevent inbreeding (both in plants and animals), enough of the population needs to have originally migrated or at least be continually replenished (Vigne and Cucchi 2005, 191). It is clear that the technology and infrastructure of marine systems by the PPNA was so far advanced as to comfortably negotiate open seas whilst simultaneously bearing difficult and sizeable loads. The material culture required to facilitate this movement would have had to adapt to the increasing distance, quantity and diversity of material being exchanged. Despite this acknowledgment, the discussion on exactly how these materials were transported during this period is all but absent in a research context.

3.4 | Storage in the PPNB

The PPNB is commonly subdivided into three sub-categories, the early, middle and late periods spanning from ca. 8700-6900 BC. It is in this period that we begin to see the development of storage facilities employ a wide variety of shapes, sizes and positions within settlements. This broadly coincides with architectural developments noticeable in the PPNB, most prominent of which being the change from circular to rectangular houses, and an additional storey incorporated into the latter (Akkermans 1999; Banning 1998; 2003; Verhoeven and Akkermans 2000). Storage develops into a fundamental element of the household and elaboration of storage practices, as well as the increase diversity of storage locations, are noticeable. On a household level, storage becomes the norm as the number and density of settlements noticeably increases. A note of caution is necessary though when presenting the typically forwarded concept of a grand PPNB, densely populated by vast and substantial settlements. Yes, the PPNB does herald astonishingly diverse and elaborate sites across the entirety of the Neolithic, but two issues need to be reiterated and apply even more so in the context of trade and exchange.

Firstly, of the settlements which are noticeably large – prominent examples include Abu Hureyra, Tell Mounbateh, Jarf al-Ahmar, and Mureybet in the Euphrates region, some of which span over 10 hectares – there is limited stratigraphic evidence to suggest the entirety of the site was occupied at one time (Akkermans 2013c; Hole 2000). There remains a tendency to adopt anachronistic impressions of horizontal exposures, without recognising the strong possibility of intra-site movement and occupation. Secondly, the emphasis on larger settlements reduces attention from the multitude of smaller, ephemeral settlements which populated river valleys, basins, coasts and other fertile regions. A prime example of this being in the Balikh valley, where other than Tell Sabi Abyad and Tell Mounbateh, the region was restricted to small mounds which encompassed less than 1 hectare in size (Akkermans 1999, 524-5; Akkermans and Verhoeven 2000).



Figure 3.10- Plan of operations I-V at Tell Sabi Abyad I, illustrating the nature of shifting settlement patterns at the site (Akkermans 2013a, 31)

That said, the increased breadth of certain settlements cannot be ignored. Whilst the Balikh was restricted to minor mounds of size, the Euphrates appears to have consisted of numerous larger settlements suggesting a more organised structure along its banks (Akkermans *et al* 1983; Moore 1975; Moore *et al* eds. 2000; Molist and Ferrer 1996; Molist *et al* 1994; 1996). In the Mesopotamian region, we remain relatively impoverished in archaeological identification and excavation of PPNB sites, particularly when compared to the Levant and Anatolia. At pre-pottery Tell Sabi Abyad, rectilinear buildings with several rooms, some of which are far too small for habitation or lucid movement, have been described as reserved for storage (Akkermans et al 2011). Rectilinear houses appear consistently at Abu Hureyra level 2 (PPNB level) with the site reaching 8 hectares in extent and buildings incorporating dedicated storage areas (Moore *et al* 2000, 493). Whilst the population of Abu Hureyra is perhaps exaggerated somewhat - estimated by the site director to have peaked at 6000 - the presence of storage chests in addition to storage rooms underlines the increasing importance of storage by this period (Moore *et al* 2000, 202). Similar examples are noticeable at Dja'de al-Mughara and Tell Halula (Christidou et al 2009). Elsewhere in central Anatolia, intricate and innovative ways of stockpiling food have been recorded through the application of micromorphology at Catalhoyuk, where rooftops were utilised seasonally for this purpose (Atalay and Hastorf 2006; During 2001). Similarly two storey houses are common in the Levant such as at Jericho, where the spaces between the close proximity of houses have been suggested to have served for amassing produce (Banning 2003, 13-14; Kenyon and Holland 1981), whilst storage bins are noted in an increased frequency across the Levant and appear both inside and outside of structures (Kuijt 1998, 306).

3.4.1. | Portable storage and trade in the PPNB

From the above, it is clear that storage had developed into a standardised part of life. It is in this period that we begin to gain a slightly more refined image of portable storage. The trade of obsidian extends over further distances suggesting trade networks continued to expand (Kuijt 2008, 172). Abu Hereyra in particular provides an interesting insight into the some of the organic containers which would have been used in an everyday context. Traces of matting were noted in burial contexts as well as impressed on mudbrick *pise* floors, suggesting the ubiquitous presence of baskets within the settlement (Molleson 1994, 74). Baskets were probably made of straw and chaff as well as wood, tightly bound in a criss-cross pattern leaving a clearly identifiable outline which can be distinguished in the

archaeological record. Such traces provide a glimmer of insight into some of the portable systems used to transport goods both within the site, but most likely over long-distances when necessary. Similarly connections between the Levant and Cyprus sustained and increased in propensity, where cattle and deer were moved onto the island by the 8th millennium BC (Peltenburg *et al* 2000, 851).

3.5 | Late Neolithic/Pottery Neolithic

The Pottery Neolithic refers to the era following the PPNB and before the Halaf, and can be ranged from ca. 6900-6200 BC. It represents a period which remains relatively poorly understood in comparison to the preceding and proceeding chronological horizons (Akkermans and Schwartz 2003). Continuity needs to be stressed even more in this context as there is tendency to generalise developments in the Levant and apply them throughout the Near East. This Levantine-centric model originally brought about the term *Hiatus* (de Vaux 1966; Kenyon 1982; Mellaart 1975, 67-9), which although no longer referred to, developed connotations of a widespread 'collapse' of the PPNB culture and the abandonment of settlements (Simmons 2000, 212-13). In truth this 'collapse' is restricted only to the southern Levant (Twiss 2007). A brief look beyond the Levant clearly shows the inaccuracy of this assumption, which has been actively illustrated in a recent publication which has brought together a wealth of research specifically addressing the archaeology of the Late Neolithic of Upper Mesopotamia (Nieuwenhuyse *et al* Eds. 2013).

Here, I will simply discuss the changes which occur in relation to storage practices and the subsequent implication on trade. Starting with the architectural developments, houses and structures begin to change shape once more. The commonly employed rectilinear houses of the PPNB gradually shifts to monocellular round houses, but interestingly rectangular buildings remain in the form of storage structures (Akkermans 2010, 27). This represents a move almost similar to that of the Natufian and early PPNA practices of external storage contexts (Kuijt 1998, 308). The number of smaller 'hamlets' increase in appearance in Upper Mesopotamia suggesting a more mobile, pastoral economic interaction with the wider landscape, whilst the larger settlements do not fluctuate massively in size (Akkermans *et al* 2006, 123).

The Pottery Neolithic of Northern Syria personifies this where multiple short lived camps have been recorded during survey (Ibid). Tell Sabi Abyad represents one of the few sites which has yielded plentiful information on this pivotal transitional period, where continuous occupation has been recorded from the late PPNB through to the Halaf. It therefore provides a unique insight into the residual changes which are seen elsewhere across the Neolithic at this time, but at one site. Operation III at Tell Sabi Abyad almost perfectly slots into this timeframe, spanning chronologically from around 7000-6200 BC (Plicht et al 2011). Here circular structures (or tholoi) begin to emerge from around 6500-6450 BC measuring, on average, 3-5m in diameter and believed to have been occupied for just a single generation (Akkermans 2010, 23). It could be suggested that the alternative or supplement to architectural forms of storage was the introduction of pottery, a new material production which allowed for storage to be associated within a mobile economic context, but there is no evidence to stress the functional model for the inception of this commodity. Instead architecture represents arguably the biggest shift in storage related practices.



Figure 3.11- Example of circular tholoi which emerge in the Pottery Neolithic (from Akkermans 2010, 25)

3.5.1 | Portable storage and trade in the Pottery Neolithic

If we now turn to the evidence of trade and portable storage for the Pottery Neolithic, we find exchange networks indeed extend and multiply as can be seen in the archaeological record. Interestingly the first types of pottery noted at Tell Sabi Abyad are not the bare plant tempered forms which appear later and in huge quantities, but instead a mineral tempered ware which bears surprising sophistication, suggesting they were imported through means of exchange networks (Nieuwenhuyse et al 2010). The introduction of pottery adds to the existing repertoire of portable and visually conspicuous containers which were part of the later PPNB and early Pottery Neolithic culture (Akkermans et al 2006, 152-3). At the limits of the so called 'Fertile Crescent', obsidian networks begin to reach new horizons from around 6600 BC with artefacts recovered in north-west Turkey, found to have originated from the island of Melos some 330km away (Perles et al 2011). It provides yet more evidence of the increasingly refined marine transport available by this period, where specialist travellers and seafarers were capable of moving over 110km of sea to acquire obsidian from Melos to Crete for example (*Ibid*, 47). It is probable that the acquisition of items from perceivably remote locations were exchanged and displayed at regional communal centres such as Tell Sabi Abyad. This point is dealt with in detail in the following chapter, but it remains clear that the move towards mobility that defines the Pottery Neolithic is indicative of expanding into new pastures and systematically developing new networks.



Figure 3.12- Examples of some of the earliest forms of pottery in northern Syria, but appear too fragile for functional use or as portable storage containers (from Akkermans 2013b, 24)

3.6 | The Halaf

The Halaf spans from ca. 6200-5300 BC and represents a culture geographically confined to Mesopotamia and the northern Levant. Storage undergoes a phenomenal transformation during this period, where individuality and ownership begins to dominate in importance. Whether this necessarily equates to inequality and a break from egalitarianism is not entirely clear, but what is clear is that the introduction of clay sealings to record and protect one's property represents a significant adaptation in the social understanding which existed between individuals within a particular community. Beginning with the architectural developments, the circular tholoi which at first surface in the Pottery Neolithic are ubiquitous from around 6200-6000 BC, and witness an 'explosion' from around 5900-5300 BC across Mesopotamia, appearing in sites such as Tell Sabi Abyad, Tell Halula, Tell el-Kerkh, Chagar Bazar and others (Akkermans 2010, 22). Population increase and settlement size increase are similarly noted throughout this period, with Tell Mounbatah for example reaching an astonishing 20 hectares in size (Nieuwenhuyse 2006, 26). At Tell Sabi Abyad, round and rectangular buildings appear together, often connected to one another in what appears to be a response to increasing settlement density (Akkermans and Verhoeven 1995). The importance of sedentary storage is duly noticeable once more, associated with an increase in architecture. It is the increased archaeological visibility associated with greater architectural presence that led to certain authors attributing the preceding Pottery Neolithic as a *Hiatus* of sorts (discussed earlier). However, the mobile element of society remains well attested even in the Halaf. Bernebeck for example notes that not only do Halafian societies fail to display signs of public institutions or cities, there is no evidence for subjugating herders to the peripheries of society either, despite the investment in settlements (Bernbeck 2013, 51).

3.6.1 | Portable storage and trade in the Halaf

As for trade in the Halaf, certain scholars have suggested that the emergence of this culture was based on the increased frequency of trade and exchange in the preceding period (Perkins 1949, 44-5; Braidwood and Braidwood 1960, 137; Theusen 1988, 187). Indeed as has been outlined above, by this point in the Late Neolithic the existence of long and short distance trade was well established. Improvements and extensions are made to these networks, however, as communication between the coastal Levant, south-east Turkey and the Mesopotamian plains continues to intensify (Akkermans and Verhoeven 1995, 5). The same accumulation of material that was traded previously is sustained, but importantly the trade of pottery attains prominence and significance. At Tell Sabi Abyad, the type of pottery classified as Orange Fine Ware and Fine Painted Ware are believed to have originated from elsewhere (Le Miere and Nieuwenhuyse 1996, 160). Similarly geochemical analysis on chlorite vessels indicate direct trade existed between Tell Sabi Abyad and the site of Hagoshrim in northern Israel (Rosenberg *et al* 2010). The most notable of examples for trade and storage are the emergence of sealing practices from around 6000-6200 BC in Syria and the northern Levant (Akkermans and Duistermaat 2004; Akkermans *et al* 2006, 154). Hundreds of these seals have been located at the 'burnt



Figure 3.13- Examples of some of the elaborate painted styles which would have acted as agents of exchange in the Halaf (from Akkermans 2013b, 23)

village' at Tell Sabi Abyad, suggesting the storage of an increasing variety of items merited some form of administration (Akkermans and Duistermaat 1996, 24). What this indicates is a clear emphasis on the protection of certain goods and items. Accumulation of distant material were visibly more important by the late Neolithic, and the development of practice underlines the this increasing significance of exchange networks.

