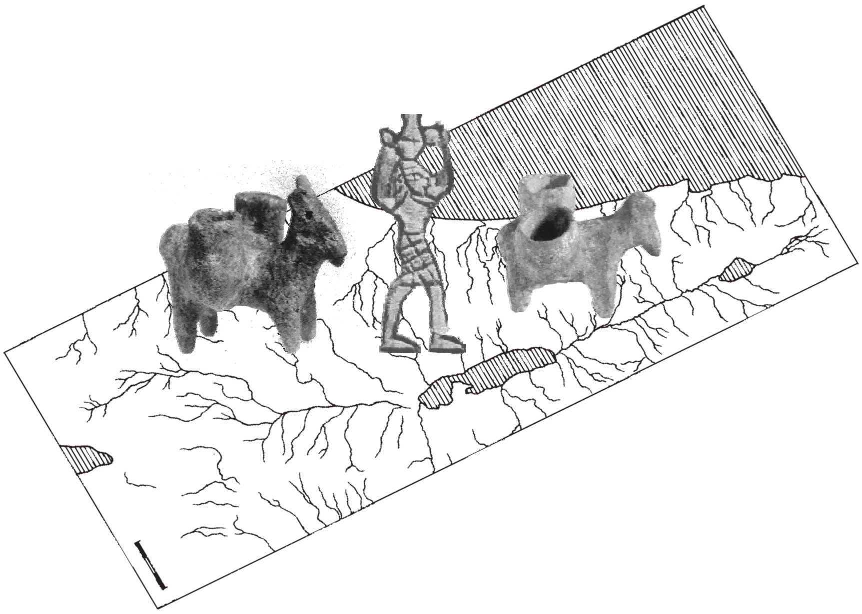
Tel Aviv University

The Chaim Rosenberg School of Jewish Studies

The Lester and Sally Entin Faculty of Humanities

Department of Archaeology and Near Eastern Cultures

LOCAL EXCHANGE IN
EARLY BRONZE AGE CANAAN



Thesis Submitted for the Degree "Doctor of Philosophy”

by

Ianir Isaac Milevski

Submitted to the Senate of the Tel Aviv University

AUGUST 2005

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February 2005

This work was carried out

under the supervision of

Prof. Ram Gophna

To my family

Tamara, Nahum, Margalit, Miki, Marco, Aviv and Ben

"The habitants of this country are unusually handsome and large. And they are frank in their dealings, and nor mercenary; for they do not in general used coined money, nor do they know any number greater than one hundred, but carry on business by means of barter, and otherwise live an easy-going life. They are also unacquainted with measures and weights..."

(Strabo, *Geography* XI, 4,4)

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PREFACE

Two decades ago as a teacher at the University of Buenos Aires, I developed an interest in and lectured on aspects of trade in the Ancient Near East. That interest has remained with me during years of field experience as a research archaeologist for the Israel Antiquities Authority, when I worked mainly on Early Bronze (henceforth EB) Age sites. This dissertation is the result of several years of research on production, exchange, craft specialization and the relationship between art and society in the southern Levant during the EB Age. Its subject was chosen because of the opportunity it presented to combine my field experience and data from it with theoretical aspects on society and economy, a major area of interest for many researchers working on the Ancient Near East

This research could not have been done without the assistance and support of a number of colleagues and friends. I wish to thank Prof. Ram Gophna who guided me and supported me during all the steps of the work with great patience and investment of time. I wish also to express my gratitude to Eliot Braun, colleague and friend, from whom I learned a lot on the Early Bronze of the Southern Levant and who provided me with a great deal of information on the subject. His English editing has made the work more intelligible to the reader. I wish also to thank my colleagues and friends, Ofer Marder and Liora K. Horwitz, who read several chapters of the first draft and made important observations on it. They and Hamoudi Khalaily, another colleague and friend, who made helpful observations on the chapter on flints, were a great source of encouragement for me during the writing of this work.

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In addition, I wish to thank Israel Finkelstein and Avi Gopher, directors of the Department of Archaeology and Near Eastern Cultures of the university for their support. Thanks are also due to Gideon Spiegel and Sara Vered for their guidance in all the administrative and technical aspects accompanying submission of this work. This dissertation benefited from a scholarship from Yad Ben Tzvi and Tel Aviv University. I also thank Gideon Avni, Director of the Department of Excavations and Surveys of the IAA, who support me during the final phases of this work.

Last but not least, I wish to express my love and thanks to the members of my family whose encouragement and forbearance made this work possible.

ABSTRACT

Exchange is the principal means by which goods circulate and are disseminated between early societies. Exchange, sometimes called barter, refers to a particular type of interchange of commodities in which no money or other medium of exchange is used, although nominal exchange-values existed.

In this work the term “exchange” is given a much wider meaning that includes all inter-site interchanges of commodities, including intermediate phases between production and consumption. Numerous earlier studies have dealt with the subject in divers regions and from a comprehensive theoretical point of view. However, studies dealing with this subject in the southern Levant have hitherto tended to be limited. They either concentrated on aspects related to particular finds or were restricted to very localized regions.

International connections or contacts between the southern Levant and neighboring cultural regions, such as Egypt, are related to trade and exchange and have been dealt with extensively by scholars for the EB Age. However, localized exchange within the southern Levant, understood as a system of circulation of goods between sites and local regions, is a subject not been fully addressed for this period, although it has been the subject of much study for later periods. This research attempts to fill this gap in understanding, by providing a synthetic study for the region in the EB Age using a materialist, dialectic perspective.

The approach employed in this research was to study the overall process of exchange of commodities, including production and circulation, in an interrelated and dialectical mode. For that purpose different commodities were identified and then defined by site, region and period, within the EB. These commodities include such items as recognizable groups of pottery (i.e. wares), flint and other stone tools, shells, raw

materials and some additional items. They were studied as specific cases by site, regions and periods (within the EB Age) and then considered in terms of socio-economic relations, i.e. exchange patterns, evident from them, after which a comprehensive picture for the entire period under discussion was reconstructed.

The dissertation is divided into twelve chapters grouped in four thematic parts. Part I –Chapters 1 and 2, describes aims of the research and the theoretical framework on which it is constructed. Chapter 1 depicts the subject and discusses previous work on exchange in the Southern Levant. Chapter 2 notes different approaches to exchange in anthropology and presents the present writer's theoretical framework. Included are a synopsis on theoretical approaches to exchange in prehistory (Section 1) and this writer's methodological approach to the theory of value and commodities exchange (Section 2). It was developed from the dialectic, materialistic view of Karl Marx and within a general archaeological framework developed by V. Gordon Childe. This work has also adopted elements from models on archaeological exchange developed by Colin Renfrew and Fred Plog. Section 3 of this chapter outlines ethnoarchaeological and historical sources to explain archaeological data, while Section 4 explains the relationship of exchange models within their spatial parameters, usually in regional and trans-regional terms.

Part II presents the commodities according to the traditional archaeological patterning, i.e. pottery (Chapter 3), flint tools (Chapter 4), groundstone tools (Chapter 5), metals (Chapter 6), archaeobotanical data (Chapter 7), fauna (Chapter 8) and minerals (Chapter 9). Each of these chapters offers primary analysis of exchanged goods, their production and previous, relevant ethnoarchaeological studies on their circulation. Once provenance was established, these groups were defined typologically, chronologically and regionally.. A later phase of research investigated distribution patterns of each commoditiy in order to identify their regional and temporal distribution. Relevant data are presented in

Maps 1-19 and Tables 1-20, according to types of products and periods. Twenty-two figures illustrate the commodities and their sources (described in Part III).

In Part III means of transportation are investigated as well as agents and networks of exchange. Chapter 10 deals with the donkey as a beast of burden for transportation of commodities. It further considers the expression of equid figurines as likely related to social groups involved in exchange and possibly related cultic activities (Figures 23-27). Chapter 11 describes networks by region according to data on the distribution of divers types of commodities with results summarized in Maps 21-28.

In Part IV, Chapter 12, presents conclusions on characteristics of networks of exchange and the entire spectrum of EB Age economy and society in the light of the present research. This chapter further suggests perspectives that seem likely to be fruitul lines for future research on exchange in the EB Age and that may be extrapolated to other periods in the Southern Levant.

Section 1 notes primary factors of distribution networks, i.e. centralization, directionality and symmetry. It summarizes for the reader characteristics of exchange networks of different commodities, found to have left patterns that were sometimes similar, sometimes overlapped, or at other times were at great variance with each other. In general, these separate networks were observed to be non-integrated. Another aspect of these networks is that, at least within the preserved archaeological record, most suggested non-symmetrical patterns of circulation of goods between regions.

Section 2 analyzes temporal differences within the EB Age and the economic and probable political derivations of these variations over time. They indicate that distribution patterns in EB IA are most decentralized, while they become more centralized in EB II. By EB III this centralization decreases and there is a certain return to decentralized networks. Section 3 discusses differences between commodities and valuables as shown in the archaeological data presented in Part II. Section 4 summarizes what is believed to be the existence of a merchant class and its social status. Section 5 presents the author's conclusions, while explaining the economic basis for exchange of commodities in the EB Age. Notably, there is no evidence for any single, homogeneous 'market' operating; rather there were many and varied regional based networks throughout the period. After noting the absence of specific media of exchange and lack of any evidence for documents of exchange, this section attempts to explain economic and historic implications of the author's understanding of exchange patterns. Finally, Section 6 suggests future directions of research and presents some unresolved questions that the author feels should be brought to the attention of scholars.

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PART I

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PART I: RESEARCH FRAMEWORKS

Chapter 1

INTRODUCTION

1. DESCRIPTION OF THE SUBJECT AND RESEARCH OBJECTIVES

Exchange is the principal means by which goods circulate and are disseminated and as such it is an intermediate phase between production and consumption. The significance of this intercourse has been well recognized, especially for study of pre and proto-historic cultures, with entire volumes dedicated to the subject in Mesoamerica, the Aegean-Mediterranean region and Mesopotamia (e.g. Polanyi, Arensberg, and Pearson 1957; Sabloff and Lamberg-Karlovsky 1975; Earle and Ericson 1977; Ericson and Earle 1982; Gale 1991; Oates 1993; Knapp and Cherry 1994). Such studies deal exhaustively with the subject itself *in modo grosso* from a comprehensive theoretical point of view and in its details in diverse regions.

EXCHANGE IN THE SOUTHERN LEVANT

Most studies on exchange in the ancient southern Levant have dealt with historical periods, while neglecting earlier evidence. There have been detailed studies of exchange/trade in the Middle Bronze (hereafter MB) and Late Bronze (hereafter LB) Ages that have dealt with local and external trade (e.g. Liverani 1972; Na`aman 1981; Bietak 1991, 2002; Marcus 2002a) within the context of a system of circulation of goods between sites and regions, but the subject that has not been fully addressed for thes periods. Iron Age studies of exchange have primarily centered on Biblical sources (e.g. Barnett 1969; Elat 1979; King 1999) with little regard for archaeological sources.

Studies dealing with trade and exchange for the southern Levant for the EB Age have tended to concentrate on external relations, especially those associated with contacts with Egypt (e.g. Ben-Dor 1937; Ward 1963, 1991; Hennessy 1967; Ben-Tor 1986, 1990, 1991a; Gophna 1987; van den Brink and Braun 2002). Studies of localized, internal south Levantine exchange has hitherto tended to be limited in scope, dealing with aspects related to particular finds or restricted to regions of no significant size (e.g. Rosen 1983 a,b,c; 1997a; Ilan and Sebbane 1989; Esse 1982, 1991,1993; Esse and Hopke 1986). The aim of this work is to ameliorate the present situation by providing an overall view of exchange for the period under discussion.

SOURCES

Major increments to our knowledge of the EB Age from excavations and surveys have greatly increased our overall understanding of the typology of archaeological finds, matters relating to chronological and regional sequences, and settlement patterns (Ben-Tor 1968, 1978; Gophna 1974, 1984, 1989; Kempinski 1979; Gophna and Portugali 1988; Beck 1988,1993, 1995; Louhivuori 1988; de Miroschedji 1989a; Amiran and Gophna 1989, 1992; Esse 1991; Dessel 1991; Yekutieli 1992; Braun 1991; Stager 1992; Joffe 1993; Finkelstein and Gophna 1993; Greenberg 1996a, 2002). Especially within the last decade major excavations reports and collective works on EB society with particular emphasis on pottery have been published (e.g. Biran, Ilan and Greenberg 1996**;** Braun 1996b, 1998; Finkelstein, Ussishkin and Halpern 2000**;** Kochavi, Beck and Yadin 2000**;** Philip and Baird 2000, Wolff 2001; Eisenberg, Gopher and Greenberg 2001**;** Getzov, Paz, and Gophna 2001; van den Brink and Yannai 2002; Greenberg 2002; Kempinski 2002; Levy and van den Brink 2002; Ussishkin 2004). This work is based on these major and additional minor studies.

CHRONOLOGICAL AND GEOGRAPHICAL LIMITS OF THIS STUDY

The focus of this research is on local exchange in the Southern Levant at sites primarily west of the Jordan River, during the EB Age. The Intermediate Bronze Age (henceforth

IBA), identified by some scholars as EB IV, i.e. as integral to the EB Age, will be not addressed here due to its special characteristics that, in this writer's mind set it apart from the EB Age proper. The name Canaan is used interchangeably with the term Southern Levant with full cognizance that the geographical, chronological and cultural implications of this use are still a matter of scholarly controversy (e.g. Rainey 1996).

Since this study is primarily focused on localized exchange, exchange, or exchange mechanisms with neighboring regions are dealt with only when directly related to local exchange. While this research focuses mainly on the area west of the Jordan River, for which there is abundant available evidence, some Transjordanian sites are also included when evidence indicates they are parts of local exchange mechanisms.

Since there are several and sometimes conflicting nomenclatures for the chronology of the EB Age, specific terms have been adopted for this work from other scholars. They represent this writer's understanding of the periodization of the era. A clear cultural dichotomy between North and South for EB I is acknowledged in this work. For EB I in the south the chronological divisions of Yekutieli (1992, 2000) in combination with those of Gophna (1995, revised from Amiran and Gophna 1992) are followed. When indicated, different phase names such as EB IA (or early EB I) and EB IB (or late EB I) are applied to the period.

For the northern region definitions are less clear for two phases recognized by some scholars, EB IA and IB (cf. Braun 1996b: 175-184). The chronological dividing line passes is generally between Types of Gray Burnished Ware with Types I and II associated with EB IA/early EB I) and Types III and IV associated with EB IB (late EB I; and see Chapter 3). At least one scholar (Braun, forthcoming) suggests that there is yet a third, post Gray Burnished Ware phase of Late EB I.

East of the Jordan there are difficulties in synchronizing southern, sites such as Bab edh-Dhra and Wadi Feinan with their south western counterparts (for a discussion see Braun 1996b: 187; Genz 1997) and so for them, the simple label EB I must suffice, with no more specific periodization**.**

Radiocarbon dates (Braun 1996b: 156-163; 2001) give a general absolute chronological framework, but it should be noted that there are some major problems with them, especially concerning the EB I period (e.g. Braun and Gophna 2004; Golani 2004). For EB II and III Amiran and Gophna (1989), and Getzov, Paz and Gophna (2001: 14-21) provide the chronological framework for discussion. Although internal divisions of EB II and III were discussed by Callaway (1978), Seger (1989) and de Miroschedji (1999, 2000b), they will only be dealt when they apply to very specific discussions such as that related to Khirbet Kerak Ware.

TERMINOLOGY

The study considers first a theoretical framework by offering explanations of basic terms of reference. These terms will then be used to investigate the archaeological record of the EB, explain and interpret it. Observations are based on theoretical approaches found in the economic, anthropological and archaeological literature (see Chapter 2; for seminal approaches to this subject see the works by Stjernquist [1966], Sabloff and Lamberg-Karlovsky [1975], Earle and Ericson [1977], Kohl [1981], Ericson and Earle [1982], Spriggs [1991], and Renfrew and Bahn [1994: 307-338, 405-436]).

The term “exchange” instead of “trade” in this dissertation’s title is in need of explanation and justification. The etymology of the word “trade” offered by Adams (1974: 141-142) shows that the meaning of this expression has a history related to “travel” trough the word “tread” --“path” or “beaten track” in Old English and German. In two modern dictionaries, for instance, the following definitions are given: *“Trade: The act or* *business of exchanging commodities for other commodities or for money; the business of buying and selling; commerce",* or *"buying and selling of goods, exchange of goods for money or other goods"*[1], and *"Exchange: The act of giving one thing or commodity for another; barter; trade; the act of parting with something in return for an equivalent".* [2]

While there may be some minor differences between the concepts of exchange and trade, they are not always clear. This work follows the critical approach to political economy applied by Karl Marx (1970[1859], 1977a[1867], 1977b[1894], 1993 [1953]), wherein exchange refers only to commodities paid for in kind, with no money or other exchange-medium in use. This form of exchange is sometimes called barter. It should be stressed that standard weights (related to media of exchange) are also not associated with EB Age material culture, and as far as is understood, they appear in the southern Levant only from the MB Age onwards (Stern 1971; Meshorer and Reich 1998; Kletter 1998).

Although we do not possess archaeological information proving that exchange-values existed during the EB Age, this does not mean that commodities did not have equivalent values when exchanged for one another. Nevertheless, it is assumed that nominal exchange-values did exist and may well have led to specialized objects that came into use in the period following the EB Age to fulfill this once nominal function. Meshorer (1976) has suggested that metal bars (sometimes identified as ingots) found in IBA sites of the Negev (e.g. Cohen 1999: Figs. 115-116), may actually represent a specialized medium of exchange. If so, then they would represent, so far as is understood from the archaeological record, the earliest evidence from the Southern Levant. The earliest historical sources of information regarding such a medium of exchange from the region are from the MB (Ben-Tor 1992; Horowitz and Schaffer 1992) and LB Ages (Moran 1992).

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[1] *Webster's New Twentieth Century Dictionary of the English Language* (Unabridged; Second Edition 1961). New York.

[2] *Oxford Advanced Learner's Dictionary of Current English*. (Revised and Updated 1982). Oxford.

Biblical sources suggest continued use of such media. Coinage, as a much more highly developed medium of exchange, first appears in the southern Levant in the Persian period during the 6th-4th centuries BC (Meshorer 1982). Until that period the economy in the Southern Levant was based on weight-measure standards (cf. Kletter 2003, 2004; contra Gitin and Golani 2004).

By contrast, there is evidence from Ebla of two types of exchange existing as early as the middle of the third millennium BC. One of them is called barter (baratto) by Pettinato (1979: 178-180), translated from the expression *šu-bala-aka* as "to transmit from hand to hand".. In that type of exchange metals (mainly silver) are the bases for exchange-values, although *de facto*, they are not really utilized. The second type of exchange is called "buying and selling" (*compravendita*) in which the word *ni-šam*$_x$ is translated as a "price" (*prezzo*) that appears in transactions (Pettinato 1979: 180-184). This work favors the translation of this expression as "exchange-value", since price is the result of other components that influence in an economy related to production of commodities (see note 1). In this second type of exchange a specialized medium is utilized, one generally expressed apparently, *de facto*, in quantities of silver.

Off course there are no documents for the southern Levant to indicate the terminology utilized during the EB Age to suggest special terms for trade and exchange. Some expressions in Biblical Hebrew and other ancient Semitic languages associate words for trade, exchange and merchants with the verbs "to change" and "to travel".[3]

[3] In Eblaitic texts merchants are labeled as 'messengers' *kas*$_4$ and commercially initiated journeys as ni- *kas*$_4$. In Biblical Hebrew the words that mean trade or exchange (מסחר), merchant (סוחר) and commodity (סוחרה) have a common root--סחר, "to go around, to travel" (Brown, Driver and Briggs 1979: 694-695). Another world related to merchants is רגל connected with the root רגל, to go and foot (*idem,* 920). Of course these words derive from a later period, the Iron Age II. Exchange-media and values of commodities are found in Biblical texts. In addition, another root מכר means "to sell" and from it is derived the word מֶכֶר, "commodity"

In this work the term "exchange" is used to describe all inter-site giving and receiving of commodities. The expression "commodity" refers to all goods that have a use-value and an exchange-value (and see Chapter 2). Exchanged commodities may be simple functional objects such as pottery, flint artifacts, foodstuffs, raw materials (i.e. useful minerals), or precious commodities with prestige or ceremonial use-value. Commodity exchanges could also have been gift-exchanges or competitive-exchanges, in order to establish alliances or settle rivalries (Dalton 1977).

AIMS

The aims of this study are to identify the main commodities exchanged during the EB Age and, when possible, to pinpoint their sources. This work attempts to plot patterns of their movement between archaeological sites and to by doing so to trace likely links and circuits between sites and regions. It also attempts to periodize the links identified within the EB

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or "merchandise" and "value" or "price" (Brown, Driver and Briggs 1979: 569). The word מחיר is also utilized for "price" a word borrowed from Akkadian *maḫirum* (*idem*, 564). In Jewish Aramaic מחיר is utilized for equivalent, or counter-value of a gift in goods (Hoftijzer and Jongeling 1995: 613), whileמכר is derived from Akkadian *tamkāru* "merchant" (Sumerian *dam-gàr*, von Soden 1981: 1314-1315). The Ugaritic word *mkr* is the term used for merchant (pl. *mkrm*) distinguished from *bdlm* (Gordon 1965: 371, 433). This last word is derived from the Semitic root "to exchange" as in Arabic بدل (Lane 1863: 167-168). The same root appears in several instances in Akkadian where *bi-da-lu-ma*, i.e. "merchants" are equated to *tamkāru*. In Ugaritic *mkr* is also the root of the verb "to travel" and in Aramaic, Punic and in the Dead Sea scrolls it has several meanings: "to sell", "merchant" and "trader" (Jean and Hoftijzer 1965: 150; Hoftijzer and Jongeling 1995: 625-626). The root *sḥr* was also employed (Jean and Hoftijzer 1965: 192; Hoftijzer and Jongeling 1995: 782-783) in the same body of literature. In Biblical Hebrew the root for change and exchange is חלף (Brown, Driver and Briggs 1979: 322). However, the only passage where this term is used appears in a text probably dating from the Persian period (Num. 18:31) wherein the tenth of the tenth is given to the Levites as חֵלֶף , i.e. as compensation for their work.

Age, according to geographical areas. It further attempts to define the types of exchange relations according to available data.

More generally, the primary object of this study was to test archaeological theory through application of data derived from the field. To date, most archaeological research in the southern Levant has focused on taxonomy of artifacts, architecture, and burial practices through time and space. The present study attempts, by observing the most accurate data available, to go beyond mere description and interpret the archaeological record. Such an approach entails a somewhat lengthy and tedious description of data. The justification for this treatment is found in a statement made by Edward H. Carr (1961: 8) who once pointed that for the study of history, “accuracy is a duty, not a virtue”. This writer feels it is no less a binding need for the prehistorian.

Although this study aims at precision regarding both quality and quantity of data, it should be noted that sources are many and varied and data may be of uneven reliability or even dubious *bona fides*. While such problems may affect this work, it is felt that they are common to all archaeological research and thus, unavoidable. To what extent they may have biased the results is unclear, but this writer believes that, given the present state of knowledge available, this study offers at least a reasonably good general picture on local exchange, not just for one specific geographic region of the Southern Levant, nor for a specific commodity for a relatively short span of time, but rather for many types of commodities over the entire region and for the entire length of the EB Age.

Establishing patterns of exchange will help towards an understanding of social interactions, regional variances, and diachronic changes in patterns, reflecting historic changes in the area. The author of this dissertation is convinced that the task of seeing these relations through the archaeological record, while arduous and dependent on many variable of uncertain reliability, is, nevertheless, still possible. At the same time, the database of major EB commodities organized in this work, it is hoped, will be helpful as a starting point for further research for further investigation.

The conclusions proposed in this work on local exchange are also meant to augment interpretations of the economic pre and proto-history of the Southern Levant. It is further hoped they will become a basis for further discussion and debate. Moreover, scholars of economic history may be able to benefit from gaining a perspective on a "history without written sources".[4]

FRAMEWORKS

The discussion on exchange goods and patterns is realized within two main frameworks:

1) typological, chronological and regional settings in which this research is done, and 2) a theoretical background against which the subject is discussed. This theoretical background primarily includes economic and anthropological approaches that sometimes cannot be differentiated one from another based on archaeological data.

Consequently, although the study of exchange has been approached from different points of view, the main interpretation is still based on archaeological data (and see Chapter 2). For instance, history, anthropology and economics study the same phenomena, and if one of these disciplines perceives one aspect of reality, the resulting image is partial if not completed by other disciplines. However, the conversion of an abstract into a concrete picture, e.g. a given network pattern derived from the finding of pottery or flint artifacts at several sites, cannot be achieved by adding up several partial images. Knowledge of past human facts cannot only be reached by joining together partial and distorted results of factual archaeology with theoretical sociological or

[4] Ben-Tor (1990: 3) has addressed problems that scholars must deal with when trying to research the subject of exchange while lacking written sources.

anthropological results. Concrete knowledge cannot result from mere addition but rather derives from synthesis of concepts elaborated with the help of those disciplines (see Goldmann 1952: 9).

STEPS OF RESEARCH

Section 2 of Chapter 1 offers the reader a general review of previous works on exchange in the Southern Levant. Chapter 2 presents a theoretical framework based on approaches to exchange derived from anthropological models.

This research investigated the whole process of exchange of commodities with particular attention paid to their production and circulation within an interrelated and dialectical mode. Groups of commodities such as identifiable pottery types or wares, flint and stone tools, seals, shells, raw materials are recognized, defined and discussed, the result of intensive investigation of finds, site by site and then across regions and periods. Once these groups were defined typologically, chronologically, and regionally, the next phase was to establish their provenance. The results offer what appears to be a comprehensive picture of these groups of commodities and the socio-economic relations and exchange patterns evident from them.

Investigation of distribution patterns in order to identify regional and temporal facets and stages allowed production of maps according to types of products and periods (Part II). These maps and plans attempt to: 1) compare the distribution of each commodity according to periods, regions and sites; 2) analyze each region according to commodities by period, 3) to examine distribution of commodities between different regions; 4) to reconstruct exchange relations between regions and sites and extrapolate that information in order to reconstruct socio-economic links behind the interchange of goods.

In Part III we study the use of the donkey as a beast of burden for transportation of commodities and an iconographic expression of related activities likely to be associated with social groups involved in exchange. Data on archaeozoological remains are presented along with a discussion on domestication and use of donkeys and possibly other equids. Another discussion considers the iconography and distribution of the donkey figurines.

Part IV offers conclusions on characteristics of EB Age networks of exchange and on the EB economy and society in the light of the research.

SOURCES UTILIZED

Sources upon which this research is based are mainly published stratigraphic excavation reports and unpublished accessible collections of archaeological finds. When important, in some specific cases, surveys are utilized to complement the sources (For limitations of surveys for researches of this type see Ammerman 1981, Flannery 1974: 131-160, Renfrew and Bahn 1994: 61-69).

Unpublished sources from excavated sites are used to complement primary data obtained from excavations, when available. That material comes mainly from this writer's work and that of colleagues who have kindly allowed its use in this research. In some instances excavations the writer participated in excavations as assistant or field supervisor as a researcher for the Israel Antiquities Authority (IAA henceforth).

It should be emphasized, as in all archaeological research of this kind, that work is based only on a surviving sample of what once existed, a sample that is not necessarily representative of the parameters of the study. Data from excavated sites are considered most reliable since we know the archaeological contexts in which they were found. However an amount of information is missing from non-excavated sites. Since distribution patterns derived only from excavated sites do not necessarily represent all evidence for settlements in a given region it follows that the present work does not purport to present a complete picture local exchange in the Southern Levant during the EB Age.

Although that will never be possible, it is likely that with increments in knowledge, more accurate ones will be forthcoming in the future.

To reconstruct likely sources of pottery, petrographic data are essential. They present results of microscopic examination of thin sections of pottery, i.e. petrographic results which reveal the evidence regarding the distribution of materials from geological sources (Porat 1989; Goren and Porat 1989; Goren 1991, 1996b) that indicate geographic regions in which pottery production is likely to have taken place.

Other methods generally used include trace-element analysis, mainly neutron activation analysis (NAA) (Perlman and Asaro 1969), atomic absorption spectometry (AAS), X-ray fluorescence spectometry (XRF), inductively coupled plasma-atomic emission spectrometry (ICP-AES), proton-induced X-ray emission (PIXE), and proton-induced gamma-ray emission (PIGME)(Knapp 1987; Yellin 1984). These trace-element methods provide tables of chemical elements, and the problem is how to interpret them. In the case of pottery, different sources can have similar compositions, which can result in misleading results. Petrographic methods are much more satisfactory, and less expensive. Trace-element analysis, however, can be more effective in distinguishing between sources near one another (Goren and Porat 1989; Renfrew and Bahn 1994: 317-318; Tite 1999).

In some notable instances questions related to production and exchange of commodities and parallels from ethnographic sources related to the subject of study are included in studies. As observed by Esse (1989b: 86), we are dealing here with what Rice (1984: 45) called “micro-provenancing” studies for pottery, i.e. the making and distribution of commodities within a limited, highly localized area. While micro-provenancing studies refer mostly to objects found within rather limited areas, it should be noted that the extension of exchange distances is a relative concept, dependent upon geographical and historical conditions (Tite 1999).

Data presented in this study do not include all finds associated with the EB Age in the Southern Levant, but rather are specific ones chosen for their ability to provide information on the subject of research. This study further considers that the investigation of manufacture and exchange of commodities is subject to a set of variables. Following van der Leeuw (1977, 1988) and Arnold (1985)[5], who used several ethnographical descriptions and studied technology of ancient pottery, these variables can be simply stated for ceramic other non-ceramic archaeological commodities as follows:

1) Correct identification of the kind of commodity at an archaeological site (for instance hand-made pottery, pottery made on small turntable, or pottery made on a potter's wheel, etc.).

2) Identification of the level of production at a site (household production, workshop/village manufacture, large scale production, etc.).

3) Correct identification of ceramic groups and types of other finds within a site and throughout a region.

4) Accurate use of sourcing studies and their application to distribution maps.

5) Use of accurate descriptions of ethnographic and ethnohistorical data.

6) Application of archaeological data to comparable ethnographic situations.

2. Previous Research

Earlier, the importance of exchange and trade studies in early societies in the realms of Central American, Aegean, and Mesopotamian archaeology was noted. For the Southern Levant there have been a number of treatments of evidence of earlier than EB Age prehistoric trade routes and exchange. They have discussed information on commodities such as flint (e.g. Rosen 1997b), obsidian (Perlman and Yellin 1980; Yellin, Levy and

[5] See also Franken 1974; Franken and Kalsbeek 1975; van der Leeuw 1976; Esse 1989b; Goren 1991a.

Rowan 1996), basalt (Weinstein-Evron 1994; Weinstein-Evron et al. 1995, 1999, 2001), ochre (Zackheim 1997), and shells (Bar-Yosef Mayer 1999a).

As noted above, for the EB Age a number of scholars have investigated the subject of international relations, i.e. relations between the Southern Levant and areas bordering and beyond (e.g. Henessy 1967, Ben-Tor 1968, 1990, Andelkovic 1995). An article by Harrison (1993) has developed, on a fairly limited scale, according to the nature of the work, several theories concerning the character of trade with Egypt, and the way in which commodities circulated within Canaan. This article was mainly based on the theoretical work of Renfrew (1975, 1977).

REGIONAL STUDIES, TRADE AND URBANIZATION

A number of scholars have dealt with exchange and trade in the southern Levant for the EB Age. One of the earliest treatments is in a work by Esse (1991: 99-125) on Beth Yerah. It considered trade as understood from evidence in the northern region of the southern Levant, treating it at regional, interregional and international levels. Schaub (1987) published results of research dealing with the role of ceramic vessels as evidence for trade during the EB in Transjordan.

Other scholars have offered studies relating regional, social and urban inquiries to trade and exchange. Joffe's (1993) research was a major attempt at trying to understand exchange processes within what he calls complex or semi-complex societies. Previously, Rosen (1986) analyzed the relation of trade and craft specialization already in the Chalcolithic period. The role of trade and exchange in urbanization during EB I, was first examined by Kempinski (1989) and Esse (1982, 1989a,b), and recently was re-examined for the IBA by Haiman (1996). Haiman maintains that the emergence of settlements in the desert during that period is primarily related to the transport of copper from Jordan to Egypt.

Finkelstein and Gophna (1993) have drawn attention to the phenomenon related to the trade of agricultural products. Based on Mesoamerican and Iranian examples (Rathje 1971, Wright and Johnson 1975) they point out that the demand in Egypt for Canaanean goods accelerated the expansion settlement in the Hill Country and produced the development of marketing stations in the south, as well as the development of social and political stratification in the Southern Levant. This relationship between Egyptian trade, settlement growth and urbanization in EB I-II has been the subject of several works (e.g. Gophna 1987; Kempinski 1992; Milevski 1993).

POTTERY SOURCES AND CENTERS OF PRODUCTION

Several works have been done in the last years on pottery sourcing that allow us to partially reconstruct some of the main networks of ceramic distribution. These studies deal with Gray Burnished Ware (Goren and Zuckerman 2000), which presents a picture of pottery sources of this group of the EB I.

For EB II-III, Greenberg and Porat (1996), Esse and Hopke (1986) and Mazar, Ziv-Esudri, and Cohen-Weinberger (2000) have made substantial contributions by studying northern production centers of Metallic Ware and Khirbet Kerak Ware and their relationships to site provenance and distribution. Porat (1989a,b) have contributed in the analysis of pottery wares from the Negev, Sinai and Egypt in the understanding of southern pottery trade.

Work on later periods has yielded similar results. For the IBA, an important contribution to our subject, while in the restricted areas were made by Falconer (1987) and Goren (1996a). For later periods, we have the skillful work by Adan-Bayewitz (1993) on local trade of Roman pottery in the Galilee.

BASALT, FLINT AND OTHER MATERIALS

Basalt and similar looking stones were favorite materials for stone working in the Chalcolithic and EB I periods. It is likely they were made in specific regions where the raw material was found and then exchanged. Scholars have made attempts at locating sources of production and have tried to trace patterns of exchange.

Amiran and Porat (1984) conducted petrographic studies on a limited quantity of basalt bowls of the Chalcolithic and EB I periods and noted the restrictions of petrography in the identification of basalt sources. Goren's work (1991b) on phosphorite vessels of the Chalcolithic period sheds light on a different industry noting circuits of distribution of similar basalt and phosphorite bowls (but see Gilead 1995: 314-321). More recent work has investigated south Levantine sources of basalt found as temper in Chalcolithic and EB I vessels have been investigated using XRF analyses by Philip and Williams-Thorpe (1993, 2000, 2001), with relatively good results. Rowan (1998) has undertaken a research on basalt vessels of the EB I, based on ICP-AES methods. They suggest likely regions where pottery was manufactured and distributed from.

Flint sources and proveniences are very difficult to establish by applying trace-element analysis, because the material tends to be non-homogeneous. Frachtenberg and Yellin (1992) attempted to investigate sources of flint from some prehistoric periods, but their results do not seem convincing. Some evidence of sources comes from discovery of flint quarries and areas of sourcing and production of tabular scrapers (e.g. Quintero, Wilke and Rollefson 2002), but in general, information as to sources of flint used for production and distribution of tools is scarce.

Rosen (1983a,b) has made an important contribution to the subject of flint tool distribution during the EB Age, while attempting to establish existence of production centers for Canaanean blades and tabular scrapers, a distribution net for them, and a model for dispersion of material culture. In a comprehensive handbook on post-Neolithic industries Rosen (1997a) has researched relations between organization of the production of tools and their distribution in late prehistoric, protohistoric and early historic times. Of particular interest to this study is a section on the EB Age.

Exchange of raw materials such as bitumen have received some attention, mainly in relation with export to Egypt (Connan, Nissenbaum and Dessort 1992; Milevski 1993). This material has, as well, been discussed as a product of local exchange, likely deriving from the Dead Sea (Nissenbaum, Serban, Amiran and Ilan 1984, Marder, Braun and Milevski 1995, Milevski, Marder and Goring-Morris 2002). Other archaeological materials, such as animal bones, shells and ivory are dealt with less frequently (e.g. Caubet and Poplin 1995; Bar-Yosef 1999 a,b; Hesse and Wapnish 2001).

MEANS OF TRANSPORT AND ROUTES

Relatively little work has been done on the actual logistics of exchange concerning means of transport and routes through which it was accomplished. Amiran (1985), Haiman (1996), and Greenberg and Porat (1996) have, in different works, pointed out, the importance of donkey caravans in the local and external trade based on their interpretation of objects they believe to be of artistic and cultic importance. As far as is known, there are no representations or archaeological records of traders or middlemen for the EB Age beyond the evidence of animal bones and the few examples of figurines. For further information it is necessary to look at ethno-archaeological sources (see, for example, Arnold 1985, Wood 1990) and a later depiction of what may reflect EB Age practices. That information comes from a tomb at Beni Hasan of the 19th century B.C. Egypt (Newberry 1893: Pl. XXXI) in which apparently traveling metal-workers (Albright 1960: 207-8) or Asiatic merchants (Shea 1981) are depicted with their loaded donkeys.

Pottery containers with their special characteristics are likely to have been used widely for the exchange of specific commodities. Schaub (1996) has suggested pottery vessels as containers of agricultural commodities and McGovern and others (1997) have published results of wine residues from EB Canaanite storage jars found in Egypt. Greenberg and Porat suggested donkey figurines could illustrate the manner in which these vessels were transported (Greenberg and Porat 1996: 10, Greenberg 1996b: 139). Faunal collections often contain bones that may not be identified to the degree of genus and species but which can only be classified generally. Sometimes the presence of donkeys can be confirmed (e.g.Horwitz and Tchernov 1989; Horwitz, Hellwing and Tchernov 1996), but there are numerous instances when bones may only be classified as equids and for which no further definition is possible. While they could be interpreted as evidence for existence of beasts of burden involved in exchange or trade (e.g. as at Arad; Lernau 1978: 85-86), Tel Halif (Zeder 1990), Tel Dalit (Horwitz, Hellwing, and Tchernov 1996), and Tel Kinrot (Hellwing 1988-1989; Ovadia 1992, Grigson 1995), yet another interpretation suggests equid remains could also be interpreted as horses used for plowing (Grigson 1993).

As far as we know, little research has been done on local routes and roads during the EB (a brief mention is made on the region between the coastal plain and Jerusalem in a work on Roman roads by Fischer, Benjamin and Roll [1996]), and most of the studies are related to international trade (e.g. Oren 1973, 1989). Gophna and Liphschitz (1996) and Galili et al. (2002), have put forward evidence of maritime trade along the Mediterranean coast, from Lebanon to Upper Egypt and from Egypt to the Levantine coast based on information derived from some archaeobotanical and mollusca remains. Wood and other botanical remains can also be interpreted as inter-regional exchange within the southern Levant, and for trade with other regions beyond (e.g. Lev-Yadun and

Gophna 1992). That has been the thrust of work on the EB Age by a number of scholars (e.g.Liphschitz 1986; 1992; 1996a,b; 2000a,b; Gophna, Liphschitz and Lev-Yadun 1986-87).

Chapter 2

THEORETICAL FRAMEWORK

1. GENERAL APPROACHES ON PREHISTORIC EXCHANGE

Recent decades have seen a spate of literature concerning production and exchange in prehistoric times throughout the world. However, archaeologists specializing in Levantine studies have been reluctant to place production and exchange within a theoretical framework (see Knapp and Cherry 1994: 123-124 for a generalized discussion of this issue).

While a comprehensive study of theories of production and exchange in archaeology is beyond the scope of this dissertation, in this chapter we briefly review the most important scholarly work. A most elaborated appraisal of these theories can be found in the works by Adams (1974), Trigger (1989), Renfrew and Bahn (1994), and Knapp and Cherry (1994).

Two alternate and contrasting approaches to the subject are prominent in the literature on prehistoric and protohistoric exchange. One, known as “substantivism” has been championed by a number of scholars (e.g. Dalton 1965, 1977; Renfrew 1975, 1977) who maintain that different societies organize their economic activities–exchange in different ways. Polanyi and others (e.g. Polanyi, Arensberg, and Pearson 1957) have defined three ways of exchange in ancient societies: reciprocity, redistribution and market. Other scholars, following the substantivist approach, including Dalton, have emphasized its functionalist perspective, while Service (1975) and Sahlins (1972) have re-interpreted Polanyi in an evolutionary mode.

A second approach, known as "formalist" has pointed out that all societies display certain common economic characteristics that center on the behavioral principle of "choice" (Binford 1982). For these scholars (e.g. Burling 1962, Cook 1966) exchange patterns are the result of a combination of fixed sets of interacting variables, all of them imbedded in general and non-changing patterns of human behaviour.

Other scholars have interpreted trade and exchange in prehistoric societies following a nomenclature used in recent decades in America and Europe, calling them "processual" (e.g. Knapp and Stech 1985; Renfrew and Cherry 1986) or "post-processual" (Knapp 1993). Others have preferred to discuss the subject through general anthropological approaches e.g. "world systems theory" (Rowlands, Larsen, and Kristiansen 1987), "structuralism" or "contextualism" (Hodder 1982, Tilley 1990), or structuralism adapted to Marxism (Patterson and Galley 1987).[6]

Most recently, scholars have been divided on the interpretation of prehistoric trade and exchange among those that follow Weberian notions on the centrality of production in economy (mainly agricultural production; e.g. Weber 1961) and those that support Sombartian (e.g. Sombart 1967) points of view that stressed the idea of "conspicuous consumption" (see Veblen 1912). While Weberians (e.g. Weiner 1991) placed emphasis on the supply side of economy as the main factor of exchange, Sombartians have emphasized the side of demand and consumption (e.g. Sherratt and Sherratt 1991).

The following section defines our premises and offers a better understanding of prehistoric exchange based mainly on Marxist critiques of political economy. This approach falls within what Blumfiel and Earle (1987) defined as "commercial development" or what Knapp and Cherry (1994: 126) classified as "social" models on

[6] On this anthropological school of research see Godelier 1977.

production and exchange. This work prefers, as Marx did, to call it a "political-economic" or a "materialistic, dialectic perspective".

2. MATERIALISTIC DIALECTIC PERSPECTIVES ON EXCHANGE

Development of EB communities produced subsistence-based demands which could not be met by individual communities. That led to a need for exchange of commodities between different regions and settlements. Objects exchanged included not only basic commodities but also prestige or luxury goods. Put in Marxist terms, exchange of commodities became a prerequisite for continuing production and reproduction of material conditions necessary for subsistence (cf. Marx 1993: 471-479).[7]

All this human activity involved a great deal of human labor. While there was probably no considered intent to create surplus (for purposes of exchange) as in modern capitalist societies, which do so on industrial scales, nevertheless, the effect was similar. Created were surplus products for exchange, either for domestic use, for that of the community or for a central political power controlling exchange (*idem*, 472). An important distinction between the portion of labor directly consumed by its producers and their families, and the products of labor (which is, by definition, the result of surplus-labor) that serve to satisfy general needs, in whichever way they are distributed (Marx 1977b: Chap.51).

Marxist theory claims that each commodity has a "use-value", i.e. a thing which, through its qualities satisfies human needs of whatever kind (Marx 1977a: 126). However,

[7] This part of the *Grundrisse* is known as "Forms which Precede Capitalistic Production". We deliberately avoided here the definition of what is Marxist archaeology and we prefer to speak about Marxist perspectives in archaeology as pointed out by Spriggs (1991: 3). For the place of Marxist thought in economic history see Kula 2001: 16-19.

this use value comes into play really only when an object is exchanged and consumed. For commodities to be exchanged, another type of value, called "exchange-value", must be assigned to the object, so that it can have an equivalent that allows for its exchange. The "exchange-value" of a commodity is calculated according to the average necessary labor invested in it within a given society, a given level of technology and within the parameters of its physical location.

The object that becomes a commodity could then be exchanged for other commodities. For instance, X quantity of a certain crop could be exchanged for Y amount of flint tools. Notably, the exchange-values of commodities is completely dissociated from their use-value; the only commonality between two exchangeable commodities is in the amount of labor necessary to produce them (Rubin 1972: 63-76).[8]

Although the main purpose of economic production is to create use-values and not exchange-values, barter or "spontaneous form of exchange" as Marx (1970: 50) called it, is something most prehistoric societies engaged in. Barter gave rise to a need for conceptually assigning to commodities exchange-values based on use-values. In later phases of exchange, exchange-values are generally expressed in terms of metal weights

[8] *"Whatever its social form may be, wealth always consists of use-values, which in the first instance are not affected by this form. From the taste of wheat is not possible to tell who produced it, a Russian serf, a French peasant or an English capitalist. Although use-values serve social needs and therefore exist within the social framework, they do not express the social relations of production … We cannot tell by looking at it that the diamond is a commodity. Where it serves as an aesthetic or mechanical use-value, on the neck of the courtesan or in the hand of the glass-cutter, it is a diamond and not a commodity. To be a use-value is evidently a prerequisite of the commodity…. Use-value is the inmediate physical entity in which a definite economic relationship --exchange-value-- is expressed"* (Marx 1970: 27-28).

(e.g. shekels,[9] talents, etc.), but *de facto*, no exchange medium is used. In later times these metal equivalents will evolve into coins and money.

In his work on the theory of value, Rubin (1972: 86-88) pointed out that one of the aspects of the Marxist viewpoint includes the concept of social regulation of exchange, i.e., when two commodities are exchanged and represent two types of merchandise (for example crops and animals) these two economic branches are in equilibrium in terms of the distribution of labor previously done before the exchange. However, Marx never maintained that exchange is carried out in conditions of "exact equilibrium". He more than once pointed out that the qualitative "inequality" of commodities is the necessary result of the division of labor and represents, at the same time, a necessary stimulus of exchange (e.g. Marx 1993: 242).

While it is difficult to point to an internal array within the communities of this division of labor for the EB in the present state of research, it is clear that a regional or site specialization can be drawn, and a delineation of the exchange patterns between the sites and regions can be obtained from the data we posses. We assume that settlements or communities that extracted and grew specific raw materials or crops, and transformed these into artifacts and goods (at different levels of production), not only exploited these resources at their own natural workshop, but entered into relations with other communities and settlements or intermediate merchants with whom they exchanged their products based in this principle of exchange-values, even when we have not written documents that can show it.

These premises were adapted to the archaeological discipline by Gordon Childe, who explained that during the Bronze Age the proliferation of craft specialties was due to

[9] In Hebrew and other Semitic languages the root of the word שקל (Akkadian *šiqlum*) means “to weight” (Brown, Driver and Briggs 1979: 1053-1054).

the heightened productivity of agriculture that ensured a surplus for the community and allowed some segments of the population to engage in specialized non-agricultural tasks and to exchange the surpluses with other communities (Childe 1930).

At any rate, Marx (1970: 50; 1993: 479) suggested that real exchange in pre-capitalistic societies (as that of the Southern Levant in the EB) was embedded in a certain simplicity of an economy, in spite of the existence of the processes of urbanization and the beginning of social complexity. The economic backwardness of the Southern Levant, even in relation to Egypt or Mesopotamia found its expression in a much lesser and exceedingly low degree of craft specialization (see Joffe 1991, 1993), suggesting that real exchange occurred only between communities and not within them.

Exchange of commodities did not imply a capitalistic form of production as many scholars have suggested for antiquity (e.g. Silver 1983; 1985). However, in the opinion of this writer, that view was successfully refuted some time ago by Salvioli (1979) and following him, Gaido (2003), who argued against the views of historians and economists who, under the influence of modern conditions, believed full-fledged capitalism existed in ancient societies.

The reactions of substantivists (e.g. Renger 1994) and Sombartian supporters (e.g. Sherratt and Sherratt 1991) to such theories of capitalism *avant la lettre* produced, in this writer's opinion, yet a different type of inaccuracy. These scholars reject the economic character of circulation of commodities in pre-capitalistic societies. Here, however, it is suggested that there is, indeed an economic character and it is in the supply and consumption aspects of exchange. They cannot be separated, but rather should be understood within the framework of a complete economic system.

This thesis expresses the viewpoint that exchange should be understood within the scope of a total economy but, in this instance, at a level concomitant with prehistoric societies. Local exchange within an EB Age framework must take into account the degree of development of productive and social forces for that period within the Southern Levant. Therefore, behavioral or formalist theories on exchange are rejected since they suggest exchange and human social behavior do not change over time. This work sees the need to interpret exchange by taking into account the specific chronological and technological characteristics of production of the EB Age.

3. ETHNOARCHAEOLOGY

This aspect of research makes use of ethnography and/or history, resources that suggest possibilities for enhancing interpretation of the archaeological record; this is what in general is called ethnoarchaeology and/or ethnohistory. Analogies, drawn from ethnoarchaeological and historical sources allow, in several cases, for identification of commodities exchange patterns (Chapter 3). Since, however, all these sources represent a body of information too large to be dealt with within the scope of this work, only a few most pertinent to this study are discussed.

Utilization of ethnoarchaeology and history to explain the archaeological record is not without its pitfalls. The first approach utilizes typical methods of anthropology for studying what some scholars call "traditional" societies, still extant. [10]

By contrast, ethnohistory draws from both historical and ethnographic data, while its historical methods go beyond referencing books and manuscripts to study cultures wherein a continuum exists between prehistoric and historic times. An example of this type of

[10] A number of syntheses on this subject are available in Vossen 1984, Féblot-Augustins and Perlès 1992; David and Kramer 2001: 360-377.

application is found in the study of American pre-columbian and colonial cultures (e.g.Trigger 1982: 3).[11]

Use and abuse of historical sources to interpret archaeology and mainly Biblical sources has been the target of a vast bibliography and we do not have the space to describe the discussions on the matter (e.g. Levine and Mazar 2001; Finkelstein and Silberman 2002; Finkelstein 2002). Interpretation of historic sources has its own problems, because such sources always represent subjective viewpoints (whatever was chosen to be set down in a document) or simply because they do not present anything near a complete account of the phenomenon being studied but partial information related to the find spot of the documents. [12]

For a variety of reasons there is relatively little utilization of ethnography for the study of the southern Levant (e.g. Dalman 1928-2001; Marx 1967). Some notable exceptions are found in the works of LaBianca (1984), Betts (1989), Finkelstein (1990), London and Sinclair (1991), Biger and Grossman (1993), Ziadeh (1995, 1999) (Greenberg 1996a: 28-54), Bienkowski and van der Steen (2001) and Rosen (2002).

However, the use of ethnographic approaches to archaeology is far from simple issue for archaeologists (e.g. Wendrich and van der Kooij G. 2002: 13-26) that has engendered much discussion and debate between those that fully accept use of ethnographic examples to analyze archaeological data (e.g. Torrence 1981; Kramer 1982; Watson 1980, 1999) and those who question their utility (Wobst 1978; Trigger 1982).

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[11] Besides, anthropology and history, are very close to economics and the problem in fixing limits between these disciplines have been discussed in the past (e.g. Adams 1974; Godelier 1977: 15-62).

[12] See also Wattenmaker (1990: 273-275, 1994) who claims to point out contradictions between ceramic finds and their disappearance in written sources at Ebla.

Some even simply reject applying ethnographic sources to the explanation of archaeological data (Lamberg-Karlovsky 1989).

The position put forth in this thesis is that ethnographic and historic parallels or analogies may work in three cases:

1) When ethnographic or historic parallels derive from the same region or country but in different (generally later) historical periods. In this instance comparisons are workable as far as common geography and probable climatic conditions. Thus, it is sometimes possible to learn from analogies derived from later, historical periods.

2) When ethnohistorical comparisons are given with adjacent regions that for some reason have better-known sources on the subject. In those instances it is assumed that comparisons are with contemporary frameworks. Comparisons are valid as far as they can illustrate what happened in contemporaneous societies, albeit with probable differences in the degree of economic or political developments.

3) When ethnographical and ethnohistorical comparisons are made between societies in different and geographically removed regions within different absolute chronological frameworks. Such comparisons may be productive if the societies under consideration have similar degrees of economic and social development.

Use of ethnographic and historic sources in this work is not meant to imply in any way that they necessarily explain the archaeological data under discussion. Rather, they are understood as ways to interpret them that are likely to reflect ancient realities. There are no universal laws that can work for any society independent of their nature (Childe 1946) and thus, caution must before accepting results based on ethnoarchaeological approaches.

4. SPATIAL ARCHAEOLOGY AND EXCHANGE MODELS

This dissertation utilizes the potential that exists for interpreting the archaeological record according to spatial patterning of archaeological data (Hodder and Orton 1976).

Several techniques are useful for the study of distribution of commodities. The obvious, primary technique involves plotting of distribution maps of finds. This allows exchange routes and networks to be drawn. Then, by taking into account topographical and regional aspects that are likely to have bearing on exchange, it is possible to indicate the principal direction of the flow of certain goods.

By doing so, we will try to avoid a mechanical view which regards the presence of given goods (finds) as a mere typological evidence. We will not search for the principle of unity of assemblages but from their disparity, i.e. we will look for the contradictions that exist between the sources of the commodities and their find spot.

For this discussion the concept of network is useful. A network is defined as a series of components linked by specified exchanges of goods belonging to one chronological horizon. It is a key concept for building exchange models (Plog 1977: 128).

The networks and maps in this work where the networks are depicted, show relationships between sources of raw materials and centers of production of finished products, and locales where commodities in question were found. It must be stressed that archaeological research considers static units, i.e. sites, loci, contexts, activity areas within the networks and does not deal with individuals or social groups.

While studying distribution of commodities, quantitative aspects are of cardinal importance, since there is a relation between distances and commodity frequencies when analyzing exchange networks (cf. Renfrew 1977). Unfortunately, while distances can be measured (see Chapter 3), in light of the present state of available information, quantitative estimates of most commodities are not available. Exceptions are, however found for data on stone tools and faunal remains.

PART II

COMMODITIES

Chapter 3

POTTERY

1. POTTERY PRODUCTION, EXCHANGE AND ETHNOGRAPHIC EXAMPLES

POTTERY PRODUCTION AND RESOURCES

While much of the discussion in this work concerns EB pottery it should be stressed that very little is known of pottery workshops in the southern Levant of that period. Remains of a kiln from Tel el-Farah (N) and dated by the excavator (de Vaux 1955: 558-563 to AB II, pottery "Période 3"; i.e. EB II). This unique published example of an Early Bronze kiln from the southern Levant is classified as an example of a "vertical" type (Wood 1990: 26-30). Another kiln from Bet Yerah, dated to EB III was reported on, but remains essentially unpublished (Maisler, Stekelis and Avi-Yonah 1952: 227, Fig. 3:6).

Additional evidence of potting activity is found in several potter's wheels from Qiryat Ata (EB II?; Rowan 2003: 191, Fig. 6.3), Megiddo (EB I, III; Loud 1948: Pl.268:1,2), Tel Megadim (*idem*), Jericho (EB III?; Kenyon and Holland 1983: Fig.231:2), Tel Yarmuth (EB III; de Miroschedji 2000: 697-698, Fig. 11; 2003: 168*), Tel Miqne [13] and Horvat Ptora (EB I; pers.observ.). However, no precise locales have been defined as workshops complete with all components of pottery ateliers (kilns, potter's wheels, hand tools, etc.), as have been found for later periods (cf. Wood 1990: 20, Figs.12-15).

[13] The potter's wheel came from a later context but it is probably originated in not yet excavated EB strata as numerous pottery sherds dated to EB at the site.

Arnold's (1985: 35-60) study of ancient pottery production discusses the availability of necessary resources (i.e. clay, temper, fuel, water, etc). Crucial to development of this industry are critical distances (known as "threshold distances") between population centers and sources of raw materials are. They must be within proximity to each other to make the related activity, in this instance, pottery production, worthwhile in regard to the quantity of labor and other resources invested. Beyond that threshold returns of such activity are not worthwhile and accordingly, such activity does not take place.

Browman (1976) has also addressed similar issues in a discussion on effectiveness (in terms of costs and return) for exploitation of territories in relation to economic activities of ethnic communities in South America. He took several elements related into consideration: 1) distance to the resources; 2) transport and other energy costs for obtaining resources; and 3) social costs (if the members of the community are very distant from resources) that demand temporary physical separation of members from the community. These parameters must be taken into account in any discussion of sources of raw materials and their relation to centers of production.

While fuel and water must almost always readily available at any site where pottery manufacture occurred, clay and tempers (non-plastics) are significant components that must have been available within the limits of threshold distances. Other factors also come into play that determine sources, especially for pottery manufacture. Clay quality is one, and it may be affected by tempers present or artificially added during the process of pottery production. Many clays contain some natural non-plastic components but experience shows that potters often add materials such as sand, crushed stones, shells, straw, grass, or even crushed pottery (grog), in order to achieve specific end results (e.g. hardness, porosity, aesthetic qualities). Other resources such as paints and slips are used in smaller quantities in relation to clay and temper. Tools are often community property and their influence on costs in ceramic production is negligible (Arnold 1985: 36-37).

Instance of transportation of raw materials to centers of production are numerous. Arnold (1985: Table 2.1, Fig. 2.5) brings ethnographic examples of geodesic distances to clay resources from less than 1 km to 50 km. These examples came from all over the world, mainly Latin America, South and central Asia, and Oceania. However, there are only a few examples from the Near East and the Eastern Mediterranean. One of them is from the village of Beit Shebab in Lebanon where potters bring clay from a source located 2 km away. Another is Kafr Lebbad in the West Bank, Palestine, where clay sources are encountered 8 km from the workshop.

Two additional cases from the region under study are instructive because they indicate the extent of traditional parameters for transportation of raw materials for ceramic production in the Southern Levant. One, of particular interest to the present study is from a much later era. Adan-Bayewitz (1993: 25, n.5) while researching Roman pottery from Galilee, noted a potter working at Akko transported clay from Upper Galilee, some 6-12 km to the east. A second case is a potter's workshop at Zizia, Jordan (ca. 30 km south of Amman), which belonged to a group of migrant potters from Egypt (see below). Those potters brought four types of clay from Suweilah, some 40 km to the northwest, for preparation of vessels (London and Sinclair 1991: 421-422).[14]

From the cases presented above, it may be concluded that in ancient times raw materials for pottery were not traded or transported over distances greater than 50 km (Porat 1989b: 170). However, each case must be analyzed according to historical and geographical circumstances with real distances between sources of materials and centers of production dependent upon different factors. Thus, it seems likely that efforts to

[14] Franken (1986) presented a different group of potters from the same workshop.

improve ceramic production could instigate a search for better raw materials that in turn could see exploitation of new and different sources of clays and tempers (see Goren 1991a: 15*-16*).

POTTERY EXCHANGE

Ethnographic studies of pre-industrial pottery cultures demonstrate that the primary means by which pottery is diffused is through direct exchange. Secondary means involve the relocation of consumers, i.e. people migrating from one region to another and transporting their pottery (Wood 1990: 59-60).

Rice (1987: 192-197), following Renfrew (1975, 1977) has summarized ethnological evidence on ceramic trade and exchange, indicating five different options. The following options, specifically intended to explain methods of distribution may also explain dispersion of non-ceramic finds:

1) The consumer travels to the potter, as in the examples of Chiapas, Mexico (Howry 1976), and the Siuai of the Solomon Islands (Oliver 1955).

2) The potters travel to the consumers, carrying the vessels on the potter's back, a donkey, a canoe or by any other means of transportation. Examples include Pagago Indian potters (Fontana et al. 1962: 23), and Costa Rica (Stone 1950). Other examples are the potters who work in Zizia, Jordan and sell the pots in their town and at el-Qastal, some 5 km distant.

3) The potters and the consumer travel to a third location (e.g. market, fair, street-corner, etc.). For instance, in Guatemala potters or their relatives come to local markets (Reina and Hill 1978: 207-208) selling their commodities to consumers who attend the market. A similar situation is described for Yoruba areas in Africa (Hodder 1962: 116). That may also have been the case of Roman pottery from Kefar Hananyah and Kefar Shihin studied by Adan-Bayewitz (1993: 23-26). Apart from archaeological data, Adan-Bayewitz has

presented in his study some Talmudic sources indicating the purchasing of pottery in markets at these two locations. Certain tractates (*Tosefta Bava Metzia 6.3* and *Bavli Bava Metzia 74a*) discuss prices of potter's balls of clay (Hebrew ביצין של היוצר, "potter eggs")[15] but, according to Adan-Bayewitz (1993: 26) the passages do not relate to clay balls but to pottery vessels since the debate presented in *Bava Metzia 5.7 is* on the price of pottery in its last stages of preparation in relation to wine and oil.

4) The potter sells the vessels to a third party, a middlemen or a wholesaler as the "*regatones*" and "*comerciantes*" from Guatemala (Reina and Hill 1978: 207,215). Balfet (1981: 262) mentions peddlers transporting pottery vessels into the Atlas mountains in Morocco up to 40 and 50 km from the point of production (quoted by Esse 1989b: 89, n.30). Other examples show even longer distances, as the case of high-quality pottery in Ghana, traveling 100 km in primary distribution, and farther in a secondary distribution (Crossland and Posnansky 1978: 87).

5) The potter transfers vessels to a central agent which assigns him with goods in exchange, as in the case of a monopolist merchant in Mexico (Renfrew 1977: 14) or the Inca storage jars at Huanuco Pampa (Morris 1974). All these options are idealized categories, and may occur in combinations, including what Polanyi and others (1957)[16], Sahlins (1972), and Service (1975) call reciprocity and redistribution (Rice 1987: 191-192, 195-196).

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[15] Biblical Hebrew also defines the potter as יוצר (lit. a creator) as in Is. 45:9 (יוצר חרש, lit. creator of pottery), and the pottery and pottery vessels as חמר היצר and כלי יוצר as in Is 29:16 and Ps. 2:9 respectively. Other references related to the process of pottery manufacture in the Bible appear in Is.41:25; Jer 18:3-4; 19:1; Ps. 2:9, 22:16; Job 2:8.

[16] And see also Dalton 1965.

2. DISTRIBUTION OF EB WARE TYPES

GRAY BURNISHED WARE

Definition

Gray Burnished Ware (GBW henceforth) was identified by Wright (1937) who called it "Esdraelon Ware", on the basis of its massive presence in the Jezreel Valley area; he divided GBW into four Types, labeled 1 to 4. This ware is characteristic of a group of shallow and deep bowls, some of them carinated and some of them with pedestals. Some have a series of flattened, sinuous projections at the line of carination or conical knobs, others have applied rope decoration, while others have no decoration. To those three types is added another curved type with small conical knobs projecting in a ring below the exterior rim of the bowl. Most of them are characterized by a gray to black lustrous or burnish on their surface (Wright 1958: 41*), although some of them are of light buff, yellow or ivory colors, depending on different conditions of firing (Braun 1996b: 176). Related types or imitations of the GBW such as "Crackled" ware (Esse 1989b) or "Mottled" ware (Braun 1985: 62) are discussed below.

Sources

GBW is so distinctive an element in EB I material culture that it has been the object of much discussion from the time it was first discovered. It was considered by Wright as an "intrusive or imported element in a native horizon" (Wright 1958: 40*). Contrary to Wright's view, many scholars have considered the GBW as locally made. They have noted evidence for its regional pattern of distribution (e.g. Kenyon 1960; de Vaux 1971; de Miroschedji 1971; Handbury-Tenison 1986; Louhivouri 1988; Esse 1989b; Braun 1991; Stager 1992).

Hennessy (1967: 35-40) and Mazar (1990: 103) have recognized the local origin of the GBW, but suggested the shapes and decoration are of eastern Anatolian origins. Lapp

(1968: 34) claimed that GBW was in imitation of Chalcolithic basalt vessels done by EB I "newcomers", who had a "weak" tradition in making stone vessels. Braun (1990: 94, Fig.4) has stressed the similarities between Chalcolithic fenestrated pedestal pottery vessels and GBW bowls. Further similarities exist between some GBW bowls and a so-far, unique example of a pedestaled basalt bowl from Megiddo (Guy and Engberg 1938: Fig. 21). Philip and Rehren (1996) have suggested that GBW was meant to imitate silver vessels, e.g. the silver goblet of Tel el-Farah (N) (de Vaux 1951: 587, Fig.13). However, Amiran (1983) suggested the silver goblet was actually made in the image of pottery goblets that have no relation with the GBW.

Recently, Goren and Zuckerman (2000) carried out research on the GBW both from petrographical and typological points of view, arriving at the conclusion that each type of Wright's classification belongs to a different petrographic family and that their sources are to be found in the northern region. Following is a summary of the results of their research in which they have designated what they term "Families", labeled I to IV (instead of Wright's "Types"), of vessels of like typology and fabric. The present work has divided the GBW into sub-families taking into account petrographic research and morphology of vessels as suggested in a recent work by Yannai (1999).

Family I (similar to Wright's Type 1)

This family is basically composed of shallow carinated bowls with flattened, sinuous knobs or protrusions. Goren and Zuckerman (*idem*) divided it mainly into two subtypes: bowls with flat bases and bowls on fenestrated pedestals (and see below) (Figure 1:1-8). The clay of these bowls is usually buff with calcite grains, and grog inclusions. The matrix is composed by marl rich in foraminifers, of Senonian-Eocene ages. The origin of this group is probably Senonian marl of the Central and Northern Galilee. This family, according to clay profile and tempers, originated in the Jezreel Valley and/or other places such as Western Galilee and the Huleh Valley (Goren and Zuckermann 2000: Appendix A). Sub-families Ia and Ib used crushed calcite or calcareous sand for tempering and they are classified on morphological grounds (and see below). Subfamilies Ic and Id have as common temper grog plus calcareous sand (the majority) or crushed calcite.

Some few of these vessels contain chalk sand and are labeled as sub-family Ie, which probably originated in the Huleh Valley. Others have basaltic and calcareous sand tempers and are labeled here sub-family If. It has its sources in Western Galilee.

Family II (= Wright's Type 2)

The vessels were found in tombs at Tel el-Far'ah North and another, nearby site, Aqrabanyeh. They are divided into two subtypes: bowls with flat bases (Figure 1:9) and bowls on fenestrated pedestals. They are usually self-slipped, but not burnished, and the clay is generally darker than that of Family I. Laminar, rectangular, or flat shale fragments and spherical grains of quartz sand are visible within the clay matrix, as well as limestone grains. This petrographic profile is found only in this family. It derives from the Lower Cretaceous, and its provenance seems to be the eastern Samarian region (Goren 1991c).

Family III (= Wright's Type 3)

This family is composed of narrow and deep bowls exhibiting carination near the rim (Figure 1:10-11). Some of them (e.g. Yannai 1999, forthcoming) have fenestrated pedestals (Figure 1:10) but all lack external plastic decoration. The clay is usually buff, rich in basaltic, calcareous and/or quartz sand inclusions; the slip is thin and tends to peel. The clay, as in Family I, is rich in foraminiferous marl, of Senonian-Eocene origins. The source of the clay may be the marl of Galilee, but it is tempered with different materials, pointing to several possible sources: the Jezreel Valley area (as in Family I), the western Galilee (Kabri), the Huleh Valley (Tel Teo), and the central Jordan Valley.

Family IV (= Wright's Type 4)

This family is composed of deep hemispherical bowls with a series of pointed knobs under their generally incurved rims (e.g. Figure 1:12). Their slips are usually dark in color, restricted (in general) to their outer surfaces and rims, while their finish tends to be less lustrous with some exemplars red painted or even made of light cream colored clay. Some of the exemplars are not even burnished. The fabric of this family is that of Family III.

Miscellaneous Types of GBW

This is a group of vessels coming from excavations at a number of sites, including Affula, Bet Haemeq and Afridar (Area G). These vessels do not fit with any of the above-described types or petrographic groups. Some of the vessels (Afridar, Area G) are made of clay with Lower Cretaceous shales and originated in Eastern Samaria. Others (Bet Haemeq, Affula) are made of clay rich in foraminiferous marl with calcareous sand inclusions, originated somewhere in Galilee or northern Canaan. Finally, there is another group from Afridar (Area G) made of undifferentiated clayey, silty matrix with calcareous/quartz sand for which origins within the southern Levant have yet to be established.

Distribution

The distribution of GBW is presented in Table 1 and Maps 1-2 according to familes.

Family I

The following are the areas were this family is encountered (Map 1):

Lower Galilee and Jezreel Valley

The central core of distribution of Family I is the Jezreel and Bet Netofa Valley region, i.e. Yiftahel (Braun 1997: Figs. 9.2; 9.3; 9.4:1-5), Tel Qashish (Ben-Tor, Portugali, and Avissar 1981: Fig.17:20; Zuckerman 1996a: Fig. I, BIII), Tel Qiri (Baruch 1987: Fig.70:6-10), Tel Abu Zureiq (Meyerhof 1986: Pl.23), Hazorea Tomb 33 (Meyerhof 1989: Pl.24: 107), Affula (Sukenik 1948: Pl. II:1-11; Gal and Covello-Paran 1996: Fig.4:7-8),[17] Megiddo (Goren and Zuckermann 2000: Appendix A; Joffe 2000: 163; Fig.8.1.3, 12),[18] and Tel Jezreel (Gophna and Shlomi 1997: Fig.4:1-3).

We include in this group two sub-families labeled Ia and Ib, the former being characterized by deeper and closer carinated bowls (e.g. Braun 1997: Fig. 9.4:1-5), and the latter by flat bowls with pointed rims (e.g. Braun 1997: Fig.9.2:7).[19] Variant Ia appears probably also at Rosh Haniqra and Gadot (and see below). Both variants use crushed calcite or calcareous sand for tempering.

Besides, we distinguish at Affula two variants, which probably were made on site (Gal and Covello-Paran 1996: 30, note 2). The first one labeled Ic, is a bowl with carinated body and flat base and separate triangular projections (e.g. Sukenik 1948: Pl. 4:1-2). The second one, labeled Id, is a somewhat carinated, hemispherical bowl with a dense row of small projections (Sukenik 1948: Pl. II:4-11; Gal and Covello-Paran 1996: Fig.4:7). It is

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[17] There is unique vessel with loop handles, included into the *Varia* by Goren and Zuckermann (2000, Appendix A).

[18] The examples from Megiddo came from Stratum J-2 of the renewed excavations of the Tel Aviv University.

[19] Yannai (1999) distinguished a third sub-family; however we classified it as part of our Western Galilee sub-family If (and see below)

Table 1. Distribution of Gray Burnished Ware bowls according to family.

very similar to variant Ib present at Yiftahel (Braun 1997: Fig. 9.2:7), but with a different temper (grog plus calcareous sand). It appears also at Tel Qiri (e.g. Baruch 1987: Fig.70:10, Photo 84:3-4)[20] and Megiddo (Braun 1985: Fig.. 36, Goren and Zuckermann 2000: Appendix A) as well as in sites outside the Jezreel Valley (and see below).

Huleh Valley

A sub-family of Family I, labeled Ie, appears in the Huleh Valley at Tel Na'ama (Greenberg et al. 1998: 26), Tel Teo (Eisenberg 1989: Fig. 7:2-4; Eisenberg, Gopher and Greenberg 2001: Fig.7.2:2-4), Gadot, Yesod Hamaaleh, and Tel Hatzatz, (Greenberg 1996a: Figs. 16:1; 18:7-11; 44:3; 2001a: Fig.9:4-5). This variant is represented by flat rounded and carinated bowls with a dark black or red slip. Besides, at Gadot Greenberg (2001a: 83) reported that a single unillustrated fragment of what he calls "classic" (Families Ia-d) was found.

Western Galilee

Western Galilee sites have also yielded GBW vessels of morphology similar to sub-families Ia-d, but they exhibit a different petrographic profile.. This group is labeled sub-family If, and is distinguished by its morphology, a rounded body with flattened protrusions below the rims. It differs from the Huleh Valley specimens in petrography. Rosh Haniqra (Tadmor and Prausnitz 1959: Fig. 6:24), Kabri (Kempinski and Niemeier 1991: Fig.13:10-12), Bet Haemeq (Givon 1993: 9:6), Khirbet Uzza (Ben-Tor 1966: Fig. 4:1) are some of the sites where this variant appears. Additional examples of this variant appear as far north as Tel Teo (Eisenberg 1989: Fig. 7:1). Braun (1996b: 177-178) has pointed out that the overall morphology of this variant is markedly different from GBW's

[20] These samples have the same composition as the bowls from Affula: foraminiferous marl clay with grog plus crushed calcite or calcareous sand as temper. Unfortunately they were found in mixed contexts. We suggest that they were made at Affula.

Family I (Wright's Type 1) and that its distribution is more northerly. GBW bowls of Family I (variant Ib or Id) have been found as far north as sites in Lebanon at Aktanit (Amiram 1969a: Photo 32) and Kamid el-Loz in the southern Ba'qa (Marfoe 1995: Fig. 44:5).

Examples of variant Ia probably derived from a core area in the Jezreel Valley were found at sites in western Galilee at Rosh Haniqra (Tadmor and Prausnitz 1959: Fig. 6:23, 26) and Bet Haemeq. Variants Ia or Ic (Greenberg and Paz 2004: Fig.7:2-4), and Ie (*idem*, Fig. 7:1) were recovered in excavations at Bet Yerah

Central Coastal Plain

In the central coast plain, south of the Jezreel Valley, variant Id (represented at Affula ;see above), was found at En Assawir Level III (Yannai forthcoming: Fig.17.4:9-16), and Metzer Strata I-II (Dothan 1957: Fig.2:2; 1959: Fig. 8:1, 3). Exemplars found at En Assawir and Metzer are noted for their grog and calcareous sand tempers (Goren and Zuckerman 2000: Appendix A). That could indicate the possibility that the same pottery that supplied Affula also supplied sites in the Central Coastal Plain via the 'Iron Pass (Wadi 'Ara). Alternatively it can be suggested that a workshop at Assawir used the same types of temper as did the potters at Affula. At Tel Megadim (Wolff 1998) some exemplars of Family I were found (S.Wolff pers. comm.) but no petrographic analyses of the Tel Megadim samples are available. The southernmost occurrences of GBW in the Central Coastal Plain (Family I and miscellaneous types of GBW) are known from Azor (Golani and van den Brink 1999).

Jordan Valley

To the east and south-east of the Jezreel Valley, Tel esh-Shuneh, Bet Shean, Tel Um Hammad and the Jericho area have also yielded bowls from Family I on both sides of the Jordan Valley. At Tel esh-Shuneh, for instance, three different types of GBW were found in Area A, within an early phase of EB I. One belonging to sub-family Ie, probably originated in the Huleh Valley) (Rowan 1994: 126-127, Fig. 12:1-2). The second, similar to Type If, probably originated in Western Galilee (*idem*, Fig. 12:2), while the third is similar to variant Ic found at Affula (*idem*, Fig.12:4). At Bet Shean Strata XVI-XVII two variants are depicted in FitzGerald's (1935: Pl.III:2,4) publication; they are very similar to those found at Affula. [21] Sub-families Ic-Id were found In Stage 2 at Tel Umm Hammad (e.g. Helms 1986: Fig. 11:2; Betts 1992: Fig.216:5,8).[22] The furthest east that an example of Family I (variant Ib or Id) has been found is in Transjordan in a cave burial at Arqub edh-Dhahr (Parr 1956: Fig. 13:24).

Near Jericho at Tuleilat Abu Alayiq near where the Wadi Qelt debouches into the Jordan Valley, some examples of GBW were encountered by Pritchard (1958) in excavations under the Herodian structures. As far as we can observe from the description of the sherds and their photographic illustration (Pritchard 1958: Pl. 37) the vessels are similar to those from Affula (variant Ic) and Yiftahel (variant Ib). A sherd of variant Ic has also been found (Khalaily 2002) in a cave located near Ketef Jericho, on the cliffs west of Jericho.

Southern Coastal Plain

The southernmost occurrences of GBW in Canaan (Family I and Varia) are known from Palmahim Quarry (Braun 1992), Tel Ashkelon (L. Stager, pers. comm.) [23] and Afridar

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[21] No petrographic analysis was reported and the comparison is based on a shape's ground.

[22] Bowls from Family III also appear in Stage 2 (and see below), but the author classifies them as one common genre (Betts 1992:76-77). The discussion of this occurrence is out of the scope of this work, but we understand these bowls as intrusive material.

[23] The material from Tel Ashkelon is still unpublished.

Area G (Braun and Gophna 2004: Fig. 7:3).[24] At Palmahim Quarry, the GBW types are of sub-family Ic (Gophna 1974: Pl.10:9; Goren and Zuckermann 2000:Appendix A; E.Braun pers. comm.). The burials excavated by Reich (1988-89) also yielded a number of bowls of Family I. Two of the bowls analyzed from Afridar came from eastern Samaria according to their petrographic profiles which contained Lower Cretaceous shales (Goren and Zuckerman 2000: Appendix A).[25]

Family II

Distribution of this family as pointed out above is restricted to Samaria in the region of Nablus where it has been found mainly in tombs in the Tel el-Farah North and Aqrabaniyeh cemeteries (Map 1).

Families III and IV

This family was encountered in several regions and is discussed in a progression from north to south (Map 2):

Western Galilee and Jezreel Valley

The northernmost appearance of Family III is registered at Qiryat Ata in Areas A-G, in both Strata II and III (Golani 2003: Figs. 4.2:7-10), and in Area L (Fantalkin 2000: 38). At Tel Qashish Stratum Family III is one of the main components of the ceramic assemblage (Zuckerman 1996a: Fig. VII:1-17) At Tel Qiri this family is also represented (Baruch 1987: 288, n.35; Fig.70:11-12). At En Shadud, the main forms found are those of Families III (Braun 1985: Fig. 19:1-10) and IV (*idem*, Fig. 18:8-11). At Hazorea several bowls of

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[24] At Afridar Area F a few sherds of GBW were found, but unfortunately they cannot be typologically related (H. Khalaily, pers. comm.).

[25] Local bowls imitating GBW appear at Maadi (Rizkana and Seeher 1987: Pl.1-3). The interpretation of this phenomenon is, however, is also out of the scope of this dissertation.

Family III were found in Tomb 33 (Meyerhof 1989: Pl.24:144, 167, 168) as well as a bowl of Family IV (*idem*, Pl..24:140).

Family III is also present together with Family IV at Megiddo both in the settlement (Strata XIX-XX and Stages IV-VII) and tombs (Engberg and Shipton 1934:19, Fig. 6:17A, 18A,B; Guy and Engberg 1938: Pl. 3:26-27, Shipton 1939: 45). At Megiddo, the morphology of the Family IV bowls with its conical knobs is replicated in a unique pedestalled basalt bowl (Guy and Engberg 1938: Fig. 21). Family III bowls are also found at Affula (Sukenik 1936: Pl.I:7-8; 1948: Pl.2:21; Gal and Covello-Paran 1996: Figs. 4:13,14, 18).

Central Coastal Plain

En Assawir level II yielded bowls from Family III at the site (Yannai 1999: Fig. 1:3-5) as did nearby tombs (Dothan 1970: Pl. 6:1-15; Yannai 1996:Fig. 2:17-24). At least one of the bowls of this Family found at the site was locally made according to the petrographic profile of its fabric being unpainted (Goren and Zuckermann 2000: Appendix A). A tomb at Kfar Glickson has also produced some GBW vessels of this family (Ziegelman 1978:Fig.2:1-3). Excavation at Tel Megadim has also yielded several examples from of Families III and IV.