3.7 | Summary

In sum, this chapter has highlighted that trade and exchange were ever present throughout the Neolithic, from its beginnings through until its end. Despite shifting settlement patterns, changing climate, increased and decreased mobility as well as other socio-economic factors, the activities surrounding trade and exchange sustained and persevered. Such dedication to this cause strongly underlines the importance Neolithic peoples afforded to this practice. This is not to prescribe a linear evolution to this activity, but instead new and innovative ways to extend community outreach revolved around the settlement dynamic.

As such the beginnings of 'Neolithisation' as we may call it in the Natufian provided the utilities which allowed for such networks to be established. In other words, only when people began to be connected with one place could other communities associate them with that place. The presence of architecture and subsequent storage facilities do not necessarily correlate with sedentism – in fact we know that ephemeral sites in the Natufian were by no means occupied all year round – but it does provide the basis for the accumulation of surplus and material in one place. A sense of memory would have ensued where foreign communities would immediately have identified a particular mound or settlement with a specific people, although this is by no means to be mistaken for a specific culture or ethnicity. Only when this sense of place had developed could a new outlet for trade surface, a regional exchange centre of sorts (this is discussed in detail in the next chapter).

Regional communities would have a platform to congregate, exchange ideas, arrange marriages and share experiences and material. These centres emerge in greater frequency in the PPNA and particularly the PPNB, where distant societies and communities could have participated in larger ceremonies, proliferating the expansion of novel and innovative ideals. Whilst the so called collapse of PPNB society's remains far from relevant for Upper Mesopotamia, this chapter has demonstrated that exchange networks remained just as strong as before, but had to restructure and adapt to the shifting settlement patterns noted.

| CHAPTER 4 |

PREHISTORIC TRADE AND EXCHANGE: HOW DID IT WORK?



Figure 4.14- Image of modern day Tuareg nomadic group (from online source, see list of figures)

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"Although archaeologists routinely describe long-distance movement of materials in pre-history... formal theoretical investigation of the conditions under which we should expect these material 'interaction spheres' is almost completely absent" (Winterhalder and Kennett 2009, 646)

This chapter deals directly with the above issue. There remains an underlying assumption in the general discourse on prehistoric activity that long-distance exchange of items was ever present. As far back as the Upper Palaeolithic, the assertion that systematic trade over considerable lengths is held as common belief (Ofek 2001, 172-173). Prehistoric trade is routinely inserted and substituted into various discussions in prehistory, without an understanding on *how* this activity was administered. This is even more apparent in the origins of agriculture and 'Neolithisation' debate. Hayden (2009) for example argues the accumulation of grain and agricultural produce, often obtained from lengthy distances, provides clear evidence for the role of feasting and emergence of status towards the beginning of the Neolithic. Zeder and Smith (2009) argue the opposite, suggesting long-distance trade was not an individualistic desire to accumulate, but rather the forced removal of prestige items from society to underline the egalitarian ethos (Zeder and Smith 2009, 685).

Similarly the vast majority of excavation reports pertaining to the Neolithic, both early and late, pre and post pottery, include a section on the presence of material whose provenance is not local. A generic list would include marine shells, bitumen, beads and most commonly obsidian, the latter particularly relevant beyond Anatolia where distances become fairly substantial. Tell Sabi Abyad, as will be discussed in the second section of this study, is not exempt from this practice, and site publications similarly list various items of distant origin without understanding its journey and ultimate arrival at its final point of deposition (e.g. Akkermans 1997). The following will attempt to shed light on how any given item reached point A to point B in prehistory, specifically in the context of the Late Neolithic. Three possibilities were available to our prehistoric ancestors in the exchange of materials, 1) transportation by foot 2) transportation with the assistance of pack animals and 3) marine transport.

4.1 | Who and how?

Having established this, the next question to address is who would have been responsible for the facilitation of this long-distance trade, and how would it have been carried out? Are we to assume that designated individuals were assigned the responsibility of travelling to extreme lengths to acquire and return with certain 'exotic' items? Or was the material simply passed on from settlement to settlement, eventually arriving at its final point of deposition? Opinions on this matter are somewhat polarised. Bernbeck, for example, argues 'it is definitely wrong to imagine wandering traders' and that desirable items such as obsidian were 'rather a curiosity than a raw material for daily needs' (Bernbeck 2004, 142). Others assert that long distance trade facilitated by dedicated travellers was indeed practiced, and well established by the Late Neolithic (Akkermans and Duistermaat 1997; 2004; Cauvin et al 1998; Dogan 2008; Perles et al 2011; Rosenberg et al 2010; Weinstein-Evron 2001). I would align with the latter interpretation, and will attempt to display how such interactions were performed and were possible, without overwhelming burden. Ancient trade has for some time been linked with nomadic activity, and has at points been recorded in the ethnographic record (Cribb 1991; David and Kramer 2001; Kramer 1985). Even in an ethnoarchaeological context, historical evidence is abundant in representing nomads as intrinsically involved in the caravan trade, such as in the Bronze Age Near East (Klengel 1977, 164; Khazanov 1984, 209). This does not suggest nomads were necessarily involved in the creation of trade or benefited from its fortune, but instead would have held positive relationships with a range of communities. To avoid 'trespassing' or interfering with the resources available within a particular region, it is safe to assume nomads shared jovial affiliations with a multitude of groups and people (Cribb 1991, 14; Khazanov 1984, 211). That said, it may not have been nomads alone that were responsible for the redistribution of material but such networks were available to access by the wider community (Akkermans and Verhoeven 1995, 25). It appears

regional centres had an important role to play in this redistributive process, but I will return to this in detail later in this chapter. The notion that the exchange of long-distance items was reserved for prestige items rather than for pure subsistence would seem the more likely scenario (*Ibid*, 31).

As for the mechanisms which supported this network, Renfrew has proposed 10 modes for understanding exchange in the archaeological record (Renfrew 1975, 41-43). This model entails trade systems as a whole from prehistory, antiquity and beyond. For the Neolithic, the most suitable explanations based on the discussion within previous chapters would be systems 1, 2, 4 and 5 respectively (see table 4.1). Number 1 refers to direct access to the desired product or material by an individual, or more likely a group of individuals set out on a task for retrieval. This access is unregulated in the sense that the group is only limited by the amount they are able to carry, and can take as much of the material as they wish without interference. This could be associated with the extraction of obsidian and bitumen from its source by groups of individuals. Numbers 2 and 4 overlap somewhat and entail exchange between sites. This would have been common in the Neolithic where commodities, perhaps not necessarily of prestige or luxury, were exchanged between sites within a close proximity to one another. It is likely a particular community experiencing a shortfall in supplies were assisted by nearby communities in a shared sense of reciprocity, with the unwritten obligation to repay the favour when necessary. Such transactions probably took place on a regular basis, much like borrowing milk or bread from a neighbour in a modern context. Number 5 would undoubtedly have been a common node of redistribution within the late Neolithic in particular. It refers to regional centres, sites where congregations of people from the wider landscape would assimilate on specific occasions. Such occasions would create the ideal scenario for the display and acquisition of distant material to convene, even more so in the Late Neolithic where populations were fairly mobile. I will return to this latter point in greater detail when introducing the case study of Tell Sabi Abyad (chapter 4), and illustrate its relative importance in the facilitation of this activity.

#	Name of System	Explanation		
1	Direct access from A	B has direct access to the resource a without reference to A. If a territorial		
	to B			
		boundary exists, he can cross it with		
		impunity		
2	Home based	B visits A at A's home base (a), and		
	reciprocity	exchanges the special product of b for that		
		of a		
3	Boundary reciprocity	A and B meet at their common boundary		
		for exchange purposes		
4	Down the line trade	This is simply reduplicated home-base or		
		boundary reciprocity, so that the		
		commodity travels across successive		
		territories through successive changes		
5	Central place	A takes his produce to p and renders it to P		
	redistribution	(no doubt receiving something in		
		exchange, then or subsequently. B takes his		
		produce to p and receives from P some of		
		A's produce		
6	Central place market- exchange	A takes his produce to p and there		
		exchanges it directly with B for produce		
		from b. The central person P is not		
		immediately active in this transaction		
7	Middlmen trading	The middleman C exchanges with A at a		
		and with B at b. C is not under control of A		
		or B		
8	Emissary trading	B sends his emissary B, who is agent and		
		under jurisdiction, to a exchange goods		
		with A		
9	Colonial enclave	B sends his emissaries B to establish a		
		colonial enclave b, in the close vicinity of a,		
		in order to exchange A		
10	Port of trade	Both A and B send their emissaries A and B		
		to a central place (port of trade) which is		
		outside the jurisdiction of either		

Table 4.1- List of explanatory models for systems of exchange (adapted from Renfrew 1975)

Aside from the systems of exchange, the potential transportation of these items would have arrived at its destination through three possible modes, or most likely a combination of the three. Movement of items by foot, meaning over land and without assistance of animals, would have been one option, but naturally restrictive in the amount one can carry and for the duration it can be carried. Secondly, the assistance of animals would undeniably have been sought, although we are confronted with the dilemma of pack animals (donkeys, horses, mules and camels) not yet domesticated by this point, therefore either we are to assume they were indeed being used but remain undetected due to the noticeable lag in the morphological traces of domestication, or other domesticated animals were used sparingly, most commonly sheep and goat. Finally, trade overseas within the Near East would have been a viable option for Late Neolithic peoples to have explored, and strong evidence suggest this was a practical alternative for transportation along coasts and even rivers.

4.2 | Transportation by foot

Movement of material by foot, or rather supported on one's body as opposed to any other mechanism, is a habitual practice and an innate human capability. Technological advancement in the first world, and indeed many developing and third world countries, has since reduced our need to carry heavy items over long distances, but 3000 years prior to the invention of the wheel Neolithic communities would undeniably have relied upon their own strength and capacity to move things. This sub-chapter will illustrate the capability of humans to bear considerable loads over vast distances, and how innovative techniques are noted in the archaeological record to help in this activity, the use of pottery being one of them. Strong ethnographic parallels provide an insight into the endurance of humans for the sole purpose of moving goods from one place to another, either for subsistence or for redistribution and exchange elsewhere. Today, metal and plastic are the most commonly employed vessels for transportation. Pottery was arguably the common item of use prior to the industrial revolution, and likely would have been in the Late Neolithic (Cribb 1991; David and Kramer 2001; Kramer 1985). The question then arises as to how groups would have supported vessels and other items on their bodies to sustain such journeys.

4.2.1 | Luri Nomads

The work of Frank Hole in the Iranian Zagros region merits particular attention. Hole could be considered an archaeological polymath of sorts, having worked extensively for decades across Iran conducting surveys, excavations, ethnographic research and more, publishing material spanning from prehistoric to Islamic times (see Hole et al 1969; Hole et al 1977). His ethnographic study on the Luri nomads is particularly relevant in the context of portable storage and the systems used to move heavy items for a sustained period of time. He noted that despite the broad assemblage of items the Luri travelled with, all the necessary items could be carried on foot (Hole 1978, 140). The Luri originally used wooden vessels to carry necessary bedding, clothing and other subsistence items, and this was often carried by hand. The use of pack animals was noted to be a potential burden rather than of assistance, particularly during the warmer months where thick and heavy items were not as necessary, and providing fodder for animals was somewhat troublesome (Ibid, 149-50). Of course, the modern assemblage of items consists of metallic pots and plastic containers instead of wooden or ceramic vessels, but Hole asserts that pottery would have been utilised in prehistory. He provides an example from Mexico where 'human porters' would carry pots over vast distances to reach a central market-place, although the reference for this case study is unfortunately not cited (Ibid, 150).

4.2.2 | Human porters

Fortunately studies on human porters have been carried out elsewhere, and the example of this practice in Nepal provides an astonishing case study of the lengths and weights individuals are able to carry over a period of weeks in some cases. Malville's study on this occupation in modern day Nepal was carried out with the intention of understanding the limits of foot transportation in the context of Mesoamerican archaeology, where difficult terrains and lack of pack animals, prior to Spanish colonisation, meant transportation was presumably carried out by this means (Malville 2001). Debates in Mesoamerican archaeology regarding foot transportation are somewhat polarised. Lightfoot, for example, suggests that 50km constitutes the limit of food redistribution when moved by humans (Lightfoot 1979,

332), whereas Drennan suggests 275km represents a more accurate limit (Drennan 1984). With this pretext, Malville set out to examine in a modern context the extent and capabilities of transport by foot. He interviewed 635 porters to establish their age, as well as weight of their loads and distance travelled, all to ascertain the nature of this activity in its fullest. The individuals who undertake this occupation are obliged to do so for a number of reasons, most prominent of which being that the Namache region – where this study was based – is located in a mountainous terrain, meaning access by modern vehicular transport is not possible and air transportation is naturally too costly for rural communities (Malville 2001, 232-233). 95km separates Namache from the nearest market place at Jiri, where everything from metal roofing, window glass and even cement is carried by people. Porters are not controlled by any central government or authority, and it is purely an individual endeavour, providing an ideal example for analogous comparison when examining the capacity for this means of travel.

	N	Age (yr),	Load weight (kg),	Load as % of body wt.,
Category		mean (SD) [range]	mean (SD) [range]	mean (SD) [range]
I. Load weights of adult males (≥20 yrs	s) classi	fied according to pur	pose for which load w	as carried
Self-employed				
Carrying to home (domestic)	71	35.1 (12.0) [20-65]	59.1 (14.6) [23-96]	123 (33) [53-215]
Traders	54	28.3 (7.0) [20-52]	79.3 (15.0) [48-111]	157 (32) [100-231]
Combined	125	32.2 (10.7)	67.8 (17.8)	138 (36)
Hired by others				
Hired by shopkeepers	264	32.9 (10.1) [20-61]	73.4 (12.7) [23-107]	148 (27) [69-224]
Hired by government development projects	49	34.3 (9.7) [21–64]	71.3 (17.2) [33–108]	145 (32) [74–219]
Combined	313	33.1 (10.0)	73.0 (13.5)	147 (28)
II. Summary of load weights by age ar	nd sex			
Subadults, 10–14 yr				
Males	37	12.8 (1.2)	33.6 (9.8) [15-62]	105 (32) [52-207]
Females	4	13.3 (1.0)	35.6 (7.9) [25-43]	115 (11) [104-129]
Subadults, 15–19 yr				
Males	125	17.1 (1.3)	60.3 (13.7) [31-94]	136 (28) [78-198]
Females	17	17.0 (1.3)	47.7 (6.8) [35-60]	113 (12) [91–135]
Adults, ≥20 yr				
Males	438	32.8 (10.2)	71.6 (15.0) [23-111]	145 (31) [53-231]
Females	14	35.2 (10.3)	53.4 (8.3) [35-66]	119 (24) [78-164]

Loads Carried by Hill Porters on Three Major Trade Routes of Eastern Nepal^a

^aIncludes only long-distance portage activity of several days' duration (Malville 1999); local household and agricultural activities are not included. The three trade routes included in the study are as follows: (1) Jiri to Namche Bazaar; (2) Katari to Okhaldhunga; and (3) Hile and the Arun River valley and tributaries.

Table 4.2- List of porters and details of their journey (from Malville 2001, 234)

The results of Malville's survey are noted above in figure 4.2, but I will briefly summarise the more pertinent figures here. What is clear is that it was an overwhelmingly male activity, but women and children were not exempt from performing this role. The average load of adult males that were employed in this profession was 73kg which, when contrasted with the average weight of a Nepalese porter (51kg), means that most typically the load one bears is 143% of their own body weight. In addition, the average distance was around 8-11km per day taking 9-12 days to complete the entire journey, categorically highlighting the abundant potential of individuals and groups to transport goods over vast distances (*Ibid*).



Figure 4.15- (Above) - Image of modern day Nepali porters. (Below)-Image of tea porters working along the Silk Road (both images from online source, see list of figures)

This activity was not exclusive Nepal, to similar ethnographic studies have been performed in Guatemala and East Africa where results observed found on average individuals carried less weight - 45kg was the average - but covered around 20km per day, almost double the distance of the Nepalese (Tourtellot example 1978). Even in Nepal however. porters by employed tourists were noted to travel some 14-18km per day and still carrying up to 45kg each (Malville 2001, 235). If we consider these results for the Near Eastern Neolithic, than the possibility of long-distance exchange by a similar convention of human porters is highly perceivable. I will postulate specific distances and weights in the following chapter with the case study of Tell Sabi Abyad, but here it is clear the movement of material through bearing loads on one's body and head, with the assistance of purposely prepared products (i.e. pottery and leather pouches, lime and wooden baskets etc.), was a strong possibility. As for the option of balancing vessels on one's head, Malville noted head straps were often used to assist in this particular strategy (Malville 2001, 230).

4.2.3 | Top heavy: bearing weight on the head

It is a common sight in the developing world for individuals, commonly women, to carry quite large and heavy pots on their head for transport. I would suggest that a similar practice could easily have applied in prehistoric communities, including in the Late Neolithic of Syria. A recent study of domestic water carrying in the Limpopo province in South Africa showed that surprising distances and loads can are carried on a daily basis by members of the community (Geere et al 2010). The study found those carrying loads on their head were at times carrying 27 kg. This on average accounted for 59% of the mean body weight of those carrying the containers, rising to a maximum of 77.8% in one instance (see table 3 in Geere et al, 6). Considering this skill was predominately practiced by young women and children, the weights and relative percentage of body weight lifted is fairly substantial, meaning the potential for head-based transportation in prehistory definitely merits further attention. That said, carrying such heavy loads was not possible over long-distances, but movement of lighter loads and the consummate ease with which, from a very young age, individuals could easily balance and support a sizeable vessel on their heads should be noted. Parallels could have easily existed in prehistoric communities, perhaps not for long journeys but definitely on a more local scale. It is possible men undertook lengthier journeys and carried heavier loads in the system of long-distance exchange, whereas women and children were responsible for the more localised movement of material, even from the agricultural fields back to the place of storage or between sites within a valley or river basin.

I would suggest another, somewhat speculative proposition in this context. Cranial modification has long been highlighted through burial remains, where the practice of elongating an individual's skull was undertaken through wrapping bandages around the head during infancy in the Neolithic (see Croucher 2013). The result left a visibly lengthened and flattened surface of the head, typically assumed to represent a ritual context through



Figure 4.16- Zulu women displaying the relative ease in which they are able to balance pottery on their heads (from online source, see list of figures)

bodily expression in the Late Neolithic. But could this have been a practical modification? Could the extension of one's upper head provided a secure platform to carry pots for instance? It may sound strange, but there is a tendency to jump towards the 'ritual' interpretation when the pragmatic – albeit a somewhat extreme version of pragmatism – option is often overlooked. If transportation and movement of goods over long-distances was necessary, or even at intra-site level, then the adoption of practices to help facilitate this may well have a been a very realistic possibility. Carrying weight on one's head, aside from the back, allows for the easiest means to move fairly heavy amounts, and over a reasonable distance, as opposed to using hands or shoulders. As highlighted above, the practice of carrying pots on one's head remains abundant in many developing countries, and appears to be the preferred option in the absence of machinery or vehicles of transport. This is, admittedly, purely speculative and further evidence would be necessary to substantiate its basis, but it remains a possibility worth exploring in future study.

4.2.4 | Issues with foot transportation

There are, however, certain assumptions which are associated with the concept of transportation by foot. Firstly, the repertoire of material goods would presumably have to be carried on the individuals' back or head to bare heavy loads. If this was the case, a further assumption would be that unnecessary items would be limited, particularly items that could cause intense strain and damage on the body. The first piece that could be removed would be a tent or canvas used for shelter, arguably the heaviest and most cumbersome of the nomadic repertoire. Cribb notes in her study of 'Nomads in Archaeology' that the construction of rudimentary shelters wherever and whenever necessary was probably the norm, and would account for the lack of identification in the archaeological record of ephemeral hamlets, as opposed to the erection of purpose built camps which has the likelihood to leave more traces of visibility (Cribb 1991, 80-82).

Basic shelters could be made from wood, reeds, stone and constructed entirely from locally available materials, materials which would probably have been available throughout the fertile plains of Near Eastern Neolithic. Similarly, Hole notes that migrations by pastoralists are timed to avoid colder spells, and to save on the quantity of grain or flour necessary to carry when wild acorns are able to serve as a reserve means of sustenance (Hole 1978, 150). It has been suggested that Bedouin communities, very rarely travel lightly and their range of stuff is of great importance to their tradition and livelihood, therefore the minimalistic approach of travelling by foot and with few items is difficult to postulate (De Schauensee 1968). However, modern Bedouin benefit from the usage of beasts of burden to transport their sizeable assemblage of material on their journey, as well as using car more recently (Chatty and Salzman 1980). Of course by the Late Neolithic, only sheep, goat, cattle and dogs were fully domesticated in the archaeological record (Garrard et al 1999). Hence the dismissal of foot transportation as common place in the late Neolithic is not only misplaced, but human porters of sorts appears a very plausible scenario. Of course exchange practices were not necessarily pressed by such extremes as in the Nepalese example where porters moved material necessary for survival, instead the quantity of items carried would have been manageable to ensure the journey was not too strenuous.

4.3 | Transportation with animals

The use of pack animals in the ethnographic and ethnoarchaeological records is abundant (Abdi, 2003Cribb 1991; Bar Yosef and Khazanov (Eds.) 1992; Schwartz 1995). Pack animals, or beasts of burden as they are sometimes referred to, entail working animals used by humans for the transport of materials, usually saddled to the animals back. Several sturdy mammals are used for this purpose dependent on what animal is locally present and their relative domicile behaviour. For the Near East, horse, donkey, mule and camels are most commonly used by modern Bedouin, although this practice is dying with the introduction of vehicles and pickup trucks gradually becoming the more favourable option. The problem for the Late Neolithic of the Near East is that the animals which we would typically associate with this activity were not yet domesticated (Bulliet 1990; Levine 1999: Rossel et al 2008). Even cattle were at this point (ca. 7000-5700 BC) not yet managed by humans, although it was domesticated by the end of the Neolithic (Gotherstrom 2005; Russell *et al* 2005). We must therefore move on to other animals, those which were domesticated already, in an attempt to assess the possibility of these species to have played a role in the bearing of weight over long-distances. Two prominent types are well recorded by this stage, namely sheep and goat, both believed to have been domesticated as early as 11,000 BC (Pedrosa et al 2005; Zohary et al 1998). The other option is the dog which was domesticated much earlier (Clutton-Brock 1995), but would naturally be limited in the amount it would be able to withstand. Unfortunately, sheep, goat and dog no longer perform the function of acting as pseudo beasts of burden in a modern context, as the traditional pack animals are almost always relied upon. Ethnographic and general observations would not specifically make account of this possibility given the narrow research context in which it applies, and the presumably limited nature of the activity itself. As such, the following will present a theoretical supposition of the capability of sheep and goat to undertake this responsibility.

Two hypotheses can be suggested, firstly, either sheep or goat were used to carry some of the burden associated with nomadism and movement of material. The second option is that perhaps some pack animals were indeed used for this purpose, but the lag associated with morphological traces for domestication was preventing its visibility in the archaeological record. In other words, donkeys, horses and camels were perhaps domesticated before we are able to see any traceable changes. For the latter option to hold weight, the presence of animal remains for these species should be recorded in archaeological contexts. The problem for archaeologists is twofold. Firstly, if we assume that these animals existed predominately in a nomadic context, then the likelihood of their appearance in the archaeological record is very low, given that their remains are more likely to be deposited outside of a given settlement. Secondly, we are reliant on zooarchaeological research beyond the identification of this species to establish their role as beasts of burden. Indications of stress as a result of a life of load bearing needs to be identified to make the connection between Neolithic peoples using such animals for trade, as opposed to the presence of wild animals which could have been hunted or used for other reasons. These two conditions are not necessarily met in the majority of excavation reports, which are commonly limited to establishing the presence of a given species and its evolutionary change in terms of size, which is understandable given the context of pastoral economies is arguably the key research question in much of the studies conducted in this connection.