Jordan Valley

Family IV bowls are found at Bet Shean Stratum XV (FitzGerald 1935:Pl.V:28). At Tel Shalem a sample from the EB IB (Stratum III?) of Family IV was analysed (Eisenberg 1996:9, Fig.13:8) by Goren and Zuckermann (2000: Appendix A). It was produced at the site or nearby according to its petrographic profile. GBW bowls related to the assemblage at Tel esh-Shuneh, Area A, seem to be a hybrid type related to Families III and IV. They are reported as “the form with out-flared rims and knob like projections” (Rowan

1994:127). Tel Umm Hammad Stage 1 yielded some exemplars of Family III (e.g. Helms 1986:Fig. 11:11-12). At Jericho (Tomb K2) a bowl similar to this family was found, the rim being sharpened and slightly everted. According to Kenyon (1965:21, Fig.7:8) it is an imitation of GBW. However, its relation to GBW is not universally accepted (Braun 1996b:83).

Central Hill Country

Family IV related bowls appearing at `Ai (Marquet-Krause 1949: Pls. LV:1055, LXXIV:1055) and Tel en-Nasbeh (Wampler 1947:Pl.52:1124). Although, as Braun (*idem*) has pointed out, the association of these bowls with the GBW is tenuous, since their fabric is different (see below "Crackled" Ware). The example from `Ai, is actually a mixed form with Family III.

Chronology

Wright (1958), based on data from the excavations at Tel el-Farah (N) and Jericho considered Types 1 and 2 (here Families I and II) (Figure 1:1-2 and 3-4) to be earlier than Types 3 and 4 (here Families III and IV) (Figure 1:5-6 and 7). He related Types 1 and 2 to the EB IA or early EB I and Types 3 and 4 to EB IB or late EB I, contemporary with Red Burnished and Line Painted wares of the south (Wright 1958: 43*). This chronology is confirmed by later excavations, mainly those conducted at En Assawir by Yannai (forthcoming). Family I shallow bowls were found in Stratum III (EB IA) (e.g. *idem*, Fig.17.4) and Family III deep bowls were found in Stratum II (EB IB) (e.g. *idem*, Fig. 2.5:1-7; see also Goren and Zuckerman 2000). At Tel Umm Hammad, while some examples of Family III appear in the early EB I Stage 2, they certainly are intrusive (see above). Conversely, no vessels of Family I are represented in the late EB I Stage 1 (cf. Betts 1992).

At Palmahim, Family I appears in Stratum 3, dated to the very beginning of the EB IA and is associated with sausage-shaped buildings of the village (Braun 1992). It is not, however, found in Strata 1 and 2, dated to the end of EB IB. On the other hand, at En Shadud, Families III and IV are present, but this is site does not represent the latest phase of the EB I; Braun (1985: 99-100) dated it to a post Yiftahel II phase of Early EB I. It is likely that Families III and IV are were not present at the very end of EB I and that a stage prior to the EB II, without GBW existed within the EB I in northern Canaan (Braun, forthcoming).

Summary and Discussion

GBW is one of the hallmarks of the EB in the north. While Families I and II should be dated to EB IA, Families III and IV are characteristic of EB IB. The materials employed in the fabrication of GBW[26] show that special attention was given to those properties of the vessels, especially in Family I.

As noted by Zuckerman (1996a: 75) and Yannai (1999) regional differences between the families and their variants are also consistent with regional attributes characteristic of EB I pottery assemblages. This indicates that GBW is not an intrusive component of the EB I horizon, although it does exhibit northern influences as in Dark Face Burnished Ware (DFBW) and the Khirbet Kerak Ware (and see below).

While GBW is a northern phenomenon, some types of vessels were distributed in the central and southern part of the country, while some few related examples have been found in Lebanon, Jordan and Egypt. Some may even have been imitations of their northern originals made by local potters who intended to imitate GBW types.

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[26] The use of calcite, basalt or grog, for instance, increases the resistance of the vessel and reduces the porosity.

Distribution patterns of early and late families of the GBW show some remarkable differences. Family I seems to have had three different areas of production within the northern part of the country. One is the core area of the Jezreel Valley with its distinct subfamilies Ia, Ib, Ic, and Id. They may represent production of four different village workshops which distributed vessels within a core area within a maximum radius of 50 km and beyond it to regions further afield on the Coastal Plain and in the Jordan Valley. Alternately, one of these production centers could have utilized different types of temper that accounted for different petrographic profiles of fabrics it produced, as in the example of variants Ic and Id. That would suggest that tempers made their way to the workshop by exchange, i.e., that middlemen or potters from a different locale within the core area brought material to craftsmen at a workshop. An example could be that a workshop at Assawir received clay and/or temper from potters working at Affula some 30 km distant.

A second region that appears to have been a center of production is the Huleh Valley which seems to have produced Sub-family Ie. A third center of production seems to have been the Western Galilee where at least one variant of Family I (If) has been identified. We know that this variant was distributed in the Huleh Valley and even northwards, in Lebanon. A fourth center of production is suggested by examples from Afridar Area G. Analyses of their petrographic profile indicate an eastern Samaria source for the clay, but the few data we have on these types preclude more precise conclusions.

As shown in Map 1, relationships between the different variants of Family I are notable, with variants from one center of production found within areas of different sources. Distribution from these centers seems to have been to the east as far as the Jordan Valley as far south as Jericho, and in limited quantities farther east through the *wadis* of Transjordan to Arqub edh-Dhahr. The coastal plain seems to be the second way that GBW traveled west and then down the coast as far south as Palmahim Quarry.

Family II is a singular phenomenon, probably confined to the Samaria region.[27] For all the variants of this Family we suggest here that the vessels were exchanged by groups of potters who traveled between villages (ethnographical case 2), mainly within the core area of distribution, and/or middlemen (ethnographical case 4) who distributed the GBW to other parts of the country.

Families III and IV originated and were distributed mainly in the Jezreel Valley core area (Map 2). Some vessels of Families III and IV found in the Huleh Valley (Tel Teo), Western Galilee (Bet Haemeq), and the central Jordan Valley (Tel Shalem, Tel esh-Shuneh), could have been locally made as indicated by the petrographic analyses of Goren and Zuckerman (2000:175).

While the distribution of Families III and IV is partly analogous to that of Family I for which there is evidence to indicate several workshops. Furthermore, some vessels found in the Central Hill Country, i.e. 'Ai (et-Tell) and Tel en-Nasbeh, seem to be local imitations of GBW vessels according to their petrographic profiles and morphological characteristics. There is a vessel from 'Ai, for instance, that is a combination of Families III and IV forms. Furthermore, the fabrics of some of these vessels from `Ai and Tel en-Nasbeh are different from those of vessels of these two families found in the core area (see Braun 1996b:176ss).

We suggest that the ethnographic models of exchange (see above) of Families III and IV could be similar to those of Family I, while the amounts and degree of exchange vessels seems to be more restricted.

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[27] Miscelaneous GBW found at Afridar seem to be a different occurrence with clay sources also coming from the Samaria region.

"METALLIC" WARE

Definition

This unifying features of this handmade ware are in its fabric, the composition and firing of the paste at high temperatures. The fabrics are notably inelastic and brittle when struck give a characteristic metallic-like sound when struck, hence the name. There is a limited use of decoration on vessels of this ware, aside from the presence of combing patterns, thin slips, and generally continuous matte burnishing.

Vessels produced in "Metallic Ware" (henceforth MW) include all household and industrial types, aside from cooking pots. They duplicate almost all the EB II repertoire of non-MW pottery types. Main types are saucer-bowls (Figure 2:1-5), platters (Figure 2: 6-7), jugs, juglets (Figure 2:9-11), small jars (Figure 2:12-13), combed vats (Figure 2:14-15), combed jars and pithoi (Figure 2:16-20). A distribution of vessel types, according to the classification provided by Greenberg and Porat (1996:6) is given below in Table 2. Donkey figurines and bed models made of MW have also been found (Greenberg 1996b: Fig. 3.38). These figurines are discussed separately (see Part III, Chapter 10).

MW has been studied and defined from a typological and technical point of view by Greenberg and Porat (Porat 1989a, Porat 1996, Greenberg and Porat 1996, Greenberg 2000). This dissertation accepts their definition of MW and uses it as a basis for discussion. MW has alternately been termed "Abydos Ware"[28] or "Combed" Ware by different scholars (Prausnitz 1954; Mazzoni 1986; Esse 1991:109-116; Ben-Tor 1991a:107-109). It is generally defined as belonging either EB II or EB III in date, but as below, it is a actually a hallmark of EB II of northern Canaan.. In two recent works

[28] But see Amiran 1969 who indicates that this ware includes the kind painted with triangles and dots as in Arad.

Table 2. Distribution of Metallic Ware according to vessel types.

Greenberg (2000, 2001b) labeled this group as North Canaanite Metallic Ware (NCMW) in order to differentiate it from southern Syrian types that appear to be similar.

Some pithoi of this ware, known mostly only from fragments, bear cylinder and stamp seal impressions. There is a strong connection between these impressions and MW as Greenberg (2001b) and Joffe (2001) have pointed out.[29] These impressions were dealt in the pioneering research by Beck (1967) bear two types of motifs classified by Ben-Tor (1977, 1978) as Classes I and III: geometric motifs (Figure 3: 1-3,5,7-8) and cultic scenes respectively (Figure 3: 4,6,9). Beck suggested that Class I represent a sort of building (Beck 1976:123-124) and Class III represented rulers in a religious ceremony and that the buildings appearing in the seals were probably representations of a palace or temple or both as in Mesopotamia (Beck 1967:49-51, 1995:14-17). The sealing of the vessels could indicate a) a standard volume for the vessel, b) a special content for a specific vessel or c) the owner or controller of the vessels and contents (and see Greenberg 2001b:193, Braun 2004a:28).[30]

Sources

Petrographic analyses of MW by Porat and published by Greenberg and Porat (1996:13-18) described its attributes of its matrix clay and tempers. While several kinds of tempers are used in MW, its main temper components are shale fragments, quartz and carbonates. Shale fragments vary in their silty component: some contain silty quartz and others are rich in iron oxides (Greenberg and Porat 1996: Fig. 7:1).

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[29] The entire subject of EB Age sealings, a related area of research, is beyond the scope of the present research.

[30] Mazzoni (1992) has proposed that jars bearing seal impressions found in Palace G at Ebla (mid-third millennium BC) were made elsewhere and collected by the central administration from peripheral localities.

A considerable variety of clays was used to produce MW but in general the same silty components as in the tempers are present. The components of the clay matrix are quartz, iron oxides, carbonates and mica laths. The source of the quartz is desegregated siltstone. The iron oxides are rhomboid and some of them have a hollow center (*idem*, Fig. 7:6) and the carbonates are not evenly distributed. The mica laths also probably originated in the siltstone.

According to the petrographic profiles of MW described above, Greenberg and Porat (1996:16) concluded that the raw materials utilized for MW vessels come from a sicliclastic formation, composed by non-calcareous clays, siltstones and mature sandstone, all rich in iron oxides and related to weathered basalts. Formations that fit with this petrography are the basal Lower Cretaceous formations, which overlie Lower Cretaceous flows of weathered basalts. While these formations crop out in the eastern slopes of the Galilee hills, the largest outcrops are found in the Hermon massif and in Lebanon (Map 3). The closest Canaanean site to this location is Tel Dan.

Notably, petrographic studies on MW pottery from Lebanon show their clay components differ from those of MW (Matson 1960). This has been interpreted by Greenberg and Porat (1996:18) as proof that the production center of the MW must be in the vicinity of the Hermon massif and is probably at Tel Dan (Biran Ilan and Greenberg 1996).

Distribution

MW vessels have been found at more than 30 major sites within the Levant, most of which are presented in Map 3 and Table 2. The distribution of seal impressions on MW vessels is shown in Table 2 as well.[31] The most abundant quantities of this ware were found in the Huleh and upper Jordan Valleys, the southern Lebanese Biq`a, the Golan

[31] We will give in the text only the seal impressions found at the main excavated sites.

plateau, the highlands and coast of southern Lebanon, the Galilee, and the Jezreel Valley. Its occurrences in southern Canaan are less frequent.[32] Following is a discussion of MW according to regions:

Huleh Valley

MW is fully represented in the Huleh valley at Tel Dan (Greenberg 1996b:99-133) and Tel Teo (Greenberg 1987:134-142, Eisenberg, Gopher and Greenberg 2001). At Tel Dan numerous seal impressions of Classes I and III (Greenberg 1996b:142-149) are known. At Tel Abel Bet-Ma'acah Dever (1986:220) found MW sherds in a survey of the site. A sounding at Tel Na'ama has produced bowls, platters, jugs and jars of MW (Greenberg et al. 1998:24-26, Fig.22:1-9, 11-17). MW bowls, platters and jugs were found in a tomb at Gadot, which is probably related to the site of Metzad Ateret (Greenberg 1996a:133-135, Fig.17; 2001b:Fig.14:1-3, 6, 9,13, 15, 17, 19-21). At Hazor MW is also well represented (Yadin et al. 1989:Pl.CLIV:2,4,5; Greenberg 1997a:187-193).

Galilee

In northwestern Galilee several sites have yielded MW. Several vessels were reported in Stratum I at Rosh Haniqra. They include bowls, platters and jars (Tadmor and Prausnitz 1959: Fig. 5:17-19, 22, 26). At Tel er-Ruweisa, Amiran (1953:123) reported several sherds from a collection surface at the site.

At Meona numerous fragments of MW body sherds from storage jars were found in Stratum I (Braun 1996a:17, Fig. 10:10). The body sherds probably belong to Greenberg’s type SJ1a. Seal impressions of Classes I and III appear as well (Braun 2004a:18-23). At Kabri MW bowls, platters, jugs and jars are reported from rectangular structures of Stratum 8-7 (Scheftelowitz 1990:X, Fig. 21:14; 2002a:103-104, Fig.5.8). Bet

[32] Notably, several MW vessels have made their way to Egypt, where they were discovered in tombs of the kings of Dynasty I.

Haemeq also has yielded MW vessels, mainly platters and jars (Givon 1993:16, 19-20, Figs. 12:1-11, 15:1,2) and several seal impressions of Class I (Beck 1976).

At Qiryat Ata in Areas A-G (Stratum I) several types were found including bowls, platters, small jars and store jars (Golani 2003:121-147). In Area L mainly bowls, platters and storage jars (Fantalkin 2000:39) were found. Several seal impressions of Class I (mainly) and III were also found (Greenberg 2003a). MW bowls, platters, storage jars and juglets were also found in EB II contexts at Tel Gat-Hefer (Covello-Paran 2003:110-111).

On the western coast of the Sea of Galilee several sites have yielded MW. At Tel Kinrot (Tel el-'Oreimeh) sherds of jugs and jars, belonging probably to Greenberg's type SJ 1a or 1b were found in an EB II context and defined as "*Ware mit Kammistrich*" and "Abydos-Ware" (Fritz 1990:22, Pl.51:14, 19,20). At BetYerah (Esse 1991:46-47, Pls.1:F-H, 2:A-I; Greenberg and Paz 2004:Fig. 11) bowls, platters, vats and storage jars are the main component of the assemblage. Some MW vessels are also reported from a nearby tomb at Kinneret (Mazar, Amiran and Haas 1973:179, Fig. 5:1,2) At BetYerah and Tel Kinrot numerous seal impressions of Classes I and III have been found (Ben-Tor 1978:7,11-12; Fritz 1990). One, from Bet Yerah (Greenberg and Paz 2004:Fig.12) is the only seal impression that was found together with the rim and neck of a storage jar (SJ3b according to Greenberg's typology).

Jezreel Valley

A number of sites in the Jezreel Valley have yielded MW Vessels. At Megiddo stages V-II (Engberg and Shipton 1934:10-11), several MW sherds of platters, jugs and jars were reported. MW sherds of the same vessel types were also published by Loud (1948:Pls.101:7-9, 23; 105:3-6; 107:16, 34, 35). These sherds originated in Stratum XVIII, but they were found also in Stratum XVII.[33] At Tel Qashish (Zuckermann 1996a:123, 129,130; Figs. X:14, 17-18?, XI:3,6,7, XV:5-7) excavators found MW platters and storage jars. Several seal impressions from Tel Qashish belong to Classes I and III (Ben Tor, Bonfil and Zuckerman 2003:167-175).

Surface finds from Har Haruvim (now in the collection of the Ramat Hashofet museum) include MW storage jars and a seal impression of Class I (Ben-Tor 1978:4) on a fragment of this ware (pers. observ.). Excavations at Tel Taanakh have also yielded MW (cf. Esse 1982:213-214; 1991:92), but specific types are not specified in available publications. Sherds of this ware were sealed with two Ben-Tor's Class I impressions (Ben-Tor 1978:6-7; Lapp 1999).

Golan

In the Golan plateau two sites have produced MW, the Lawieh (Leviah) enclosure and Gamla. Unfortunately, the only references to the presence of this ware are in the works of Porat and Greenberg (Porat 1989a:Fig. 10.9, Greenberg and Porat 1996:Fig.5; and see Kochavi 1993, 1994). Some of the seal impressions of Classes I and III been found the Lawieh were published by Epstein (1972) and are, apparently on MW.

Jordan Valley

In the Jordan Valley MW hase been reported at Tel Yaqush (Esse 1993:1503), Tel Shalem (Eisenberg 1996:12, Fig.17:6) and Tel Abu al-Kharaz (Fischer 1994:132, Fischer and Toivonen-Skage 1995, Goren and Fischer 1999). MW appears at all these sites in minor quantities. At Bet Shean in recent excavations conducted by Mazar (Mazar, Ziv-Esudri and Cohen-Weinberger 2000:270) only a single sherd in Phase R12 was found. This phase, according to the excavator, constitutes a transitional phase between EB II and III (*idem*, and see Greenberg 2003b).

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[33] On the discontinuity of Megiddo during the EB II see Greenberg 2003b with bibliography therein.

The easternmost site where MW appears is Khirbet ez-Zeraqon in Transjordan (Ibrahim and Mittmann 1987, 1994; Genz 2002). Finds there include large storage jars and the larger corpus of seal impressions that were apparently impressed on vessels of MW.[34]

Central-Southern Canaan

In central and southern Canaan MW was found in still lesser quantities. The excavators of Tel el-Farah (N) have reported a complete jug of MW (described by them as "*sonore au choc*" (de Vaux and Steve 1948:555, Fig. 4), while a later work revealed that some platters and jars (e.g. de Vaux and Steve 1947: Fig. 4:8, 6:2) belong also to the MW (Huot 1967: 544-546, Fig. 8). The jug was found in a building belonging to a level identified as EB IIB together with other fragments of sherds probably belonging to the same type of vessel. Further south in the hill country, MW jars and probably platters were found at `Ai (Market-Krause 1949: Pl.LXXIX:145 II; Callaway 1980: Pl.68:9?).

Three sites in the Shephelah yielded MW. The most common forms were found at Tel Dalit (Gophna 1996: 122-123, Figs.47:4,50:1-7). De Miroschedji (1988: 71, Pls. 21:6) reported carinated bowls, hemispherical bowls and sherds of jugs 23:1,7-8, 24:6, 25:22) at Tel Yarmuth. Bowls, juglets and a small jar were found by Ussishkin in renewed excavations at Lachish (Gophna and Blockman 2004:876-879). Further east, at the juncture of the Shephelah and the coastal plain, a few sherds of MW, probably of platters, were found in excavations conducted by Yeivin Tel Erani (B. Brandl, pers. comm.). Excavations at Tel Ashkelon, conducted by Stager (pers. comm.), have yielded quantities of EB II material within the fills, including several sherds of MW jars. The southernmost site where MW has been found is Arad, in the northeastern Negev. Amiran et al. (1978:114-115, Pls.23:7, 97:10) reported a platter from the temple in Stratum II. Two

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[34] I am indebted to H. Genz for allowing me to see unpublished plates of the sealings.

additional, unpublished jugs of this same ware were also recovered there (Porat, forthcoming; and see below).

From Table 2 we learn that the most complete assemblages of vessel types MW are found in the Huleh Valley. By contrast, only some of types were distributed in the central and southern regions. The two families more distributed outside the Huleh Valley are platters (Type B2) and storage jars, with few pithoi (Type SJ 3). Tombs contain just bowls, platters and jugs. It is worth mentioning the appearance of carinated bowls (Greenberg's Type B1c) at a site as far south as Yarmuth, and absent from northern sites, aside from Tel Dan and Tel Teo.

MW is reported as totally lacking in the ceramic assemblages at Bab edh-Dhra (Rast and Schaub 2003:247) and at sites south of Arad. However it is worth mentioning that seal impressions similar to Class I and III were encountered at Bab edh-Dhra (Lapp 1989, 2003), on non-metallic fabrics. One of the impressions belonging to Class I (No. 2947) was found in a silo together with EB II pottery, while a Class III impression (No. 1855) is derived from an EB III context, supposedly a sacred area. These seal impressions are clearly related to the northern motifs in the MW, albeit with some stylistic differences.

Chronology

In northern Canaan MW appears in strata between EB IB and EB III levels, e.g. Bet Haemeq (Givon 1993:Figs. 11-13, 15), Kabri (Scheftelowitz 1990:X), Rosh Haniqra (Tadmor and Prausnitz 1959), Tel Qashish (Ben-Tor, Bonfil, and Zuckerman 2003), Tel Qishyon (Cohen-Arnon and Amiran 1981), BetYerah (Esse 1982, 1991) and Tel Teo (Greenberg 1987:134-142). In central and southern Canaan, secure dating for MW in EB II strata is provided by the finds from Tel el-Farah (N) (de Vaux and Steve 1948: Fig.4) and Arad (Amiran et al. 1978: 114-115, Pl. 23:7).

However, there is some indication that MW vessels first made their appearance as early as late EB I. This pottery has been reported from strata at three sites dated to EB IB, probably to the very end of this period. They are Tel Yaqush (Esse 1993:1503), Tel Shalem (Eisenberg 1996: 12, Fig.17:6) and Tel Abu al-Kharaz (Fischer 1994: 132; Fischer and Toivonen-Skage 1995; Goren and Fischer 1999), all located in the Jordan Valley. This has been interpreted as evidence for a stage between the last phase of EB I and EB II in the north of the country (Eisenberg, *idem*).

While jars and pithoi still appear in early EB III contexts (Greenberg and Porat 1996:12; Greenberg 2000, and bibliography there) they seem not to continue late in EB III, from which we can conclude that MW is essentially a phenomenon related to the EB II period.

Discussion

The main areas of distribution of MW were in Western Galilee, the Jezreel Valley, the Huleh Valley, and along the south-western shore of the Sea of Galilee. The appearance of a small number of sherds in th very end of the EB IB at Tel Yaqush, Tel Shalem and Abu al-Kharaz, and one sherd at Bet Shean in the late EB II, seems to indicate it was an area outside of the core distribution area.. The absence of MW in the southern Jordan Valley and the Dead Sea area (e.g. Jericho, Bab edh-Dhra) must be interpreted in the same way. This indicates the distribution line of northern pottery during the EB II was different from that in EB I (e.g that of GBW), and in the following EB III (e.g. Khirbet Kerak Ware).[35] It looks as if the main line of distribution of MW to the south went through the coastal plain and the Shephelah, instead of the Jordan Valley.

From the distribution of different types within the MW assemblages (Table 2) it can be observed that only small vessels, mainly bowls, platters and jugs, made their way

[35] But see below the distribution of other commodities during the EB II.

to the central and southern regions. Large vessels, especially storage jars, did not pass the southern line of 'Ai, and the distribution of vats was restricted to the Huleh Valley with Hazor as the southernmost locale in which they have been found. The extremely regional distribution of the MW points to some social and economic restraints on their distribution that are analyzed below.

Sealings found on MW vessels are, with the exception of Khirbet ez-Zeraqon in the hill country of Jordan, concentrated in the western Galilee, the Huleh Valley, the Jezreel Valley, and the northern Jordan Valley, following a similar pattern of distribution for MW as a whole, The social role of the seal impressions during the EB has been discussed (Joffe 2001 and bibliography therein) giving several answers to the question. However, in the case of seal impressions on MW vessels a connection with the center of production and the restricted distribution of the ware is clear. There must have been some relationship between control of production and distribution of vessels. If the motifs of the impressions represent institutions of control (such as palace or the temple) then it is suggest that these impressions are an important part of exchange and distribution of MW vessels.

The general picture that emerges from a study of the production and distribution of MW illustrates a highly centralized socio-political uniformity (Greenberg and Porat 1996, Greenberg 2000) at least in the northern regions. Technical expertise was required for the production of MW and the mass distribution of vessels. Because the area of production and distribution was confined to the Mount Hermon and northern regions, in a maximum radius of ca.70 km, it is suggested that we have here an example of case 5 of the ethnographical models described above, i.e. vessels were exchanged by a central agent simultaneously in control of a large-scale pottery production center. Distribution of MW vessels in the south was the job of middlemen who traded commodities on a small scale between the northern and the southern parts of Canaan.

SOUTHERN VESSELS FROM ARAD AND THE NEGEV

Definition and Sources

This section examines results of petrographic studies taking mainly into consideration the pottery groups from Arad and their presence at other sites of the Negev and Sinai.[36] Petrographic studies from Arad and the Negev carried out by Porat (e.g.. 1989a, 1989b, forthcoming) have revealed the potential of sourcing and distribution studies initiated by Glass (1978a,b).

Porat (1989a, b) identified five types or groups of pottery vessels present in the Northern Negev in EB II, i.e., vessels made of the same raw materials that were identified by petrographic analysis (Figure 4 and Table 3). Porat (forthcoming) has identified 8 clay types divided in 17 petrographic groups at Arad, presented here in Table 4 according to vessel morphology.

Five of these groups are germane to the present study. Additonal remarks on other Arad groups from will augment the present discussion. They include three types of holemouth jar wares found at Arad and other sites in the Negev and Sinai, and groups of jugs, juglets, and jars mainly found in the Negev. The vessels are grouped according to typological characteristics and petrographic groups as follows.

Arkose Group

Globular holemouth jars used as cooking pots (eg. Amiran et al. 1978:Pls. 43-45, Porat 1989b:Fig.3:a) (Figure 4:1-2) belong to this group. Their fabrics are light gray to brown

[36] While we do not deal with the Sinai as a region involved in Canaanite local exchange in this dissertation, questions related to the origin of the pottery vessels in this area require mention of finds from Sinai sites where pottery groups of the Negev appear as well.

Table 3 . Distribution of EB II pottery southern groups.

(*) Sources

Groups / *Sites*	*Arkosic*	*Fossil shells*	*Calcite*	*Fine quartz*	*Chert*
`Ai			+		
T. el-Hesi			+		
T. Halif			+	+	
Arad	+	+	+*	+*	+*
E. Besor	+				
T. Esdar	+		+	+	
K. Telem	+				
N.Refet	+				
H. Avnon	+				
N. Boqer	+				
N. Zalzal	+				
H. Yeruham	+		+		
N. Ahdir	+				+
R. Matred	+				
H. Horsha	+				
E. Kadis	+				
E. Hame`ara	+	+		+	
K.Barnea	+				
B. el-Hatyeh	+*				
B. Uvda	+	+*		+	
Sheikh Muhsein	+?	+?			+
Nabi Saleh	+?	+?			

and include quartz, mica and feldspar. The temper is arkose (i.e. granite fragments and other acidic igneous rocks).

The temper and clay must have been collected from dry riverbeds (*wadis)* that drain areas where igneous rocks are found and that are devoid of sedimentary or metamorphic rocks (Glass 1978a, Porat 1989b:174). Two areas fit with these characteristics, southern Sinai and a region south-east of the Aravah (Porat 1989b:Fig.5). The Sinai source was the favored provenance by Amiran, Beit-Arieh and Glass (1973) and Porat (*idem*) since the southern Sinai sites yielded the same holemouth jars. However arkose is also present in Transjordan area (Amiran, Beit-Arieh and Glass, *idem*) and holemouths, found at Barqa el-Hatiyeh, Wadi Feinan (Fritz 1994) have recently been proved to belong to this group. They match nearby arkosic sources (Adams 1999). Therefore, it is suggested that the Wadi Feinan area is more suitable to be the source of the

Table 4. EB II petrographic groups from Arad.

After Porat (forthcoming). Shadowed columns indicate non-local groups. (*)Painted krater, belong to the same group as the painted jars.

Clay types	**1**							**2**		**3**		**4**	**5**	**6**	**7**	**8**	
Groups	**1a**	**1b**	**1c**	**1d**	**1e**	**1f**	**1g**	**2a**	**2b**	**3a**	**3b**	**4**	**5**	**6**	**7**	**8a**	**8b**
Pottery types																	
Platters					+												
Metallic platters																	+
Cup bowls																	
Stratum III			+														
Stratum II	+	+															
Lamps		+															
Bowls			+														
Carinated bowls																+	
Kraters			+*	+						+		+	+				
Juglets																	
Small	+																
Large		+													+		
Jugs																	
Globular	+																
Tall			+		+												
Large			+		+												
Metallic jugs																+	+
Small jars																	
Globular	+	+															
Tall					+												
Painted vessels			+							?						+	
Medium jars	?	?			?		+										
Necked jars			+					+			+				+		
Knob-handle jars		+				+		+									
Pillar-handle jars	?	?	+		+												
Pithoi			?					+									
Pink storage jars									+	?	?						
Special jars										?	?		?			+	
Holemouth jars																	
Statum III														?			
Stratum II & I				+						?	?			+		+	
Cooking pots										+		+	+				

clay utilized in the arkosic group of houlemouths, because it is closer to the sites of the Negev than those of southern Sinai.

Fossil Shells Group

Holemouth jars with globular body, flat bases, and sometimes rounded rims (e.g. Figure 4:3) are the most common type of vessel in this group. Clays are reddish-brown to brown with silt-size quartz, carbonate particles and iron oxides. The temper of this group is made of fossil thin and elongated shell fragments. As result of the fossilization shells have certain characteristics (quartz replaced calcite, iron oxides, stylotites, etc.; Glass 1978a, Porat, forthcoming) which precludes their derivation at the sea shore (Porat 1989b:175). Source of this temper are believed to be the Ora formation of Cretaceous (Turonian) origin in the southern Negev (mainly in the Uvda Valley), or central Sinai (Porat 1989a:Table 8:5; 1989b:177, Figure 6) (and see below).

Calcite Group

Holemouth jars, similar in shape to vessels of the previous group are the most common type in this group, but they have notably thicker walls and rims (e.g. Porat 1989b: Fig.3c). Some of them have rope decoration (Figure 4:4). Different types of clay were used, but in general it was calcareous, containing Paleocene-Eocene dated microfossils. Clay could have originated in the Taqiya formation in the Northern Negev. Alternatively it could have originated from the erosion of Eocene chalk formations in the Negev. Since all these formations are found in the Negev, this group is most probably local, made at Arad and the Northern Negev sites (Porat 1989b:178). Temper in this group includes angular calcite crystal, frequently broken along the cleavage and forming rhomb-shaped grains, with grains of coarse limestone (Porat 1989b:177). Sources of the temper are calcite veins located in limestone and chalk, common in carbonate formations of the southern Levant.

Fine Quartz Group

This group is represented by red slipped and polished juglets and bowls (e.g. Amiran, Beit-Arieh, and Glass 1973:195, Pl.49:C-F) (Figure 4:5-7). The clay is calcareous containing microfossils (of Paleocene-Eocene age), rounded-deep red stains, and carbonate grains. The suitable location for the clay is the Taqyia shales located mainly in the Northern Negev. The temper is well-sorted fine-sand size quartz accompanied by some rounded limestone grains. Quartz sand could have originated in several areas within the southern Levant, but the exact source was not identified (Porat 1989b:178, Fig. 7). Porat pointed to the Arad area as the probable origin of this group and the chert group (and see below; Porat 1989b:178), but she also suggested that since the fine quartz group is common at Tel Halif, this site could as well be the source (Porat, forthcoming).

Chert group

This pottery group is composed of small and medium jars with knob-handles (Figure 3:8-10). The calcareous clay strongly resembles that of the previous group. The temper includes, unlike the above-described group, chert fragments. Chert fragments are poorly sorted, angular and coarse. The source of this pottery group could be the same as that of the fine quartz pottery group.

Distribution

Arkose Group

This pottery group is present the Northern Negev, the Negev Highlands, the Eastern Aravah, Biqat Uvda and the Sinai (Porat 1989a: Appendix, Fig. 3:a). Recently studied assemblages from Wadi Feinan area reveal that the Arkose group is fully represented at Barqa el-Hatiyeh (Fritz 1994, Adams 1999), near the arkosic sources of the Eastern Aravah (Map 4, Table 3). That suggests a likely source for temper in vessels found in the Negev. In the Northern Negev the Arkose group is found at Arad in Stratum III (Amiran et al 1978: Pls. 43-45), and at En Besor in Stratum II (Gophna 1980:Fig. 4:4-6, 8,10; 1995a: 14). At Arad it was classified by Porat (forthcoming) as belonging to her petrographic Group 4, a collection of vessels of micaceous clay used to produce several kraters (Table 4). This group appears at a series of small sites of the Negev Highlands such as Tel Isdar, Har Yeruham, Khirbet Telem, Nahal Refet, Khirbet Avnon, Nahal Boqer, Nahal Zalzal and Nahal Ahdir (Cohen 1999: 37-81, Figs. 18:2, 20:3-4, 23:4-5, 27:11, 31:12-16,36:7-8, 39:1-15; Porat 1989b:Appendix). Further to the south it appears at Rekhes Nafha 396 near the Ramon krater (Saidel 2002:54), Ramat Matred Sites 10 (Beit-Arieh 1999:Figs.12, 13) and probably Ramat Matred 3 (Haiman 1994:28-29), Har Horsha (Porat 1989b:Appendix, Haiman 1991:Fig.12:1-15), Ein Kadis (Porat, *idem*) and Kadesh Barnea (Beit-Arieh and Gophna 1981:132-133). It is also found at Biqat Uvda (Sites 3, 7,9, 16, 96/III, 124/III; Avner 1990) in the Southern Negev and in Sinai at Nebi Saleh and Sheikh Muhsein Amiran, Beit-Arieh and Glass 1973:Pl.50:B-C; Beith-Arieh1977:92-98; 1986:29-45; Porat 1989b: Appendix).

Fossil Shells Group

This group comprises holemouth jars and some kraters (Porat forthcoming) (e.g. Figure 4:3). The distribution of this group is restricted to few sites (Map 4, Table 3). The Fossil shells group is present at Arad (e.g. Amiran et al. 1978: Pls. 46, 49-50), Ein Hame`ara (cf. Cohen 1999:66) and at Biqat Uvda (Sites 3, 7, 9, 16, 96/III, 124/III, 124/IV) (Porat 1989b:Fig.2b, Appendix), indicating that the vessels were probably transported from these sites to the north. The group is also present at Sheikh Muhsein (Bet-Arieh 1986:29-45).

Calcite Group

This group is very common in the Northern Negev where it was found mainly at Arad (cf. Amiran et al. 1978: Pl. 47:4), Tel Halif and Tel el-Hesi (cf. Fargo 1979:27).[37] It was also found at `Ai, but there it could be a local variant of calcite found in the Central Hill Country (Porat 1989a: Appendix 5c; 1989b:177, Fig. 2c; Map 4, Table 3). This fabric was also found in certain kraters at Arad where it is classified as Clay Type 1 (Fossiliferous); its temper is designated as Group 1d (Porat, forthcoming) (Table 4). It is absent from the Southern Negev (Biqat Uvda) and southern Sinai.

Fine quartz Group

Vessels of this fabric are common at Arad (Amiran et al. 1978:Pl.24) and the Northern Negev, i.e Tel Isdar and Tel Halif. They also were found in the Negev mountains at

[37] Probably from Phase 4e (Toombs 1983:39-40).

Rekhes Nafha 396 (Saidel 2002:54), Har Horsha, and at Biqat Uvda (Sites cf Porat 1989a, Appendix 5; Porat 1989b:178, Fig.2d, Appendix) (Map 4, Table 3). This is part of the fossiliferous clay, Group 1a in Arad (Porat forthcoming) (Table 4).

Chert Group

This group is found only at Arad (Amiran et al. 1978:Pls.30:3, 4; 34:8; 101:6,7; 103:2) and Horvat Ahdir (and see Cohen 1999: 56-59) in the Northern Negev, and Sheikh Muhsein in South Sinai (Amiran, Beit-Arieh and Glass 1973:196, Pl.51:A; Porat 1989b:Fig. 2d, Appendix) (Map 4, Table 3). This is part of the fossiliferous clay, Groups 1f and 1g in Arad (Porat, forthcoming) (Table 4). The difference between both groups at Arad is based on the different textures of the chert fragments**.** The chert group is absent from the Negev Mountains and the Southern Negev (Biqat Uvda).

Chronology

All the southern petrographic groups presented here were found in EB II contexts, mainly Arad Stratum II, En Besor Stratum II, Tel Halif and sites of the Negev presented here. The identification of several of the small sites within the EB II in general was made on the basis of the comparison with Arad (and see Amiran, Beit-Arieh and Glass 1973, Beit-Arieh and Gophna 1976, Haiman 1990).

There are, unfortunately, no radiocarbon dates for small sites in the Northern Negev and the Negev Highlands. However, there is a series of dates for the Biqat Uvda sites (Avner 1990; Sebbane et. al. 1993; Avner, Carmi and Segal 1994). Available determinations suggest that the pottery groups found there date to sometime between EB I – EB III, but no further precision is possible because of limited information available. In some cases they show a long time span, some of them begin in EB I (last quarter of the fourth millennium BC), while others are dated from 3,000 to 2,700 BC, i.e. EB II (Sebanne et al. 1993:Table 1.4; Avner, Carmi and Segal 1994:Table 1). Sites 7, 9 and 16 seem to begin earlier than EB III, but they continue to exist according to these radiocarbon dates until ca. 2,700-2,500 BC. In sum, nothing precludes that the pottery groups described here and found at the Biqat Uvda sites date exclusively EB II, as the same groups found in very well stratified sites like Arad, En Besor and Tel Halif.

At any rate, we cannot disregard the information that some of the changes in the composition of the vessels, mainly the holemouth groups, could reflect some internal chronology in the production and distribution of them. Therefore conclusions on the distribution and exchange of the pottery southern groups could be biased because they assume they to belong all of them to the same time period (i.e. EB II). Notably, some of the fabric types are present at IBA sites in the area, showing some continuity in pottery traditions in spite of the existence of major differences in pottery production between the EB Age (Porat 1989b:180-184) and the succeeding period.. This could point to some sort of continuity as well in patterns of distribution in the Negev.

Discussion

A comparison of vessels according to type, function and petrographic profile suggests the existence of specialized workshops, some of them in certain large-scale production. The clays and tempers seem to have been chosen carefully in order to obtain better quality day-to-day use vessels, suggesting a high level of specialization in pottery production occurred during the EB II in the Negev.

The distribution pattern of the five studied southern groups of the Negev bear in common the fact that all of them where found at Arad in relatively large quantities. The maximum distribution distances of these groups are between 70 and 150 km from their suggested production centers. Two of them (Calcite group and Chert group) could have originated in Arad or in the near vicinity. One may have been located in the area of Tel

Halif (Fine quartz group) and the other two in the areas of Wadi Feinan (Arkose group) and the Uvda Valley (Fossil shells group).

The transport of vessels took place in several directions, including the Northern Negev, the Eastern Aravah and the Southern Negev. It looks as if the small sites were a sort of trading posts within the routes between Arad and the Southern Negev, and southwards to the Sinai Peninsula (Beit-Arieh 1999:90). The question is to what extent there was an exchange with Sinai.