Let us now examine the first possibility, i.e. the use of sheep and goat as beasts of burden. The domestication of these two closely related, even-toed ungulates is widely accepted by the Late Neolithic. Of the two, the possibility for goats acting as beasts of burden appears the more likely. That said, Bedouin communities commonly note that goats can be notoriously difficult animals which require a noticeable degree of attention to ensure they either stay on the intended path set by the herders. Beyond their relative inconformity, they are not particularly muscular animals and the ability of goats to bare significant weights on their backs would be limited. Even so, it would undeniably help facilitate the movement of materials and remove the entire burden from humans, as the travelling by foot scenario would have enforced.

The other possibility, as was briefly mentioned previously, is that beasts of burden were adopted during the Neolithic but the transition is not immediately noticeable. Such animals would have instantly been recognized for their potential to help the strain of carrying an increasing breadth of materials if the suggestion of trade is accepted. The primary obstacle would be in identifying the ability to tame these animals and use them for this purpose. It must be remembered that the dog had already been domesticated for several millennia by the time of the Late Neolithic. The dog would have represented a more dangerous and aggressive species but it appears the hostile persona was not a limiting factor in the domestication process. Therefore the domestication of the camel, donkey or horse, albeit much larger animals, was probably less of an immediate danger, given that these animals are herbivores and probably less aggressive, even when wild. It is therefore possible that they were used in a sparing capacity. This must be counterbalanced against the restraints and negative aspects involved. One such example would include the value of livestock, presumably tied to a certain community. If animals were used for long-distance journeys, then the potential economic basis would be removed from the settlement for an extended period of time, and therefore be considered a risky strategy. Secondly, sheep and goat bearing extra weight would subsequently be losing more energy, and would require a higher quantity of food supplies to compensate for the deficit. This increased maintenance in relation to the herd would probably have proven an unnecessary slight. What is more probable is that pastoral communities were using these animals for the movement of material on a more regional basis, within the loose boundaries of their grazing patterns. Therefore goods distributed and recycled within a region, or to the boundaries of a region, could have been shifted along with the hard, rather than forcibly engaging the herd in another direction.

4.4 | Transportation over water

Having dealt with a land-based systems of transportation, a further supplementary, particularly in coastal regions, would have been maritime travel. Although we lack direct archaeological evidence for boats and similar water based vessels in the Neolithic, secondary evidence proves that well developed and reliable means of sea and even river transfer were available and regularly used. Of course this is more applicable for coastal regions of the Near East bordering the Mediterranean, Red

and Black seas respectively, as well as the Arabian/Persian Gulf, but the possibility of transport along the Euphrates and Tigris could have facilitated movement through Mesopotamia also. Maritime technology existed far before the Neolithic. Indeed the migration of anatomically modern humans out of Africa and into the Levant some 90,000 years ago has been suggested to have included transportation by boat (Stringer 2000). Even by the early Neolithic, the movement of material and cattle by boat from the Levant to Cyprus has recently been proven to have transpired by 9000-8600BC (Vigne et al 2011; 2012). It is clear the capacity and capability to move considerable weight and distances by marine vessels would have been well understood by the Late Neolithic. The following will therefore attempt to postulate the exchanging materials, both by river and by sea. The focus on river transport will be highlighted here to tie into the case study of Tell Sabi Abyad in the Balikh valley of Upper Mesopotamia. Maritime transport would have offered one of the more favourable solutions to carry heavy loads over long distances for a number of reasons.

4.4.1 | Potential of early maritime transport

Firstly, as briefly mentioned above, is the issue of size and weight. The movement of material by foot greatly restricts the amount that can be lifted, as well as the quantity which can be carried, even if each individual is able to carry more than their own body weight. Similarly, movement over land can present several difficulties even if assisted by the use of pack animals. Topographic difficulties and territorial boundaries would have to be navigated carefully without causing a great deal of disruption. Considerable foresight would have been necessary to circumvent or negotiate mountainous regions and valleys, whilst intruding on foreign lands could easily have created potential conflict or unrest. That said, the issues related with seafaring must be countered against the option of travelling by land. Travelling by boat is inherently hazardous, requires great skill and, given the event of a vessel capsizing, would incur great physical and economic loss. The archaeological evidence in relation to this issue is somewhat limited, but ever growing. Work carried out in the Arabian/Persian Gulf has provided intriguing evidence for Neolithic trade of pottery, possibly in exchange for marine shells (Carter 2012). Whilst pottery was possibly an item of trade itself, it naturally would have acted as an agent of trade also. The fragility of pottery could be deemed a deterrent for utilising it for this purpose, but the assemblage analysed from the above study showed a mixture of larger vessels and particularly fine smaller ones, the latter of which was highlighted for its vulnerability (*Ibid*, 46). Despite this potential economic loss which could have been incurred through the movement of fragile pottery via rudimentary boats, Neolithic peoples persisted with this practice and were confident enough to continue with it, reinforcing the importance of maintaining systems of trade and exchange intact at this stage.

4.4.2 | Trade routes and methods of construction

As for the routes of trade possible, the likelihood is that Neolithic seafarers restricted themselves to hugging the coastal perimeters rather than venturing too far outwards. The evidence for Neolithic boats is sparse, both in the recovery of its physical remains as well as in iconography, particularly for the eastern Mediterranean which would have served the Levantine region (Budja 1999, 126). Nonetheless, ethnographic evidence points towards coastal populations regularly producing boats for the dual purpose of fishing and transport, the latter of which has a direct relation to trade (Ames 2002, 29). Leaving aside the possibility of trade and exchange with outer networks and communities, resource exploitation and potential colonisation of new lands would also have provided an additional stimulus for communities to venture towards new pastures accessible via sea's and rivers. The case of Cyprus mentioned above is an apt example of such a scenario transpiring, with the 'Neolithic package' - consisting of cereal and animal domesticates as well as architectural similarities to the Levant – presumed to have been carried onto the island to establish new settlements (Zeder 2008). There is no reason to assume the opposite interaction did not take place, i.e. the introduction of new material and ideas from other regions.

In terms of the method and materials used for the construction of Neolithic maritime technology, a few possibilities have been posited. Canoes dug out of logs is the simplest option, but such crafts would be highly restrictive and hardly adaptive for anything beyond short-length voyages (Casson 1995). An extension of
the dug-out canoe would be to have a number of logs tied together with planks of flat pieces of wood laid on top, propelled by punting poles (*Ibid*). There is similar evidence for boats constructed as sturdy rafts, made from bundles of reeds strapped together and lined with bitumen for waterproofing (Carter 2002, 46). All of these rudimentary vessels are too primitive to have successfully carried cattle and other large weights successfully. There is no evidence for sail boats used in the Neolithic, or indeed anywhere until its appearance in Egypt around 3000 BC (Robb and Farr 2005). An estimation on weight and capacity of such early vessels has been conducted by Broodbank and Strasser (1991, 240) where it was calculated that 10-15 boats would have the ability to carry 15,400-18,000 kg of cargo and around 40 people. Unfortunately we lack any complete evidence of sunken boats for this early period, but it is safe to assume that the technology existed to have facilitated the movement of the 'Neolithic package' and more.



Figure 4.17- Image depicting perceived capability of marine transport in the early Neolithic colonisation of Cyprus (from Broodband and Strasser 1991, 126)

Moving onto ethnographic evidence, modern examples of maritime technology without the use of the sail and built of solely organic material is increasingly limited, but certain pertinent examples have been recorded. James Hornell, the famed English zoologist and ethnographer, repeatedly visited India and made some interest observations during his travels in the early 20th century. His opinions on certain matters would by today's standards be deemed unacceptable, particularly his disdain towards certain 'wild negrito tribes' who he classified as 'the very lowest in civilisation of all existing races of the human species' (Hornell 1920, 63). Nonetheless, he noted that river crossing was tackled by a number of novel solutions, such as rafts formed of upside down pots used as the base and leashed together with a stick (Hornell 1920, 67). Elsewhere, the Aborigines of New Zealand use bundles of reeds to create similar platforms whilst Iraqi herdsmen bizarrely use inflated goatskin as a basic way to overcome waterborne difficulties, a practice still used in parts of China and Mongolia (Casson 1995, 3). Whilst direct ethnographic examples of techniques employed to negotiate the Euphrates and Tigris in the Mesopotamian region are, as far as I am aware, non-existant, ancient sources do provide some insight into the matter. Xenophon mentions in his account of crossing the Euphrates that bound logs were used, and mentions that the natives created leather-rafts for this function (Anab 1.5.10). Similarly Assyrian reliefs depict a vessel similar to what is known as the Kelak, a basic construction made up of multiple bladders of either sheep, goat or cattle lined with a wooden frame (Casson 1995, 4-5). The use of bladders comes with the additional benefit of being deflated and easily transported.



Figure 4.18- Image of market stall selling inflated goat skin raft's in Mongolia (from online source, see list of figures)

All in all, the means to create boats, rafts, canoes and the like was possible, and was clearly used. As mentioned in the previous chapter, visits to distant lands – Melos and Cyprus being prime examples - would not have been isolated, rare occurrences. Visitations would have been frequent, where movement back and forth would have been necessary on a systematic basis, if only to introduce new livestock for genetic diversity. At the same time, the new inhabitants – or colonisers depending on one's outlook – would have returned to the mainland for the very same reason, to create new marital bonds and form new relationships to sustain a healthy population. Even beyond the genetic argument, these people would undeniably have held a close affinity to their ancestors and past communities residing on the mainland, and the attendance of ritual ceremonies and conventions being held periodically would have necessitated adequate transportation to ensure safety, sufficient capacity and relative efficiency were prioritised to allow for regular access. The assumption that boats travelled in congregations, particularly when hauling heavy loads over lengthy distance, seems a valid and logical solution to the potentialities of incurring great losses which such a costly journey could easily have suffered. By travelling in numbers, the risk factor is somewhat reduced with the possibility of other members of the party assisting when necessary, for example during the advent of a technical difficulty on one of the boats.

4.5 | Centres of Exchange

What the aforementioned discussions have highlighted is the capability and possibility of Late Neolithic communities to embark on distant journeys in an effort to acquire or exchange materials, all during a period of overwhelming social and economic change at a local and regional level. In reality, all three of the above possibilities – transport by foot, transport with the assistance of animals and transport over water – would have acted together to help overcome the tumultuous journeys one would inevitably face, through difficult terrain, seasonal climatic ameliorations, social interactions, unforeseen issues and other such occurrences which undeniably would have surfaced. What is also apparent is that pottery, at a later stage, would have played a key component in all three transportation options available for long-distance trade.

There is an additional outlet to this system which would have formed an integral part of the redistributive process. The role of regional centres, sites with extended history and memory to the inhabitants of the wider landscape, were persistent throughout the Near Eastern Neolithic and particularly Mesopotamia (Bailey 2000, 156-60; Wilkinson 2003, 108). Tell Sabi Abyad provides a relevant example for the Balikh valley, but each region would have permanent settlements which, over centuries, were focal points where meetings of the wider landscape took place and loose socio-economic agreements were made (Akkermans *et al* 2006, 123-4; Nieuwenhuyse 2006, 26).

Larger settlements situated upon visible mounds would have been instantly recognisable in the landscape, particularly in the river valleys of Syria which are defined by relatively flat terrains. These mounds have been posited as centres which encouraged social engagement and exchange of not only marriage partners, but equally of commodities (Akkermans 2004, 290; Campbell 1992, 139-157; Campbell et al 1999). Relationships would subsequently strengthen between communities bound together by centuries of intermarriage and exchange (Akkermans 2013, 72-3). The presence of communal storage buildings at Tell Sabi Abyad in the Late Neolithic only strengthens the suggestion that such sites were representative of not just the sedentary dwellers residing within the buildings all year round, but of the wider geographic expanse (Akkermans and Schwartz 2003, 150; Duistermaat 2013). Even at PPNA Jerf el-Ahmar situated on the Syrian Euphrates, communal and multi-functional buildings for meetings, ritual and storage are well represented (Stordeur 2000). More recently, excavations at sites such as Gobekli Tepe and Wadi Faynan have produced spectacular and huge buildings which have been suggested to have entertained periodic communal gatherings (Mithen et al 2011; Schmidt 2005).

So how would it all have functioned? It is likely that a tentative date, based on solar or lunar patterns, was agreed upon and probably understood to hold some ritual significance, much like the gathering of Neolithic people at Stonehenge at the midwinter solstice (Worthington 2004). Individuals and groups who had accumulated products from distant lands would then have the prime opportunity to display their belongings to the wider congregation. Items were probably traded for other items, or possibly even for foodstuffs and the creation of social agreements. A primitive form of the 'dowry' system – where marriage agreements were based on exchange of materials of value – may similarly have taken place and is commonly noted in ethnographic examples (Anderson 2007). This material would subsequently be redistributed across the broader landscape once the gathering comes to completion, eventually reaching smaller, more ephemeral sites in the wider area.

The role of pottery would presumably have been central in this process, both in the retention of items and their return to the regional centre, but also by the attendees of such conventions who required some form of vessel to hold their newly acquired products. It should be emphasised this does not constitute an open market in a contemporary sense, nor an economically motivated convention of sorts where items of value were bartered and sold. Instead, the diffusion of materials, ideas, values and bonds of marriage would have participated in a broader discourse within the social dialectic. The communities involved would have held onto a general understanding of when and how to meet, and perhaps even what to bring. To facilitate the latter, it is undeniably clear that portable vessels would have been an essential element of the mobile repertoire, enabling the convergence of a broad range of materials for exhibition. The very vessels used may well have acted as agents of reverence themselves.

| CHAPTER 5 |

CASE STUDY: TELL SABI ABYAD



Figure 5.19- Image of excavation at Tell Sabi Abyad (from Akkermans 2013b, 23)

5.1 | Selection criteria

In selecting a suitable case study for this research, a number of criteria were necessary to provide a representative example to illustrate the nature of trade and exchange in the Late Neolithic. Primarily, and in line with the research questions noted in the introduction, the site required a chronological sequence which incorporated the pivotal transitional period from the pre-pottery Neolithic through to the pottery Neolithic and beyond. In doing so, the ability to chart any impact, amidst the introduction of pottery, could suitably be noted at a site level. Secondly, the topography of the region should be well understood to allow for any discussion of systems of trade and exchange, both between local sites and more far-fledged communities. Finally, the available data should be thorough and substantial enough to allow for a detailed study to be administered. In line with the above, Tell Sabi Abyad, a Late Neolithic settlement in modern day Syria, was selected as the ideal case study for which this thesis is based. Most notably regarding the last point, i.e. adequate publication and accessible data, Tell Sabi Abyad remains unprecedented in its continuous and vastly impressive congregation of excavation and publications. The site has undergone excavations since the 1980s (Akkermans 1989; 1993) and was only prevented from continuing in its latest excavation season due to the unfortunate inception of the civil war which pervades today.

This chapter will provide a brief background to the site of Tell Sabi Abyad, specifically within the broader context of trade and exchange in the Late Neolithic and evidence for such activity at the site. It will illustrate the topographic background within which the site is stationed, as well as quoting its relationship with nearby sites within the region. Most of all though, I will attempt to establish time it would take in the procurement of certain tradable items in an attempt to understand whether they could have been extracted directly from their source. Obsidian and bitumen will be focused on specifically, as they form the best studied raw material, and information on their provenance has been carried out in an accumulation of recent studies which will be presented below. Other materials of distant provenance will briefly be mentioned, but at first it is necessary to understand the logistics of such journeys, which relate directly to the socioeconomic dynamic of activity in the Near Eastern Neolithic. If communities were going to such pains to obtain items which were, in essence, not necessary for survival alone, then it is clear that functionality was not the sole motivator in their actions. Material such as bitumen can be extremely useful in performing a number of actions, most notably waterproofing, but we also find vessels painted with this residue, suggesting that it held multiple uses beyond bare functionality. Therefore understanding the infrastructure and effort required in this material exchange has the potential to engage new research directions, depending on the extremity, or lack of extremity, pursued in obtaining these items.

5.2 | Introducing the site

The site of Tell Sabi Abyad I, which literally translates from Arabic as 'mound of the white boy', is located in the Balikh valley some 30km south of the border between Turkey and Syria. The mound itself, spanning 240x170m and rising to around 5-10m in height intermittently, is somewhat deceptive in nature due to the effects of erosional deposits and overburden which give the impression of a uniform, singular entity (Akkermans 2013a, 29). It is in fact a congregation of four smaller mounds, each containing individual, prehistoric biographies, with the earliest deposits deeply stratified 4m below the modern day surface level. Tell Sabi Abyad I is the largest mound in the immediate vicinity, with four other mounds positioned nearby and labelled from I-IV.



Figure 5.20- Plan of operations I-V at Tell Sabi Abyad I, illustrating the nature of shifting settlement patterns at the site (Akkermans 2013a, 31)

The site has been under excavation since 1986 with the original premise of research focusing on broad horizontal exposures on the south east of the main mound (Akkermans et al 2006; Verhoeven and Akkermans 2000). Initially, research was primarily concerned with developing a greater understanding of the Halaf culture in northern Mesopotamia which, at the time, was scarcely researched in terms of the socio-economic dimensions of smaller sites (Akkermans 1988). Excavations have circulated throughout the mound of Tell Sabi Abyad I, each individually known as operations I-V. Annual excavations from 1986-1999 of operation I scrupulously revealed incredibly well preserved architecture and settlement patterns. From 2001 onwards, the emphasis has since shifted to operations II-V, revealing an occupational sequence as far back as ca. 7500 BC (Akkermans and Verhoeven 2000; Verhoeven and Krandendonk 1996). Of course the onset of the war in Syria has all but ceased further excavation at the site.

5.2.1 | Temporality and shifting settlement patterns

Two important areas here are necessary to emphasise in relation to this particular investigation. Firstly, the issue of inter-site mobility, temporality and shifting settlement patterns has continually been raised by the site excavator in relation to Tell Sabi Abyad (Akkermans 2013), suggesting that the population at the settlement would have withheld elements of nomadism or pastoralism as part of the very fabric of society. The exposure of broad horizontal stratigraphy and excavations across each of the mounds was able to confirm the notion that despite its relatively large size (5 ha.), the entirety of Tell Sabi Abyad I was not occupied at any one time. Systems of mobility were therefore necessary considering the foresight of inhabitants was not one of permanent occupation, even if the occupational shift was 50 or so metres away. In other words, people were not tied to a fixed location, but shifted within a larger settlement whenever necessary. As such, the representation of low-level mobility requires explanation, specifically answering the question of how people moved their belongings, both individual and communal, from one area of the site to another. This could further be extended to agricultural fields, and how harvested produce was accumulated and moved when required.

Secondly, the lengthy chronological sequence established across the four mounds at Tell Sabi Abyad I has provided a unique position of illustrating continuous occupation between the pre-pottery and pottery Neolithic periods, which remains relatively unobserved within sites in Syria (Akkermans 1999; 2013a). Whilst this transition has been overstated somewhat, by the Halaf period multiple directions of trade and a variety of products, including ceramics, are exchanged at the site. Numerous goods of foreign provenance – 'foreign' in this context referring to material retrieved from beyond the Balikh valley – have been recovered at the site, some of which include obsidian, basalt, copper, cedar wood, Dark-Faced burnish ware, tubular flint from the Levant as well as, for the later period, Samarra and Hassuna pottery from Eastern Syria or Northern Iraq respectively (Akkermans and Duistermaat 1997, 24). This suggests long-distance transport was similarly present, and therefore understanding the mechanisms of this transport are necessary.

5.3 | Topography and environment of the Balikh region

The Balikh regions sits within the broad, seemingly never-ending flat steppe, referred to as the *Jezireh* in Arabic. The world literally translates to 'island' and defines the area between the two great rivers of the Euphrates and Tigris. The climate is somewhat varied between north and south with rainfall averaging 200-600mm respectively (Wilkinson 2003, 100-103). Precipitation falls, and indeed would have fallen, in greater abundance in the northern region. The climate and ecology of the current landscape noticeably contrasts with the equivalent region in the Neolithic. Today, most of the steppe is semi-arid and maintained either directly by agriculturalists, or indirectly through the movement of pastoralists and animal grazing. It is the vegetative history, however, of this region that merits particular attention.



Figure 5.21- Map of Balikh and its location in Syria (from Akkermans 1989, 124)

The Wadi's (valleys), tributaries and particularly river basins were densely shrouded by a variety of flora and even forested in places with an accumulation of tamarisk, willow, poplar and beds of thick reeds (McCorriston 1998; Wilkinson 2003). Such a climate is complimentary to the mobile, itinerate lifestyle, as nomadic groups could have survived off subsistence through either hunting small game or foraging, or even timing migration patterns to acquire wild cereals which would have grown across the extended Fertile Crescent (Abbo et al 2013; Hole 1978, 150). It is also of strategic significance, with

access to the Euphrates and Tigris not too far away and probably accessible within a day at a stretch.

Two mounds dominate the Balikh landscape in general, Tell Mounbatah and Tell Sabi Abyad, the former only partially excavated with a distinct lack of information available (Akkermans 1999, 524-5). As for the socio-economic residential pattern of the landscape, a three tiered system has been proposed consisting of nomadic hunter-gatherer-foragers at the bottom – roaming freely across the region and exploiting its natural ecology in small groups – followed by small camps, ranging from 0.5-1 hectare in size and catering for a semi-nomadic, semi-pastoral population, and finally regional centres, also populated by a semi-mobile members but with a permanently based community as well (Akkermans 1993; Verhoeven 2002, 10).

At first it appears the location of these settlements within the Balikh was not immediately desirable, at least in the context of obtaining certain materials which were accustomed to the Late Neolithic economy (Nieuwenhuyse 2006, 25). Bitumen, malachite, copper, obsidian, marine shells and the like were not locally obtainable as has been illustrated in the previous chapter. The Balikh basin is only 100km in length meaning access to these materials were only possible through either venturing further, or by being brought in from others (Akkermans 1999, 523). This would necessitate strong trade networks to have extended beyond this region alone, for example with Khabur sites (Hole 1995). Networks would have been strengthened with continuous contact, but an important question does arise as to what communities that perhaps did not have direct access to desirable items were able to trade.

5.3.1 | Economic capacity of the Balikh

What form of material exchange was sufficient to obtain some of the rare or 'luxury' items listed above? For this it is likely special agricultural products or livestock would have played an important role. Exchange locally within the Balikh would have existed on a regular basis and has been referred to elsewhere (Akkermans and Duistermaat 1996, 24). Even within the PPNB, the distinctiveness, or rather the anomalous nature of activity within this region has been highlighted, suggested to have constituted a separate cultural identity of sorts (Verhoeven 2000, 197). It is not unperceivable to imagine that residents of the Balikh coming together to consider material transactions with foreign communities, to advance their ability of obtaining items in a greater volume. Considering a variety of ecological zones were exploited in the Balikh and by the late Neolithic, an assortment of domesticates were regularly cultivated (van Zeist and Waterbolk-van Rooijen 1996), the potential for economic posterity was present. This combined agricultural and semi-pastoral economy meant livestock was similarly abundant, with strong evidence of sheep used for wool by the presence of spindle whorls at Tell Sabi Abyad (Cavallo 2000, 107). A combination of specialist agricultural and animal related products could have provided the economic basis for residents within this valley to procure the favoured items of choice.

Of course the other option was to recover primary resources independently. Certain secondary products, particular ceramic types which were not made locally, appear to have been introduced through systems of exchange. The acquisition of obsidian and bitumen could have provided critical leverage in exchange patterns to allow for these products to be brought in. The following will therefore assess the potential burden of such resource-related expeditions.

5.4 | Distance-weight model assumptions

For the purpose of establishing the estimated length of a journey, I will rely on the following assumptions based on the discussions of the previous chapter, and will posit two scenarios, one where the load was carried by humans alone and one where the assistance of animals was used to redistribute the weight. Firstly, the carrying capacity per individual will be ranged from 15-60kg, rising 15kg for each scenario. For the 15kg option, I will assume that a distance of 25km per day would be possible. This figure is based on studies from Guatemala and East Africa where individuals carrying 45kg were able to travel 20km per day on average (Toutellot 1978). I will assume a lower average distance to weight ratio to account for logistical difficulties and a presumed lack of urgency compared to the ethnographic studies, where porters were employed to undertake this practice and

were therefore at a rush to deliver their loads to its destination as soon possible. I will incrementally reduce the time-weight ratio by around 21%, or 5km, every 15kg, again based on a similar percentage drop witnessed for example of modern potters in Nepal.