The Arkose and Fossil shells groups are non-local to Arad, but certainly Arad played a role in the their distribution. The Arkose group probably originated in the Wadi Feinan area; perhaps Barqa el-Hatiyeh was a specific locale for a workshop producing holemouth jars of this ware. Bearing in mind that in ancient times raw materials for pottery were not traded or transported over large distances (Porat 1989b:170), it is a much more likely candidate for the source of these vessels than sources in Sinai. Ethnographical cases discussed above seem to confirm that raw materials are found within a maximum radius of ca. 50 km from the workshop. The fact that metallurgical ores from the of Wadi Feinan (and see below) seem to be the origin of the metal objects in most of the Canaanean sites (and not the Sinai sources as speculated before) seems to reinforce this conclusion about the Transjordan origin of the Arkose group.

If this interpretation is correct, the distribution of the Arkose group was northward to Arad and to the south through the Aravah Valley to Biqat Uvda, while the group reached the Negev Highlands through the Uvda Valley or via sites in the Northern Negev from Nahal Aroer and the area north of the Maktesh Ha-Gadol (the large Crater). En Besor could have been reached via Arad through the Beersheva Valley or alternatively from the sites in the Upper Nahal Habesor area (Nahal Boqer, Nahal Zalzal).

The Fossil shells group originated in the Uvda area and distribution to the Northern Negev was made probably through the Aravah Valley. This pottery group was found at only one site in the Negev mountains, Ein Hame`ara,which is the closest site in this area to Biqat Uvda.

A number of workshops certainly existed at Arad using mainly what Porat (forthcoming) classifies as clay Types 1 and 2 (Table 4). Some fabrics were used in different types of vessels such as kraters from Arad of Group 1d.. These workshops produced the vessels which were exchanged with other regions and sites for some everyday and high-quality wares introduced to the site, including the Arkose and Fossil shells group described above (Groups 4 and 6), and a small amount of MW and Carinated bowls (Table 4, Groups 8a, 8b; and see below).

The Calcite group is remarkable because its distribution seems to go beyond the Negev borders, being found as north as Tel el-Hesi and `Ai. The absence of this group south of the Beersheva Valley shows this northern orientation. Even if there could be several locales for these vessels, it is most probable that those found at `Ai arrived from Arad via one of the routes going to the north of this site. Vessels found at Tel el-Hesi could reach their ultimate destination from Tel Halif via the southern Shepelah.

The Fine quartz and Chert Groups originated in the Northern Negev, probably the Arad area. The first group was distributed to the south (following the same way as the Calcite group?) as far as the Negev Highlands and Biqat Uvda, through the Aravah Valley. The Chert Group is also present in southern Sinai, arriving there possibly through the Central Negev (Nahal Ahdir).

In light of the observations above, we suggest that a proposed extended exchange of pottery between Sinai and the Negev (e.g. Amiran, Beith-Arieh and Glass 1973, Porat

1989a) must be reconsidered.[38] Sourcing and distribution of the five southern pottery groups presented here show a clear regional phenomenon focused on the Negev and its near periphery, i.e. the eastern Aravah and the southern Shephelah.[39] We propose that groups of merchants were in charge of a central part of this exchange with Arad and Barqa el-Hatiyeh playing important roles in it. The possibility cannot be excluded that groups of potters from sites of the Uvda Valley or middlemen did take part in this exchange.

Exchange with southern Sinai certainly existed and included pottery vessels of the Chert Group, but it must be included in a long-range trade. While this is not the subject of the dissertation we will return to it in Chapter 8 in a discussion on shells as a commodity of exchange. Relations between the Negev and the Central Hill Country, i.e. `Ai, could be part of a different kind of exchange that will also be presented below.

KHIRBET KERAK WARE

Definition

Khirbet Kerak Ware (hereafter KKW) is considered by several scholars as belonging to an exotic ceramic tradition that is quite different from south Levantine traditions of pottery production in the EB Age (e.g. Sukenik [Yadin] 1947; Amiran 1952). This distinctive type of pottery was first noticed by Albright (1926:28; 1935:200) at the site of Bet Yerah/Khirbet Kerak (from which this pottery group takes the name) prior to excavations that began in 1944 (Maisler, Stekelis and Avi-Yonah 1952). As Amiran (1952) described this ware (Figure 5) shows different ceramic conceptions than those known from repertoires of the EB Age such as the decoration of the surface of vessels with highly burnished slips that range from black to red as well as molded grooving and ribbing.

[38] This exchange certainly existed and included the pottery vessels of the Chert group and other items. We will return to this subject below.

[39] On the Eastern Dead Sea Plain see below.

KKW was viewed as showing clear connections with Anatolian pottery and the distribution of this ware in Canaan was interpreted in terms of population movement. As noted by de Miroschedji (1986: 25) KKW "*est l'un des rares exemples dans l'archéologie du Proche-Orient ou l'on a affaire incontestablement à un mouvement de population*".

Braidwood and Braidwood (1960: 519-520) and Todd (1973) considered that KKW was a manifestation of relations between the Levant and Anatolia-Transcaucasian Red-Black Burnihsed Ware (RBBW)[40] and a certain resurgence of the DFBW, found in the southern Levant during the Late Neolithic (and see Gopher and Gophna 1993). In Syria this pottery appears during the Amuq H phase (Hood 1951, Tadmor 1964) and on the coastal plain sites of Ras Shamra (de Contenson 1992, Genz 1994), Tel Sukas and Qalaat er-Rus (Ehrich 1939:72-73). It also was encountered, *inter alia*, at Hama on the Orontes (Thuesen 1988: 11) and at Tel Arqa in the Lebanese coastal area (Thalmann 1991).

Explaining the distribution of this pottery prompted several theories including invasion (Callaway 1978: 53-55; Amiran 1980a; Burney 1989), peaceful settlement (Kenyon 1979: 110-111, Esse 1991: 139-140, Stager 1992: 39) or the entrance of potters into Canaan (Hennessy 1967: 75; de Miroschedji 1986: 26, 2000a: 260). Recently Philip (1999) has challenged these interpretations, suggesting that KKW was the result of social differentiation within south Levantine society in which certain groups utilized this ware in their activities as a sort social tag that permit us to identify them.

As noted below, NAA and petrographic analyses prove that KKW was locally made (Esse and Hopke 1986; Mazar, Ziv-Esudri and Cohen-Weinberger 2000). Amiran (1968: 317) pointed out that KKW vessels are a fusion of local elements with those of its northern kin. KWW represents at least a local phase of pottery production of settlers

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[40] On RBBW see the review works of Sagona 1984, 1994.

coming from the north who continue to produce a Levantine version of RBBW. In any case this study will take into account this local phase but will not relate to the question of how the connections of KKW with its relatives in Anatolia and Syria were established.

Amiran (1952: 92-93) presented eight morphological types of KKW, while Esse (1982:Table 2) suggested a slightly different typology. Following are the main types in our view[41]: 1) small deep bowls, one handled or handless (Amiran's Type 2, Esse's Type 1) (Figure 5:1), 2) small sinuous sided bowls (Amiran's Type 2, Esse's Type 3) (Figure 5:2-3), 3) hemispherical small and medium bowls (Amiran's type 2, Esse's type 1) (Figure 5:4-5), 4) large deep bowls or kraters with a bend in the middle of the wall (Amiran's Type 3, Esse's Type 4; Figure 5:6); 5) small jars with wide mouth/deep bowls with one handle (Amiran's Type 1) (Figure 5:7-8), 6) holemouths (Figure 5:9), 7) cooking pots (Figure 5:10), 8) necked jars Figure 5:11). 9) jugs (Amiran's Type 5 (Figure 5:12-13), 10) biconical stands (Amiran's type 6, Esse's type 5) (Figure 5:14-15), 11) knobbed lids (Amiran's type 7, Esse's type 6) (Figure 5:16-17), 12) andirons sometimes decorated with a modelled human face (portable hearths?) (Amiran's type 8, Esse's type 7) (Figure 5:18-19).

Recently, Getzov (1996) conducted a new excavation at Bet Yerah bringing new relevant information to the subject. In Stratum II, dated to the second phase of the EB III, a complete assemblage of household ceramic vessels was discovered. In addition to the all the known forms (e.g. Greenberg and Paz 2004:Fig. 15:10-13), Getzov (Getzov, Paz and Gophna 2001: Fig.5) found cooking pots, holemouths and necked storage jars made of KKW (our Types 8-10) (and see below Table 5). If we add to this information the previously found cylindrical jar not retrieved in any other site (cf. Amiran 1989), it is clear

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[41] We follow the system developed by Amiran (1969a), presenting in the first place open vessels and then closed vessels and going from the large forms to the smaller.

that we are in presence of a comprehensive body, a close ceramic repertoire without any other element present in the EB III assemblages. According to Philip (1999:Table 3) KKW represent between 20 and 30% or the EB III ceramic repertoire, but Getzov (pers. comm) inform us that in his excavation KKW represents ca. 60% of the repertoire.

Level XII Bet Shean of FitzGerald's excavation (1935:5-22, Pl. X) and Mazar's Phases R11-R17 added some information about the ceramic types of KKW. At Bet Shean main types are small bowls, sinuous bowls, deep bowls, stands, and lids (our Types 1-4, 8-11) (Mazar 1997:149, Mazar, Ziv-Esudri, and Cohen-Weinberger 2000:260-265, Figs.14.3 and14.4). It must be stressed that according to Mazar, Ziv-Esudri, and Cohen-Weinberger (2000: Fig. 14:7), 60% of the EB III repertoire consists of KKW.

Sources

Sourcing analysis is still being researched for KKW and not as far advanced as the study of GBW and MW. Nevertheless, we have enough data to describe a pattern of distribution of this ware.

NAA (Esse and Hopke 1986:328-332; S. Pfann, pers. comm.) was done on number of sherds of KKW from the northern and southern Levant. Esse and Hopke's analyses comprise 76 samples of KKW sherds, 37 from Syrian sites, and 41 from Hazor and Bet Yerah. They show that all the samples can be classified into seven groups or clusters. The clusters were tested utilizing disjointed principal components (SIMCA) models. Three basic groups were found for the southern Levant, two for the vessels encountered at Bet Yerah (n=23, n=6) and one for Hazor (n=7). One sample from Hazor showed an overlapping between the smaller group of Bet Yerah and Hazor. At Hazor there are two sherds that show a clustering with those of Syria (Amuq sites) and two sherds from the Amuq sites show a clustering with the group from Hazor (Esse and Hopke 1986:330-331). NAA conducted by S. Pfann (pers. comm.) indicated that at least four sources existed for this ware, or that the production of this ware was performed at four sites or in their surroundings, Hazor, Bet Yerah, Bet Shean and probably Affula. Trace elements in KKW sherds from Bet Yerah and Bet Shean are very similar, as are those from Affula with Hazor (S. Pfann, pers. comm.).[42]

In a recent petrograhic work on the material from Bet Shean, Mazar, Ziv-Esudri and Cohen-Weinberger (2000: 260-265, 270-276) concluded that KKW from Bet Shean originated in at least two workshops. [43] They distinguished nine petrographic families for the entire EB Age pottery assemblage from the site, labeled from A to I. KKW was found to mainly to families A and D. Family A was made of a carbonatic clay with up to 5% silt, and included travertine fragments of silt and sand grains as temper with rare incidences of basalt fragments. The travertine fragments suggest that this clay is found near the site. The vessels made from this family generally are associated with coarse forms (e.g. deep bowls, called by the authors "kraters").

By contrast, Family D is characterized by silty carbonatic clay with 10% of silty components bearing mainly quartz and minerals derived from basalt. The lack of travertine fragments indicates that this family probably originated in a locale of the Bet Shean region. Most of the small fine bowls of KKW belong to this family, but also other vessels from non-KKW (see below). Other KKW exemplars belongs to Family E, which consists of a non-carbonatic, to some extent silty clay with non-plastic components such as fine lime fragments (Mazar, Ziv-Esudri and Cohen-Weinberger 2000: 271-272, Table 14.4). A KKW vessel from Khirbet ez-Zeraqon was made from similar components

[42] Unfortunately the results of the NAA were never published.

[43] Chazan and Mac Govern (1984) chemically analyzed seven KKW sherds from Bet Shean (small bowls, a deep bowl and a stand) in order to study the technology of production of this ware but the conclusions on the sources of the clay were not clear.

according to Y. Goren (quoted in Mazar, Ziv-Esudri and Cohen-Weinberger, *idem*). Finally, three samples of probably KKW from Kabri (Goren 1990; Table 1; Goren and Cohen-Weinberger 2003: Table 15.1), show that two of them exhibiting light tan, carbonatic clay with foraminifers probably originated in the Jezreel Valley. Another, of very silty, isotropic clay with grains of sandy quartz, similar to Family D in Bet Shean (Mazar, Ziv-Esudri and Cohen-Weinberger 2000: 271) probably originated in the nearby region.

Distribution

The distribution of KKW is shown in Map 5 and Table 5. Aside form Bet Yerah and Bet Shean (mentioned above) the following are the main sites where this ware was found:

Galilee, Golan and the Jezreel Valley

The northernmost site to have yielded KKW is Tel Dan where small hemispherical bowls (our Type 3) were found in L..47, Area A (Greenberg 1996b:Fig. 3.31:4; 2000:Fig.11.4:2). Further to the south we have Hazor, where bowls, jars, jugs, lids and stands (our Types 1,3,4,8-10) were found in Area L, local Phases 11 and 10 (Greenberg 1997b:187-191,Figs. III.2:9-12, III..3:17-20; 2000: Fig. 11.8). Further exemplars were found in L.1114, in a section cleaning from the same area (*idem*, Fig. III.4:12-22). KKW represents between 10 and 25 % of the EB III pottery at Hazor (Greenberg 1997a,b). Aharoni (1957:10-12, Pl. 6:12, 14, 16,17,19) found some sherds from at least two different types of bowls (our Types 1 and 4) at Tel Qadesh (Naphtali) (and see Esse 1991:97) in the mountainous region of Upper Galilee. To the south of Hazor and the north of Bet Yerah, Tel Reqet (Khirbet Quneitra) on the western shore of the Sea of Galilee, just north of Tiberias, yielded some KKW bowls (Esse 1991:95).

In Western Galilee, the coastal site of Rosh Haniqra yielded a number of sherds of

Table 5. Distribution of Khibet Kerak Ware types according to vessel types.

(*) Sites mentioning KKW withouth specific types

Types	***Small deep bowls (1)***	***Sinous. bowls (2)***	***Hemisph bowls (3)***	Deep bowls or kraters (4)	***Jars (5)***	***Hole-mouth jars (6)***	***Cooking Jars (7)***	***Necked jars (8)***	***Jugs (9)***	***Stands (10)***	***Lids (11)***	***Andir. (12)***
Sites												
T. Dan			+									
T.Qadesh	+			+							+	
Hazor	+		+	+						+	+	
R. Haniqra*												
Kabri*												
T. Reqet	?	?	?	+								
Bet Yerah	+	+	+	+	+	+	+		+	+	+	+
T. el-Fakhat				+								
A. el-Dhar										+		+
T. esh-Shuneh	+	+	+	+					+	+	+	+
K. ez-Zeraqon	+											
T. es-Sa`idyeh*												
T.Rechesh												
K. Safsafa*												
T. Qishyon	?	+	?	+						+	+	
T.Estaba*												
T.Yaqush*												
T. Regev												
Megiddo	+											
Affula	+		+	+	+				+	+	+	
T.Taanakh	+			+								
E. Jezreel												
T. Yosef Hayeshana*												
T. Bet Shean	+	+	+						+	+	+	+
T. Magal	+		+				+					
Bethel*												
Ai	+		+	?								+
Jericho	+	+	+	+	+							
B. edh-Dhra			+									
Jerusalem*												
B. Sahur	+											
T.Aphek*												
Gezer*												
T.Yarmuth		+	?									
Lachish	+											
T.Erani		+										
Nizzanim	+											
T. Nagila*												
T. el-Hesi	?											
T.Halif*												

KKW found on the surface. However, no types are reported from the excavation (Tadmor and Prausnitz 1959; Esse 1991:96).

On the Golan heights, KKW were found at Lawieh, some 3 km from the eastern coast of the Kinneret, and at Tel el-Fakhat, close to the Yarmuk River (Kochavi 1996).

KKW has been found in the Jezreel Valley region at a number of sites. Among them are Megiddo (Stratum XVII; Loud 1948: Pls.106: 8,107:27; Esse 1991:84-85), Ein Jezreel (Zori 1977:19), Tel Jezreel (Gophna and Shlomi 1997), Khirbet Safsafa (Zori 1977:113), Tel Yosef Hayeshana (Zori 1977:26-27),[44] and Tel Qishyon (Cohen-Arnon and Amiran1981; Esse 1991:96-97). Burials in the Tel of Affula excavated by Sukenik (1948:11-12, Fig.6; Pls.X, XI:1-10) yielded a representative assemblage of KKW (our Types 1,3,4, 8-10). Dothan (1975:34) excavations in the south of the tel also yielded additional examples of KKW. Lapp's (1969:4) preliminary report on the Tel Taanakh excavations indicated recovery of ca. thirty KKW vessels, mostly jars and small bowls (our Types 1 and 4; Esse 1982:217, 1991:93).

Jordan Valley

On the western bank of the Jordan Valley, aside from Bet Shean, KKW was found at Tel Yaqush and Tel Estaba (Esse 1991: Table 4; 1993). Some 40 km to the south, KKW sherds were also found at Khirbet Mahruq, near the confluence of Wadi Farah and the Jordan River (Yeivin 1977b:766).

In the eastern Jordan Valley, Tel esh-Shuneh yielded a wide range of vessels of the KKW assemblage, including stands, lids and andirons (our Types 1-4, 8-11; Leonard 1992:50-55, Pls.13-19) representing a high percentage of the EB III pottery assemblage (Philip 1999:43). Other KKW forms are more local such as bowls and platters and are interpreted as part of a production center in the site (Philip 2001:208, Fig.5.15) but no data

[44] Further to the west of Tel Yosef Hayeshana, Zori (1977:6-9) surveyed two more small sites bearing KKW.

about their sources were provided. At Tel es-Saidiyeh sherds were reported in Phase L1 by Tubb (cited as pers.comm. in Philip 1999:35; and see Tubb 1988; Tubb and Dorrel 1993, 1994).

KKW is was also found on the Jordan plateau at Arqub edh-Dhahr (Parr 1956:Nos.208, 214) and at Khirbet ez-Zeraqon where a "large amount" of KKW was reported (Ibrahim and Mittmann 1987:6) that included hemispherical bowls (our Type 3, Genz 2002: Pls.21:9, 11;38:2), a deep bowl or jar with handle (our Type 4; Ibrahim and Mittmann 1994:10; Genz 2002:Pl.4:3), and necked jars (our Type 7, Genz 2002:Pl.38:5). Jericho tombs A, D12 and F2 have yielded all types of KKW bowls (Garstang 1932, 1935; Kenyon 1960:158, Fig.57:42-43; 1965: 96, Fig. 38:27-35; Kenyon and Holland 1982:Figs.57:15-17; 83:26-32, see also Henessy 1967:Pls.LXII:2,5, LXIV3,5, LV:1,2, LXVI:1,3). Some of them, found in tomb F2 (Kenyon 1960:161:Fig.58:6,7), have been defined as local imitation of KKW, i.e. KKW locally produced (de Miroschedji 2000a: 260).

Central Hill Country

In the Central Hill Country KKW has also been found at several sites, Bethel, `Ai, Jerusalem and Bet Sahur (near Bethlehem). At `Ai several types of bowls (our Types 1, 2 and probably 4) and andirons (our Type 11) were found in different occupation areas of the site including Sanctuary A (Market-Krause 1949:Pls.LXXV:1521; LXXXI:2197, LXXXV:1261,1561; Amiran 1967; Callaway 1972:303, Fig.73:8; 1980:193, Fig.125:37, 40, 43, 46, 47). Local imitations of some of these types (Courtois 1971 [quoted by de Miroschdeji 2000a:260]; Callaway 1980:193, Fig. 125:44). Callaway (1980:193) dates the KKW within Phases VII-VIII or EB IIIB. At Bethel, only four sherds of this ware were found in the glacis of the west wall of the city (Albright and Kelso 1968: 22). At

Jerusalem, sherds of unidentified vessels of KKW were found in the excavations of the City of David (A. De Groot, pers.comm).

Southern Canaan

From Gezer southwards a cluster of sites in the southern Shephelah has yielded KKW pottery. These sites include Tel Yarmuth (de Miroschedji 2000b:328, Fig. 18.5:5), Tel Erani (Brandl 1989:Fig.6:1; pers. comm.), Lachish (Tufnell et al. 1958:57, Fig. 4: 7 [284]; Gophna and Blockman 2004: 881), Tel el-Hesi (Petrie 1891:Pl.5:39,40; Fargo 1979: 26) and Tel Nagila (Esse 1991:Table 4).. At most of the sites such as Tel Yarmuth, Tel Erani and Tel el-Hesi, our Types 1 and 2 may be identified from bowl rims. At Tel Yarmuth some KKW exemplars seem to have been produced locally (Y. Goren pers. comm. quoted by de Miroschedji 2000a:260).

Moving further south, this ware has been found at only three sites. Nizzanim, on the Southern Coastal Plain, yielded two rims of small bowls (our Type 1) were found in Stratum 2 (Yekutieli and Gophna 1994:Fig. 2:7,8). The most southerly site where evidence of this pottery has been found is Tel Halif (Seger 1989: 130, note 9; Porat 1989a:Appendix 5), in the Northern Negev. Excavations there yielded two sherds in Stratum XII. The presence of a small hemispherical bowl (our Type 3), together with unidentified sherds (Esse, *idem*) from Bab edh-Dhra, in the eastern side of the Dead Sea, adds to the list of sites that have yielded this type of pottery.

Chronology

Wright (1937:71) suggested that KKW to be indicative of the beginning of EB III in the southern Levant. Accordingly, the appearance of KKW in a site has been defined as the beginning of the EB III. On the base of synchronisms between Canaanean material recovered from Egyptian tombs from the beginning of the EB III and the appearance of KKW, the period is understood to commence ca. 2,700 B.C. (Stager 1992:41, Fig.16;

Joffee 1993:68). Amiran (1968:318) concurred with Wright but further observed from excavations at `Ai and Bet Shean that KKW continued to appear during EB IIIB.

Recent information from excavations at Bet Yerah suggest that KKW only appears in a second phase of the EB III (Getzov, Paz and Gophna 2001:16). According to Getzov, Paz and Gophna (*ibid.*) such distinction could be observed in the excavations of the Oriental Institute at Bet Yerah, where the KKW appear only in Phase A of Sounding D (Esse 1982:Pl.10:1-16). However it is possible that the first occurrences of KKW should be dated to the first phase of the EB III as at Dan (Greenberg 1996b:Fig. 3.31:4). Some KKW vessels were still in use at the beginning of the third phase of the EB III (and see below). At Bet Shean a similar distinction could be observed. The first phase of EB III lacked KKW (Phase R12 in Mazar's excavations, Mazar, Ziv-Esudri and Cohen-Weinberger 2000:269).

In addition to its early phase there is a late EB III, post-KKW phase at Hazor (Greenberg 1997a, 1997b:191) but this phase is not clear in other sites of the north (see discussion in Getzov, Paz and Gophna 2001:17). For instance, at Bet Shean the last phase of EB III in the Mazar's excavations (Phase R7a) lacks KKW, but the authors of the pottery report (Mazar, Ziv-Esudri and Cohen-Weinberger 2001:270) are not sure that this phenomenon is not related to a functional aspect of this phase where KKW was not present and no to a chronological question.[45]

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[45] Nevertheless, we have to take into account that some continuation in the use of KKW must have existed, since for instance some sherds continue to appear in the third phase of the EB III (Phase VIII) at `Ai if we follow the chrono-stratigraphic correlations by de Miroschedji (2000b:Table 18.2; but see Seger 1989:Table 1), and at Jericho Tombs A and F2 could continue to be active in the EB IIIC (and see Amiran 1968:318). As indicated by de Miroschedji (2000b: 328) other problems arise when we take in account that in some

Based on new radiocarbon dates from the northern and the southern Levant, Philip and Millard (Philip 1999: Table1; Philip and Millard 2000) suggested that 2,870 BC must be indicated as the *terminus post quem* for the appearance of KKW in the southern Levant, i.e., the KKW must already have been present in the southern Levant at the end of the EB II. This interpretation of course challenges not only the evidence that in most of the cases KKW appear in a second phase of the EB III, but also that the EB III is considered to begin in the time span between 2,700-2,650 BC.

This writer does not accept these scholars' interpretation. Dates from Syrian sites are not considered relevant to the discussion because they do not affect the appearance of KKW in the Southern Levant, while the conclusions based on 14C dates from Tel Abu al-Kharaz, Tel Yaqush and Tel es-Saidiyeh are problematic. No KKW has been found at Tel Abu al-Kharaz (Fischer 1998) while the 14C dates of Tel Yaqush (Esse 1993) are from strata dating from the EB II, previous to the occurrences of KKW. Furthermore, all the samples from Tel es-Saidiyeh and Tel Yaqush (where KKW was found in EB III) come from charcoal originating in structural timbers (Phillip and Millard 2000:283-284) that are likely to suffer from the 'old wood effect' and thus give dates that relate to the wood, but not to the date of its utilization (and see Braun 2001). Therefore, this radiocarbon evidence cannot be proof of early dating for the KKW.

Therefore, the conclusions of de Miroschedji (2000a,b) and Getzov, Paz and Gophna (2001) that indicate KKW is a phenomenon that represents a second phase of the EB III or EB IIIB seem to be the most acceptable. Nevertheless, it is possible that in some locales KKW appeared at the very end of the first phase of EB III or in EB IIIA (Greenberg 1996b).

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southern sites as Tel Yarmuth there are few sherds in secure contexts or as in Tel el-Hesi they are no stratiphied at all (Fargo 1979:26).

Summary and Discussion

The analyses of the KKW - both in the northern and southern Levant - by different means show that this ware was locally made at several centers, each workshop using local clay albeit with similar technology. Distribution of this ware was mainly during the second phase of the EB III. Although KKW is interpreted here as a local phenomenon, nevertheless its foreign connections cannot be ignored. More than three decades ago, Amiran (1968:317-318) pointed out that some of the types show a fusion of local EB III elements with those of the KKW or its north Levantine kin (RBBW), and that in general local potters producing KKW were either immigrants or influenced by foreign conceptions of how to make pottery.

It is probable that at least five KKW workshops were active in the northern region. One was at Hazor, two at Bet Yerah, and two at Bet Shean. Another two workshops at Tel esh-Shunehh and Affula may also have existed. [46]

By comparison with the MW of the EB II there is a decentralization of pottery production during the second phase of the EB III (Greenberg and Porat 1996:20, Mazar, Ziv-Esudri and Cohen-Weinberger 2000:272). The pattern of distribution of the KKW is also multi-directional and to some extent similar to that of the GBW in its early phase (EB IA).

Proportions of KKW within EB III assemblages vary greatly from one site to another, including those presented as production centers. While we do not have the figures for several sites, including Tel esh-Shuneh, one of the candidates to be a production center, Bet Yerah and Hazor show a low percentage of KKW in relation to other wares

[46] Another workshop is probably indicated by the sherd from Hazor that contained overlapping chemical components between the group of Bet Yerah and Hazor.

(20-30%) compared to Bet Shean, where 60% of the found pottery belongs to that ware. Of course the former sites still have a very important component of KKW within their ceramic assemblages, if we compare them with Tel Yarmuth where the KKW element is about 0.01% (de Miroschedji 2000a:259).

While we are not sure about all the sources of KKW, we suggest that the distribution cores were the Lower Galilee, the Jezreel Valley and the central-northern Jordan Valley.

Hazor was the distribution center for Tel Dan and Tel Qedesh in the Huleh Valley, and probably Rosh Haniqra in Western Galilee. It is possible that Hazor exchanged KKW vessels with northern Levantine-Syrian sites, if we take in account that some of the sherds found in sites of the Amuq clustered with those of Hazor in the chemical analysis conducted by Esse and Hopke (1986:330-331), and sherds from Hazor show a clustering with those from Syria.[47]

Bet Yerah was the distribution center for the nearby area, including Tel Reqet, the Tabor region, and probably the pottery that made its way to Lawieh and Tel el-Fakhat, in the Golan. We suggest a probable maritime route to this last locale from Bet Yerah (and see Chapter 11). If our interpretation of the chemical analysis conducted by Esse and Hopke (*idem*) is correct, it is possible that vessels produced at Bet Yerah also made their way to Hazor.

Tel Bet Shean appears to be a major distribution center for the Jezreel Valley and the south of the country, while it is probable that Bet Yerah also provided vessels to sites in the Great Rift Valley as far north as Tel Rechesh, near the confluence of Nahal Tabor with Nahal Qishon. A different line of distribution appears in the Eastern Jordan Valley

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[47] The interregional contacts with Lebanon and Syria were common, but this subject is of course outside the scope of this study (and see Henessy 1967, Esse 1982:240-241)

and the Jordan plateau. If Tel es-Shuneh was a production center, this could be the source of the KKW vessels found up to Zeraqon. Otherwise we would have to suppose that Tel Bet Shean was the provider of all or part of the KKW pottery found in Transjordan... This is suggested from the information provided by Y. Goren on the petrography of one sherd from Zeraqon, similar to that of Family E from Bet Shean (and see above the section on Sources).

To the south the Rift Valley was certainly the line of distribution of KKW as far as Jericho, and Bab edh-Drah including the Central Hill Country and the Jerusalem-Bethlehem area. The Shephelah, the Southern Coastal Plain and the Northern Negev were reached either through the *wadis* that run to the west from the hill country or by a line going down from the Sharon plain southwards

A study of the distribution of ceramic forms should be considered when we try to understand the KKW phenomenon and its exchange patterns. Bet Yerah and Tel esh-Shuneh represent two sites with the most varied repertoire of KKW forms, followed by Hazor, Bet Yerah and Affula. This last site could also be a different center of production (as suggested by S. Pfann, pers. comm., unpublished) and the provider of the pottery found in the Jezreel Valley. But the fact that the results of the NAA samples from Affula are still unpublished precludes us from stating this view with any degree of assurance.

At any rate, it is clear that some types such as lids and andirons (our Types 9 and 10), that appear mainly in the production centers of forms did not go beyond the borders of core areas. Esse (1991:139) has suggested that because these forms are closely related to a culinary tradition, their distribution may reflect cultural boundaries (and see Hodder 1977). The only exception is an andiron from `Ai, found in Sanctuary A with other cult objects, that was interpreted either as a northern influence on the site (Callaway 1972:303; 1978:53-54) or simply as an indication of trade (Esse 1991:140).

Small bowls, sinuous-sided bowls and hemispherical bowls (our Types 1-3) have the largest distribution range, including the southernmost sites. All in all, these small forms were easily transported to the south because of their sizes (Esse 1991:139, de Miroschedji 2000a: 259), probably as an exotic medium as suggested by Philip (1999:50), as were the small MW forms during the EB II.

OTHER CERAMIC WARES

Other ceramic wares, for which less detailed information is available, have been defined for the EB Age. Some of them are discussed below according to a chronological and geographical order, though we will not discuss most of them in depth since systematic petrographic analyses were restricted or not carried out at all. Some of the groups are limited to very small areas, as in the case of the groups of Bab edh-Dhra and Numeira.[48]

Grain Wash

This decorative technique, also referred to as “Band slip” (Albright 1926:29, Glueck 1946), appears to have been a rather thin slip or wash, applied with broad brushes in vertical, diagonal, or crisscross strokes, and was named “Grain Wash” (GW henceforth) by Engberg and Shitpton (1934:28) (Figure 6:1-3). These swaths covered only parts of the vessel’s surface, leaving barren patches and creating an effect that in the opinion of some resembles wood grain. The technique was often used in storage jars and seems to have been popular in north in EB IB (Braun 1996b: 197-198).[49]

GW is known from the following sites (Table 6, Map 6):

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[48] For another pottery groups see the recent work by Cohen-Weinberger 2004.

[49] A different and exceptional case of GW appears in late contexts ascribed to the EB II- III at Khirbet ez-Zeraqon and other sites in the nearby area (Genz 2000, Kamlah 2000).

In Western Galilee, Kabri have yielded some jars displaying GW treatment (Scheftelowicz 2002a:100, Fig.5.6:5-6). Bet Haemeq also has yielded some sherds of storage jars with GW (Givon 1993:Pl.8:7-8), At Qiryat Ata Strata III-II (EB IB) (e.g. Golani 2003: 4.10:1,3; 4.13:1, 16) also yielded several storage jars decorated in GW. En Shadud, in the Jezreel Valley has yielded several jars with different types of necks with GW treatment (Braun 1985:Fig. 20:8-11, 13). In the Central Coastal Plain, at EB IB Tel Megadim (S. Wolff pers. com) some sherds exhibit GW.

In Transjordan, there are some occurrences of GW during EB IB. At Tel esh-Shuneh some sherds bearing GW are mentioned by Rowan (1993:25) and at Pella this surface treatment is reported in the earlier EB IB phases(Bourke 2000:237, Fig. 13.1.1-2). On the western side of the Jordan River GW sherds have been found at Tel Shalem (e.g. Eisenberg 1996:Fig.15:13).

Southern sites where GW was noticed include Lachish in the southern Shephelah a body jar sherd with typical “band slip” decoration was noted (Gophna and Blockman 2004:876) and probably Nahal Mishmar with several sherds labeled as decorated with “band slip” (Bar-Adon 1980:Ill.13:6-11) were noted. In addition, Braun (pers. comm.) noted several small sherds bearing this type of decoration were found in fills at Palmahim Quarry.

The only published petrographic analyses of this ware are from Kabri (Goren 1990: XLI, Table 1; Goren and Cohen-Weinberger 2003:Table 15.1). They show that it is possible that these jars were produced in an area where both carbonatic rocks and basalts existed, such as the Jezreel Valley. We suggest that GW, although in the most strict sense a treatment and not a ware, originated at least in one workshop located in the Jezreel Valley and was distributed east and west in the restricted area of that valley, nearby western Galilee and the area of the Jordan Valley close to the Jezreel Valley. Such a

Table 6. Other ceramic groups.

localized pattern of distribution accounts for only a very few occurrences of this decorated style to the south.

"Crackled" Ware

This ware, also labeled "Mottled" ware by Braun (1985:62), was described by Esse (1989b:77-78) in an article presented to Helene Kantor, who together with her co-excavator at Tel Bet Yerah, Delougaz, distinguished this ware within the pottery assemblage from the site. According to Kantor and Delougaz it is an imitation of GBW, in late contexts of EB I in the north of the country (Esse, *idem*).

"Crackled" Ware (hereafter CW) fabrics range from buff to gray with fine ground pieces of limestone with small grits of silica and grog temper. Its slips are thick and range in color from reddish-brown to dark grey. Surfaces on vessels of this ware are characterized by fine crackling lines indicating that the slip cracked either during firing or drying (Esse 1989b:80). The forms of CW ranged from shallow bowls, sometimes with vestigial handles or projections, to deep bowls with simple "V-forms" and straight or curved rims (e.g. Figure 6:4-5).

The distribution of CW is as follows (Table 6, Map 6):

In the Jezreel Valley En Shadud (Braun 1985:61) and Megiddo (Guy 1938: Pl.3:31-32, Esse 1989b:Fig. 15.a) yielded CW bowls of a type with the conoid projections. In the northern Sharon plain En Assawir (Dothan 1970:Pl.6:29-30) CW appears together with Family III bowls of the GBW.

At Bet Yerah most of the types described above were found (Esse 1989b:Figs. 13-15; Greenberg and Paz 2004:11). In the Transjordan plateau, an EB I-III tomb at Arqub edh- Dhahr produced some "V-shape" bowls of the CW (Parr 1956:Fig.14:99-101, Esse 1989: Fig.16). In the eastern Jordan Valley, bowls of the CW with or without knobs appear at Tel esh-Shuneh (Rowan 1993:Fig.10, 1994:127-128). In the western side of the valley, south of Bet Shean, a tomb located at En Hanatziv yielded several bowls with conoid projections (Amiran and Sebbane 1986:16). It is not clear if they belong to CW.

The unique occurrence of a probable CW in the south of the country is at Tel en-Nasbeh in the Central Hill Country, where a tomb has produced some bowls with plain buff pink clay, no slip and conoid projections (McCown 1947:Pl.25:37; Wampler 1947:Pl.52:1124; E. Braun, pers. comm).

As Esse concludes (1989b:78) the area of distribution of the CW is very restricted, even more than the GBW Families I and II, contemporaries with the CW. We see this ware as the product of a workshop located in the Jezreel Valley or in the Bet Yerah area during the EB IB that imitated the GBW earlier families of the EB IA. The cracked appearance of the CW surfaces was probably the result of the difficulties experienced by these workshops in obtaining the finer surfaces of the GBW workshop vessels (*idem*).

Splash and Drip Style Painting

Another case for our research on local exchange of pottery is that of the Splash and Drip Style Painting (SDS henceforth). This group was defined by Braun (1996b:183) as a particular style of painting by means of splashing and ripping of red paint (Figure 6:6-9). It appears to be a local style limited to the central and southern Jordan Valley and seems to have appeared during the last part of the Chalcolithic (*idem*, Fig. VI.C.1.h.1:1,3,4,6,7).

SDS occurs during the early EB I or EB IA at sites like Tel es-Saidiyeh (Helms 1987:Fig. 15:8), Tel Abu al-Kharaz (Fischer 1994:Fig. 7:5), Tel esh-Shuneh (Gustavson-Gaube 1985: Figs. 9, 16, 14,18), Tel Umm Hamad (e.g. Betts 1992:139:1,2; 139:4,5; 219:2, 7) and Jericho (Kenyon and Holland 1982: Fig.37:22; 1983:Figs. 46:4, 95:14, 126:33, 132:26, 150:2) (Table 7, Map).

Related SDS pottery was found at two sites located in the Shephelah: Gezer and Shoham. In these two cases the painted style resembles that of the SDS but is not the same

(Seger 1988: Pl. 4:1,2; Braun, *idem*). It is possible that the group of vessels of the Shephelah is an imitation of those originated in the Jordan Valley.

SDS is concentrated in the Jordan Valley and its southernmost point is Jericho. While we don't have published petrographic analyses, we point to the central Jordan Valley, probably one of the eastern sites, as the origin of this ware.

"Pre-Urban D" or Tel Umm Hammad Ware

"Pre-Urban D", lately called Umm Hammad Ware (UHW henceforth) was defined for the first time by de Miroschedji (1971: 37-40). This is an EB IB type of highly stylized class of pottery. It was most commonly known as UHW (Betts and Helms 1992: 29,42-43,101-113) after the site that yielded it in great abundance. As Braun (1996b) has pointed out this pottery is notable for its superficially archaic aspects that make it similar to Chalcolithic types (Betts and Helms 1992: 143-144). Characteristics of this ware are the use of rope decoration and large, thick, flat rims on pithoi and jars. The material is a hard fabric, dark red-brown or gray with finely detailed plastic features. Shapes include different types, jugs, medium size bowls, storage jars and pithoi (de Miroschedji 1971: 38, Fig.14). (Figure 6:10-13).

The most acceptable suggestion is that its production was primarily associated with Tel Umm Hammad. Besides, there is evidence of it mainly at Tel esh-Shuneh (Rowan 1993: 26), Bet Shan (e.g. FitzGerald 1935: Pl. I:16, Braun 2004b: 48, Fig.3.12:2, 10), Tel Mefaliq (Leonard 1992: 103-108, Pl. 36:1-6), Ruweiha (surface finds) (Betts 1992: Fig.257:1-3), Tel el-Farah (N) (e.g. de Vaux and Steve 1948: Fig. 5: 9, 12-14) and Givat Yonatan (Zori 1977: 8-10, Fig. 6:2) (Map 6, Table 6).

"Tel Erani C" Horizon Pottery

This group was defined after Kempinski and Gilead (1991) at Tel Erani found this distinct group of vessels in Level C. Certain elements of this group continue to appear in later assemblages (and see below).