The second scenario, where animals such as goats and sheep are utilised to ease the burden of weight carrying and share the load, will similarly assume a steady drop in the weight/distance ratio, but reduce incrementally less at 16%, or 2.5km. This is because the redistributive weight capacity with the assistance of animals would allow for the individuals involved to carry less whatever the weight, and therefore allow for increased mobility. I will nonetheless posit a more conservative scenario for this considering the need to periodically stop for animal grazing, drinking water and general unforeseen issues which naturally would have arisen with the movement of a herd.

For both cases, I will assume that the same weight was carried out for the return excursion, as the consumption of subsistence carried is countered by the weight of the newly acquired produce. Indeed, the weight should reduce incrementally during both the original and return journeys as food supplies are used, but I will keep this figure constant once again to suggest a more restrained outcome, to allow for mitigating circumstances which could arise.

Finally, I will assume a constant rate of movement at all times. Of course fluctuations per day in the distance travelled would have been common place – some days progress may have been quicker, others worse – but it is necessary to assume a rigid average to play with the concept of estimating distance of journey in the Late Neolithic.

5.5 | Tell Sabi Abyad: second-tier centre for exchange

The previous chapter has discussed the existence of regional centres across the late Neolithic and particularly in Mesopotamia. Here I will provide evidence for Tell Sabi Abyad to be included within this list as a second-tier settlement within the perceived three tiered system. Archaeological evidence for the manifestation of a range of distant materials has been noted, but not yet embedded into the discourse of systems of trade and exchange. Instead, these have focused on geochemical analysis to establish provenance and extraction, without realising their broader significance in the redistribution of material in the Near East. So what evidence was there for exchange systems at Tell Sabi Abyad? To establish this we must at first recognise which items were recovered from a distant provenance. The following will focus on obsidian and bitumen which form some of the commonly found items of trade at the site, and will attempt to interpret how they may have ultimately reached their point of deposition.

5.5.1 | Obsidian

The first commonly cited item which appears throughout the Near Eastern Neolithic is obsidian, the dark, glassy, volcanic, flint-like stone which originates from its primary source in Anatolia. The occurrence of this material is prevalent throughout the site, but I will focus on a particular example from Tell Sabi Abyad II, where a package of retouched obsidian bladelets has been recovered (Verhoeven 2004, 196-7). The cluster was found together and tightly deposited from the eastern section of the narrow trench. It has since been suggested to have been a package, originally bound together by rope or in a small textile or leather bag (Verhoeven 1994, 10). The context within which they were recovered has been dated to 7600-7540 BC, or the PPNB period (Copeland 2000, table 3.4). What is interesting is that they are believed to have existed from a specific Anatolian tradition, from either the Cappadoccia region of Central Turkey or at the Bingol/Meydan Dag area of Eastern Turkey (Astruc *et al* 2007). The entire package is crafted with incredible precision and technique, meaning that a skilled workman would have spent a considerable length of time and effort to shape each bladelet into its ultimate form.

This topic has recently been taken up by the site director in an attempt to understand the significance of this assemblage of obsidian and its perceived point of origin, for which I will summarise some of the relevant findings (*Ibid*).



Figure 5.22- Parcel of obsidian bladelets from Tell Sabi Abyad II (from Astruc 2007, 3)

5.5.1.1 | Production and procurement

Two means of production have been hypothesised, first of which is the fuel production model which suggests a dedicated group travelled to the source of obsidian with a number of skilled knappers within the group and prepared a large quantity of bladelets there, before returning with the desired produce. The second model suggests obsidian cores were collected and either distributed to sites, where they were then produced, or these cores were taken to a workshop somewhere nearby where they were then redistributed. The second model has been tentatively dismissed considering the lack of evidence for on-site manufacture. For the first option, it is estimated a highly skilled individual would have been able to produce 70-130 bladelets per day weighing between 340-400g. Including the additional binding or parcel within which it would be delivered, the total weight was probably around 500g (*Ibid*, 10). 2-3 knappers may have travelled together with an additional apprentice learning his skill whilst also offering assistance by collecting fresh water, wood and food. Over a period of 60 days, 30kg per knapper worth of parcels could be prepared, each individual therefore having to carry around 30kg plus the

weight of subsistence and tools required for the journey. The daily ration for 2600cal and 40g of protein would mean some 500g of food would be necessary to bring along *per diem*. For a hypothesised 2 month session, this would require 30kg of food per person, naturally declining in weight as the journey progresses and this is consumed. On top of this, local wild game and cereals could be harvested. Numerous sources of origin were available to the inhabitants of Tell Sabi Abyad to have exploited ranging from 319-459km in distance. Interestingly, the closest point in the Bingol region of eastern Anatolia was not always selected.



Figure 5.23- Map of key sources of obsidian in Anatolia and their range of distribution across the Near East (from Cauvin et al 1997, 115)



Figure 5.24- Map showing linear distances to obsidian sources from Tell Sabi Abyad



Figure 5.25- Map showing estimated walking distances to sources of Obsidian from Tell Sabi Abyad

Figure 5.5 above shows the key regions which catered for the movement of obsidian across the Near East, all of which are present across central through to eastern Anatolia. Tell Sabi Abyad is somewhat convenient in its central positioning, and was able to potentially exploit all of the most commonly known obsidian sources seen in the map above. The Cappadocia region has typically been noted as one of the most frequented areas for the extraction of obsidian and its presence is noted in sites such as Mureybet, Jerf-el Ahmar and Tell Halula in the Euphrates (Cauvin *et al* 1997, 120). The Tell Sabi Abyad assemblage, however, derives from Cappadocia as well as the Bingol and Lake Van regions. This is somewhat strange from a perspective of efficiency as the Bingol, despite it being the closest proximity in comparison to the other areas, does not represent the most commonly used type of obsidian.

Figure 5.6 above shows the direct distances that separate Tell Sabi Abyad from these prominent areas of obsidian derivation; 'direct distances' meaning the shortest undeviating route from A to B. This is of course not an accurate reflection of the actual journey length which would have meandered and accounted for valleys, mountainous peaks, rivers, territorial hostile parts and other such hazards associated with terrain in general. For this, the easiest possible walking route in a modern context to travel by foot from Tell Sabi Abyad to each of the six prominent sources has been suggested in figure 5.7 above. No doubt the terrain has changed to a great extent over the course of around 9000 years, but the easiest possible route has been postulated in this scenario. As such the required distance to travel greatly increases, from 469km to 626km for Agicol, 319km to 402km for Bingol, 438km to 610km for Gollu Dag, 457km to 615km for Meydan Dag, 357km to 505km for Nemrut Dag and 459km to 629km for Nenezi Dag.

Each of these distances seems untenable at first, particularly when considering the short distance we commonly walk in an everyday modern context. The distance between Leiden and Amsterdam for example – just over 35km – would be almost never be associated as a walking distance. 35km would probably have performed this journey within a day, even when bearing luggage. Modern nomadic groups are accustomed to undertaking similar lengths on a daily basis, despite being presented

by harsher climates and limited resources. Thus when considered in the context of the Neolithic world, a 600km plus journey including the return leg would not necessarily have been so daunting. Tables 5.1 and 5.2 below present the results of the estimated journey length associated with the acquisition of obsidian at all of the sources.

Obsidian	Direct	Walking	Estimated Journey Length in days (carrying 15kg	Estimated Journey Length in days (carrying 30kg	Estimated Journey Length in days (carrying 45kg	Estimated Journey Length in days (carrying 60kg
Source	Distance (km)	Distance (km)	each)	each)	each)	each)
Agicol	469	626	25	31	42	63
Bingol	319	402	16	20	27	40
Gollu Dag	438	610	24	31	41	61
Meydan Dag	457	615	25	31	41	62
Nemrut Dag	357	505	20	25	34	51
Nenezi Dag	459	629	25	31	42	63

Table 5.1- Travelling by foot model: Estimated number of days to reach each source of obsidian

Obsidian Source	Direct Distance (km)	Walking Distance (km)	Estimated Journey Length in days (carrying 15kg each)	Estimated Journey Length in days (carrying 30kg each)	Estimated Journey Length in days (carrying 45kg each)	Estimated Journey Length in days (carrying 60kg each)
Agicol	469	626	18	19	23	25
Bingol	319	402	11	12	15	16
Gollu Dag	438	610	17	19	22	24
Meydan Dag	457	615	18	19	22	25
Nemrut Dag	357	505	14	16	18	20
Nenezi Dag	459	629	18	19	23	25

Table 5.2- Travelling with animals model: Estimated number of days to reach each source of obsidian

As the two tables above show, the distance necessary to reach the required destination would have varied somewhat dependant primarily on distance and weight. The above scenario is representative of the conservative option where added time has been afforded to overcome issues which may commonly be encountered on a journey, but even this restrained measure provides an intriguing insight into the potential number of days reaching the source could have taken.

5.5.1.2 |Results of foot transportation scenario

For option one, where humans would have carried the weight themselves, the result is dependent on the number of people travelling in the group. We can immediately rule out the 60kg category on account of the time it would have taken for the entire journey, ranging from 51-63 days one way, or 101-126 days for the return trip. This scenario was unlikely beforehand given the assemblage of obsidian at the settlement is minimal, and the regular retrieval of this material does not seem to have been a priority. The time factor would undoubtedly have played a role also. Considering most of the sources of obsidian are in mountainous regions, it is likely that expeditions were timed to fit within a particular window to maximise exploitation and obtain as much as required. If we combine the travel time with the period of stay at the obsidian source, then in the 60kg scenario the entire expedition could have lasted around 6 months. It is unlikely, given the small populations which seem tied to the settlement system at Tell Sabi Abyad, that such a lengthy duration would have been desirable or necessary.

Let us now turn to the 30kg per person option which appears to have been most plausible, given the scenario posited earlier in the acquisition of the obsidian package at Tell Sabi Abyad II. For this option the potential journey, one way, ranges from 20-31 days to any of the sources of obsidian. The return journey would therefore range from 40-62 days for a direct visitation to any of the sites. Other than the Bingol region, both Cappadocia and eastern Anatolia would have taken the same amount of time to reach, some 31 days or around a month. This, when taken into context, seems more than reasonable. Journeys bordering around a month in duration would not have seemed daunting to communities who were relatively mobile. Given the communal storage facilities which begin to emerge in the Halaf and are well described at the Burnt Village at Tell Sabi Abyad, the notion of periodic visitation at a site amidst semi-nomadic lifestyles would have been common place. Therefore, it could be perceived that a small group, or even small community set out on missions to retrieve certain resources such as obsidian, and were removed from the settlement for a period of around 2-3 months. This duration would neither be excessive, nor would responsibilities tied to activity at Tell Sabi Abyad be neglected – responsibilities which may have included general maintenance of structures, presence during harvesting season, attendance at communal and ritual events etc.

5.5.1.3 |Results of animal assistance scenario

Using sheep and goat as potential early beasts of burden could have drastically reduced the number of days necessary to reach the obsidian extraction site. The results are based on each individual redistributing his or her carrying capacity amongst the flock accompanying the journey. Here, the ability to carry greater weights over longer journeys becomes a distinct possibility, and may have even become a necessity considering the fodder and additional resources needed to carry for the sheep/goat involved. Even for the heaviest possibility, the range to either Cappadocia or the Bingol/Eastern Anatolian sites shrinks to 16-25 days, or 32-50 days return.

If the weight of 15kg per person is redistributed, then the journey becomes doable in a surprisingly short space of time. Here the range drops to 11-18 days one way, with the return trip potentially completed within 22-36 days or around a month at most. Given this context, the group involved would neither be subject to a unnecessary long journey, nor would they be separated from their community in the Balikh for too long a period, keeping their relationships strong.

As for the choice of obsidian source to exploit, it is clear distance and time alone was not the only factor in the selection criteria. Unfortunately we do not have information on the percentage of obsidian recovered from each of the areas of provenance at Tell Sabi Abyad. This would have provided a particular insight into the desired exploitation patterns. A number of reasons could underpin this desire to venture further afield. Ties with certain communities based in distant regions could have been one reason, allowing for an excuse for visitations either en route or situated nearby the volcanic areas of extraction.

Topography and environmental factors may have played a part, where either seasonal difficulties or harsh terrains meant certain routes were avoided at particular times of the year. The Bingul and Nemrut Dag region for example are considerably mountainous in nature, and would only have been accessible during the warmer months, implying seasonal workshops would have exploited this window of opportunity (Astruc *et al* 2007, 9-10). The composition of the obsidian may have been an additional element for consideration, perhaps providing an economic basis for travelling further. Obsidian from Meydan Dag or Acigol, two of the furthest sources from Tell Sabi Abyad, could have held greater economic value and subsequently merited the increased subsistence and resource burden required for carrying out a longer journey. Whatever the reason, it is clear that the Neolithic community were driven by some impetus to embark on a time consuming and somewhat laborious aspiration for the procurement of a variety of obsidian types, and the economic impetus was arguably one of the underlining pull factors.

5.5.2 | Bitumen

Another commonly cited raw material found across a spectrum of sites in the Near Eastern Neolithic is bitumen, the highly viscous, sticky dark black residue also known as asphalt (Connan *et al* 1999). It is a form of petroleum and recovered in regions where crude oil is also located, but importantly for the benefit of Neolithic communities it held a number of practical benefits which constituted economic value. The extraction and use of bitumen was not confined to Neolithic society, but was in continual use even by Neandertal populations and on flint implements within Syria by 40,000 years ago (Boeda *et al* 1996). Thus we see it used for activities such as hafting tools, waterproofing containers and boats as well as repairing broken pottery throughout the Fertile Crescent (Boeda *et al* 1996, 33; Schwartz and Hollander 2000, 84). It held an added benefit in the Mesopotamian region where a lack of timber meant it was useful as an element in the strengthening and creation of vessels (*Ibid*, 86), whilst also commonly used in the Late Neolithic as a form of iron oxide (Connan and Velde 2010).

As for its presence at Tell Sabi Abyad, excavations have revealed numerous traces indicating continual use. Evidence on some tools and sickle elements have been recovered demonstrating its value as an adhesive to bind implements together (Copeland 2000), whilst at PPNB Tell Sabi Abyad II, traces of baskets coated with bitumen were noted (Verhoeven 2000, 102-103). Additionally, a lump of bitumen was recovered in operation I dating to the transitional period (ca 6100-5900 BC), appearing to show impressions which would suggest it was used to waterproof a reed boat (Connan and Nieuwenhuyse *in press*). Most pertinently, however, was the identification of bitumen appearing beyond a functional context and as a decorative element applied on ceramic vessels (Connan *et al* 2004). This has since been suggested to be the earliest ever evidence for bitumen painted ceramics appearing in the archaeological record around 6100 BC (*Ibid*, 116). What is clear is that it was considered an item of value for a range of activities, beyond purely practical alone.

5.5.2.1 |Production and procurement

As for its provenance, a number of suggested sources have been speculated, all of which are beyond 100km in distance from the site. Connan has undertaken geochemical study to ascertain the origin of the bitumen found at Tell Sabi Abyad and has found that the two main sources of extraction correlate to the Zakho and Kirkuk regions of northern Iraq, both of which are over 300km in distance (Connan *et al* 2004). He notes in his study that 'future studies should investigate how bitumen reached Tell Sabi Abyad' (*Ibid*, 112) and it is line with this research void that the following will concentrate on, using the model applied above for the case of obsidian. Figure 5.8 below shows the natural asphalt deposits commonly used by sites across the Near East. The Hit region of north-central Iraq is one of the best known origins of bitumen, but evidence analyses on the deposits from Tell Sabi Abyad show it did not feature at the site (Nieuwenhuyse 2006, 74). The other region which would have logistically been far easier to exploit, at last in terms of distance, is Samsat or Samosate in Anatolia, some 130km away. Connan has suggested that

bitumen would have reached the site as a raw material, where lumps were deposited within vessels to carry back to the site (Connan *et al* 2004, 123). Considering pots were exchanged over long-distances also during this highly mobile period, it is not unperceivable to imagine they were also use in its transport.



Figure 5.26- Map of prominent Bitumen sources in the Near East (from Connan 1995, 39)



Figure 5.27- Map of linear distance to prominent Bitumen sources from Tell Sabi Abyad



Figure 5.28- Map of estimated walking distances to prominent Bitumen sources from Tell Sabi Abyad

As figure 5.10 above shows, of the possible zone available to exploit, the shortest option was not adopted. Instead the Zakho and Kirkuk regions, the latter representing the furthest of all options available, was exploited for this purpose. 485km is the exact distance separating Tell Sabi Abyad from Kirkuk, but as highlighted in figure 5.10 above shows the estimated walking distance was 589km, almost the same distance from Leiden to Berlin. Perhaps the traders at Tell Sabi Abyad were not privy to the deposits situated much closer at Samsat, but this seems unlikely given the interactions which would have existed between Anatolian and Balikh communities, who regularly visited the region to extract obsidian. It would not have been difficult to recognise the thick, black residue within other sites in Anatolia on their travels, and would probably have enquired about its origin.

Bitumen Source	Direct Distance (km)	Walking Distance (km)	Estimated Journey Length in days (carrying 15kg each)	Estimated Journey Length in days (carrying 30kg each)	Estimated Journey Length in days (carrying 45kg each)	Estimated Journey Length in days (carrying 60kg each)
Kirkuk	485	589	24	29	39	59
Hit Abu Jir	465	552	22	28	37	55
Samsat	130	256	10	13	17	26
Zakho	325	382	15	19	25	38

Table 5.3- Travelling by foot model: Estimated number of days to reach each source of bitumen

			Estimated Journey Length	Estimated Journey Length	Estimated Journey Length	Estimated Journey Length
Bitumen	Direct Distance	Walking	in days (carrying 15kg	in days (carrying 30kg	in days (carrying 45kg	in days (carrying 60kg
Source	(km)	Distance (km)	each)	each)	each)	each)
Kirkuk	485	589	17	18	21	24
Hit Abu Jir	465	552	16	17	20	22
Samsat	130	256	7	8	9	10
Zakho	325	382	11	12	14	15

Table 5.4- Travelling with animals model: Estimated number of days to reach each source of bitumen

5.5.2.2 | Results of foot transportation scenario

In line with the results mentioned previously, the findings from the Bitumen extraction scenario are similarly interesting, particularly as the choice of exploitation constitutes a far longer journey than the nearest possible source at Samsat. Taking the 30kg per person average once again, the potential return expedition to Samsat could have been completed by foot in a period of 20 days. Instead the preferential source, at the Kirkuk and Zakho regions respectively, represent more laborious options. Travelling to Kirkuk would have taken around 29 days, or around two months including the return leg. The Zakho expedition would have been shorter, around 38 days or one and a half months both ways. That said, both journeys would have taken under a month going in one direction, which, as mentioned previously, would not have been overly taxing to a habitually portable population.

Looking at the 'light-weight' option of carrying 15kg, both sources could have been reached between 15-24 days, or 30-48 days return. Given the distances involved however, it is unlikely such a lack of weight could have proven sufficient for the journey. Had inhabitants at Tell Sabi Abyad exploited the Samsat source instead, the 15kg per person scenario may well have been a possibility as the return journey could have been completed in less than two weeks. Similarly, the 60kg category would surely have been far too burdensome for each individual to have carried to the further provinces, particularly when considering the number of days involved in the journey. In the ethnographic parallel mentioned in the previous chapter, porters carrying over 60kg did not travel for more than 18 days. Even those who did chose to carry such a substantial weight did so for some economic, monetary benefit or by necessity. It is unlikely in this context that Late Neolithic people were pushed or coerced into such extremes.

5.5.2.3 |Results of animal assistance scenario

As with the extraction of obsidian, it is clear that Neolithic communities were not governed by time, at least not in parallel with a modern context. Whereas the Nepali porters are required to deliver their products in the shortest possible time and at the quickest possible speed, the communities undertaking such expeditions would not have fallen under such restraints. As for the movement of goods with animals, it is perceivable that large quantities of bitumen were able to be imported in this context. It is likely that bitumen would have been required in greater volumes than obsidian with its functional value transferrable in a number of day-to-day activities. As mentioned previously, bitumen is noticeable on traces of sickle blades as an adhesive for hafting tools and for lining baskets and vessels for waterproofing. Boats and rafts would presumably have been lined with this also but of course we have no direct evidence for this. These activities would have required a far more constant or regular pool of bitumen to use on a consistent basis, particularly when compared to obsidian which could have been substituted for flint or other regularly available materials to use in a functional context.

The 60kg option above could have materialised given this criteria, nor does the journey seem entirely unreasonable. For the Kirkuk source, the return journey would have lasted around 50 days or around one month and a half. Assuming bitumen is easier to excavate and retrieve than obsidian, the group could have spent around two weeks recouping the required quantities before setting off once again for home. It can be estimated, therefore, that the entire journey could have lasted just over two months, which would fit well into the seasonal cycles of exploitation. For the Zakho region the expedition would be even shorter, some 15 days one way or a month return, meaning the whole expedition could have been completed under two months. The ability to obtain a desirable source within such a narrow time frame, without necessarily exhausting efforts, provides an interesting insight into the potential exploitation patterns of Late Neolithic communities.

| CHAPTER 6 |

DISCUSSION: TRADE AND EXCHANGE IN CONTEXT



Figure 6.29- Artistic representation of an idyllic Neolithic community (from online source, see list of figures)

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6.1 | Explaining exchange at Tell Sabi Abyad

In attempting to explain the limits and distances of lengthy journeys in the Late Neolithic, certain issues become necessary to investigate. What is apparent is that there was a complexity to exchange based systems beyond efficiency alone. The acquisition of raw materials was not centred solely on proximity. In the case of bitumen, it appears the opposite was taking place and the closest possible source was deliberately rejected in preference for other, more distant sources. We therefore need to break this understanding down into two distinct modes of material transfer. Firstly, if groups were indeed travelling directly to the source as has been hypothesised in this case study, then it appears they were selective in their decision making as to which particular source to exploit. The other alternative is that the material reached the site through some foreign influence, either from a workshop or from another centre of exchange (Akkermans et al 2006, 144). Even for the latter option, the issue of preferential source origin requires explanation. Why were items which derived from further along the exchange network preferred to ones which presumably could have been obtained from a more immediate network?

I would argue that these 'networks' were only existent in the very loosest definition. In other words, there was no structured organisation nor a governing polity which held effective control over the extraction of raw material or the flow of goods. This can be seen at Tell Sabi Abyad where, judging by the nature of activity, trade did not transpire in a two-way relationship back and forth. It is in essence indiscriminate and directionless, as obsidian flows in from central and eastern Anatolia, bitumen arrives from eastern Anatolia and northern Iraq, cedar wood originates from the Lebanese forests, chlorite vessels appear from the Dead Sea region, marine shells presumably derived from the Red Sea whilst different pottery types came from several regions (Akkermans and Duistermaat 2004; Akkermans and Verhoeven 1995; Nieuwenhuyse *et al* 2010, 80; Rosenberg *et al* 2010, 290). Equally, in the case of pottery at least, certain ceramic traditions that apparently originate from the Balikh and around Tell Sabi Abyad were moving out in varying directions, and not related to the flow of material coming in (Le Miere and

Nieuwenhuyse 1996, 160). As such, the following discussion will attempt to contextualise this understanding in an attempt to realise what exactly was going on.

6.2 | Picking and choosing: a case of material preference?

6.2.1 | Aesthetic value

The most immediate possibility is the preference of certain materials over others based on attractiveness. This would explain the need for inhabitants at Tell Sabi Abyad to go to further lengths in their attempts to obtain certain items. Aesthetic value would present the most obvious option in the selection process, and obsidian in particular can assume several shades of its recognisable dark-black hue. Residents at Tell Sabi Abyad, or indeed the extended Balikh valley, could have preferred the style and design of certain obsidian types over others, much like the preference of certain types of wood, precious stone, and similar desirable goods. Conversely, the visual appeal of the item may have been an important factor in the exchange process rather than to the community itself. The intended recipients may have desired certain types rather than the producers, creating an economic basis – and indeed social basis considering the closely linked societal relationships which were apparent – to the need for acquisition of certain items.