The group is characterized by its incised and applied plastic decoration, sometimes in conjunction with painted decoration. These features include longitudinal or horizontal incisions on small loop handles (Figure 7:1), oblique incisions arranged in bands around the neck of jars (Figure 7:2), and thin, circular bands of clay applied around small spouts. Some jars sometimes exhibit a whitewash with narrow, vertical red/orange painted bands (Figure 7:3; see Braun 1996b:94). Red burnished deep bowls with a round rim are also characteristic of this assemblage (Figure 7:4).

The "Erani C" horizon (EC henceforth) should be ascribed to the EB IB, but not its latest phase, labeled by Yekutieli (2000, 2002) as EB IB1 (ca. 3350-3200 BC). As far as we know only one sample of this group, an incised handle from Tel Erani, was petrographically analyzed (Porat 1989b:Appendix 5c, 463). Its mattrix has determined to be clay group 2, i.e. fossiliferous clay (*idem*, Pl.1:2) with crushed limestone temper that matches with the lithological configuration of the area between Tel Erani and Lachish. This environment is the most probable place for a workshop producing these vessels.

Its source is assumed from the distribution of this group. EC vessels appear in two areas of distribution (Yekutieli 2002:74*-75*) (Table 6 Map 7):

1) The core is in the southern Shephelah and the contiguous coastal plain area. Sites there that have yielded examples belonging to this pottery group include Hartuv (Mazar and de Miroschedji 1996), Nahal Yarmuth (Ramat Bet Shemesh) (E. Eisenberg, pers.comm.), Gat Guvrin (Braun 1996b:Table VI.E.1.e), Erani (Brandl 1989, Kempinski and Gilead 1991, Yekutieli 2002), Horvat Ptora (pers.observ.), Lachish (Tufnell et al. 1958:Pl.57: 44-48),

Gezer (Macalister 1912:Pl. XXII:9) and Afridar Areas A and J (Gophna 1974:Fig. 32:4, 2002b; Baumgarten 2004:Fig.11:14).

2) The second area is more peripheral and includes Azor (Ben-Tor 1975a, Amiran 1985) in the Central Coastal Plain, `Ai (Marquet-Krause 1949:Pl.LXXVI:166a, LXXXII:2, Tel en-Nasbeh (Wampler 1947:Pl.10:151), Jerusalem--Ophel and Siloam tunnel (Vincent 1911:Pl.VIII:11; Reich and Shukron 2004:211; R. Reich, pers. comm.) in the Central Hill Country, Jericho (Tel) (Kenyon and Holland 1983:Fig. 124:36) and Cave VIII/9 in the Jebel Quruntul cliff (Khalaily 2002: Fig. 6:4-6) in the Jordan Valley, Nahal Mishmar (Bar-Adon 1980:Ill.16:1,4 and probably Ill.14:1) in the Judean Desert, Tel Halif (Levy et al. 1997:7-8) , Wadi Ghazza/Nahal Habesor (Site H) (Macdonald 1932: Pls. XXXI, XXXIV) and En Besor in the northwestern Negev and Taur Ikhbene Stratum IV-III (Oren and Yekutieli 1992:Fig.12:5), in the Southern Coastal Plain. In these later sites the EC vessels appear in mixed assemblages with other pottery types of EB IB.

Dolomitic Wares

Dolomitic clay and tempers were defined by Porat (1989a) as a particular group mostly present in the center-south of the country. They are distinguished by rhomb-shaped, zoned silt-size dolomite crystals (*idem*, Pl. 1:1). The use of dolomitic clay and temper starts in the Chalcolithic and flourished during EB IB (Goren 1987). The most common vessels made of dolomitic pastes are red-striped painted storage jars with a whitewash background, a family defined by Stager (1990) as the Line-Group Painted Ware (LGPW hereafter) (e.g. Figure 7:5-10) in which Braun (1996b:216-219) distinguished also a Basket Style Group. However, other vessels as unpainted jars, pithoi, amphoriskoi, bowls and jugs belong to this same petrographic group (Porat 1989a:47) and it is not proved that all the line painted vessels are made of dolomitic sands, though all these groups originated in the center-south of the country and match with the clay sources of the area. Dolomitic rocks crop out in the mountains all over the country including the Galilee and the Central Hill Country (Porat 1989a:Fig. 6.1). Porat assumes that since these vessels were found mostly in central and southern Canaan, it is likely that they were produced in the Judea and Hebron hills, from nearby sources (*idem*, 48).

The distribution of dolomitic wares (DW henceforth) vessels is shown in Porat (1989a: Fig.8.4.A) (here Table 6, Map 7) and includes only one site in Galilee, Tel Qishyon, with most of the sites localized in the center: Azor (coastal plain), `Ai (Central Hill Country), and the south: Tel el-Hesi, Tel Erani, and Tel Maahaz (southern Shephelah), Taur Ikhbene, En Besor (Southern Coastal Plain), Tel Halif, Small Tel Malhata, Arad (Northern Negev). Stager (1990:86*) adds other sites of his LGPW as Gezer (southern Shephelah), Tel en-Nasbeh and Jerusalem (Ophel tomb) (Central Hill Country), Jericho (Jordan Valley) and Bab edh-Dhra, in the Dead Sea plain. At Nahal Tillah (Tel Halif)[50] (Levy et al. 1997:36, Table 4) jars of different sizes and one bowl were found to belong to this group, classified as Group 2. These vessels are often decorated with whitewash and red painted lines as defined in Stager's (*idem*) LPGW. Rocks of Cenomanian origin exposed 15 km northeast of the site, suggesting that the clays used in the vessels could have been brought from the source or the vessels themselves imported from a site located in the Judean or Hebron mountains (*idem*), coinciding with her earlier conclusions (Porat 1989a:48).

"Tel Aphek Bowls" (henceforth TAB)

This family of bowls was first defined by Beck (1985) on the basis of the excavations at Tel Aphek and the similarities observed there with bowls from different sites. These bowls

[50] Previously the different researchers of the site had given separate names such as Site 101, Site 301 (Seger et al. 1990), the "Villa Site", and the "Silo Site" (Alon and Yekutieli 1995)

were also known from the earlier excavations of Eitan (1969: Fig. 2:9-14, 16) at the foot of the tel. The ware of these bowls is in general very fine, ranging from a brown-reddish clay to dark brown or gray-brown. Tempers include very small grits. The finish of the vessels includes a slip with a burnish called by Hennessy (1967:73) "pebble burnish". Some of them were made of MW. Whatever the implications of this fact (see below), only the non-MW examples are discussed in this section.

From the morphological point of view there are several variants of these bowls: a) shallow bowls with a pronounced carination (e.g. Beck 1985:Fig. 4:1-5) (Figure 7:11-13); b) shallow round bowls with horizontal lug handle (e.g. *idem*, Fig.4:6) (Figure 7:14-15); c) shallow bowls with inverted rim (*idem*, Fig.4:7-8) (Figure 7:16); d) deep bowls with a soft carination (*idem,* Fig.4:9-10) (Figure 7:17); and e) lamp bowls, i.e. rounded bowls with patches of soot (*idem*, 23, Fig. 4:11) (Figure 7:18).

Petrographic and XRD analyses on some of the bowls from Tel Aphek, Tel el-Farah North, Tel Nagila and Arad (Porat forthcoming) were undertaken by Porat (1989a: 30, appendixes 1, 2a, and 5). They reveal that the bowls contain clay Type 3 of Porat's (1989a: Pl.I:3) classification, i.e. a silty clay with well sorted quartz of eolian origin.

Distribution and Chronology

The distribution of TAB is presented in Map 7 and Table 6 and is as follows:

Carinated bowls of this family appear in the Galilee at Tel Qashish (Ben-Tor Portugali and Avissar 1981: Fig. 17:9) and at Bet Yerah (Esse 1991: 324). In the Jordan Valley, there are carinated exemplars at Bet Shean (FitzGerald 1935: Pl.V:15), Tel Abu al-Kharaz (Phase II, EB II) (Fischer 2000: Fig.12.5.4) and Jericho Phase K-ii (EB IB-II) (e.g. Kenyon and Holland 1983: Figs. 87:2, 92:12, 93:3, 99:4102:1, 137:34) yielded also some exemplars. In the Central Hill Country they are known from Tel el-Farah (N) (carinated bowls, exemplars with handles and several lamps), associated with EB IB and

EB II material (de Vaux and Steve 1947, 1948, 1949, de Vaux 1955, several occurrences), and at `Ai (e.g. Callaway 1972: Fig.3518-23; 1980: Figs. 61:35-36, 68:5-8, 90:17-18) in Phases III and IV. A small carinated bowl found at Mitzpe Shalem (Bar-Adon 1989: Fig.Z9: 4) probably belongs to TAB.

In the Central Coastal Plain this family is fully represented at Tel Aphek in Stratum XVIII of Strata Area A, and in Stratum VIII of Area B (Beck 1985; 2000:106-107, Figs. 8.4:14,15, 8.5:3, 5-7, 16-20). They appear also in lesser quantities in Stratum VII of Area B (Beck 2000: 94) and in part of Area G (Beck 1985:17). These Strata are dated to late EB IB and to EB II.. In the Lod-Ayalon Valley carinated bowls appear in Shoham (N) Cave 2 (EB IB; van den Brink and Gophna, forthcoming). They are fully represented at the Lod excavations (Yannai and Marder 2001) where they are related both to the Late EB IB and EB II strata (pers. observation). Egyptian *serekhs* of the time of Narmer (van den Brink and Braun 2002) were found within the fills of these strata. Other sites that have yielded examples of these bowls are Tel Dalit with carinated examples (Stratum V, EB IB) (Gophna and Iron-Lublin1996: Fig.39:5-6,14) and Gezer (EB IB; Dever et al. 1974: Pls.7:26; 11:34).

In the southern Shephelah, exemplars of TAB were found at Tel Yarmuth (carinated with or without handles, and lamps) (de Miroschedji 1988: 73, Pls. 21:4-6, 23:7-8, 12), Lachish (with handles) (Tufnell et. al. 1958: 161:Pl.58:88-89), Tel Nagila (Beck 1985: 17), and Tel es-Safi (Beck 1985: 18). The southernmost point of distribution is in the western-Northern Negev, where exemplars of carinated bowls were found at Arad in Stratum III (e.g. Amiran et al. 1978: Pl.13:31).

This family of bowls is dated to the Late EB IB-EB II on the basis of the stratigraphy of the most important sites the bowls were found, mainly Aphek, Tel el-Farah North, Tel Dalit, `Ai, Jericho and Arad.

Discussion

Beck (1985) concluded that this particular family must have been produced at one workshop because of the homogeneity of the fabric. She asserted that as far as Aphek it is the only site in which all the subtypes of the family are present and it is located in the center of the area of distribution, the workshop of the TAB must be in the site or close to it. Besides she pointed to the fact that the earlier occurrences of TAB were precisely at Tel Aphek and Tel el-Farah North (Beck 1985:25). The petrographical and XRD analyses conducted by Porat (1989a, forthcoming) show that Beck was right since the clay type and the temper most probably originated in the area of Tel Aphek.

Furthermore, the pattern of distribution reveals that the carinated subtype is the most common of the exemplars found outside Tel Aphek, making its way to the locales farthest away such as Tel Qashish in the north and Arad in the south. Tel el-Farah North seems to get most of the subtypes. It is probable that the carinated type was in a sense most wanted because of its aesthetic value.

Technical expertise was required for the production of such well-finished TAB. The reason that some MW variants were found could be the adoption of this variant by the northern workshop of MW during EB II. The appearance of MW carinated bowls (Greenberg's type B1c) in the south, and their absence from northern sites (except Tel Dan and Tel Teo) could suggest the MW variant is an imitation or replication of the southern exemplars from Tel Aphek. However this assumption is difficult to prove since not many other MW forms were found at Aphek, and no non-MW TAB was found at Tel Dan and its vicinity, the supposed place of the MW center. Probably TAB became known to MW potters through an intermediate area (the Jezreel or Jordan Valleys?) or through the merchants that transported the bowls.

The main area of distribution of the TAB was within a maximum radius of ca. 90 km from Tel Aphek, with a core area of ca. 50 km which includes Tel el-Farah North, Jericho and the southern Shephelah. As is suggested in Map 10, the main routes within this radius led to the northern part of the hill country and the Jordan Valley through dry river courses (*wadis*) and to the south through the Coastal Plain. It is also suggested that some vessels were transported through the Jordan Valley northwards. The distribution of these bowls was the job of middlemen who traded commodities on a small scale between the different parts of Canaan. However, the possibility cannot be disregarded that TAB was exchanged through merchants related to major settlements in core areas.

Dead Sea Plain Tempers

Comparative analyses of sources temper found in the pottery of Bab edh-Dhra and Numeira, in the eastern Dead Sea plain have been the object of several studies (Benyon et al. 1986, Schaub 1987, 1996). They enable us to recognize the exchange of pottery between these two locales during EB III. Since these sites are located very close one to another –some 15 km- (Map 7), it is possible to understand them as a special study case of exchange between two sites within a limited range.

More than 600 sherds from both sites were analysed in thin sections, revealing the existence of five temper types for bowls, storage jars, holemouths and juglets (Benyon et al 1986: Table 1, Schaub 1987:239) (e.g. Figure 7: 19-21; Table 7). Four occur in the EB II-III; a fifth is present only in EB IB vessels of Bab edh-Dhra (Schaub 1987: 247; 1996:239; Rast and Shaub 2003:357, Table 11.2). Here we will deal only with the temper types of EB III at Bab edh-Dhra and Numeira.

Table 7. Dead Sea Plain tempers.

Bab edh-Dhra (EB II-III) and Numeira (EB III). B=Bowls; B1:Fine and plain ware, B2: Creamware;

B3: Burnished platter bowls; SJ1: Fine and plain ware; SJ 2:Creamware; SJ3:Coarse ware;

HM: Holemouths; J: Juglets (modified from Beynon et al. 1986: Table 1 and Schaub 1987: Fig.1).

Tempers Sites	*Wadi Sand*				*Nubian Sand*				*Limestone*				*Basalt*			
	B 1	SJ 1	H M	J	B2	SJ 2	H M	J	B	SJ 3	H M	J	B	SJ	H M	J
B. edh-Dhra	+	+			+	+					+		+			
%	42				4				26				28			
Numeira	+	+		+	+	+	+				+		+			
%	46				14				22				18			

Wadi Sand

The most common tempering type is wadi sand consisting of rounded to sub-angular sand-sized grains of quartz, limestone and flint. The composition, shape and size led to the assumption that the sand was collected from the Wadi Kerak or Wadi Numeira. Samples collected from these *wadis* corroborated that assumption.

Wadi sand was found mostly in fine and plain bowls and storage jars of Bab edh-Dhra from the EB IA onwards. Most date from EB III. They represent a 42% of all tempers (Schaub 1987: 248). At Numeira, this temper is also common (46% of all tempers; Schaub, *idem*) being used mostly also on bowls and storage jars. We suggest that this temper is common to both sites, which produced their own vessels—both having access to the sources of wadi sand.

Nubian Sand

The second temper includes just sand-sized quartz, sub-rounded to angular shaped grains. Outcrops of Nubian sandstone matching these characteristics are found some 300 m. from

Numeira, while there are no outcrops in the vicinity of Bab edh-Dhra. Nubian sandstone samples were taken matching the petrographic pottery sections.

This temper is common at Numeira (14 % of sherds) but not at Bab edh-Dhra (4 %). It appears mainly within bowls (e.g. Benyon et al. 1986: Fig.6:B) and storage jars of the “Creamware” type. The conclusion is that the vessels found at Bab edh-Dhra with Nubian sandstone inclusions were produced at Numeira.

Limestone

Crushed limestone is the third tempering type containing coarse, angular, tabular grains of fossiliferous and fine-grained limestone. This temper is most common in coarse holemouth jars (e.g. Beynon et al. 1986: Fig.6:C. The petrographic profile corresponds with Mezosoic limestone present around Bab edh-Dhra in the form of cobbles and boulders form alluvial surfaces. Samples taken from these cobbles matched the petrographic sections of the pottery.

Since this tempering type occurs at both sites in relatively similar frequencies (Bab edh-Dhra 26%, Numeira 22 %) it is clear that a great amount of these vessels at Numeira was acquired from the Bab edh-Dhra workshop.

Basalt

Crushed basalt temper consists of angular fragments of basalt with large crystals of plagioclase feldspar, amphibole and pyroxene. Basalt outcrops are found in the alluvial surface at Bab edh-Dhra. That material corresponds to the basalt found in the thin sections of pottery of this group. The basalt temper was found mainly in burnished platter bowls both at Bab edh-Dhra (e.g. Beynon et al. 1986: Fig.6:D) and Numeira, with relatively frequent occurrences at the first site (28%) and lesser occurrences at the later site (18%). These vessels were most probably acquired from Bab edh-Dhra and brought to Numeira.

Discussion

Matching nearby tempering sources with the pottery produced and located at Bab edh-Dhra and Numeira helps us to understand part of the mechanisms of exchange between both locales. This actually is a study case *par excellence* of what Rice (1984: 45) called “micro-provenancing” research. While the utilization of local tempering sources in the pottery production has developed at Bab edh-Dhra from the EB IA onwards, only the EB III period is discussed in this work because it is the time when Numeira also existed and developed local sources for pottery.

The fact that “Creamware” bowls and jars produced with Nubian sand at Numeira were acquired from Numeira as a different type of vessel present at Bab edh-Dhra made with Wadi sand temper, probably reflect the different value of these vessels from an aesthetic point of view. Platter bowls made of crushed basalt at Bab edh-Dhra, encountered at Numeira together with the local platters of Wadi sand tempers, could have had the same aesthetic value. Basalt tempers could possibly have helpedd to produce a better paste for burnishing (Benyon et al. 1986: 304).

However, the coarse holemouths produced at Bab edh-Dhra from crushed limestone and exchanged to Numeira, must have a different use if we assume that holemouths from other tempers were fully in use at both sites. One of the possible functions of these holemouths as suggested by Rast and Shaub (2003: 357, Table 11.8) is as cooking pots for large groups.

We do not know who performed the exchange of the pottery vessels; whether the potters or the merchants travelled from Bab edh-Dhra to Numeria or *vice-versa*, as in the examples described by Rice (1987: 192-197). However it is probable that Bab edh-Dhra merchants were in control of most of the exchange since this site has a long span of existence evolving from a village during the EB I through a town during the EB II and III.

3. SUMMARY AND DISCUSSION ON POTTERY DISTRIBUTION

The distribution patterns between the different pottery groups both diachronically and synchronically show some remarkable differences but also similar patterns the importance of which must be stressed. EB I wares in the north, namely the different families of GBW have multiple sources during EB IA (Families I and II) probably located within a relatively limited area. The resultant distribution of GBW indicates a multiple networks of pottery exchange within the northern region. The number of exchange networks decreases in EB IB (Families III and IV).

CW (EB IB), is more restricted with a probable workshop center in the Jezreel Valley and a net of distribution mainly to the east, passing through Bet Yerah and the Jordan Valley. GW was distributed in an opposite direction, i.e. from the east to the west, in a restricted area that includes the Jezreel Valley, the nearby western Galilee and the area of the Bet Shean Valley close to the Jezreel Valley.

SDS and UHW, concentrated in the Jordan Valley and their southernmost point is Jericho. While we do not have published petrographic analyses of the SDS and UHW, we point to the central Jordan Valley, probably Tel Umm Hammad or one of the Transjordanian sites, as the origin of these wares.

The EC and later the TAB were wares with an eastward distribution, while these pottery groups appear also to the north and to the south of their supposed workshop's locations. The EC horizon is a mainly a phenomenon of the Southern Coastal Plain and the Shephelah, while the TAB family is representative of a workshop in the Central Coastal Plain. The TAB have a radial distribution net reaching the western Jezreel valley, the Bet Shean Valley, Jericho and Arad in the northwestern Negev. DW also has a radial distribution, but with a location in the center-south of the country. Judging for this distribution pattern, it is suggested that the occurrence of DW in Tel Qishyon is probably related to a dolomitic source in the Galilee, and is not related to the central-southern sources.

Jordan Valley settlements, first and foremost Jericho, are indicated as crossing points in the exchange of the Jordan Valley wares with these above mentioned central-southern groups during the EB I.

MW represents a case of a centralized workshop in the northernmost part of Canaan. As with other wares, e.g. the EC group, the MW has a core area of distribution and a second or a third ranges of distribution in the center and southern parts of the country. We suggest that exchange with sites in the core area was controlled by the workshop or by the authorities that controlled a workshop. The distribution to other parts of the country could be the result of middlemen or other kind of merchants non related to the production center in the north.

Southern wares of the EB II show a different pattern of exchange. There is no centralization from the point of view of a ware dominating the entire region. Arad centralized the distribution of these southern wares, producing the Calcite, Fine quartz and Chert groups and distributing the Arkosic and Fossil shells groups originated in the eastern Aravah and the Southern Negev respectively. Arad could also be a re-distributor of wares like the DW to the Dead Sea plain.

If during EB II the distribution of northern wares favoured the coastal plain instead the Jordan Valley as exchange routes, in EB III the situation seems to return to the pattern of EB I, with KKW appearing as far south as the Southern Coastal Plain, the Shepelah and the Dead Sea plain. This distribution, however, could be the result of some central southern center(s) of production of KKW (also called “local imitations”) and not the product of exchange with northern centers/workshops. Future petrographic work will allow distinguish "imported" from local KKW at central and southern regions. At any rate, the existence of several workshops and centers of KKW reflected more decentralized exchange spheres. On the other hand, each production center of KKW, as in other wares of the EB Age, had cores of distribution (mainly in the north), and extensive secondary areas where this ware arrived by exchange.

Chapter 4

FLINTS

Following Rosen (1997a: 106-107) we can divide the local flint industries of the EB into three main systems: the sickle blade industry, the tabular scraper industry and *ad-hoc* industries. Since the third industry actually encompasses the production of a number of tool types, very localized and characteristic of each site, and their exchange is very difficult to follow, it is disregarded in this study, with the exception of perforators that seem to have been involved in the workshops of beads and other materials (e.g. Rosen 1997c). Other tool such as Bet Shean points (Bankirer 1999) provide very few data to delineate a distribution network. A fourth system, although non-Canaanite in origin, consists of Egyptian tools appearing during the EB I (e.g. Yeivin 1976, Rosen 1988a). It included both imported tools and probable blades manufactured in Canaan with Egyptian technology, though the cores of these blades are very few (Rosen 1997a: 108)

Among the local flint industries, the Canaanean blade industry (Rosen 1983a,c), and the tabular scraper industry, which is a continuation of the Chalcolithic tradition (Rosen 1983a,b; 1997a: 71-75, 105-106), are analyzed below as they represent the best examples of flint tool exchange. In order to extract some conclusions the distribution patterns of the flint tools frequencies will be mentioned, although several methodological problems exist. The most important of them are: 1) the collection methods of flint items are far for being alike in all the excavations (both old and new) and 2) in numerous cases we do not have the figures for a comparison between the quantities of flint items and excavated volumes.

1. RAW MATERIAL AND PRODUCTION

From a geological point of view, our study area is dominated by Late Mesozoic and Early Cenozoic limestones that provide an ample specter of flint types (Orni and Efrat 1971: 8-14). Among them the Eocene (end of the Cenozoic) outcrops are the best sources for chipped tools, due to their relative homogeneity.[51]

Although recent research has been done on flint mining and quarries, albeit from the Pleistocene and the Holocene (Wilkie and Quintero 1996; Barkai and Gopher 2001, Barkai, Gopher and Philip 2002), EB flint quarries are unknown in the Southern Levant.

Two areas that have been surveyed in the last years may be pertinent to this discussion. Though no convincing dating relates them to the EB, one of them, Har Qeren, has been suggested by Rosen (1983b) as a source of tabular flint (Figure 8) that could have supplied the EB Age tabular scraper industry. The second area is the Jafr basin in Transjordan researched by Quintero, Wilkie and Rollefson (2002; cf. below). Besides large quarries of flint and cores from the Paleolithic period, huge blocks with the detachment of definite flakes suitable for tabular scrapers were found there (Figure 9).

No chemical analyses have been done on flint sources and implements in order to corroborate common origins of these items. Flint sources and provenience, although difficult because the material is non-homogeneous, could be established by applying trace-

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[51] In Egypt, Eocenian flint was also especially sought after for chipped tools. For instance, Eocenian flint mines were quarried in Wadi el-Sheikh, ca. 100 km south of Cairo (Weisgerber 1982). Different techniques were used during the Neolithic and historical times in order to obtain the raw material. The workmen utilized simple pits a few centimeters deep, and there is a 2-meters-long trench. Tunnels with a diameter up to 1.5 m, a length of 8.00 m, located at a depth of ca. 4.00 m were also found. The debitage found near the mines is a testimony that a workshop existed at the site (Veermesch 1997).

element analysis (Luedtke 1979).[52] Unfortunately almost no studies of this type exist for the Southern Levant and the few ones available (e.g. Frachtenberg and Yellin 1992) are far from being helpful. As most of the reports of flints utilize visual identification of the raw material, sometimes mentioning the particular source or sources, we will utilize this visual method of recognition. However, it should be remembered that ambiguities could exist when describing material and that visual criteria may vary from one researcher to another (Luedtke 1979: 745-746). Besides, a change in color could exist in different parts of the same outcrops, blocks and nodules.

Unfortunately, ethnographic studies on chipped stone tools have focused more on technological and socio-ideological aspects than on production and exchange, and sometimes ground stone ethnographic examples are more available (cf. Torrence 1981: 193-195). We will bring some cases in our Summary and Discussion section of this chapter.

2. CANAANEAN BLADES

DEFINITION

Canaanean technology is a specialized blade technology existing in the EB in Canaan, although it is also known in Anatolia (Matney, Algaze and Rosen 1999; Hartenberg, Rosen and Matney 2000), Mesopotamia (Anderson, Chabot and van Gijn 2004 with bibliography therein), Lebanon (Hours 1979: 59-61) and even in Iran (Valla 1978). Some decades ago, Neuville (e.g. 1930) defined this technology for the first time in Palestine. Moreover, Crowfoot (Payne) (1948: 72-79) refined Neuville's definition, giving a more precise definition of the technical aspects of the preparation of the striking platform. Rosen (1983a,

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[52] Flint is composed of 70% to 99% of silice dioxide (SiO_2) and has oxides of calcium, carbon, iron, potassium, aluminum and magnesium, among other impurities. These and other elements are the so-called trace elements which could reflect the original sources of the flints (Luedke, *idem*).

c, 1997a: 46-60) studied the definition and distribution of this flint techno-typology in depth.

A survey and collection conducted in 1997 by a team from Tel Aviv University at Har Haruvim, perhaps the largest known site where Canaanean blades were produced in the country, was published as a preliminary technological study of the cores, adding the concept of "core table flakes" (CTF) in the production of the striking platform surface (Shimelmitz, Barkai and Gopher 2000). Finally, the function of the Canaanean segments was discussed by Otte, Pelegrin and Collin (1990) as well as by Anderson, Chabot and van Gijn (2004) utilizing use wear analyses, experimental archaeology and ethnographic comparisons.

Canaanean technology is prismatic and intended for blade production, mainly for sickles and retouched blades (contra Anderson, Chabot and van Gijn, *idem*). Cores are large single platform blocks worked on one to three faces, some of them with cortex. Raw material is generally restricted to fine-grained Eocene nodules, even though coarse-grained blades were also found.

The most common tool produced from Canaanean blades is the Canaanean sickle segment, while there are also retouched blades and plain blades. For the sake of unity we will address all the Canaanean blades as one category in the frequencies and references in the text and table.

DISTRIBUTION OF CORES

The most northernmost occurrence of cores for the production of Canaanean blades is Nahal Gush Halav, Upper Galilee (Frankel et al. 2001: Site 346) where several cores were found in the framework of a regional survey (N. Getzov, pers. comm.; Map 8, Table 8).[53] The cores

[53] Another group of cores is housed in the collection of the Museum of Kibbutz Sasa. The cores were collected by amateurs archaeologists decades ago but their find spot is not clear (H. Smithline, pers. comm.).

are light gray-whitish in color. The closest site of Nahal Gush Halav was dated to EB IB (Frankel et al. 2001: 42,75, Table 3.2) but there are other sites close to it dated to EB II-III (*idem,* 41-42,74-75, Table 3.2; Getzov, Paz and Gophna 2001: Site 6).

Har Haruvim, in the Jezreel Valley, is the site where the large quantity (more than 200) of cores for Canaanean blades was found (Meyerhof 1960; Rosen 1983c; Shimelmitz, Barkai and Gopher 2000; e.g. Figure 10:1-2). The cores are beige to grayish beige in color, and the raw material came from flint nodules originated in Nahal Shofet (Wadi Fureir), in the vicinity of the site. The site must be dated to EB I and EB II according to the surface pottery finds. Har Haruvim is located in a Middle Eocene area called the " Senin tongue" of the Nizzana Formation (Rot 1977).

At En Assawir a single small pyramidal core (Milevski et al. forthcoming) (Figure 10: 3) was found on the floor of a building (L4014) dated to the EB IB. It is made of coarse-grained, light gray-brown flint. Narrow blades with overshoots were struck from it. It seems that in the final knapping stages, based on the observation of hinge fractures on the core, flakes were also struck from it, indicating an unsuccessful attempt to produce blades by Canaanean technology from local flint. Despite its small size and the fact that it is in an exhausted stage, this core resembles in shape many Canaanean blade cores known from Har Haruvim, ca. 15 km to the northeast.

At Fatzael, a core made of dark brown Eocene tabular flint, covered at both sides by the cortex (Figure 10:4), was found in the framework of a survey directed by N. Goring-Morris (Department of Archaeology, Hebrew University). In spite of the Chalcolithic dating

Table 8. Distribution of Canaanean blade cores.

	EB I	*EB I- II*	*EB III*	*EB I-III*
Sites				
N.G.Halav				1
H.Haruvim		Hundreds		
E.Assawir	1			
Fatzael				1
Gat Guvrin	Dozens			
H.Ptora	2			
T. Halif			7	
Afridar	1			
Tel Sera				2

of the site (Porat 1985), there are some Canaanean blades (cf. below) that could suggest an EB occupation there on the basis of these blades. The material of the core matches known Eocene sources in the Jordan Valley north and south of Wadi Farah (Picard and Golani 1992).

At Gezer a pyramidal core for Canaanean blades was found by Macalister (1912: 126, Fig. 300) who correctly identified it as a core for the production of what he and Petrie (1891: 49-50) called " ribbon blades". It must be stressed that the area of Gezer, i.e. the southern part of the Ayalon Valley probably bears an Eocene formation (Picard and Golani 1992). One core at Horvat Illin (Tahit) (Marder, Braun and Milevski 1995: 65, n. 5) is probably a very exhausted exemplar of a Canaanean blade or a tabular scraper core, but its diminutive size and the pattern of its scars do no enable us to reach a definitive conclusion as to its original function. At Tel Yarmuth, two blocks of Eocene flint of hight quality were encountered, suitable for Canaanean core preparation (S. Rosen, pers. comm), but no cores have been recovered from the site.

Gat Guvrin is the second site where dozens of cores for Canaanean blade preparation were found. The cores in the collection of the IAA are of dark brown flint. Unfortunately these cores were collected from the top soil and they were not found in the excavations by Perrot (1961b) that revealed a probable upper level with EB I pottery and a lower level with Chalcolithic remains. Heavy agricultural plowing work was done on the topsoil by tractors during the last decades, perhaps removing the EB I layer. Recent excavations by Khalaily (Khalaily and Hermon, forthcoming) found the Chalcolithic level in a small exposure, which contained mainly pits. Within the pits, Canaanean blades were also found.

At Horvat Ptora (pers. observ.), two exhausted cores for Canaanean blades and one CT were found in Area D, in EB I contexts. One was recycled as a heavy-duty perforator and exhibits a deep retouch. The cores are made of gray flint and the CT is made of fine brown fine Eocene material as the numerous Canaanean blades at the site. Few blades are made of gray flint as the cores.

Further to the south, another exhausted core for Canaanean blades was found recently in the excavations of Afridar Area L by A. Golani and studied by Khalaily (forthcoming a).[54] The core is made of grayish brown flint similar to several Canaanean blades found at the area.

Other surface finds include two cores found by the late D. Alon at Tel Sera, in the northwestern Negev, today in the collection of the IAA.[55] One of them, is very pale brown in color with a heavy patina, but the true color is visible on small fresh breaks (pers. observ.). No EB remains are known from the site (Oren 2001). Further to the northeast a published core from Nahal Habesor (Site H) is probably a core for Canaanean blades (cf. Macdonald 1932: Pl. XVIII), although Roshwalb (1981: 284, 299) reported that no cores for Canaanean segments were found at the site.

At Tel Halif nine cores (e.g. Figure 10:5), several core fragments, Cananean blades and a small amount of debitage from core manufacture or maintenance have been found in Field I in an EB III context (Futato 1996). The cores are of fine-grained Eocene material defined as “chocolate” colored; outcrops of this flint are not known at the site. Since large

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[54] I thank both of them for this information.

[55] I thank Zinovi Matskevich for this information

amounts of debitage were not found (Futato, *idem*), it is assumed that the flint was brought to the site in nodules. In addition a cache of Canaanean blades and a tabular scraper blank (probably the result of the cortical removal of the core) were found in a cache (cf. below). Since the blades and the tabular scraper are made of the same material and the blades exhibited remains of the cortex, Futato (*idem*) suggested that the cores were for blade and tabular scraper preparation.

DISTRIBUTION OF CANAANEAN BLADES

Golan

Data from the Golan are provided only from Gamla (EB II) and a survey the IAA has conducted during the last years (O. Marder, pers. comm.; Map 8, Table 9). Canaanean blades are fully represented at Gamla (Olami 1989: Table 1). They are made primarily of brown (57%) and gray-beige (26%) flint.

Canaanean blades from the survey are made of several types of flint including pale brown, grayish brown and gray beige fine and coarse-grained flint. Olami (*idem*) noticed that some of these blades have remnants of cortex. It is true that the gray-beige flint fits with the material from which the cores found at Har Haruvim were made, but the suggestion of Olami (1989: 127*) that this site was the manufacturing center for sickle blades for Gamla must not be taken for granted. We alternatively suggest that sources for Canaanean blades in the Golan may be Har Haruvim and the Jordan Valley, but also local sources close to the Yarmuk River (O. Marder, pers. comm.).

Galilee and Huleh Valley

Canaanean blades of fine-grained Eocene non-local material are recorded at Meona (EB II), in the Upper Galilee, where they represent 27 % of total tools (Marder 1996). In Western

Table 9. Distribution of Canaanean blades.

Galilee, Canaanean sickle blades represent 15.4 % of total tools in EB II-III contexts (Hershman 1990). Further to the west, at the Coastal Plain, several Canaanean blades were found at Bet Haemeq (EB I-III) (Scheftelowitz 1993) and at Khirbet Uzza (Ben-Tor 1966: 5). At Qiryat Ata Canaanean blades represent ca. 25 % of total tools during the EB I and II. The raw material is similar to the cores of Har Haruvim (Bankirer 2003: 172). Only 6 Canaanean blades were found in EB IA Yiftahel; they are made of light-brown fine Eocenian flint (Rosen and Grinblatt 1997: 134). Further to the southeast, Canaanean blades were also found in Tel Gat-Hefer (EB II and III) representing almost half of the tools found in the excavations; they are concentrated in the rooms of Area C (Bankirer and Marder 2003).

In the Huleh Valley, at Tel Dan several Canaanean blades were found in EB II contexts (e.g. Greenberg 1996a: 139, Fig. 37:3-6). Further to the south, a small sounding at Tel Na`ama has yielded some 25 Canaanean blades (Greenberg et al. 1998: 27-28), although some of them could belong to the IBA phase at the site. Tel Teo has yielded 26 Canaanean blades from the EB I and four from the EB II (Gopher and Rosen 2001: 55). In all these cases the raw material of the Canaanean segments is not described in detail.

On the northwestern coast of the Sea of Galilee, Tel Kinrot (Tel el-`Oreimeh) has yielded several Canaanean blades made of brown to light gray flints, fine and coarse grained in quality (O. Marder, pers. comm.). The light gray-whitish flint resembles the material of the core found at Nahal Gush Halav. Further to the south, the Getzov excavations at Bet Yerah have yielded more than 50 Canaanean blades which represent one third of total tools from the EB I to the EB III. The material of these blades does not match the material of the local small pebbles, originated in the proximity of 5 km (Bankirer, forthcoming).

In the Jezreel Valley, Canaanean blades were found at En Shadud, representing ca. 11% of all the tools (Rosen 1985: 155). At Affula, Canaanean blades are reported from Sukenik's excavations where they represent almost 21% of total tools (e.g. Crowfoot 1948:

Pl. XXVI:1-3). Few Canaanean blades were recovered from new salvage excavations by Gal and Covello-Paran (1996: Figs. 8:3, 26:1). Canaanean blades are also fully represented at Megiddo (e.g. Garrod 1934: Figs. 21, 22:C-E; Loud 1948: Pls. 106:8-10, 107:2-3). Unfortunately no numbers are given.

From Tel Qashish we have a considerable quantity of Canaanean blades, representing 45.3% of total tools in EB I to III contexts (Rosen 2003a: Figs. 158, 159:1-2). These blades are made of Eocenian flints in a wide range of colors from dark brown to beige (Rosen 2003: 395-396). This description fits with numerous cores found at Har Haruvim.
At Har Haruvim, the collection of flint items in 1997 (Shimelmitz, Barkai and Gopher 2000) yielded 24 Canaanean blades, representing 4.1% of total items – including 22 cores- and 14.7 % of the tools. The collected items are thought to be part of a workshop for Canaanean blade production. Naturally these frequencies could not distinguish differences through time, since the site was not excavated.[56]

Jordan Valley

In the Jordan Valley, the Bet Shean excavations by Mazar (1997) recovered numerous Canaanean blades (Bankirer and Marder forthcoming a, b). In Area M, they represent between 20 to 30% of the total tools during the EB I, II and III. A cache of 10 blank non-retouched blades is worth mentioning; it was found attached to a mud brick wall of Stratum M2 (EB II), and probably they were left as a cache, wrapped in some medium that has long vanished. They are made of brown-gray Eocenian fine-grained flint. Other relevant find spots contained 33 Canaanean sickle blades, five retouched Canaanean blades and six Canaanean blades on a bench of Stratum M3 (EB IB).

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[56] For instance, the authors of the report suggested that some of the tools do not belong to the workshop and are part of post-depositional processes (Shimelmitz, Barkai and Gopher 2000:4, n.1).

In Area R Canaanean blades represent only 18.5% of total tools (Bankirer and Marder forthcoming b). The differences in the frequencies of these blades as compared to Area M can be related to differences in the functional units of the site.[57] As other *ad-hoc* tools have been manufactured from the same Eocenian material, Bankirer and Marder (forthcoming a) suggested that the source of flint for the Canaanean industry at Bet Shean must be nearby. We suggest again a Jordan Valley source, probably to the south of the site and close to Fatzael.

Further to the south, several Canaanean blades were found at the EB IB site of Tel Shalem. They are made of light to dark brown flint (Eisenberg 1996: 13, Fig. 18:1-5). As was pointed above, at Fatzael, Canaanean blades appear in what was defined as a Chalcolithic building (Porat 1985). The material is light-brown fine-grained flint (Milstein and Rosen 1985) and they are made of the same material as the core found in the top soil near the site (Figure 10:4).

Further to the south, a very long Canaanean blade was found in the Cave of the Warrior, in Wadi Makukh in the Jericho area (Schick 1998: 59-62), probably dating from the very beginnings of the EB I.[58] Canaanean blades were also found in a cave located near Ketef Jericho (Khalaily 2002). Among the flint industries represented at Tel Jericho, Canaanean blades are abundant with 326 segments, although they represent only 11.1% of total tools of the EB I, II and III at the site (Crowfoot Payne 1983: 718-720). Regrettably, a stratigraphic division of the Canaanean blades is not given. They are made of dark brown, fine-grained Eocenian flint. This material could have originated further to the north in the Jordan Valley; it is not clear if it resembles that of the Fatzael core and blades.