Bitumen is somewhat difficult to contextualise in this respect, with not much aesthetic variation, at least not that I could recognise. Perhaps some variation between asphaltic residues was noted by later Neolithic populations but it would seem unlikely. Going beyond obsidian and bitumen, the perceived 'beauty' of certain material was undoubtedly pivotal in the relationships of trade. Pottery in the Halaf, and perhaps even before, enters into such a category. The elaboration and fine-detail which is afforded into the creation of certain ceramic types, most notably the Fine Painted Ware, suggests artistic expression and visual recognition were central in the process. Similarly, the trade of marine shells appear to have no practical function. Instead we find its usage as necklaces, beads, pendants, bracelets and other forms of jewellery, all of which tie into the aesthetic assumption. At the first level, therefore, we can assume that aesthetic value formed one of the
fundamental concepts in the acquisition of goods and the exchange of material, to the extent that communities felt the need to pursue more distant travels to satisfy this requirement.

6.2.2 | Functional value

The functional element could have played a factor also, with some sources of obsidian perhaps performing better when made into tools, or were easier to manipulate. There are limitations though, for example there does not appear to be a massive disparity between the practical elements of obsidian use, or at least no study has yet to confirm one region producing more durable samples than another. Additionally, if the functional element was one of the defining concepts, then we would perceive the assemblage of obsidian at Tell Sabi Abyad to have been far higher. The actual proportion of obsidian to flint is not particularly high, throughout the sites occupation. Hence the pure functionality of obsidian at least does not appear to have been an underlying factor.

Alternatively, bitumen does appear to have been of a more functional use, despite the odd occurrence of its applications on ceramics as a decorative addition. What is strange then is the need to reach beyond the source nearest to Tell Sabi Abyad, some 250km away at Samsat, and instead exploit this resource at Zakho over 380km in distance, and even Kirkuk, more than 500km from the site. Even if these sources produced a better quality bitumen for whatever requirements needed, it is unlikely that the benefits would outweigh the burden involved in commissioning a group to venture to such far lengths. There presumably would have been other incentives in this process, beyond its usage alone.

6.2.3 | Symbolic value

Next is the possibility of a particular source falling under the remit of symbolically or ritually significant. Symbolic and aesthetic value are not necessarily mutually exclusive, as items considered particularly attractive can transfer into the realm of symbolically important over time. In this situation reverence may have been attached to a source, making visitations and extraction of it even more important. This could explain the presence of material from some sources, and no presence

from others. If a regular exchange was indeed taking place with multiple communities, then presumably a mixed assemblage of material should be found from a wide spectrum of potentially exploitable areas. Therefore at Tell Sabi Abyad, obsidian originating from the Dead Sea should also be found along with the Lake Van and Central Anatolian examples. Similarly bitumen from Samsat and Hit Abu Jir should be present amidst the Zakho and Kirkuk examples. What we find though is that it is common to have an all or nothing scenario. All of the obsidian and bitumen remains originate from certain sources, but there is no presence at all from other sources equidistant or even closer by. Was this a consciousness denial? It is not as if communities were not aware of the existence of these places as material exchange and examples of other forms of interaction within such areas is evident. This can be noted at Tell Sabi Abyad, where obsidian is extracted from Central Anatolia, but the Samsat bitumen source which runs along similar paths is not exploited. It presents an interesting dilemma The symbolic nature of certain material could provide an explanation for the patterns of exchange taking place in this period.

6.3 | Maintaining friendships: connecting exchange centres

The above has primarily relied on the assumption that material was brought by the inhabitants at Tell Sabi Abyad directly from its source, where groups purposely intended to set off on an expedition for the retrieval of certain resources. Now, I will briefly attempt to contextualise this discussion looking into the possibility of lines of trade; the movement of material from regional centre to regional centre. Regional centres, as discussed in chapter four, refers to settlements with extended history and are comparatively larger than other settlements within the same region. For the case of Upper Mesopotamia, sites over 5ha often fall under this category with some sites reaching above 10ha, although these were unlikely to have been occupied entirely at any one time (Akkermans 2013).

The possibility of these centres existing as important regional hubs is evident, but how far would this invitation extend? Would individuals and communities that reside outside of these tentative regional boundaries be afforded the opportunity to partake in these ceremonial gatherings and swap goods? It appears the answer would be a resounding yes, for several reasons. Firstly, exchange systems are dependent on connections with non-local contemporaries to develop and spread. The economic capacity of the Balikh was clearly restricted to agro-pastoral means, and perhaps basalt and a few other natural resources (Akkermans 1989; 1993; 1999). Even so, these commodities would have been limited in number and limited in tradability, given that other regions would have shared this economic basis. The presence of several non-indigenous items meant that certainly the occupants at Tell Sabi Abyad were either venturing beyond their immediate horizons to establish networks of trade, or visitors were extended a free welcome to exhibit their products at the site, or more likely at Tell Mounbateh which forms the largest settlement in the Balikh (*Ibid*).

There is no conclusive evidence for hostility in the form of fortifications, restrictive boundaries or any other such purpose built barrier. What is more likely is that commodity trading was founded on favourable relations rather than economic incentive or otherwise. If economic prosperity and accumulation of 'luxury' items formed the underlying incentive in exchange based mechanisms, then presumably trade would have been indiscriminate to allow for the maximum potential gains. Instead, as mentioned previously, the flow of goods is not two-directional. It is likely that centuries of bondage and interaction with certain communities would have played a part in the direction of exchange. Centuries of intermarriage, gifting, sharing and attendance at ritual and ceremonial events would naturally have created a favoured outlook towards certain groups rather than others, which can be noted in the archaeological record in the movement of goods (Akkermans 2013, 72-73; Akkermans 2004, 290; Akkermans *et al* 2006, 123-124. These friendships or familial ties were potentially the prime instigator in determining the transfer of material from one place to another.

6.4 | Responding to research questions

In line with the research questions originally outlined in the introduction, I will briefly revisit these concepts and discuss whether an effective answer to each can be constructed.

What is the evidence for long distance trade and exchange in the Late Neolithic?

The evidence from Tell Sabi Abyad is clear. Items were either brought directly or dispensed through a loosely defined chain of connections, ultimately reaching its final destination. Tell Sabi Abyad is no exception to this rule, this activity was undeniably apparent throughout the Near Eastern Neolithic, particularly in the Late Neolithic of Upper Mesopotamia. Hence, the fundamental basis for accepting the presence of distance networks is explicitly visible in the archaeological record, meaning the need for further study into explaining these systems is apparent.

What is the premise necessary for the facilitation of trade and exchange?

Chapters two and three discussed this premise and highlighted the intricate relationship between storage, surplus and trade. In essence, it is the presence of dedicated storage facilities which allow for the ability for exchange based relationships to transpire on a more consistent and widespread level. This is not equitable to an a *priori* relationship, indeed Palaeolithic hunter-gatherers and even Neandertals are believed to have partaken in this custom well before the development of dedicated storage features. The key point here is that the facilitation of *long-distance* trade, which clearly manifests itself in the beginnings of the Neolithic, gradually increases as the investment in architectural and sedentary storage structures emerge.

What were the mechanisms involved in this exchange?

This has been discussed in chapter four where three possibilities were forwarded for explaining exchange based mechanics in the Late Neolithic, namely transportation by foot, transportation with the assistance of animals and finally, maritime and riverine transport. A combination of the three would have been used in the movement of goods locally, regionally and beyond.

How long would an expedition have taken?

This question is perhaps the most difficult to answer and is based on a number of underlying assumptions discussed in the previous chapter. The results produced additional questions, which have been dealt with in this chapter above. To avoid unnecessarily repeating myself, I will simply surmise by stating that the ability to cover vast distances and retrieve materials would not have been as difficult as it may assume superficially.

What can the results determine about the nature of exchange and organisation of transport in the Late Neolithic?

This research has attempted to contextualise the activity of trade and exchange in Late Neolithic societies through the case study of Tell Sabi Abyad. I will refrain from regurgitating what has already been said and detracting from the conclusion (see next chapter) but I believe that a slightly clearer picture is beginning to emerge amongst a hazy backdrop. Few explorations into systems of transportation and the infrastructure of exchange have surfaced, despite the underlying assumptions continually made about this activity. I believe that Late Neolithic communities had the capability, and indeed carried out, long-distance trade and acquisition of material to facilitate and strengthen communal bonds between different groups of people. The technology and products are well attested in the archaeological record to recognise the interconnectedness of Tell Sabi Abyad with communities both near and far.

6.5 | Potential for future research

This study is merely a beginning. We are fortunate that research of provenance and directions of trade are increasingly available in archaeological publications of the Near Eastern Neolithic. As this database continues to grow, the need to synthesise and connect dots becomes ever more necessary. This study has confined this application to two sources at one site, bitumen and obsidian at Tell Sabi Abyad. The list of transferable items has been mentioned throughout this thesis, but each material, either raw or secondary, can be pursued along similar research lines to contextualise the nature of trade and exchange. The conjunction of this data would create a far more nuanced understanding of exchange based relationships which would have existed in this period. If we can chart where goods began, in which directions they flowed and, more pertinently, which directions they avoided, interesting patterns would begin to emerge.

Similarly on the regional centre exchange based model outlined above, a similar method of following tradable goods would develop an intriguing outlook on interactions spheres between Neolithic communities. The tracking of pottery would be key in this respect, as the provenance of clays would allow for a more localised and interconnected network to appear, as opposed to material such as obsidian or bitumen, for which there are few sources and exploited by a wide geography of people. Pottery has the potential to generate a high resolution input into the direction and flow of goods. On a more simple level, plotting distances between regional exchange centres and estimating the travel time to each destination would prove highly useful. It would create a better understanding of the time and effort which would be consumed travelling between centres and exchanging goods on a more regular basis.

Conclusion |

Admittedly, this case study has centred on a limited selection of exchangeable material at the site of Tell Sabi Abyad. The frequency and assemblage of items arriving from networks of trade are plentiful, but I wanted to concentrate on two of the more well studied materials. Studies on the provenance of both obsidian and bitumen conclusively allow us to speculate how they arrived at their ultimate destination. The presence of both these commodities – they can be distinguished as commodities rather than just resources given that appear not only in raw form, but as secondary products also – automatically opens the debate on systems of trade and exchange.

In doing so a number of things were realised. The Neolithic world was an open and connected space. The inhabitants at Tell Sabi Abyad were able to travel over hundreds of kilometres to obtain items which were, in essence, non-essential, but clearly important. Even more so, they were able to bypass regional and territorial zones inhabited by other communities, apparently with little or no confrontation. They were able to retrieve raw materials with no apparent indication of monopolisation or territorial control over the source. Tell Sabi Abyad was by no means exclusive in this activity, and other far fledged communities were equally benefiting from these resources apparently at will.

This study has also shown that the relative distances to these locations were not necessarily as daunting as they seem at first glance. A distance of around 500km could be achieved within a month, even with the associated baggage required to carry per person. Granted, an entire month spent travelling ruggedly appears overwhelming from a contemporary stand point, but of course these were habitually mobile people. Sedentism had developed into a well-known construct in the Late Neolithic, but similarly semi-mobile populations frequenting a site on occasions were equally as prevalent, and may well have been removed from a settlement for months at a time. As such, a two month journey would tie into seasonal movements and avoid removal from the settlement for too long, where responsibilities such as maintenance, harvesting and attendance at ceremonial activities would have been warranted. As such, the perceived 'structural' element of transportation systems appears well established, but structured in the sense of systems available for the movement of goods, rather than the presence of a controlling socio-political entity.

Abstract |

The Neolithic witnessed the inception of dedicated trade networks which encompassed vast distances, over 3000 years prior to the invention of the wheel and before the domestication of traditional beasts of burden such as horses, donkeys and camels. Communities were able to transport large quantities of material by land and water through use of a mixture of purposely created equipment and techniques. Strangely, few attempts have been made to retrace these networks of transport and attempt to postulate how material was moved from one place to another. Theoretical models of exchange are well attested, but this does not extend into practical application. This thesis will attempt to perform this application through the case study of Tell Sabi Abyad, a Late Neolithic settlement in northern Syria. The presence of bitumen and obsidian at the site have been determined to have arrived from over 300km in distance. As such, this body of research will attempt to break down such journeys and establish how they eventually arrived at a site, either by direct acquisition or otherwise. It will attempt to establish assuming groups were indeed undertaking expeditions directly to the source - how long such a journey would have taken and by what means material was transported. The tracing of such networks of exchange provides an intriguing insight into the interconnectedness of Late Neolithic communities, and what levels of organisation existed in the facilitation of this activity.

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