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[57] An increasing number of Canaanean blades were found in the deep cut of FitzGerald's excavations (Strata XVII-XV; Braun 2004b: 59, Figs. 4.13-4.15).

[58] Cf. the book review by Zbenovich (2000).

Central Coastal Plain

At Tel Megadim (EB I) ca. 10% of the tools are Canaanean blades. They are made of Eocenian tabular flint. Bankirer and Marder (forthcoming c) have suggested that this material is similar to that from Har Haruvim.

Among the flint artifacts from En Assawir (EB IA and IB), Canaanean blades represent only 6 % of total tools (Milevski et al., forthcoming). They were manufactured mainly of three types of Eocene raw material. Two are fine-grained, dark brown or pale brown in color with stripes. The third is coarser, light gray-brown in color. The coarse-grained and the dark brown fine-grained are probably of Middle Eocenian origin, while the fine-grained pale brown is probably of Lower Eocenian origin (C. Delage, pers. comm.). While the first two types are typical of the Har Haruvim area, the third type could be found within a radius of 2-5 km, although no outcrops are known.

Further to the south, in the Ayalon-Lod basin, at Tel Aphek, a small quantity of Canaanean blades (n=4) was found (Mozel 2000: 257-258). Tel Dalit (EB IB and II) yielded 274 Canaanean segments, representing ca. 75% of all tools in EB IB and II contexts (Friedmann 1996: 136-139). Large quantities of Canaanean blades were also found in the Lod excavations (Yannai and Marder 2001) in EB IB and II contexts; they are made of pale brown to brown flint (pers.observ.). At Shoham, Canaanean blades were found in domestic structures (Nadelman 1998) as well as in caves dated to the EB IB (Marder, forthcoming). They represent between 20% and 25% of total tools and are made of dark brown fine-grained Eocene material, probably found some 30 km to the south in the Shephelah (Picard and Golani 1992).

At Azor, the excavations of the EB IA settlement yielded 14 Canaanean blades (26.9% of total tools). They are made of fine-grained Eocene material, six of them brown-veined. Few Canaanean blades were found in the excavated tomb caves of the EB IB (Ben-

Tor 1975a: Fig.13:11-12). Marder (1999: 25) suggested that their source was located to the southeast, some 23 km from the site, i.e. in the Gezer region.

Central Hill Country

Canaanean blades were published in the report of Tel el-Farah (N) (de Vaux and Stève 1948: Pl. XVI) but quantities were not given. At `Ai several Canaanean blades were found in Building A (EB III) (e.g. Callaway 1972: Pl. XIX:4). Jerusalem (City of David) yielded seven Canaanean blades from EB strata (Rosen 1996a: 259). No description of the material is given. At Motza, several km to the west, the EB IA site yielded a cache of five Canaanean blades on a surface of an oval building (Eisenberg 1993: 43, 46). They are made of high quality light brown flint, probably struck from the same core. At Tel Hebron (Tel Rumeida) 24 (more than a half of the EB III tools) Canaanean blades were found (Khalaily, forthcoming b). They are made of brownish, light-gray, fine-grained Eocene flint. This material resembles the raw material of one of the Tel Sera cores found on the surface.

Shephelah

At Gezer a number of Canaanean blades were published from excavations by Macalister (1912: Pl. CXXXVIII:3-17) and from later excavations in the Field I Caves (e.g. Seger 1988: 35, Pl. 6:8, 13-14). Rosen (1983c: 22) adds another Canaanean blade from Field IV, but from later mixed contexts. They must probably be dated to the EB IB, according to the pottery of the site.

At Hartuv, a site belonging to the EC horizon (EB IB), Canaanean blades made of medium to fine-grained flint represent ca. 9% of total tools at the site (Rosen 1996b: 41,43-44). Further to the south, at Tel Bet Shemesh, Canaanean blades were found (e.g. Grant and Wright 1938: Pl. LIV: 11-15) but no quantities are available. A few kilometers to the north-west, the contiguous site of Horvat Illin (Tahtit) has yielded a large number of Canaanean blades (e.g. Figure 11:1) in several EB IB strata, representing ca. one third of total tools at the site, including double tools on Canaanean blades (Marder, Braun and Milevski 1995).

They are made of high quality Eocene flint. Sickle blades represent the greatest portion of the blades; several are found concentrated in certain loci of Strata III and IV.

Further to the south, at Tel Yarmuth, the 1980-1982 seasons of excavations yielded 147 Canaanean blades representing ca. 34 % of the tools in EB IB, II and III (Rosen 1988b). EB I is poorly represented.

Further to the southwest, EB I-III caves in the NW area at Lachish have yielded some Canaanean blades (e.g. Tufnell et al. 1958: 326, Pl.19:1, 4-6) but quantities are not given. In the renewed excavations at Lachish (Rosen 2004: 2202, Fig. 31.1:2-6), 49 Canaanean blades were found, the majority in mixed contexts; they may have originated in the EB III. They are made mainly of fine-grained dark brown Eocene flint (*idem*, 2197).

Southern Coastal Plain

On the border with the Shephelah, the site of Gat Guvrin has yielded dozens of Canaanean blades from Perrot's (1961b) excavations. In the renewed salvage excavations (Khalaily and Hermon, forthcoming), Canaanean blades were found, albeit in small quantities, in pits containing mainly Chalcolithic pottery and flints. Five are retouched blades and two are sickle blades. Another sickle blade is worth mentioning since it looks like a typical Canaanean blade but is partially backed and dented, reminiscent of Chalcolithic technology (*idem*). The raw material of all the Canaanean blades is brown fine-grained flint. No Canaanean blade cores were found, but perhaps a core tablet made of the same fine-grained material belongs to the waste of these cores.

At nearby Tel Erani (EB IB) (Kempinski and Gilead 1991: 180-186), sickle blades (n=88) are mentioned as almost all belonging to the Canaanean type. At Tel el–Hesi (Rosen 1997a: Fig.3.17) some 27 Canaanean blades were found in the excavations of the American team, but others were found in Petrie's (1891: 50, Pl. X: 8,11,13,19, etc.) excavations.

At Nizzanim (Yekutieli and Gophna 1994) a cache of eight Canaanean blades was reported from Stratum 3 (EB IA); other Canaanean blades are reported but no numbers are provided.

Afridar presents frequencies of Canaanean blades ranging from ca. 30% to ca. 70%, but the average of Areas E, F, G, J (e.g. Figure 11:2) and L is around 50% of the total tools. These blades are made of fine gray-brown Eocene material (Khalaily 2004: 144-152, forthcoming a; Zbenovich 2004a,b), very similar to the exhausted core found in Area L and to the cores found at Gat Guvrin.[59]

Further to the south, at Taur Ikhbene (Gilead and Marder 1992), only eight Canaanean blades were found (ca. 13% of total tools) in the EB I and III levels of the site. They were made of non-local dark brown tabular flint. At Tel es-Sakan, Canaanean blades were found both at the EB IB "Egyptian" settlement and the "Canaanean" EB III (de Miroschedji et al. 2001: 90, 93).

At En Besor, only five and four Canaanean blades were found, in EB I and II contexts respectively (Gophna and Friedmann 1995: 106-113). The nearby site of Nahal Habesor (Site H) yielded several (n=22) Canaanean segments, also from the EB contexts. They represent 21% of all sickle segments but only 3.7% of all retrieved tools (Roshwalb 1981: 281-284, Figure H.2:5). They are made on tabular flint and other local materials (*idem*, 283-284).

Dead Sea Plain and Negev

At Bab edh-Dhra few Canaanean blades were found in EB I-III contexts (McConaughy 2003: Fig.16.2). They were produced from a tan-colored fine-grained raw material; according to McConaughy (*idem*, 485) no sources for this material were found in the vicinity.

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[59] This is the third type of raw material that appears in Area F (Khalaily 2004:144) and Group I in Areas E, G, and J (Zbenovich 2004a: 63; 2004b:266)

At Tel Halif Canaanean blades were found in EB I and III contexts (Futato 1990). A cache of nine Canaanean blades together with a tabular scraper was found on the floor of a Stratum 12 building (EB III; Forshey 1987; Futato 1996: Figs. 10a, 10b).

At Arad Canaanean blades (e.g. Figure 11:3) represent between 20 and 30% of total tools in EB I and II (Schick 1978). It is the southernmost settlement where Cananean segments are relatively abundant.

Further to the south there are very few occurrences of Canaanean blades. For instance a small segment of a Canaanean blade was found at Horvat Avnon (Cohen 1999: Fig. 32:7). The southernmost appearance is the Uvda Valley, where two Cananean blades were found (Avner 1990: 128).

DISCUSSION

Canaanean blades are fully represented in the north and center of the country; their distribution extends as far south as Arad and the Beersheva Valley. The Canaanean blade does not extend to the Central and Southern Negev, with the exception of two blades found in the Uvda Valley. The few Canaanean blades from Bab edh-Dhra (McConaughy 1979: 219; 2003: 479), where most of the blades are simple or backed from local origin, support the idea that the Dead Sea Plain was also on the fringe of the distribution network.

However, a different pattern of distribution seems to have been existed in each region according to the frequencies of Canaanean blades per site. While Gamla in the Golan and Tel Qashish and Bet Yerah in the Galilee yielded large frequencies of Canaanean blades, other sites such as Tel Teo, Yiftahel and En Shadud exhibited smaller quantities. The material described at Gamla could have originated at Har Haruvim or in the Jordan Valley, although as noted above there are local sources in the Golan that could also have provided raw materials for the production of Canaanean blades in the region. The blades from Tel Kinrot and Bet Yerah could have originated at Har Haruvim as well (some 45 km to the west), although as Bankirer (*idem*) suggested, some exemplars could also have been acquired from Nahal Gush Halav (35 km to the northwest).

Unfortunately we do not have exact numbers for Megiddo, a natural candidate to have profited from the exchange of Canaanean blades, due to its proximity to Har Haruvim during EB I. Kempinski (1989b: 134) pointed out that Megiddo must have acquired Canaanean blades from Har Haruvim, suggesting that Megiddo was a point of distribution to other sites. However, there are other sites near Har Haruvim, such as Tel Qashish, that could also have held this position in the EB II. Conversely, since Tel Qashish and Megiddo are known to have existed during the EB III, when we have no proof for a settlement at Har Haruvim, it seems that another workshop must have existed in the region at that time.

Bet Shean seems to have functioned as a distribution point between the Jezreel Valley and the Jordan Valley. High frequencies are present during the EB I, II and III. The material found at Bet Shean must have originated in the Jordan Valley.

In the Shephelah, Gezer is a candidate to be a center for the production of Canaanean blades since the Eocene formation is located in the Southern Ayalon Valley, but it is difficult to draw conclusions from the find of a single core. This area could also be the source of the material of the Shephelah sites, but it is worth noting the existence of Eocene outcrops in the area between Nahal Soreq and Nahal Haela (Picard and Golani 1992), and perhaps near Tel Yarmuth, as the finding of the Eocene blocks in this site may indicate. Distribution points seem to have existed in the Central Coastal Plain. For instance Lod could have been such a distribution point between the Shephelah and centers like Tel Aphek and Tel Dalit, which show high frequencies of Canaanean blades in EB II. The Gezer area or the Shephelah could also have been the sources of blades arriving to the Central Hill Country. Alternatively the probable sources in the area close to Fatzael provided Canaanean blades for Jericho and westwards.

In the Southern Coastal Plain, Nizzanim, Afridar, and Tel Erani are the closest candidates for the acquirement of Canaanean blades from Gat Guvrin; they are located at 18, 20, and 2 km respectively from Gat Guvrin.

Finally, a Northern Negev source and workshops could have existed at Tel Halif in the EB III and other locales, if the cores found at Tel Sera represent an EB occupation at the site. This seems to be also the source for Canaanean blades from Arad, and other sites where Canaanean blades occur in small amounts.

In all cases there are problems correlating the settlements where cores were found, the correspondence of flints types, and the chronology of the sites where Canaanean blades were found, with the supposed centers of production and distribution.

3. Tabular Scrapers

DEFINITION

Tabular scrapers are large flakes showing cortex on almost all the dorsal surface. Also known as *racloir en éventail*, tabular scrapers were defined by Mallon, Koeppel and Neuville (1934) as a large, broad and thin flake struck from a large plaque of flint, with the cortex on the dorsal surface left intact. Usually the edge opposite the plane of percussion is retouched, giving the implement the shape of an open fan. According to Rosen (1997a: 71), the retention of the cortex was an intentional technological characteristic of these tools. Although there is a relatively high degree of variability in their shape, the most well-known are the so-called "fan" scrapers (e.g. Figure 12:3-5,7); oval tabular scrapers (e.g. Figure 12:6) are also very common (Rosen 1983b).

Tabular scrapers begin to appear in Late Neolithic contexts (Moore 1973) and they are common during the Chalcolithic (Rosen 1997a: 75, Hermon 2003). In the EB they are fully represented, disappearing at the end of EB III. While continuity exists between the Chalcolithic and EB, tabular scrapers with incised motifs only appear during the EB (e.g. Schick 1978: Pls. 82, 84; Greenhut 1989; Marder, Braun and Milevski 1995: Figs.11-13) (e.g. Figure 12:4-5). Macalister (1912: 125-16) proposed that the incised motifs are a sign of ownership or manufacturer's marks, and even of the development of some kind of proto-alphabet. Rosen (1997a: 75) has pointed out that since no tabular scrapers were found with marks in the few areas thought to be the sources of the scrapers, that theory is difficult to prove. According to the available data it seems that the marks were made outside the area of production and perhaps they indicate some kind of ownership, that eventually developed into iconographic representations, as in the case of one example from Horvat Illin (Tahtit) (Figure 12:4). Alternatively, the lack of incisions in the probable production areas show that they are pre-EB in date.

SOURCES

Rosen (1983b) has proposed that the raw material came from Har Qeren in the Central Negev from the tabular flint exposures (Figures 8, 12:1), other sources were considered by him (Rosen 1997a: 75). Furthermore, a flint mine complex was found in recent years in the Jafr basin area in Jordan (Quintero, Wilke and Rollefson 2002). The area covers 12 ha and ca. 80 sites were documented. Among them there are large quarries and mines showing large blocks from which flakes, probably for scrapers, were detached (Figure 9). Unfortunately no exact dating is provided for the complex. Only one site, as far as we know, where tabular scrapers (representing almost half of the tools from the site) were found (e.g. Figure 12:2) has been excavated. It is Qa` Abu Tulayha (W), a settlement that begins in the Pottery Neolithic (Fujii 1999, 2000), but unfortunately, due to the lack of diagnostic ceramics, it is not clear that the site existed during the EB Age. Canaanean blades were not found at the site.

DISTRIBUTION

The distribution of tabular scrapers appears in Map 9 and Table 10. We will briefly mention the sites below. It should be stated that no cores were found at sites together with tools. Futato (1990) has argued that some of the Canaanean blade cores found at Tel Halif could also been used for tabular scrapers, but that thesis has not been proved (cf. below).

Golan

At Gamla (Olami 1989: 118*-121*, Figs. 2,3) only 16 (1.1 % of the tools) tabular scrapers were found, two of which are fan scrapers. They are made of brown flint, aside from one of black flint. The origin of the brown tabular flint is not local.

Galilee

Three tabular scrapers are recorded from the EB II site of Meona (Marder 1996; e.g. Figure 12:3). One tabular scraper was found at Kabri (EB II-III; Hershman 1990) and three tabular scrapers were found at Bet Haemeq (Scheftelowitz 1993). At Qiryat Ata tabular scrapers represent around 3 % of total tools during the EB I and II. Some of them are made of non-local dark brown flint and some of them show incisions on the cortex. However there are other exemplars made of local Eocene flint of various tones of brown color (Bankirer 2003: 176). Yiftahel has yielded only 5 fragments of tabular scrapers; they are made of brown fine-grained flint (Rosen and Grinblatt 1997: 141). Further to the southeast, Tel Gat-Hefer has yielded only three tabular scrapers (Bankirer and Marder 2003).

In the Huleh Valley, at Tel Dan several tabular scrapers were found in EB II contexts (e.g. Greenberg 1996a: 139, Fig.37:1-2). They are made of dark brown flint. At Tel Teo, 8 tabular scrapers were found in EB I and II contexts (Gopher and Rosen 2001: 55). The raw material is not described in detail.

Table 10. Distribution of tabular scrapers from EB sites.

In the Jezreel Valley, En Shadud has yielded only two fragments of tabular scrapers (Rosen 1985: 155). To the southwest, Tel Qashish has yielded some tabular scrapers (5.3% of total tools). They are made of the same Eocene flint as the Canaanean blades, colored from brown to light beige (Rosen 2003a: 395-396).

At Affula, the excavations of Sukenik (1948) yielded some tabular scrapers as well (e.g. Crowfoot 1948: Pl.XXIV); they are made of fine-grained flint. Several tabular scrapers appear also at Megiddo (probably dated to the EB I; e.g. Garrod 1934: Fig.23:B; Crowfoot 1948: Pls. 106-107).

At Bet Yerah only one tabular scraper was found in an EB I context in the Getzov (1996) excavations, but there is an increase to 10 scrapers during the EB II and 7 during the EB III (Bankirer forthcoming). Additional tabular scrapers were found in previous excavations (e.g. Figure 12:4**)**. These figures represent the highest frequency (29.4%) of scrapers in northern assemblages.

Central Coastal Plain

A few tabular scrapers were found at Tel Megadim, representing less than 1% of the tools (Bankirer and Marder, forthcoming c). Apparently the raw material is the same Eocene flint from which the Canaanean blades were made.

Also at En Assawir, a small quantity of tabular scrapers was found (0.9% of the tools; Milevski et al. forthcoming). They are made mainly of the dark brown fine-grained Eocene material with others made of two other types of Eocene flint at the site (see above). At Azor, few tabular scrapers were found in the excavated tomb-caves of the EB IB (Ben-Tor 1975a: Fig.13:13-14). In the Ayalon-Lod basin, one tabular scraper was found in Cave 2 of Shoham (N) and dated to EB IB (Marder, forthcoming), while at Tel Dalit 17 tabular scrapers were found (e.g. Friedmann 1996: Fig. 68:1) representing 4.7% of the total number of tools.

Jordan Valley

From Bet Shean the Mazar (1997) excavations have yielded some tabular scrapers with frequencies ranging from 1 to 3 % between EB I and III (Bankirer and Marder, forthcoming a, b). Some of them have incisions on the cortex.

At Jericho, tabular scrapers were found in small quantities (0.3% of the assemblage); two bear incisions on the cortex (Crowfoot Payne 1983: 720-722). They are made of the same dark brown, fine-grain Eocenian flint as the Canaanean blades from the site.

Central Hill Country

Tabular scrapers were reported from Tel el-Farah (N) (e.g. de Vaux and Stσve 1948: Pl. XVI.b) but quantities are not given. At Jerusalem (City of David) eight tabular scrapers were found (five in clear EB contexts, one in Chalcolithic/EB and two in EB/MB II mixed layers; one shows minor incisions. (Rosen 1996a: 259). Tabular scrapers were also encountered at Tel Hebron (Tel Rumeida) (n=7, 15.6% of total tools in the stratum) in the EB III occupation stratum of the site (Khalaily, forthcoming b).

Shephelah

Tabular scrapers appear at Gezer (Macalister 1912: Pls. CXXXVIII:30,34; CXXXIX:5,15, 16, 21, 22; Seger 1988: 35, Pl.6:4), some of them with incisions.

At Hartuv (EB IB), only three (ca. 2 % of total tools at the site) tabular scrapers were found; two are made of medium to fine-grained flint and one seems to be a local imitation (Rosen 1996b: 43). Further to the south at Tel Bet Shemesh tabular scrapers are illustrated in the report (Grant and Wright 1938: Pl. LIV:5-10) but no quantification is available.

Nearby Horvat Illin (Tahtit) [60] has yielded a relatively high number of tabular scrapers (44) representing 10% of total tools at the site (Marder, Braun and Milevski 1995).

[60] For a preliminary report of the excavations see Braun and Milevski 1993.

Several have incisions on their cortex; one may bear crude traces of a bird (Figure 12:5). Tabular scrapers are made of the same high quality Eocene flint as the Canaanean blades. At Tel Yarmuth tabular scrapers are present (n=18, ca. 12%) in EB II and III levels, but almost all the examples are broken (Rosen 1988b: 139-140). Starkey's excavations at Lachish have yielded some tabular scrapers from the caves in the NW area (Tufnell et al. 1958: 326, Pl.19:2,3,7) but quantities are not given. In the renewed excavations of Ussishkin (Rosen 2004: 2209, Fig.31.1:1,7) eight tabular scrapers were found, all in mixed contexts. They may have originated in Chalcolithic or EB contexts.

Southern Coastal Plain

At Gat Guvrin only three tabular scrapers were found in the most recent excavations (Khalaily and Hermon, forthcoming). We do not know if they belong to the Chalcolithic or EB I layers. At other nearby sites such as Tel Erani (EB IB; Kempinski and Gilead 1991: 180-186) tabular scrapers appear in low quantities (n=10, 4.2% of total tools). At Tell el–Hesi (Rosen 1983b: Table 1) just one tabular scraper was found, though others were published from Petrie's (1891: 50, Pl.X:23) excavations.

At Nizzanim (Yekutieli and Gophna 1994) tabular scrapers are mentioned although no quantities are given. At Afridar the several excavated areas have provided a distinctive pattern of distribution of the tabular scrapers, but all of them yielded small quantities. The tabular scrapers represent between 0.7% and 4.2% of total tools (Khalaily 2004, forthcoming; Zbenovich 2004a,b).[61] The material of these scrapers is Eocene brown flint, classified as Group I, totally different from the local gray and gray-brownish material (Group II) (cf. below).

[61] These differences in the distribution of flint tools together with the differences in the architectural remains were interpreted as functional variations between the areas (Zbenovich 2004 a, b).

At Taur Ikhbeneh (Gilead and Marder 1992), only one tabular scraper was found, made of the same material as the Canaanean blades. Some kilometer to the south, Tel es-Sakan, yielded several tabular scrapers as well in EB III contexts (de Miroschedji et al. 2001: 93).

At En Besor, only six tabular scrapers were found, in EB I and II contexts (Gophna and Friedmann 1995: 106-117). At Nahal Habesor (Site H) only two tabular scrapers were found in unclear contexts (Roshwalb 1981: 288, Fig. H.2:6).

Dead Sea and the Eastern Aravah

Mitzpe Shalem, located in the Judean Desert close to the Dead Sea is probably the settlement best known for yielding tabular scrapers (e.g. Figure 12:6) since more than 400 complete and fragmentary tabular scrapers were found there (Greenhut 1989). The settlement, dated to the EB IB-III, was scattered over three contiguous sites. Several types of raw material from dark brown and black to light brown and grayish white were used for these tools, most of them are incised with different motifs.

Tabular scrapers, dark brown in color, are represented at Bab edh-Dhra mostly from the EB II-III periods (e.g., McConaughy 2003: Fig. 16:4-8). It was suggested (McConaughy 2003: 487) that one of the possible sources of the tabular flint was in the Wadi Kerak. While cobbles that fit with the material of the scrapers were found in the wadi, outcrops for tabular flint were not found in this area.

At Wadi Fidan 4 (EB IA) a tabular scraper was found in Building 1 (Adams 1999: 120). Further to the east in the Jafr basin the site of Qa` Abu Tulayha (W) yielded 30 tabular scrapers (e.g. Figure 12:2) representing ca. 50% of the tools found at the site. However as was noted above, there are no diagnostic finds to classify this site as EB.

Negev

At Arad tabular scrapers are fully represented (e.g. Figure 12:7); they range between 28 % and 35.5% of the total tools in EB I and II strata (Schick 1978). Some of them are made of a coarse-grained brown tabular flint and some bear incisions in the cortex,

Tabular scrapers are reported at Tel Halif (EB I and III). One was found together with a cache of Canaanean blades in Stratum 12 (Forshey 1987; Futato 1990, 1996: Figs. 10a, 10b). It was probably fashioned when a Canaanean core blade was stripped of its cortex.

In the Central Negev tabular scrapers appear at several sites. They are known from Tel Esdar where most of them bear incisions on their cortexes (Cohen 1999: Fig. 28). Other EB II sites with tabular scrapers include En Hame`ara (Cohen 1999: 66), Ramat Matred (Haiman 1994: 30; Cohen 1999: 56, 62-63) and Kadesh Barnea (Beit-Arieh and Gophna 1976: Fig. 9:3,4). Tabular scrapers from those sites represent between ca. 20 and 30% of the total of tools.

Further to the south, other EB II sites that have yielded tabular scrapers are Nahal Mitnan (Rosen 1993: 64-66), Har Horsha (Rosen 1991: 172), Biqat Uvda 915 and 917 (Rosen 1990: 7*; 2001). Tabular scrapers at Biqat Uvda 917 were made of medium-grain brown and dark brown flint typical of the type (Rosen 2001: 110). The frequencies at these sites ranges between ca. 10 and 30% of the total number of tools. Finally, it is notable that tabular scrapers are frequent at sites in Sinai (Gersht 2003), although a discussion of exchange with that region is beyond the scope of our research.

DISCUSSION

The absence of any debitage at almost all the sites, except Qa` Abu Tulahya (W) (which has not proven to have been active during the EB Age) shows that tabular scrapers were acquired by exchange or trade.

Rosen (1983b) pointed out, that general frequencies of tabular scrapers decline from south to north. There is a core of sites in the Central Negev near Har Qeren, a peripheral area in the Northern Negev and Shephelah, and a third area in the north of the country. It seems that in the Southern Coastal Plain relatively few quantities of tabular scrapers existed, as the lower frequencies of sites like Nizzanim, Afridar and Taur Ikhbene show. However there are concentrations of sites with tabular scrapers in the Jezreel Valley and the Carmel region.

Aside from direct distribution of tabular scrapers in the Central Negev, the lines of distribution seems to have gone through the coastal plain, the Aravah and the Jordan Valley to the north, whether Har Qeren or the Jafr Basin were the sources of the scrapers. Alternatively, it can be suggested that other unknown sources must have been existed if we consider that Meona, Bet Yerah and Tel Umm Hammad exhibit relative large frequencies of tabular scrapers.

According to the probable sources of Eocene flint used for these tools the central Jordan Valley seems a likely candidate. Aside from a unique find at Tel Halif, where a tabular scraper blank was probably detached from the cortical part of a Canaanean core, no signs of finishing of blanks were found. That means that tabular scrapers arrived at sites as finished products.

Mitzpe Shalem must be seen as a probable ceremonial or special-task center, since the quantities of tabular scrapers exceed the average of all the sites, including those supposedly near the sources. That several raw materials were identified, and that most of them exhibit incisions, suggests that the scrapers were brought from several places to Mitzpe Shalem.

4. Summary and Conclusions

The exchange of Canaanean blades and tabular scrapers seems to have been controlled at the beginning by the villages close to sources. They were the centers of production of these tools. These centers seem to be located in different areas, dependent upon the sources of flint.

Tabular scrapers, as tools that originated before the EB, have a previous network of distribution. While no exact dates for the two known sources are available– Har Qeren and the Jafr Basin - it is most probable that they began to produce them prior to the EB Age, as incised tabular scrapers were not found at these locales. Rosen's (1983b) thesis suggesting a gradual decrease of tabular scrapers within the flint assemblages from south to north has, in general, been corroborated. However, it is probable that other sources existed for these tools and therefore, a northern source may account for a relatively large number of such tools found at sites in the Galilee, the Jezreel and Jordan Valleys.

Sources for Canaanean blades cores are more clearly identified, and the network of distribution of blades has at least four stages, according to the information described above. The first stage is represented by production centers, knapping workshops near the flint sources. Har Haruvim and Gat Guvrin are the key sites in this stage, but there must have been others, judging from the distribution and raw material of the cores found at other sites. The second stage is the allocation of blades in distribution centers, whether in finished forms as sickle blades or as blank blades. At some sites (Bet Shean, Motza, Horvat Ptora, Nizzanim, Tel Halif), caches of blades have been found in EB I, EB II and EB III contexts, indicating either the existence of such distribution points or intra-site differentiation in the utilization of such blades. At Tel Gat-Hefer and Horvat Illin (Tahtit) blades were found concentrated in specific locales such as rooms.

The third stage in the circulation is represented by exhausted or recycled cores found at several sites that could indicate a phase of secondary knapping for the cores. The EB II cores of Har Haruvim and the EB III cores found at Tel Halif suggest two different networks in the urban phases of the EB, with some workshops in locales that are close to sources.

The large centers, however, are totally devoid of workshops in most of the cases, judging from the fact that no cores were found at other EB II-III urban sites. It appears then that these centers controlled the workshops that existed in the villages or close to the sources. The fourth stage in the circulation network of Canaanean blades is represented by the distribution to other sites from these locales. While the first, second and third stages occurred in a radius of ca. 20 km, the fourth stage could occur within a radius of 50 km or more.

For tabular scrapers, the data show that as we move away from the probable sources the frequencies of these tools decrease. We suggest that the flint workshops were close to the sources, and that they “sold” the tools to middlemen who brought the commodities to a third center, where the tools were again exchanged and distributed. The secondary centers were called by Rosen (1997a: 109) secondary workshops, and are more visible in the Chalcolithic period at sites such Nahal Habesor (Site A) (Roshwalb 1981: 39). EB II-III urban centers could also have been re-distributors of the tabular scrapers. This could be the reason for some relative high frequencies during the EB II at sites such as Arad and Bet Yerah.

Ethnographic examples that show different ways of exploitation and distribution of chipped tools can suggest some ideas of how our tools were distributed. In a study on modern production of obsidian tools in the Ethiopian Rift Valley, Gallagher (1977: 408) describes quarries up to a half-day’s walk from the village. In the quarries they produce blanks and carry them to the village in order to produce tools. The blanks are made in order to minimize burdens that have to be carried. People of the villages closest to the quarry are involved in some trading of obsidian to those who live in more distant locations (*idem*, 410). An example of obsidian procurement and production in Idaho, North America, show that while the Northern Paiute, who live near the sources, produced arrow-heads for exchange purposes with other groups that came to the region, the Nez Percé procured obsidian directly from the sources (Sappington 1984: 24-25).

In Indonesia, the inhabitants of zones of extraction of different materials used for axe and adze production are the owners of the quarries. A quarry located at a distance of more than four days' walk is difficult to defend, and for this reason the villages that control the quarries are the closest ones (Pétrequin and Pétrequin 2000: 358-359). The extraction and selection is done in quarries, while blocks are transported to villages in a collective effort of the members of the community (*idem*, 364-366). The exchange of axes and adzes has two systems. One is ceremonial, in which tools are given in exchange for other products on the occasion of a ceremonial visit. The second is on a more individual basis, with people exchanging other products in the village and taking the axes and adzes dozens of kilometers away (*idem*, 388-389).

We suggest that the exchange model for Canaanean blades and tabular scrapers could well be analogous to some of the examples in the method of procurement, locale of production and form of distribution. Mitzpe Shalem could have served as a kind of ceremonial or exchange center.

Most of the ethnographical examples show a control of settlements close to sources and transportation of blocks or nodules to workshops, while waste and debris is left in quarries. In both cases, Canaanean blades and tabular scrapers have a “down-the-line” model of exchange as proposed by Renfrew (1975). In this model a commodity travels successive settlements and regions through successive exchanges.

In spite of the tentative conclusions suggested here, it is important that further investigation will consider the subject of distribution systems anew when more quantitative data become available. For instance, at present we are very far from knowing the approximate production capabilities of EB workshops by which we may compare quantities of tools yielded in these locales and the amounts of tools found at different sites.

The data provided in Tables 8-10 represent a very small part of the Canaanean blades and tabular scrapers. It must be emphasized that to date, no Canaanean blade workshop has been excavated. If we consider research by Shimelmitz, Barkai and Gopher (2000), the relation between cores and Canaanean blades at workshop sites is almost 1:1. However, this statitistic is problematic because of two inherent biases: 1) these are surface finds and not the yield of excavated locales; 2) it is expected that in a workshop cores and waste will be found in greater frequencies than tools, since these last were transported for exchange outside the workshop. An example of this is found at Titris Hoyuk in Turkey. A flint tool workshop yielded some 3,000 items, including 1,600 cores and other debitage elements, but only 29 Canaanean blades were found (Hartenberger, Rosen and Matney 2000: 55-56). Since the workshop is located in one of the suburbs of an urban settlement, this situation can be explained by the fact that most of the blades were removed from the workshop to other households in the city and/or other sites in the region. Similarly, a Chalcolithic workshop recently excavated at Beersheva (Bet Eshel) has revealed between 1,500 and 2,000 cores, mostly for blade production and thousands of blades (Gilead et al. 2004: 252: Fig. 7). At Qa` Abu Tulayha the relation of cores to tabular scrapers found in Structure 03 (a probable workhsop) is ca. 1:4, which seems to be more consistent with the expected results of an *in situ* workshop.

Research on production quantities of flint tools in Mesoamerica calculated that 150 tools per year were made by males (Johnson 1996: 163). These tools had a distribution radius of 50 km (McAnany 1989), representing millions of tools, but these numbers could change dependent upon technological, geographical and historical conditions. At any rate, the quantities of Cananean blades and tabular scrapers found at EB sites do not match the quantities of cores and for this reason all the conclusions on the exchange of these tools will need to be reconsidered when and if new data become available.

Chapter 5

GROUNDSTONE TOOLS

1. TECHNOLOGICAL AND ETHNOHISTORICAL INTRODUCTION

The following section addresses aspects of sources and distribution patterns of groundstone objects, mainly made of basalt. Sandstone, beach-rock and *kurkar* artifacts are discussed as well, albeit to a lesser degree. Technological and typological questions are treated summarily since at this stage of research there is not yet a complete picture of relations between certain types of basalt vessels and particular sources for conclusive results to be presented.

Several studies have recently advanced our knowledge of grinding stones, stone vessels, and their sources in the Southern Levant. Especially those studies focusing on the EB Age have addressed both typological and sourcing questions, greatly increasing our overall understanding of exchange patterns for this period. In particular, basalt sources and archaeological artifacts derived from them have been studied in the last years by chemical methods, while minor studies have been devoted to sandstone tools.

Although technological and typological studies have appeared (Wright 1991, 1992; Rowan 1998) that deal with some aspects of production, we still have problems in defining different steps from the time they were quarried through their production and distribution. Sourcing studies have mainly been centered on basalt. [62]

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[62] The EB ground stone industry includes artifacts produced by a variety of techniques. The most common means used were pecking, grinding, abrading and polishing (Clark 1988:83). Wright (1992:53) also includes techniques such as flaking, drilling and incising, while Adams (1998:2), in

Ethno-archaeological and historical studies present a number of examples for the quarrying, production and exchange of stone tools and vessels in ancient times and in pre-capitalistic societies. For instance, Southern Mesopotamian documents from the 3rd millennium BC (Pettinato 1972:73-78) referred to trade of semi-precious stones (alabaster, lapis lazuli, carnelian, etc), and also alluded to finished groundstone tools.

Ethnographical data from Mesoamerica is provided by Cook (1968, 1970) quoted in the work by Torrence (1981:222-225), in the Oaxaca valley, Mexico. Rock outcrops from which *metates* are quarried are owned and access to them is restricted. Ownership varies from village to village. In some instances these quarries are privately owned and in others an entire community controlled them, but usufruct is given to a group of persons or individuals (Cook 1970:795).

In other research Singer (1984) studied a quarry in the Chuckwalla Valley, Riverside Country, Colorado. Each tribal unit exploited different materials (felsties, basalt, quartz, chert). Some sites have been interpreted as centers for lithic extraction and reduction, acquisition and manufacture of cores, flakes, blades and assorted tools and blanks, with each center containing dozens of workshops (Singer 1984: 39-40). [63]

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defining grinding technology, outlines three different categories of artifacts employed in grinding: (a) those used to reduce substances, (b) those used to shape other artifacts, and (c) those shaped by ground stones. (but see Wilkie and Quintero 1996).

[63] Examples of quarrying and production of grinding stone tools are provided as well for the lower Colorado River in Arizona from ethno-historic data from Spanish and American sources, showing that the people from the Yuma, Kamia and Qechan tribes went to this quarry for centuries to get “grinding stones” (Schneider 1996).

Other studies on Egyptian modern alabaster production (e.g. Hester and Heizer 1981), show that the alabaster is quarried in large pieces and trimmed for transport to the workshop. Transportation and quarrying is done by the same workmen who switch tasks, working the stone and taking charge of loading the donkeys (Hester and Heizer 1981:37).[64]

One important, pioneering study on ground-stone tools in Mesoamerica (Rathje 1972) has stressed the subject of exchange, showing the existence of two types of commercial systems: (1) a “market” system including households units, and (2) an “extra market” network composed of itinerant merchants, merchants groups and stores. Exchange of *metates* (lower grinding stones) originated in the highlands and was carried out with the help of mules. The highlands' local exchange was easily accomplished because of the relative abundance of raw materials. In the lowlands political authority concentrated and dominated the exchange of commodities of the households. The pre-Columbian merchant of the lowlands was related to the ruling elite (Rathje 1972: 371-372, 387-389). Buffer zones were involved in exchange between highland and lowlands. *Metates* were acquired in these buffer zones by a supra-household organization and then redistributed to households in the lowlands (Rathje 1972: Fig.3).

2. Stone tools and Materials

BASALT

Provenance studies

Basalt is a generic term for a hard, gray or black, grained, volcanic rock, made up of

[64] For other cases of raw material procurement see Abadi 2003:3-4.

a variety of different minerals of which less than 52 % silice dioxide (SiO_2). Minerals commonly found in basalt include olivine, pyroxene, and plagioclase.[65] Archaeologists usually use the word "basalt" to mean a dark, vesicular or non-vesicular igneous rock, a term acceptable for most archaeological purposes, but that can occasionally lead to descriptive inaccuracies. For instance, several years ago when analyzing petrographic samples of basalt from Chalcolithic sites (Gilead and Goren 1989), it turned out that some of the bowls were made actually from phosphorite, a sedimentary rock containing phosphate, that outwardly looks similar to the basalt but when examined microscopically may be seen to be characterized by a profusion of organisms, mainly fish bones and molluscs (Goren 1991). Since no known EB Age vessels are made of phosphorite we will not deal with this raw material.

A pioneering work on basalt from the Chalcolithic and the EB I periods was carried by Amiran and Porat (1984). Conducting petrographic analyses, they attempted to study the geological origin of raw materials from which the vessels were made. Two EB vessels from Bet Shean and Bab edh-Dhra were sampled, together with Chalcolithic samples. All the samples are of olivine basalt and it was concluded that all the material used for them must come from the Galilee, the Golan or

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[65] The *Oxford Companion to the Earth* states that: "'Basalt' is a term widely used and abused. It has been employed both as a specific rock name … and as a general term for almost any dark, fine-grained igneous rock… Not all rocks of basaltic composition are, however, dark and fine-grained, nor are all dark, fine-grained, igneous rocks of basaltic composition. While the term 'basalt' remains a useful field name, it should be borne in mind that whole books have been written on the finer details of the sub-classification of rocks of basaltic composition." (Hancock 2000:64). I am indebted to Graham Rutter, University of Durham, for this reference.

Transjordan sources (Amiran and Porat 1984:14, 17). However, petrographic analysis could not distinguish between the basalts from these regions.

Recent provenance studies of basalt from the Southern Levant have been able to differentiate between different sources of basalt. These studies are based on three different methods. The first one considered basalt artifacts from Natufian sites in western Galilee and was conducted by Weinstein-Evron and others (1995, 1999, 2001) based on K/Ar (potassium, argon) chemical analysis. This method is based on dating of basalt flows and can identify sources of basalt on the basis of known, datable flows. In the case of the Natufian sites the study points out that raw material was probably procured from outcrops 100 km distant from the sites, although there were closer, more easily accessible outcrops available in the Carmel area.

The present discussion, however, is based on a different study that relies on two alternate methods. One is X-Ray Fluorescence (XRF; Renfrew and Bahn 1994: 316-317) utilized by Williams-Thorpe and Thorpe (Williams-Thorpe 1988, Williams-Thorpe and Thorpe 1993) and applied to EB stone objects from the Southern Levant (Philip and Williams-Thorpe 1993, 2000, 2001). Using XRF, the weight of interpretation of the geochemical data is placed upon the stable elements which indicate rock tectonic settings and original magma. These elements are Titanium (Ti), Zirconium (Zi), Ytterbium (Y) and Niobium (Nb) (Williams-Thorpe and Thorpe 1993:280-281).

Rowan (1998:297-315) used Inductively Coupled Plasma-Atomic Emission Spectrometry method (ICP-AES; Renfrew and Bahn 1994:316). This method is utilized as a geochemical tracer of the rocks (Faure 1986:154-182). Geochemical reservoirs, distinguishing different rock types, are characterized by different Rb/Sr ratios, which are in general associated with K and Ca respectively. Rowan (1998:

Tabs. 15-17) was able to determine 40 trace elements on the basalt outcrops samples and to source the basalt objects by determining precise frequencies of alkali metals Rubidium (Rb) and Strontium (Sr).

Archaeological and Geological Samples

Philip and Williams-Thorpe (1993:54; 2001:13, Table 1) studied 30 archaeological samples from basalt vessels and tools dated to EB I. These samples were compared with 21 geological samples from 7 areas in Transjordan: Wadi Arab and Sal in the Yarmuk basin, Sweimeh and Ma`in northeast of the Dead Sea, the Mujib/Kerak plateau east of the Dead Sea and the Dana/Tafila area next to Wadi Feinan (Table 11, Figure 13:1). It appears the artifacts from Tel esh-Shuneh, Tel Erani, and Wadi Fidan 4 came from stratified contexts. Unfortunately, however, samples of vessels from Bab edh-Dhra, Ghor es-Safi[66] and Khirbet Hamra Ifdan (Wadi Feinan) are from fragments of vessels without stratigraphic contexts. However, it seems certain that they derive from EB I contexts (cf. Philip and Williams-Thorpe 1993: 54-55). Confirmation of this comes from numerous good parallels.

Some of the vessels seem to belong to simple bowls with flaring rims and high base defined by Braun (1990) as Type IB and by Rowan (1998) as Type 3C. One example from Ghor es-Safi (Philip and Williams-Thorpe 1993:Pl.2) shows a known type with a decoration of two parallel ribbed lines. The closest parallels were found in EB I contexts at Gezer (Seger 1988: Fig.5:1) and Lod (Milevski forthcoming b). Bowls with similar decorations are known from Hartuv (Mazar and de Miroschedji1996:24) and Bab edh-Dhra (Rast and Schaub 1989: Figs. 168:4,6,1 and 169 : 4, 11, 12) (and see Braun 1996b: Fig.V.C.5.c). One from Safi (Philip and

[66] Cf. Politis 1998.

Table 11. Distribution of basalt objects from EB I sites according to sources

Based on Philip and Williams Thorpe 1993, 2000, 2001; Rowan 1998.

Sources ***Sites***	***Tiberiah***	***W.Arab***	***Sal***	***Karameh***	***Sweimeh***	***Ma`in***	***Mujib/ Kerak***	***Dana/ Tafila***
Q.Ata		+						
Megadim							+	
T. esh-Shuneh		+						
Afridar							+?	
T.Erani		+?	+?					
S. T. Malhata							+	
B. edh-Dhra					+	+	+	
Safi							+	
W.Feinan							+	+

Williams-Thorpe 1993: Pl.1) seems to belong to a four handled bowl, Braun's (1990) Type IB and Rowan's (1998) Type 3Civ.

Rowan's (1998: Tables 15-17) samples included 4 basalt bowls dated to EB I[67] and 19 samples from basalt outcrops (cf. Table 11, Figure 13:2). The archaeological samples were collected from Qiryat Ata, Tel Megadim, Small Tel Malhata and Afridar (Area E) and are from flaring rims of bowls (Braun's [1990] Type IB; Rowan's [1998] Type 3C) and one mace-head (Rowan 2004: Fig.2:1). Flow samples were taken from the most of the same outcrops as Philip and Williams-Thorpe (1993) namely the Yarmuk basin, Sweimeh, Ma`in, Mujib, the Kerak plateau and Dana.

Results

The results of the investigation by Philip and Williams-Thorpe (2000, 2001) of the samples from Tell esh-Shuneh indicate the vessels are compatible with sources in the

[67] Other samples were derived from Chalcolithic contexts.

Wadi Arab and nearby Sal. Samples from Tel Erani are not compatible with known geological samples, but they could be from a northern origin. The Bab edh-Dhra, Safi and Wadi Feinan samples are distinguished by their low levels of Y, indicating an origin in the Sweimeh, Ma`in and Mujib/Kerak sources. Zr and Nb appear also in similar rates as in the geological samples (Philip and Williams-Thorpe (2001:1382-1384).

The sample from Qiryat Ata looks similar to a sample from the region of Umm Qeis (the Wadi Arab area), while the Tel Megadim and Small Tel Malhata samples are compatible with the middle of the Yarmuk and Kerak flow samples (Rowan 1998: Figure 67). A sample from Afridar matches outcrops of the Mujib/Kerak plateau.

Discussion

According to results obtained from the small but important database of chemically analyzed samples, it is possible to suggest provisional conclusions on exchange of basalt artifacts during EB I (see Map 10). Basalt artifacts at most sites seem to have originated at sources close by, as in the cases of Tel esh-Shuneh, Bab edh-Dhra, Ghor es-Safi and the Wadi Feinan sites. West of the Jordan River the sites are up to 100 km distant from the sources as the case of Afridar. Objects from Tel Megadim and Small Tel Malhata are problematic because their chemical profiles match no particular source, but appear be similar to something between basalt flows of the Yarmuk basin and the Kerak plateau. The origin of the sample from Erani has also not been satisfactorily resolved, although a northern origin is possible.

Additional information on basalt flows in the region would be helpful in determining the ultimate provenance of artifacts. For instance, information on basalt from outcrops near Tiberias could prove valuable for understanding sources, especially since we know that during the Late Bronze and Iron Ages, basalt artifacts from this source made their way to Tel Miqne (Williams-Thorpe, forthcoming).

According to available data it seems that restricted circuits of basalt production and distribution existed, some in the north and some in the eastern Jordanian plateau. Philip and Williams-Thorpe (2000:19) have suggested that there were different procurement systems for tools and vessels, but it seems to be too early to make such statements on the basis of the data presently available. In the southern part of the Southern Levant in the EB Age, the exchange of basalt artifacts seems also to be related to distribution of metal artifacts, since one of the basalt sources is near the Wadi Feinan deposits of metal ores.

Unfortunately, no remains of quarries or workshops of basalt vessels or even grinding stones have been found to date. We suggest that the production of basalt artifacts took place near the sources of raw material, and that their exchange must have been controlled by communities settled nearby, as practiced by inhabitants of the Oaxaca Valley or Chiapas in the ethnographic examples described above. The relatively long-distance distribution network for these heavy objects suggests that their exchange was controlled, at least in the first link of the network, by the producers. Basalt tools originating east of the Dead Sea and in the Wadi Feinan could have been distributed by merchants engaged in metal exchange with centrally located or important settlements such as Arad. *Wadis* and valleys leading to the Mediterranean coast could have been the routes by which ground-stones arrived at sites such as Small Tel Malhata, Afridar and Qiryat Ata.

SANDSTONE

Ferruginous quartzite sandstone originating in the area of the Ramon Crater in the Negev has been the object of several recent studies (Rosen and Schneider 2001) (Table 12). This sandstone belongs to the Upper Inmar formation datable to the Lower, Middle Jurassic (Zak 1968). In spite of the fact that these studies present preliminary conclusions we consider that some working hypothesis may be drawn from the data (Rosen and Schneider 2001:208). Abadi (2003) has investigated mining, production and distribution of grinding stones made of this material during the EB Age.

A survey of two sites in the Ramon Crater, Ramat Saharonim and Nahal Ramon 204/160, resulted in their identification as quarries datable to the EB Age.[68] The Nahal Ramon site, located through survey work in the west center of a Ramon Crater survey (Rosen 1994) near the excavated Camel Site (Rosen 1997c, 2003b), was only recently identified as a quarry (Rosen and Schneider 2001:204).

Quarries, Settlements and Sandstone Objects

Ramat Saharonim North (Figure 14:1) is a quarry located in the eastern part of the Ramon Crater, ca. one km from a bend in the Nahal Ramon (Map 11 and Table 12) and 100-200 m. north of a sanctuary site known as Ramat Saharonim (Cohen 1999: 21-25). There are at least 10 concentrations of blocks of quartzite sandstone showing quarrying activities (Rosen and Schneider 2001: Figs. 2-3) at the site. Large flakes are characteristics of the waste, chunks are lesser and chips are few (Abadi 2003: 39-45).

[68] And see above discussion on the dating of EBA sites in the Negev in the section dedicated to the pottery groups of the Negev.

The site of Nahal Ramon 204/160 is located on a low old and eroding floodplain next to Nahal Ramon in the west center of the Ramon Crater (Rosen 1994:85) where exposures of sandstone consist of a broad stratum on the top of the hill with high

Table 12. Distribution of beach-rock, *kurkar* and ferruginous sandstone artifacts.

Raw material ***Sites***	***Beach-rock***	***Kurkar***	***Sandstone***
Hazor (EB II-III?)	+		
T.Qashish (EB I-III?)	+		
E. Assawir (EB IA)	+		
T. Aphek (EB II)	+		
Lod (EB I-II)	+	+	
Palmahim (EB I),	+		
Gezer (EB I?)	+		
H. Illin (EB IB)			+?
Lachish (EB I?)	+		
H. Ptora (EB I)		+	
T. el-Hesi (EB III)	+		
Arad (EB II)			+
Afridar (EB IA)	+	+	
Rekhes Nafha 396 (EB II)			+
Camel Site (EB II)			+
H. Ahdir (EB II)			+
N. Ramon 204/160 (EB II?)			+
R. Saharonim (N) (EB II?)			+
H. Horsha (EB II)			+

frequencies of iron oxide. There are considerable quantities of debris and large blocks. Piles of this debris contain crude rough-outs with flaking scars and large flakes (Rosen and Schneider 2001:Figs. 5-6; Figure 14:2).

At the Camel Site on the north cliff of the Ramon Crater, some 8 km northeast of Nahal Ramon 204/160, grinding stones, including lower and upper grinding stones, flakes, chips and chunks made of sandstone and production waste, were found.

Petrographic analysis was done on 14 samples taken from Ramat Saharonim and Nahal Ramon quarries and the Camel site (Rosen and Schneider 2001:Table 1). The samples from the Nahal Ramon quarry are different from those of Ramat Saharonim; while the last ones show metamorphoses, the samples from Nahal Ramon are othoquartzite and do not show metamorphic deformations. Several of the flakes and chunks of the Carmel Site are quite similar to those of Nahal Ramon 204/160. One chunk is metamorphic as the case of Ramat Saharonim.

Several ground-stone tools from Rekhes Nafha 396 (Saidel 2002:51, Fig. 14: 11) located some 12 km north of the Camel Site, including seven grinding stones, three of sandstone, were found. No petrographic analyses for them are published and so no further comment on them is possible. According to Abadi (2003:33-38) debitage indicates that a small workshop for stone tools existed at the site.

Several (lower?) grinding stones made of sandstone were found at EB II sites of the Central Negev including Horvat Ahdir (Cohen 1999:56, 70, Photo 23). At another, Har Horsha, it appears (according to descriptions of Haiman 1991:10*, Table 2) that ferruginous sandstone tools were found. Several groundstones, also of ferruginous sandstone, are reported from EB II Arad (Amiran, Ilan and Sebbane 1997:55, 88). It is likely that the ferruginous sandstone of the Ramon Crater quarries is the source of all those tools.

Further north, in the Shephelah, stones made of sandstone were found at the EB I site of Lower Horvat Illin (Milevski, forthcoming c). Unfortunately, no petrographic analysis could be carried out to confirm the source of these samples.

Discussion

Analysis of the sandstone quarries cited above, waste assemblages and the distribution of ferruginous sand stone tools suggest some provisional conclusions (see Map 11) concerning exchange of groundstone objects in the EB Age. The Ramon Crater could be a source as well as a location of workshops for some of these objects. Thus, it would have been an integral part of the distribution network of this commodity during the EB Age. There are at least two quarries in the Ramon Crater, some 20 km next to each other, and debris containing rough-outs with flaking scars and large flakes from Nahal Ramon point out to a primary workshop at one of them.

At Ramat Saharonim a small quantity of chips shows that primary modification occurred there to some small degree. The Camel Site and probably Rekhes Nafha were probably secondary workshops for manufacture of grinding stones. Presumably inhabitants at these locales were the owners of the quarries, as in the example of Mesoamerica, with some villages controlling the access to the sources (e.g. the Oaxaca and Chiapas regions).

From these sites the tools, whether in a finished form or as blanks, could have been distributed to Arad and other points in the Negev and beyond, even farther to the north. Exchange of sandstone artifacts could have been combined with exchange related to pottery wares from the Negev, as the pottery Fossil Shells Group originated in the Southern Negev indicates (and see above). It is not clear whether or not producers of the tools were also the traders of commodities or alternatively other merchants were involved in the Negev network exchange.

BEACH-ROCK AND KURKAR

Raw material

Although limestone and basalt represent the bulk of raw material use for fashioning ground-stone tools and vessels in the EB, some grinding stones found in EB contexts were made of beach-rock and *kurkar*. Beach-rock is a sedimentary rock found on the Mediterranean coastline, produced by a conglomeration of sand, shells, pebbles and *kurkar* (and see below) with the help of calcium carbonate ($CaCO_3$) (Mazor 1980:132; Mitchell 1985:28).

Neri's (1994) study of grinding stones made of beach-rock from several periods includes the geology of the rocks and mechanic laboratory tests that measure the strength and abrasion values of tools. Four types of beach-rock (designated according to binding material) relevant to this study are: 1) Glycemerian, includes *Glycemeris sp*. shells, quartz and few kurkar fragments bind with aragonite (Neri 1994:72, Fig. 23), appears mainly in the southern shores of Bat-Yam and in the area of Dor; 2) Kurkarian (mainly kurkar and sand nodules bind with high Mg calcite; Neri 1994:72, Fig. 24), appears in the shores between Jaffa and Caesarea; 3) Calcarnite Nahariya (sand, pebbles and few shells with high Mg calcite; Neri 1994:72, Fig. 23), on the shores between Rosh Haniqra and Atlit; 4) Pebble beach-rock (mainly pebbles bind low Mg calcite) (Neri 1994:75), appears in the estuaries of the *wadis* along the coastal shores between the western Galilee and the Carmel ridge.

Kurkar is a geological formation unique to the South Levantine coast and is a Pleistocene formation of hardened mobile sands (i.e. fossilized dunes). It forms a ridge or several ridges with some outcrops of *hamra*, a formation also common to the coast (Gvirtzman et al. 1984, 1998) and roughly parallel to it. *Kurkar* and *hamra* bases are unevenly covered with a sand layer that can become relatively deep. Where strong sea winds prevail, this layer becomes thinner or disappears, leaving *kurkar* and *hamra* bases exposed.

Distribution

Data for beach-rock and *kurkar* stone tools found in archaeological excavation are presented in Map 11 and Table 12. The northernmost known appearances of beach-rock tools are at Hazor (Neri 1994:132, n. 13, Table 2) in the Huleh Valley, and at Tel Qashish in the Jezreel Valley (*idem*). Further to the south, one fragment of a lower grinding stone was found at Assawir (Rowan forthcoming) in the Wadi Ara, that separates the Northern Sharon plain and the Carmel ridge. It was made of the Glycemerian beach-rock type in an EB IA context (Stratum III).

In the Central Coastal Plain, near the Yarkon River, the site of Tel Aphek (Neri 1994, EB II?) has yielded one lower grinding stone made of beach-rock. At EB I Palmahim Quarry[69], one km from the Mediterranean shores on Nahal Soreq, several lower grinding stones (E. Braun, pers. comm.) of beach rock were recovered. Further to the south at Afridar Area E, also a coastal site, six stone tools of beach-rock, including three upper grinding stones, were recovered from EB IA contexts. Two other upper grinding stones were probably of *kurkar* (Rowan 2004:Table 1). Four grinding slabs made of beach-rock (Khalaily 2004:152-153) were found in Area F and in Area G, a large lower grinding stone was made of *kurkar* (Braun and Gophna 2004:216-217). Finally, seven (lower?) grinding stones made of beach rock were found in Area J (Baumgarten 2004:177).

The site of Lod produced respectively 4 % and 1% of the ground-stones from beach-rock and *kurkar*. They are dated to EB I-II and EB II (Milevski forthcoming b).

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[69] This name refers to a modern *kurkar* quarry in which remains of the site were excavated and has no direct bearing on the ancient quarries noted in this work.

In the Southern Shephelah grinding stones made of beach-rock were found also at Gezer (EB I?), Lachish (EB I?) and at Tel el-Hesi (EB III) (Neri 1994:Table 2). Gezer *Kurkar* grinding stones were found at Horvat Ptora (EB I) (pers. observ.). Unfortunately, the stratigraphic ascription of most of these objects is not clear.

Kurkar and beach-rock objects dispersed so widely show that a small scale exchange network existed along the Mediterranean Littoral. Probably this was also part of the exchange with this area, as attested by Mediterranean shells found at several sites in the Shephelah.

Discussion

Exchange of beach-rock and *kurkar* groundstone objects seems to be restricted to the area along the Mediterranean littoral in the central and southern regions and in the Shephelah. Distribution of beach-rock and *kurkar* tools is confined to an area of a maximum 35 km from the shores (e.g. Hazor or Lachish). The routes by which beach-rock and *kurkar* objects were dispersed over a trading network are difficult to reconstruct at present. However, it seems that a primary network extended from the shores of the Mediterranean Sea through the Sharon plain, the Ayalon Valley and the Shephelah, and through some *wadis* as far north and east as Hazor in the Huleh Valley.

Beach-rock and *kurkar* could be obtained directly by groups of people from sites at some distance from the sources, traveling to the coast where they would quarry pre-forms or small blocks, as in the case of the quarries of the Chuckwalla Valley in Riverside Country, Colorado. Probably this would involve a maximum journey of two days for the south Levantines. Alternatively, it is suggested that those involved in the quarrying and fabrication of the beach-rock tools were local inhabitants (e.g. Palmahim Quarry, the Afridar cluster of sites) that owned the quarries –as in the case of the Oaxaca villages in Mexico.

3. GENERAL DISCUSSION

From the above-presented data, all the local exchange of ground-stone tools during the EB Age in the Southern Levant seems to show a similar pattern. The main characteristics of this exchange are a localized net of distribution, a non-homogenous market and the consequent non-integration of economic forces in the territory within the scope of this study. Each raw material type has a different network of distribution and probably a different mode of acquisition or procurement.

The domestication of the donkey during the EB Age seems to imply a sort of technical innovation in the transport methods *vis-à-vis* previous late prehistoric periods (cf. Chapter 10). As these beasts of burden were capable of carrying dozens of kilograms during several kilometers for repeated journeys, transport of pre-forms and final stone tools and vessels became easier than it had formerly been (and see below). However, it is worth noting that the manufacture and distribution of basalt vessels was well developed prior to the EB (Amiran and Porat 1984, Gilead and Goren 1989, Epstein 1998: 229-267, Rowan 1998). Furthermore, beach-rock tools also existed during the Neolithic and the Chalcolithic at Nahal Oren, Kabri, Palmahim, Gilat and Shiqmim (Neri 1994: Table 2).

The example of Mesoamerican "*cargadores*" (transporters of cargo) of the pre-conquest period (Rathje 1972:371) indicates that workmen on their own could only carry about 45 kg, a weight equivalent to two lower and four upper grinding stones. With the domestication of donkeys, this load could be enlarged. For instance, the standard weight carried by a donkey in Assyrian caravans to Capadocia was ca. 75 kg (Larsen 1967: 141-155; cf. Chapter 10).

It seems that for basalt and the ferruginous sandstone, those involved in the quarrying and fabrication of tools and vessels were inhabitants of villages near quarries as in the ethnographic examples show above (Cook 1968, 1970; Hester and Heizer 1981, Singer 1984). Such settlements probably owned or controlled the quarries and took advantage from exchange with other near-by and far-way peoples. Alternatively it can be suggested that intermediary, itinerant merchants or even the manufactures themselves, managed the network of exchange, as in the case of highland/lowland exchange in Mesoamerica (Rathje 1972).

Part of the network of ground-stone exchange appears to suggest some degree of integration with dispersal networks for other commodities. This is the case of basalt objects originating in the Dana/Tafila region, near Wadi Feinan. Objects deriving from the Northern Negev and the Southern Coastal Plain could be distributed together with metal that originated in the Feinan area. Ferruginous sandstone tools seem to have been distributed through the same network of distribution as some pottery vessels originating in the Negev, that were eventually deposited at Arad and more northerly locales. Similarly restricted circuits of distribution of basalt items also existed in the north. The best samples originated in the Yarmuk region. Still other ground-stone artifacts may well have originated in outcrops near Tiberias.

Sites located at buffer or intermediate zones (i.e. those regions between quarries and producers on the one hand and end-consumers on the other) such as Arad, participated and probably benefited from exchange of ground-stone implements and other commodities passing through them.

Unfortunately, due to the small amount of data available for each phase of the EB, we are unable to understand the nuances of chronological development of the ground-stone exchange through time, from EB I through EB III. Too little is known about the particular differences of each period. It should be noted that the basalt samples are all dated to the EB I, as are most of the beach-rock examples. More sampled data, hopefully in a near future, will allow a better understanding of this aspect of localized exchange.

Chapter 6

METALS

1. PRODUCTION, SOURCES AND EXCHANGE

Metal tools and objects revealing metallurgical operations, mainly from copper, were found at several EB sites, mostly in EB I and EB II strata (Table 13 and Map 12). Metal artifacts of silver and gold have also been found in EB deposits (Mazar, Amiran and Haas 1973; Prag 1978; Amiran 1983; Shalev 1992:Table 3-A3; Philip and Rehren 1996), but they are so rare that they offer no data relevant to the subject under discussion. Consequently, only copper objects are dealt with in the following discussion.

The division of the copper objects proposed here is into tools, weapons and other miscellaneous objects and remains of metallurgical activity, is a simplified version of a classification proposed by Shalev (1992: Table 3-A.1). We will present the evidence for the most frequently encountered copper tools and weapons found at EB sites according to the definition given by the excavators. The only specific typology is that developed by Miron 1992) for bifacial blades, i.e. axes, adzes and chisels in a search for some pattern of distribution.

ETHNOGRAPHIC BACKGROUND

Before we deal with the archaeological data from the EB Age, we also consider it necessary to address questions related to the production and exchange of metal objects, as understood from ethnographic studies. These observations are based mainly on the work of Rowlands (1971).

Ethnographic examples assembled by Rowlands (1971:211) show that while relatively long-distance exchange occurs with smiths who are near the metal sources, other cases point out that metal workers only contribute with their skill, while the raw material is provided by the customers, sometimes together with fuel and/or labor.

Rowlands (*idem*, 213) also discusses the commonly accepted idea that metal-smiths are professional specialists isolated from other social groups, doing a full time job within the society they lived (cf. Childe 1930, Renfrew 1969:160). While metalworkers are not always a specialized[70] caste, outside tribal boundaries, there are cases in which smiths are itinerant craftsmen of diverse origin: e.g. the Solubba of the Arabian Peninsula (Betts 1989) or the Kenites, Midianites and Rechabites of the Bible (McNutt 1994). In other cases, smiths are itinerants but each also has a fixed workshop in one of the villages.

Corporate groups of smiths may act in particular settlements and develop and extend exchange networks that supply metalwork to surrounding settlements. Sometimes smiths went to neighboring settlements and sometimes customers brought the smith to their own workshop. In both cases, distance between settlements traveled by smiths is limited (Rowlands 1971: 214).

In some instances we find examples of commodities exchanged for metalwork; see for example, Nandi men of Kenya who acquire tools and weapons in exchange from the Doruba for honey and small baskets. Others such as the Basakata smiths of Congo “pay” with metals in exchange for salt and luxury items from neighboring peoples (*idem*, 219).

From historical sources of the 3rd millennium BC from Southern Mesopotamia and Ebla we learn that exchange of metals and metal objects in cities was controlled in most

[70] In several societies metalworking is not a full-time occupation, and craftsmen participate in the agricultural activities of their family.

cases by the authorities (Pettinato 1972:79-83; 1979: 177). In Ugarit we note that during the 14-13th century BC, copper was brought from outside the region, although there were many copper smiths in the city (Heltzer 1977:205). Copper was brought to the city by merchants leading caravans of donkeys (and see below) under the auspices of the authorities (*idem*, 206). In biblical sources (1 Chr 4:14, Neh 11:35) it appears that some of the craftsmen were located in the so-called Valley of the Craftsmen, indicating that metal-smiths or other craftsmen habited in particular regions of the country (cf. Har-El 1977).

ARCHAEOLOGICAL SOURCES AND TECHNOLOGY

While sources and some of the workshops for stages in copper production seem to show a continuation from the Chalcolithic period (Shalev and Braun 1997; Segal, Halicz and Kamenski 1997, 2003), EB metal production indicates a change in methods, the level of craft specialization, and in the function of copper objects (Rosen 1996c). According to Shalev (1994, 1995), this change may be recognized by the unity of the repertoire of objects and the use of the same source-metal for a wide range of products. A separation between extraction and production in technological and geographical terms is also a characteristic of the period (Shalev 1994) as well as a relative standardization in copper production from EB I to EB II-III (Golden 2002:226).

The three sources for copper ores relevant for our research are those from Southern Sinai, Timna in the western Aravah, and Feinan in the eastern Aravah. Rothenberg researched dozens of ancient sites in the western Aravah, searching for evidence of copper production. Some of them have been suggested to be dated from the Chalcolithic period (Rothenberg 1970, 1979, 1987). However no clear proof has been presented for this date or an EB date (cf. Ilan and Sebbane 1989; Hauptman, Begemann, and Schmitt-Strecker 1999; Gentz 2001).

Analyses of the chemical composition of copper objects have been compared with copper ores from the three sources mentioned above. In the past, Sinai has been suggested as the source of the Canaanean copper objects (Amiran, Beit-Arieh and Glass 1973; Beit-Arieh 1983; Ilan and Sebbane 1989). However, lead isotope and trace elements contents for copper artifacts from EB I and II strata at Arad show that they could have derived from either Feinan or Timna (Hauptmann, Begemann, and Schmitt-Strecker 1999).

The results of chemical analyses on copper objects from Afridar (Areas E and G) also seem to point to Timna or Feinan as probable sources of the metal (Segal, Halicz and Kamenski 1997, 2003) However, the chemical composition of the slags from Afridar points to the Feinan region as their source; isotope ratios of the slags correspond to Feinan ores and slags (idem). Ore fragments from Tel Halif (Nahal Tilla) also show similarities with the Feinan ores (Golden 2002:227; cf. below).

Early Bronze I

Evidence for an EB IA copper industry at Feinan was unearthed in excavations at Wadi Fidan 4, where crucibles and furnaces were found (Adams and Gentz 1995, Adams 1999, Hauptmann 2000, Craddock 2001:158).[71] They are located near sources of copper.

One of the most important centers of metallurgical activities is Area E at Afridar on the Southern Coastal Plain. Hemispherical crucibles (Figure 15:1), slags, prills and copper tools were found there. In addition, several burnt structures found near the crucibles could be interpreted as simple furnaces similar to those found in the Feinan region (Golani and Milevski 1997, Golani 2004). Dozens of pits were uncovered near the crucibles and brick installations, while the area yielded a large quantity of copper objects. In Area J, a fragment of an ingot (Figure 15:2) was found together with other metallurgical remains (Baumgarten 2004:178-179, Fig.19:2). Recently, a site dated also to the EB IA was found in the Ashkelon

[71] Note that the dating of the site to the Chalcolithic period was recently changed to the early EB I (cf. Gentz 1997:444).

neighborhood of Barnea, a few km north of Afridar. It also yielded remains of metallurgical activities (A.Golani, pers. comm.).

Table 13. Distribution of metal tools and metallurgy from EB sites according to types.

Other sites yielded minor evidence of metallurgical activity in the EB Age. They are discussed below, in a progression from north to south. A single crucible was found in an early EB I context at Yiftahael II (Shalev and Braun 1997: 92,11.2). Metzer (EB IA) apparently yielded another crucible (Dothan 1959: 28). At Tel esh-Shuneh (N) (Baird and Philip 1994) archaeo-metallurgical remains were also found in EB I contexts. They include ingots, remains of molds used for casting ingots and crucible fragments (Figure 15:5; Philip and Rehren 1996; Golden 2002:228).

At Lod (Neve Yeraq) two crucibles were found in a late EB I context (van den Brink 1999). Additional excavations on the tell (Yannai and Marder 2001) yielded slag and prills in late EB I-II contexts (pers. observ.).

Ilan and Sebbane (1989: n.5) noted crucibles from EB I contexts at Tel Erani. Slag and prills were found also at the nearby site of Horvat Ptora (pers. observation).[72] Crucibles were found at Lachish in the NW settlement (Tufnell et al. 1958: Pl. 57).

The EB I occupant at Site H on the Wadi Ghazzeh (i.e. Nahal Habesor) yielded large quantities of copper ore and slag (Macdonald 1932:12). The copper was analyzed by Hauptmann (1989:128; Genz 2001:60), who concluded that the material very likely originated at Feinan.

Excavations at the Halif Terrace (Levy et al. 1997) have also yielded metallurgical remains, crucibles and copper fragments, in a context defined as a small workshop dated to EB I (Golden 2002: 226-227; Figs. 14.1 and 14.2) (Figure 15:3-4). Excavations at Small Tel Malhata (Ilan and Sebbane 1989: n.5) produced some crucibles from EB I contexts (Rosen 1997c: 87, Genz 2001:60). Tel Maqass, near the Gulf of Aqaba, has yielded slag and prills, as well as several crucibles (Khalil 1992; Khalil and Riederer 1998; Genz 2001: 59-60). The

[72] Crucibles and moulds were also found, but they seem to have originated in the Chalcolithic strata of the site.

site must be dated to the early EB I, according to parallels provided from Wadi Fidan 4 (Genz 1997: 444, 2001: 60).

Early Bronze II

Metallurgical activity at Feinan is known from EB II from excavations at Barqa el-Hatiyeh (Fritz 1994, Adams 2003). Hauptmann and Pernicka (1999) have noted the impressive increase in copper production at Feinan from EB I to EB II, due to a much more advanced technology than that used in the Chalcolithic period. In the same region, changes were discerned from the EB I to EB II, where the evidence of Barqa el-Hatiyeh shows a developed technology in smelting ovens (Fritz 1994, Adams 2003). Evidence of more intensive mining activities in EB II was also found in shafts and galleries with high grade ore in much more plentiful quantities. Earlier, EB I mines, were located in the Massive Brown sandstone (Adams 2003).

Copper production of Feinan in EB II is reflected at Arad (Strata III) where crucibles fragments were found (Amiran et al. 1978: Pls. 71:5-8, 122:8-9; Hauptmann, Begemann, and Schmitt-Strecker 1999; e.g. Figure 15:6).

Two additional sites appear to have yielded evidence of metalworking; Lod in the Central Coast Plain (pers. observ.) and the Camel site in the Negev mountains, which also appears to date to EB II (Rosen 2003b).

Early Bronze III

During EB III metallurgical activity continued to take place at Feinan, probably towards the end of the period, as is evident from Khirbet Hamra Ifdan, where hundreds of molds and crucibles were found (Levy, Adams and Najjar 1999; Adams 1999; Levy et al. 2001:168-169, 2002; e.g. Figure 15:7). At Numeira, near Bab edh-Dhra in the eastern plain of the Dead Sea, remains of what Coogan (1984:77) called secondary copper working were found, probably indicating melting and casting activities (Genz 2001:60). At Megiddo a mould for an axe was found in an EB III (Stage II) context (Engberg and Shipton 1934: Fig.13A; Genz 2001:61).

2. TOOLS AND WEAPONS

Cooper tools and weapons are summarized in Table 13 according to period. Most of the data were presented by Ilan and Sebbane (1989) and Shalev (1994; see especially Table 3-A.1). Following is a description of published and unpublished artifacts relevant to the discussion.

PINS AND PERFORATORS

Two pins dated to the EB II were found in the eastern Jordan Valley at Pella. The copper in them probably originated in the Feinan area (Philip, Glogg and Dungworth 2003: Tables 1,2). In the Central Coastal Plain, awls and borers are reported from a site on the southern bank of Nahal Alexander, ca. km east of Kibbutz Ma`abarot (Dar 1989-90). There are dated to EB I.

Azor produced copper pins with square section[73] were found in Tombs 1 and 4 which are dated to EB IB (Ben-Tor 1975a: 22, Pl. 22:7, Fig. 12:13). At Lod several perforators with square sections were found in EB IB-II contexts (pers. observ.). To the east in the Ayalon Basin, three awls are reported from Tel Dalit (Sadeh 1996:152, Fig. 70:8-10); however their stratigraphic ascription is not clear (cf. Gophna 1996:57).

One square-section awl was found in Jericho in an EB II (?) context (Tr. I.1) (Holland 1983: Fig.229:3). Two square-section awls were found at Tel Yarmuth, in the Shephelah, one in EB II (level A-3) and III (level C-IV) contexts (de Miroschedji 1988: 89, Pls. 48:15-16, XXIV:8-9). Two square-section awls were also found at Horvat Ptora (pers. oberv.) in probable EB I contexts. In the Hill Country, a perforator was found in EB III Tel Hebron (Eisenberg, forthcoming).

[73] Square-sections are though to be a hallmark of the EB Age (Ilan and Sebbane 1989).

In the Northern Negev, square-section awls were found at Arad in Strata II and III (EB II; Amiran et al 1978: Pl. 70:1-22, 25; e.g. Figure 16:1). Another with was found at Site 49-1 in the Nahal Hemar-Nahal Zohar area in a survey conducted by Yekutieli (2004: 20-21). It is tentatively dated to the EB II. Copper square section awls were found in EB IA contexts at Nizzanim (Yekutieli and Gophna 1994), Afridar (Segal, Halicz and Kamenski 2003: Figs.1:3,4,6,7,11,13) and Nahal Habesor (Site H) (Macdonald 1932: Pls.24: 47, 26:56, 28:2-3). The southernmost appearance of copper perforators is at Biqat Uvda in the Southern Negev (Shalev 1992: Table 3-A.1).

AXES, ADZES AND CHISELS

In the Northern Huleh Valley, an axe (Figure 16:2) and an adze were found at Tel Dan in later contexts but, on typological grounds, they were attributed to the EB II period (Greenberg 1996b: 149-151, Fig.3.44). At Rosh Haniqra, Tadmor and Prausnitz (1959) found an axehead. Miron (1992:12, No.39)[74] attributed it to the EB I occupation. Further to the south an axehead and two chisels were found at Qiryat Ata in Area A. These tools, along with a small flattened piece of copper were found in a cache, on bedrock, adjacent to and below an EB I wall. Golani (2003:13, Figs. 7.7:1-3) dated it to the EB IB but the context was not sealed and the tools could have been placed there at some later period. Notably, the site also has an EB II occupation. Two additional axeheads were found within the topsoil in Area L (Fantalkin 2000:50-51). In Upper Galilee, the site of Horvat Mezarot, Nahal Tabor yielded an axehead from a burial cave dated to the EB I (Miron 1992:12, No. 38). Excavations at Bet Yerah have yielded four axeheads from EB I and EB II contexts (Miron 1992:12, Nos.41-44).

[74] We quote the work of Miron (1992) only in cases when the original reports did not publish the tools or additional information relevant to our work is provided.

In the Lower Galilee, two axeheads were discovered in the early EB I occupation of Yiftahel (Shalev and Braun 1997: 93, Fig. 11.3). According to the metallurgical analysis (*idem*, 95-96) the authors conclude that the sources of the tools are either Feinan or Timna. Another was found at Affula (Dothan 1955:38). It was found beneath an MB level and it is dated to EB on typological grounds (Miron 1992: 12, No. 47).

In the Central Hill Country, an axehead was found at Tel el-Farah (N) in an EB (not specified) context (Miron 1992: 13, No.49). To the west, at the Hepher Valley (Central Coastal Plain), a hoard of five adzes was found under a wall of an house in Metzer (Dothan 1957: Pl.37:C,D; Miron 1992: 11, Nos. 29-33). Its date is uncertain. The house is likely to be dated to Early EB I, and thus it could pre-date the house and be either Chalcolithic or earlier EB I in date (Braun 1989). In addition, five axeheads dated to the EB I were found on the southern bank of Nahal Alexander, ca. 5 km east of Kibbutz Ma`abarot (Dar 1989-90). Not far from Ma`abarot, the Kfar Monash hoard produced six axe blades, seven slender adzes, and three chisels, together with other tools and weapons (cf. below; Hestrin and Tadmor 1963). It appears that the hoard should be dated to EB I (Tadmor 2002).

In the Jordan Valley, at Bet Shean, two axes were found in the FitzGerald excavations and were attributed to Level XVI (FitzGerald 1935: Pl.III:21,23 = Miron 1992:12, Nos.36,37). Three additional axes were found in a destruction layer of an EB IB building at the excavations by Mazar (1994: 57). In the eastern Jordan Valley at Tel esh-Shuneh (N) excavations yielded a copper axe; unfortunately, it was found in an unstratified context. However, its typology suggests an EB date (Philip and Baird 1993: 33, Fig. 12:1), while its metallurgy indicates a Feinan area origin (Philip, Glogg and Dungworth 2003: Table 4). To the south of Tel esh-Shuneh, a hoard of axes was found at Pella and dated to EB II (Philip, Glogg and Dungworth 2003). Three of them chemically match with the artifacts from Arad (and see below) and the characteristic copper smelted from the Feinan region (*idem*, 86, Tables 2, 4). A chisel, also found in an EB II context (probably late), was chemically identical to the Feinan sources (*idem*). Nevertheless, there is an axe that contained higher levels of arsenic, matching chemical profiles from Cypriote sources, and another axe whose lead isotope content appears consistent with a source in the region of the Taurus mountains (Philip, Glogg and Dungworth 2003: 87, Table 4).

Jericho has yielded ten axes and adzes from the (Seillin and Watzinger (1913: 117, Pls.104-105) and. Garstang (1932, 1935) excavations. Furthermore, an axehead, dated to EB III from Kenyon's excavations was recovered in Tomb A114 (Kenyon 1960:174, Fig. 66:1). Another from Site L, Stage G, probably also dates to EB III (Kenyon 1981:375, Fig. 15:4). A chisel from the same site is dated to the EB in Tr. II.xlviia (Holland 1983: 564, Fig. 228:2).

An axehead was found at Tel Aphek in an EB II context (Miron 1992: 14, No. 68). Further to the south an axehead was found at Lod in a probable EB II context (pers. observ.) (Figure 16:3). Axeheads were also found at Palmahim Quarry (Reich 1990) and Afridar Area E (Segal, Halicz and Kamenski 2003: Fig.1:1).

Two axes were found in an EB III context at Tel Yarmuth (de Miroschedji 1988: 89, Pls. 48:15-16; XXIV:8-9). Also dated to EB III is a hoard of five axes found at Tel el-Hesi (Bliss 1898: 38, Figs. 73-77=Miron 1992:15-16, Nos.71-75). Two axeheads were found at Tel Erani; Miron (1992:14: Nos. 69-70) dated them to the EB Age. At Horvat Ptora (pers. observ.) an axehead was found in Area D; it probably dates to EB I.

At Arad, four axeheads were found in EB II contexts; two from Stratum III have been published (Amiran et al. 1978: Figs. 71:1-2), while two await publication (O. Ilan, pers. comm.). Three chisels (e.g. Figure 17:1) were found in Stratum II at the same site (Amiran et al. 1978: Figs. 70:23, 24; 71:4).

DAGGERS, SPEARHEADS AND OTHER OBJECTS

One of the objects from the cache at Qiryat Ata is a blade of a spearhead or a knife (Golani 2003: 13, Fig. 7.7:4). A copper saw was found in an EB III context of Area A at Hazor (Greenberg 1997a). At Megiddo a spearhead with barbed shoulders was found (Loud

1948:Pl. 283:1) and dated tentatively to EB I .[75] Four dagger blades were found in the Kfar Monash hoard together with four spearheads, a macehead, a heavy crescent-shaped object, a saw, and three knives (Hestrin and Tadmor 1963). At Tell en-Nasbeh, in the Central Hill Country, a dagger was found dated to the EB I (Shalev 1992: Table 3-A.1).

A dagger was found in a burial cave at Givatayim (Sussman and Ben-Arieh 1966: Fig.10:1; Figure 16:4). Two daggers and one blade dated to EB I were found at Bat-Yam (Shalev 1992:125, Table 3-A.1). At Azor two daggers and a spearhead were found in EB IB Tombs 1 and 4 (Ben-Tor 1975a:22-23, Pl, 22:1-3).The EB IA site of Afridar, Area E, has also yielded a blade of a probable dagger (Segal, Halicz and Kamenski 2003:Fig.1:2). At Tel el-Hesi, in the Southern Shephelah, three spearheads with barbed shoulders were found (Bliss 1898: 36-37, Figs.70-72, Hennessy 1967:Pl. LXXV:1).

Ca. 800 (ca. 10 X 5 cm), thin, rippled sheets of copper (i.e. plaques) (Figure 16:5) were found in the hoard from Kfar Monash (Hestrin and Tadmor 1963). Others, quite similar, were found at Tel Erani (Yeivin 1977b: 97; Shalev 1994: 635). Recently, nine additional plaques (e.g. Figure 16: 6) were found in a small cache under an EB I building at Horvat Ptora (pers. observ.), three km to the east of Tel Erani.

The plaques in the Kfar Monash hoard were generally found in groups of ten, adhering to each other as if they were in packages (M. Tadmor, pers. comm.). All of them seem to originate in EB I contexts (and see Tadmor 2002, Sebbane 2003, contra Ben-Tor 1971a, Watkins 1975). These plaques have been identified as probable parts of scaled armor because of their shape and the fact that they are pierced near one edge. Another possible explanation for the function of these objects is that they were a sort of metallurgical unit, a

[75] But see Henessy (1967:119, n.166).

blank ready for the production of tools provided in prefabricated slices and attached with a string through their piercings.[76]

3. DISCUSSION

Archaeo-metallurgical objects and activities are associated with all three phases of the EB Age. The best documented information comes from EB I contexts, mainly in relation to probably metalworking installations. Awls and borers were found mainly during the EB I period and to a much lesser extent in EB II and III strata. Axes, adzes and chisels are in more evenly distributed throughout the EB Age. We have few examples of daggers and spearheads and their chronological distribution is unclear. Whether this dominance in EB I indicates a real situation or is a result of archaeological bias related to the information available cannot be ascertained at this stage of the research.

EB metal production indicates a change from the Chalcolithic period in production methods and division into different stages of the work. There also appear to be significant differences in development of networks of exchange. Rosen (1996c: 148-149) offers an interesting perspective on metal exchange. He explains it as the replacement of flint bifacials with metal axes, adzes and chisels and claims it caused a disruption of the exchange framework of the Chalcolithic period. Rosen (*idem*) further points out that the existence of new stable exchange routes established for the copper distribution from the sources is not the result of changes in metallurgical work during EB I but came about because of the existence of a new complex society. He endorses the ethnographical example of the Australian aborigines (Sharp 1952) whose flint axes were replaced by steel tools during the European conquest.

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[76] I want to thank Y. Baumgarten for this suggestion.

It is apparent that the spatial distribution of metal objects changes during the course of EB I and EB II-III periods (**Table 11** and Map 12). During EB I, with the exception of Yiftahel, metallurgical activities are concentrated in the southern part of the country. Tools and weapons are evenly distributed at EB I and the EB II sites. Weapons appear less frequently during EB II-EB III. The lack of perforators during the EB II-III at sites north of Metzer and Bet Shean, excepting Hazor during EB III, is worthy of mention, as was already pointed out by Ilan and Sebbane (1989) and Shalev and Braun (1997:96). This phenomenon may indicate differences of craft specialization over time in the northern regions.

While there are different settlements where metallurgical activities were performed and a relatively long-distance exchange occured, the sites near the metal sources, i.e. Wadi Feinan, seem to contain the main centers of production, as in the example provided by Rowlands (1971: 211). From the Wadi Feinan the main routes of distribution of copper and copper tools within the central area were: the Ayalon-Lod Valley, Nahal Sorek, the Southern Shephelah (Nahal Lachish), the Northern Negev including the Arad area in the east (Beersheva Valley), and to the Southern Coastal Plain through Wadi Ghazza/Nahal Habesor. From the Ayalon-Lod Valley it is likely that objects were distributed to the north, via the Sharon Plain. Metal hoards as in the case of Kfar Monash could suggest that these locales were a point of metal exchange. Rowlands (1971:211-212) suggests that the existence of hoards within the archaeological record could be explained by the system of collection and exchange of scrap metal by the smiths. [77] If this is the case for the Canaanean

[77] There are cases where worn and disused metal objects are given in exchange for new tools and weapons.

hoards we have to see in Metzer, Kfar Monash and Tel esh-Shuneh (N), among others, probable points of exchange of copper artifacts.[78]

Copper objects could have made their way to the Jezreel Valley through the Central Coastal Plain or the Jordan Valley (via the Bet Shean, Harod valleys) where Tel esh-Shuneh (N) was a site of copper related activities. This last site probably reflects the natural and easily accessible routes along the Dead Sea and more northern segments of the Great Rift Valley. Similarly the southernmost site of Tell Maqass probably was an appendix of the Southern Aravah exchange, with the ores originating in the Feinan or the Timna areas.

Egypt was part of a secondary area of distribution that probably extended during EB I from the Southern Coastal Plain in Canaan through Northern Sinai (and see Golden 2002:232, Gophna and Milevski 2003). Data on distribution of copper tools in Canaan during the same period, and the information from Area E of Afridar, enable us to suggest the possibility that trade in copper and copper products from Feinan during certain stages of the EB was not carried out only by overland route to Canaan, but was also effected by way of the sea from Canaan to Egypt and the Northern Levant (Gophna and Milevski 2003; cf. Chapter 10). This could include the site of Tel es-Sakan near Gaza (Miroschedji and Sadek 2000). During EB II and EB III the maritime route was certainly utilized since the land route through Northern Sinai was not in use during the Old Kingdom of Egypt until the end of the EB III (Stager 1992).

From known production sites, it appears that copper was produced in small quantities during the EB I in several places. The final products were distributed widely to all the southern Levant. According to Genz (2001: 62), EB I was characterized by a range of cottage industries with part-time specialists. However, the assumption that the EB II-III saw

[78] Philip (1988) has given a different interpretation based on theories of "conspicuous consumption"; cf. Chapter 2.

an intensification in the production of copper, reflected in the quantities of smelting furnaces and large slag heaps found in the Feinan area (Hauptmann 1989, Shalev 1994:636), must be confined only to the Feinan area, since the evidence from other sites in Canaan does not show an increase in metallurgical remains or metal objects (cf. Genz, *idem*). The quantities of molds from Khirbet Hamra Ifdan point to a concentration of copper production. The axeheads found at Pella, probably originating in Cyprus and the Taurus mountains, point to a trading network from outside the Southern Levant. Though this subject is beyond the scope of this dissertation, it significance should be noticed but not exaggerated.

The evidence suggests that during the EB II-III the metallurgical activities were concentrated at few key sites. However, another possibility suggested by Genz (2001) is that the metallurgical activities were conducted in small rural settlements or in areas outside the walls of the urban sites. In this latter case, metalworking could have been the specialty of itinerant craftsmen who, as probably show the paintings of Beni Hassan (Newberry 1893; Shea 1981), could have brought their families with them.

Chapter 7

ARCHAEOBOTANICAL DATA

1. ARCHAEOBOTANY AND ETHNOHISTORIC SOURCES

The archaeobotanical data base for the EB has been considerably enlarged in the last years due mainly to the dendro-archaeological research carried out by Lipshchitz, Lev-Yadun and other scholars.[79] In general, archaeological evidence for the domestication of plants in the region has been fully investigated in the last decades (J. Renfrew 1969, Redman 1978, Zohary and Hopf 1993, Zohary 1996, Buxó 1997, Cauvin 2000).

Until recently, exchange of wood and agricultural products during the EB was generally related to international trade. Ben-Tor (1986:5, 9) and Ward (1991:14) maintain that the textual evidence provide evidence for wood by-products having been exported from Palestine to Egypt in small jars and bottles. We also have the later story of Wenamum (cf. Gardiner 1932:68), where he was sent to Byblos to acquire wood for the boat of Amun. International exchange of wood seems also to have occurred along the Levantine coasts during the EB IA, as registered by the presence of cedar of Lebanon (*Cedrus libani*) in the site of Afridar (Gophna and Liphschitz 1996). In addition, analysis of the contents of Canaanite EB II jars (some of them from MW) from the Tomb of Djer indicated that they contained remains of vegetable oil (Serpico and White 1996). Written sources on the exchange of agricultural products for biblical periods indicates that wheat, olive oil and balm were traded by sea from the kingdoms of Judah and Israel to Tyre (Ez. 27:17), and oil was transported to Egypt (Hosea 12:1).

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[79] On dendroarchaeology and dendrochonology see Liphschitz 1986, 1988, Lev-Yadun 1987.

Comprehensive studies of agriculture and agricultural products in the Southern Levant during later periods have included data on the Iron Age (e.g. Borowski 1979), the Roman-Byzantine period (e.g. Feliks 1963) and the Middle Ages (e.g. Amar 2000). Yet the exchange and trade of agricultural goods was almost not addressed in these works, or was again related just to international trade. Furthermore, documents from Mesopotamia (3rd millennium BC) offer testimony to an exchange of wood and agricultural products with peripheral and outer regions. Lebanese cedar, ebony and palms from Bahrain, wood from the "mountains" and other wood are cited in the documents compiled by Pettinato (1972:84-89). Crops are also mentioned in these documents, with sesame and barley exported to Bahrain and dates and reeds being imported from this locale and others to Isin (Pettinato 1972:90-91).

Late Egyptian written sources provide us with evidence for the local exchange of products. The Middle Kingdom (21st century BC) story of the "Eloquent Peasant" (Pritchard 1955:407, and see below) mentions this peasant traveling northwards after he had loaded his donkeys with *iaa*-plants, *rermet*-plants, and anis, among other products, to be exchanged during his journey.

Ethnographic studies provide numerous case studies of local exchange of crops. For example, this subject is dealt with in a study of villages in the west Bengal Hills, India (Muga 1977). Several crops are almost wholly exported out of the villages and the trade of these items is controlled by the village merchants, especially the Marwari and Newari traders (Muga 1977:196). These merchants have their own warehouses or rent storage space from one another. The crops are stored in the warehouses and released to the open markets of far-away villages and cities like Calcutta. A second type of cash crop is composed of local surpluses which are utilized by the local peasant farmers for cash trade. Such crops are farmer controlled and used almost exclusively in the local petty markets for generating cash incomes. Certain types of valuables and better quality crops, are traded directly by the farmers (Muga 1977: 198-199).[80] The farmer-traders of the village are thus working as middlemen between other villages and farmers and the village merchants. They are buffer agents between the farmer and the cosmopolitan merchant (Muga 1977: 199)

In South America, the Aymara of Titicaca Lake in Bolivia travel to the valleys of the Pacific coast in order to obtain guano (LaBarre 1948: 24, 151). According to Garcilaso de la Vega (1869 VII:1): *"The Collas conveyed large quantities of quinua and chuñu, and of dried meat called charqui, on the backs of their llamas, to the valleys, returning with loads of maize, uchu, and fruit, which are not to be had in their land."* [81]

In Palestine, medieval sources describe the trade of agricultural products, mainly in relation to the taxes paid to the authorities. For instance, oil, wheat and dates are documented as part of the trade and taxes or "gifts" given to a monastery by landowners in the Early Islamic period (Kraemer 1958). *Pistacia* nuts are registered as having been sold in Jerusalem and taxed by the Mameluke government (Amar 2000:161, 219).

2. DISTRIBUTION OF SPECIES

The data are presented in Table 14 and Maps 13-15. Most of the information is

[80] The price of the crops not only depends on harvesting and the villagers need for food, but also on the season of harvesting and the possibility of storing the crops over time.

[81] This trade took place with the Quechua to the west. Cieza de Leon mentions maize, fruits, coca and especially honey being brought up from the yungas to the east by the Colla *mitamaes* or colonists (LaBarre 1948: 152). Indians of the *altiplano* trade salt in particular but also chuñu, tunt, kaya, pitu, quinua , kañawa, immature barley, and charqui with the yunga for coca, fruit, barley, maize, corn-meal, wheat flour and soqosa (a kind of bamboo from which they make their musical instruments).

based on Liphschitz's works with additional data deriving from the last decade of research (cf. Genz 2003 with bibliography therein).

According to Zohary (1962; 1966; 1972) and Feinbrun-Dothan (1978; 1986), the flora of the Southern Levant can be divided into seven groups, with general distribution areas. Eig (1939), followed by Zohary (1962) and Orni and Efrat (1971:164-177), divided the country into four main phytogeographical areas[82]:

1) The Mediterranean zone, that includes a) the Central Hill Country and the Galilee, b) a lowland region (the Shephelah and the northern valleys), c) a transition type, d) a high-mountain type and e) a dune vegetation zone in the coast.

2) The Irano-Turanian zone, a dry steppe located in the Jordan Valley, and the Northern and Central Negev. Recently Danin and Plitmann (1987) have defined the Irano-Turanian as the Transition zone, arguing that there is no real Irano-Turanian in the country.[83]

3) The Sahara-Arabian zone, a desert that includes a) the Judean Desert, the Aravah and the Southern Negev, apart from b) a halophytic vegetation zone north and south of the Dead Sea and the Aqaba Gulf;

4) The enclaves of the Sudanian zone in the Jordan Valley and next to the Dead Sea.

The data dealt with here is based on four groups: cereals, olives and grapes, trees (other than olives), and pulses. We describe the main species and sites in the text, while others are only presented in Table 10. Olives (*Olea europaea*) and grapes (*Vitis vinifera*) are the mainfruit species (Zohary and Hopf 1993, Zohary 1996) and for this reason we

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[82] Zohary (1966) renamed some of the phytogeographical regions and termed Eig's Saharo-Sindian as Saharo- Arabian and Eig's Sudano-Decanian as Sudanian. Eig's Sudano-Decanian enclaves in the Dead Sea area became a "territory of Sudanian penetration" (Zohary 1966).

[83] I am indebted to Ori Fragman-Sapir (Jerusalem Botanical Gardens, The Hebrew University) for this and other references relating to crop growing.

will present them separately. Both species appear in this region before the EB Age, but is during the EB Age that a noticeable increase occurred in the numbers of their pits, dried fruit and wood (Zohary and Hopf 1993, Zohary 1996, Liphschitz and Bonani 2000, Genz 2003) as well as an increase in the levels of olive pollen found in the sea of Galilee (Baruch 1986:45). For the sake of convenience we will present the data according to geographic areas (as well as the other commodities), but we ask the reader to compare these with the phytogeographical areas listed above.

CEREALS

As no data is available for the Galilee, the northernmost part of the country to have yielded cereals is the Jordan Valley. At Bet Shean, FitzGerald found quantities of barley and wheat in large stone jars within Stratum XIII, dated to the EB II (see Feinbrun 2004).

In the eastern Jordan Valley, at Tel Abu al-Kharaz charred plant remains from EB IB and EB II strata were analyzed and were dominated by *Triticum monoccocum/dicoccum* (einkorn/emmer wheat) (Fischer 1997). Close to the south, Tel es-Saidiyeh (EB III) produced whole, charred grains of *Triticum sp* and *Hordeum sp.* (barley) (Cartwright 2002:110-111). Plant remains from Jericho published by Hopf (1969, 1983) contained more varied examples of species *inter alia*, barley and wheat.

The Shephelah has produced several sites with archeobotanical remains. At Lower Horvat Illin charred seeds from emmer wheat were found in late EB IB contexts (Segal and Carmi 1996:91). The archaeobotanical report from the NE section at Lachish (Helbaek 1958) mentions the existence of emmer wheat, hulled barley, among other species, but does not specify to which phase within the EB the remains belong. In the Southern Shephelah, at Tel el-Hesi (Toombs 1983:40), the uppermost floor in Phase 4e (EB II or III) was covered with ash containing quantities of different seeds, the main one being emmer wheat (Toombs 1983:44).

In the Southern Coastal Plain, the late EB IB strata at the site of Palmahim Quarry has produced both grain and forks of *Triticum diccocum* (E. Braun, pers. comm.).[84] Remains of *Triticum sp.* was found at the EB IA site of Afridar, Area E2 while the En Besor oasis Strata III and IV (EB IB) produced grains of wheat and barley (Liphschitz 1995).

In the Northern Negev the main site producing archaeobotanical evidence is Arad (Hopf 1978), where about 60 kg of plant remains were recovered from the site. Most of this material came from strata dating to EB II. Among these remains, barley (Figure 17:2**,** 7A) is the dominant cultivated plant, followed by emmer wheat (Figure 17:1, 7B) and other species of this grain.

For the eastern Aravah site of Wadi Fidan 4, Meadow (1996)[85] analysed 26,000 items of carbonized plant material from 21 samples from within a Stratum IIB structure (early EB I) and associated ovens. The latter in particular revealed a wide variety of well-preserved plant macrofossils. The assemblage (Adams 1999: Table 5.1) was dominated by emmer wheat chaff (over 60% of the assemblage), but also contained barley chaff and barley grain, wheat grain, millet and wild grass seeds.

OLIVES AND GRAPES

Olives

In the Galilee, wood of *Olea europea* was found at Kabri (Liphschitz 1992: 29) and dated to EB I-II. Pits and wood were found at Megiddo (Liphschitz 2000a: 488-490) and dated to EB I and III. At Tel Qashish (Liphschitz 2003) wood and olive pits were found in EB I and EB III contexts, and perhaps EB II. At Beth Yerah (Maisler, Stekelis and Avi-Yonah

[84] The plant remains from Palmahim are still unpublished. The author thanks E. Braun, the director of the excavation, and Yoel Melamed who analyzed the botanical remains from the site.

[85] The quotations from Meadow’s Ph.D. were taken from the works of Adams (1999) and Genz (2003).

1952: 227), and Tel Taanakh (Lipschitz and Waisel 1980), olive pits were found; all contexts indicate an EB III date.

In the Jordan Valley, and other sites in Transjordan the picture is as follows. At Khirbet Ez-Zeraqon pits and wood were found in EB II and III contexts (Neef 1990: 31). At Pella an EB I context produced some pits (Bourke, Sparks and Mairs 1999: 60). At Tel es-Saidiyeh, Cartwright (1996: 73; 2002: 109-110) reports pits and wood from EB III contexts with a possible evidence of *jift* used as fuel. At Tel Abu al-Kharaz pits were found in an EB II stratum (Fischer 1997: 162), while both at Tel el-Handaquq North and South olive pits were found in EB III contexts (Donaldson and Mabry 1996: 142; Chesson 1997: 67).

In the Central Hill Country, Liphschitz (1986, quoted in 1989) reports the existence of *Olea europea* pits at the City of David, Jerusalem during the EB I-II, without any specification of stratum, and Gibson (1991: 51) reports pits as well from an EB I context at Sataf.

Several sites in the Shephelah have produced archaeobotanical remains with olives. At Horvat Illin olive seeds and wood remains were found in late EB IB contexts (Segal and Carmi 1996: 91). Nearby, the excavations conducted by Ben-Tor at Tel Yarmuth retrieved carbonized olive pits from EB III (Ben-Tor 1975b: 73, n. 31), while the production of olive oil during this period was reported by de Miroschedji (1999: 8-9; cf. below). Olive pits were also found at Gezer (EB I?) (Liphschitz 1989: 272; cf. Macalister 1912: 22-28). From Lachish NW settlement, olive pits are also reported and dated to EB II-III (Helbaek 1958:313). From the renewed excavations, Liphschitz (2004b: 2231) reported wood samples of *Olea europea* from an EB III context. Some kilometers to the west, Tel Erani produced olive pits from the early EB IB strata (Kempinski and Gilead 1991: 186). To the south, Tel el-Hesi yielded olive pits from EB III contexts (O’Connell and Rose 1980: 86).

In the Central Coastal Plain, EB II contexts from Tel Aphek **(**Liphschitz, Gophna. and Lev-Yadun1989: 264, Lipschitz 2000b: Tables 16.1-16.2) and Tel Dalit (Liphschitz 1996b: 186) yielded olive wood, and wood and pits remains, respectively. Further to the south, the EB IA and IB strata of the site of Palmahim Quarry have also produced several olive pits. To the south, olive pits were found in EB I contexts at Nizzanim (Gophna and Liphschitz 1996:146). Areas E, F, G and J at Afridar, Ashkelon, revealed the massive presence of olives (90% of the identified timber) (Gophna and Liphschitz 1996:146; Liphschitz 2004a).

Sites in the Northern Negev have produced evidence of olives from EB I and II contexts; pits and wood from Tel Halif (Seger et al. 1990: 23) and Arad (Hopf 1978: 72-73; Liphschitz 1996a: 166-167; Figure 17:7F). In the eastern Aravah olive wood dating to the EB II-III was found at Feinan 9 and 16 (Baierle et al. 1989: 216, quoted by Genz 2003: Table 1), while at the eastern plain of the Dead Sea, EB III strata at Bab edh-Dhra and Numeira produced olive pits.

Grapes

The northernmost site where grapes *(Vitis vinifera)* were found is EB III Taanakh in the Galilee (Lipschitz and Waisel 1980). Pips and dried fruit were found in several EB II and EB III sites of Transjordan: Tel Abu al-Kharaz (Fischer 1997: 162), Tel es-Saidiyeh (Cartwright 1997:73; 2002: 103-106) and Khirbet ez-Zeraqon (Getz 2003: 65, Table 3).

Remains from Jericho (Hopf 1969, 1983:567) contain samples of grape pips and dried fruits dating from EB I through EB III.

Grape pips are also reported from Lachish NW settlement (EB II-III) (Helbaek 1958:310) and EB III contexts at Tel el-Hesi (Toombs 1983:40). Grape pips were also found in EB IB contexts in the site of Palmahim Quarry on the Coastal Plain (E. Braun, pers. comm.), and at En Besor in EB IB contexts (Liphschitz 1995:232).

The only site where wood remains were found together with grape pips (Figure 17:3) is Arad, in EB II contexts (Hopf 1978: 73-74)

At Bab edh-Dhra and Numeira, in the eastern plain of the Dead Sea, pips and dried fruit were found in EB I to III contexts (Richardson 1976:56, McCreery 1979:166). In the eastern Aravah, grape seeds were found in early EBI contexts at Wadi Fidan 4 (Meadow 1996: 18, quoted by Genz 2003: Table 3).

TREES OTHER THAN OLIVES

In the Jezreel Valley wood remains of *Quercus calliprinos* (Kermes oak) and *Pistacia palaestina* (Terebinth) were found at Tel Qashish (Liphschitz 2003) in EB I and EB II-III contexts. Excavations of the Tel Aviv mission at Megiddo identified both species from EB I and III contexts (Liphschitz 2000a: Table 17.1). These species dominated the arboreal community of the Mediterranean region in antiquity (Liphschitz and Bigger 1990). Remains of Alepo pine (*Pinus halepensis*) and tamarisk (*Tamarix*) were also found in EB I contexts at Megiddo (Lipschitz, *idem*).

In the eastern Jordan Valley, charred nuts of *Pistacia palestina* and charred fragments of *Quercus sp.* appear in EB contexts at Tel es-Saidiyeh (Cartwright 2002:108). In the Yarkon and Ayalon basins, botanical remains revealed the presence of *Quercus calliprinos* at Tel Aphek and Tel Dalit during the EB I-II (Liphschitz, Lev-Yadun and Gophna 1987:48-49, Liphschitz 1996b, 2000b: Table 16.2A).

In the Southern Coastal Plain, a nutlet of *Pistaccia palaestina* was found in an EB IB context at Palmahim (E. Braun, pers. comm.). Areas E and G at Afridar have yielded several types of trees: tamarisk, lentisk, terebinth, shrubby salt bush and acacia (Gophna and Liphschitz 1996; Liphschitz 2004a). Furthermore, remains of two types of cedar of Lebanon were found at the same site (Gophna and Liphschitz *idem*, Braun and Gophna 2004) together with *Quercus cerries* (Turkish oak), a tree that covered the mountains of

Turkey and Lebanon during antiquity (Liphschitz 2004a: 309). At En Besor (Liphschitz 1995) the wood remains from the EB I included tamarisk and date palm.

In the Southern Shepehelah, terebinth wood was found at Lachish (EB III) (Liphschitz 2004b: 2233). At Tel el-Hesi, pistachio was reported from EB III, although no find spots are specified (Toombs 1983:44).

In the Northern Negev, most of the wood remains from Arad were recovered from EB II contexts, with charcoal samples showing the presence of oak, tamarisk, *Retama raetam* (White broom), *Pistacia atlantica* (Atlantic pistachio; Figure 17:6), *Pistacia palestina*, *Quercus calliprinos* and *Curpessus sempervivens* (Cypress; Hopf 1978; Liphschitz 1996a: 166-167).

The analyzed material retrieved from ovens in stratum IIB from Wadi Fidan 4 in the Eastern Aravah revealed a wide variety of well-preserved macrofossils of oats, pistachio shells and hawthorn nuts, the latter in smaller numbers (Meadows 1996)

The southernmost area where wood remains have been found dating to the EB is Biqat Uvda, in the southern Arava Valley. Liphschitz (2001) has collected data from sites 909, 910, 916, and 917, excavated by Beit Arieh (2001), dating to EB II. Relevant to our research is the fact that together with *Tamarix aphylla* (Tamarisk), *Phoenix dactilifera* (Palm), *Haloxylon persicum* (White saxaul) and *Retama raetam*, several remains of *Pistacia atlantica* were found at site 917. While the first four species are characteristic of the Southern Negev and the Aravah, pistachio originated in the Central Negev or further north (e.g. the Mediterranean woodland and shrub region [Moldenke and Moldenke 1952:170, 201, 227]), and must have been brought to the site from these regions. Sources from the Islamic period illustrate that pistachio grew in the mountains of Syria and Palestine (Amar 2000:219).

PULSES

In the Jezreel Valley, seeds of vetch (*Vicia*) were found in EB I contexts at Tel Qashish (Liphschitz 2003) while *Lens culinaris* (lentils) and *Pisum* (peas), were reported at Taanakh from EB III (Lipschitz and Waisel 1980).

In the Jordan Valley, the FitzGerald excavations at Bet Shean provided substantial quantities of lentils and *Vicia faba* seeds from Stratum XIII, dated to EB II (Feinbrun 2004). In the eastern Jordan Valley, vetch and lentils were found at Tel Abu al-Kharaz. (Fischer 1997). Plant remains from EB Jericho (Hopf 1969) contained lentils as well.

For the Shephelah, vetch and peas were found in the NW settlement at Lachish (Helbaek 1958).

The majority of botanical remains from EB IB contexts at Palmahim Quarry consisted of 763 seeds of vetch (E. Braun, pers. comm.). Lentils were also found at the site in EB I B deposits, but in smaller quantities.

At En Besor (EB I), seeds of pea and vetch were found (Liphschitz 1995). Pulses were found at Arad during EB II (Hopf 1978; Figure 17:4-5, 7C-D). Beans (*Phaseolus sp*) were found at Tel Halif and dated to the EB (Seger et al. 1990: Table 2). At Wadi Fidan 4 (Meadow 1996), small-seeded legumes appear in small quantities.

3. DISCUSSION

On the basis of the botanical data and paleo-climatic conditions, Liphschitz (1989: 275) concluded that crops and wood were transported from place to place. She has assumed that fruits cultivated in the oases were also distributed to other regions of the country.

Maps 13-15 show that the movement of crops and wood was from the center of the country to peripheral regions. In some cases, such as pulses, the movement was from the

Mediterranean phytogeographical zone—with an annual rainfall 400-1000 mm.—to other zones like the Beth Shean and Jordan Valley, the Northern Negev and the plain southeast of the Dead Sea (Bab edh-Dhra and Numeira) and the eastern Aravah.

While barley is grown today by the Bedouin in the Negev, wheat is cultivated in areas where the mean annual rainfall is above 225 mm and where the growth season is longer than 90 days (cf. Liphshitz and Waisel 1973). The Bedouin utilize terraces built during the Byzantine and Early Islamic period, when irrigated terraces were utilized for growing cereals (Avni 1996: 77, 84 with bibliography therein). Since it is difficult to presume that wheat and other cereals were cultivated by irrigation during the EB, it is reasonable to assume that these products were imported into the warmer and dryer regions (but cf. Avner 1990).

The same can be assumed for olives, which cannot grow even with irrigation in these arid areas because of the high temperatures (Liphschitz and Waisel *idem*). Amar (2000:157-161) concludes from archaeological and written sources dated to the Byzantine and Early Islamic periods (i.e. Kraemer 1958) that olive trees and oil production existed in the Northern Negev and part of the Aravah. However, part of the data he cites is not accurate.[86]

The olive, oak and terebinth wood samples from Arad have been interpreted by Liphschitz (1996a: 166) as “imports” from the Hebron mountains on the grounds that the Arad region is poor in timber resources since it has less than 250 mm of annual amount rainfall.

[86] For instance in the preliminary report, the excavators of Kfar Shahak (Nahlieli and Yisrael 1984) noted the presence of olive pits in a hearth on the floor, but no olives were reported in the botanical report, only date seeds (Israel, Nahlieli, and Ben Michael 1995:3*; Kislev 1995).

It is possible that during the EB II-III certain oil producing centers existed at Hazor (Greenberg 1997b: IIIs.1:11,2:4, 3:5,7), Bet Yerah (Esse 1991: 123-125), Kh. Ez-Zeraqon (Genz 2002: Taf. 1:1, 3:2, 24:1), Tel es-Saidiyeh (Tubb and Dorrell 1993:62-66), Tel Yarmuth (de Miroschedji 2000b: Figs.18.4:12, 18.7:4, 18.10:4) and other sites where pottery vats and certain installations were found (cf. Genz 2003: 61-66). Ilan (2001: 346, 350) has pointed out that during the EB II, `Ai contained four times more kraters (e.g. Callaway 1972: Pls. 29:5, 50:25) than Arad and that these vessels were used in the manufacture of oil. Loci containing stone tools, pottery spouted vats, twin bowls, and kilns at those sites were interpreted as installations for oil production on the basis of comparative later descriptions of this craft during Roman times (Esse 1991: 124). It looks as if these centers could have benefited from taxes paid by surrounding villages that provided their urban counterparts with olives, as in the late examples provided by medieval sources. The granary building at Bet Yerah, dated to the EB III (cf. Mazar 2001), could be a case where villages brought their crops, or a portion of their produce, to a central administration as payment of direct taxes.

Other fruit trees such as pistachio, oak, hawthorn and the various species of *Prunus*, which require low temperatures for cultivation, must also be seen as products exchanged to the arid zones. Atlantic pistachio (*Pistacia atlantica)*, for instance, was probably brought to Biqat Uvda from the Central Negev or further afield (Liphschitz 2001); and Bear's plum (*Prunus sp*) which grows in the Mediterranean *maquis* and forests, was found at Numeira.

Crop exchange seems to have been conducted mainly between settlements situated in close proximity but lying in different phyto-geographic regions, as in the examples of the Aymara in Bolivia traveling to the Quechua area, or the example of Botswana where a common locality was fixed by the !Kung San people for exchanging agricultural and other products within the framework of a ceremony called *hxaro* (Weissner 1977).

From the data presented above it is possible that sites like those of Biqat Uvda, Arad, Bab edh-Dhra and Numeira received cereals, olives and other fruit from the hill country. The point made by some scholars conjecturing on irrigation systems for agriculture in the case of Bab edh-Dhra, Numeira (Richardson 1976:56) and Tel el-Handaquq (Mabry 1989:59) cannot be taken seriously into account, since it has not been unequivocally proven that such systems existed during the EB (cf. McCreery 1979:167).[87] It is probable that during the EB I, the villagers controlled trade in agricultural products more or less independently, as in the case of the Marwari and Newari traders of the west Bengal hills in India (Muga 1977). Merchants providing other commodities from the Negev and other semi-arid areas could return with crops from the lusher areas in the center, as in the case of the Aymara of the Titicaca Lake in Bolivia (LaBarre 1948).

Aleppo pine nuts, encountered at Tel Halif, were also probably exchanged with communities inhabiting the Mediterranean *maquis* and forest and *batha* of the mountain areas in the central and northern part of the country. The suggestion that the nuts were locally harvested, supporting the theory that the Negev was more humid during the early 3rd millennium BC (e.g. Hopf 1978; Fargo and O'Connell 1978) cannot be totally rejected (see Avner 2002). However, according to Lipschitz (1989, 2001), it is evident that the same arboreal species and therefore a similar macroclimate characterized the Negev from the Early Bronze Age onwards.

[87] But see contra Philip 2003: 106 and bibliography therein. According to Philip the best evidence for the use of dams is not in the best cultivated areas but in the arid eastern Jordan (e.g. Jawa), an area which in any case is far beyond the focus of this research.

According to Borowski (1979:12-13), the first large-scale agricultural surpluses that enabled full-scale trade in agricultural products occurred during the Iron Age. He quotes the exchange of cedar wood from Lebanon with oil, wine and wheat during the reign of Solomon (I Kgs 5:25; II Chr 2:9, 14). However, this sort of exchange already took place during the EB I as the charcoaled remains of cedar of Lebanon from Afridar have proven (Gophna and Liphschitz 1996). During the EB II-III it is probable that the extent of surpluses increased, and the temple and palaces took control of them, as in the case of the probable granary at Bet Yerah (cf. Mazar 2001). Other places which appear to have a concentration of several kinds of trees are Megiddo and Tel Qashish, mainly dating to the EB I and III.

In general, the problem of exchange over a long distance is not related to technical questions but to socio-economic ones. To facilitate the use of agricultural surplus for payments in exchange for imported goods, a tax collecting system was developed by the monarchy during the Iron Age. This political power not only utilized the agricultural surplus of the farmers but was a major owner of agricultural lands (2 Sam 12:8, 1 Chr 27:25-31), as also testified to by epigraphical records (e.g. Welten 1969).

Moreover, runoff farming or flood agriculture was introduced only during the Iron Age. Water collection systems into cisterns for agricultural and drinking purposes seem to have existed in the Negev and the Judean Desert from the beginning of the Iron Age II (Evenari et al. 1958; Stager 1976).

In sum, the EB exchange of crops and timber seemed to have been restricted to those areas in the center and north of the country suitable for the cultivation of cereals, olives and grapes. The arid zones probably received these products through exchange of local products with nearby regions with a higher rainfall.

Few cases of timber exchange are shown, as in the case of the remains of *Pistacia atlantica* from Biqat Uvda, which originated in the Northern Negev or further afield, as well as some of the other species found at Arad and Biqat Uvda, both of them during the EB II. Lipschitz and Biger (1995) have related the trade and import of timber from the MB onwards to urban expansion and the necessity of using larger trees for building activities. While we have evidence for imported wood during the EB IA from Afridar (cedar of Lebanon and Turkish oak), we still lack data in order to complete our understanding of timber exchange during the EB II-III.

Finkelstein and Gophna (1993) have drawn attention to phenomena relating to the trade of agricultural products, and the intermediary role of settlements located between the lowlands and highlands. Based on Mesoamerican and Iranian examples (Rathje 1971, Wright and Johnson 1975), they point out that Egyptian demands for Canaanite goods accelerated the expansion of settlement in the Hill Country during the EB, and encouraged the development of marketing stations in the south as well as the growth of social and political stratification in the Southern Levant. The relationship between Egyptian trade, settlement growth and urbanization has been the subject of several works (e.g. Gophna 1987, Kempinski 1992, Milevski 1993), but unfortunately this is beyond the scope of this study.

Chapter 8

ARCHAEOZOOLOGICAL DATA

1. ZOOLOGY AND ARCHAEOLOGY

Archaeofaunas are one of the most important components of the archaeological record that can be utilized in the reconstruction of the economic life of ancient settlements and their hinterland. EB faunal remains of the Southern Levant have been closely studied, thanks to the research of several scholars. For example, faunal evidence indicates that sheep were raised for their secondary products that could be traded or exchanged, reflecting a shift from subsistence to a "market" economy (Grigson 1995: 251). This is supported by texts from Syria and Mesopotamia from the fourth and third millennia BC (Heltzer 1976; Limet 1979; Pettinato 1981; Mudar 1982; Pinnock 1985; Zeder 1991; Steinkeller 1992) which record the movement of animals and agricultural products from the countryside to urban centers.

However, the subject of reconstructing exchange patterns from the faunal assemblages, aside from special items such as marine shells, faces several methodological problems based on the interpretation of statistics (cf. Grayson 1979, Wapnish and Hesse 1988; Hesse and Wapnish 2001). Consequently, in this dissertation, we have chosen to narrow the focus of our subject, since we do not consider ourselves in a position to find an answer to these problems on the basis of the present data. Furthermore, the subject of donkeys will be treated in relation to the transportation and ritual aspect of these burden beasts and not as commodities (see Chapter 10). Consequently we will present here two sections in the study of exchange items within the field of archeozoological data where more or less secure statements can be made: marine shells and fish, and objects made of hippopotamus ivory.

2. DISTRIBUTION OF SPECIES

MOLLUSCA AND FISH

The circulation and utilization of marine shells in the Southern Levant is documented from the Upper Paleolithic and Epipaleolithic times onwards (Goring-Morris 1989, Reese 1991, Bar-Yosef Mayer 1999a). During the last century, the exchange of shells was one of the issues studied by anthropologists who researched exchange systems and gift giving (Bar-Yosef Mayer 1999a: 7-17; Trubitt 2003). The work of Malinowski (1919, 1922) on the Kula system of gift-giving in the Trobriands Islands[88] is probably the best known study on this subject.

Shells have been used and exchanged for marriage ceremonies (Kenoyer 1997:275), decoration of the body expressing social status (Harding 1961), as a means of payment (La Pena 1978:330), in funeral and cultic ceremonies. (Safer and Gil 1982:173, Burger 1984, Reese 1989, 1990), for the production of color and lime (Bimson 1980, Reese 1979-80, 1987) and simply for the purpose of consumption (Meehan 1982).

[88] The *Kula* ring was a special exchange system in the Trobriand Islands in the Pacific Ocean. Shells are part of this system of exchange or gift giving among various tribes of the islands. The exchange takes place between friends or relatives in order to maintain the relationship and gain power within the society. Mauss (1990), based on the work of Malinowski, developed the conception of 'the gift' as a special act in pre-capitalistic societies to pursue exchanges without an economic purpose. A similar system is registered among the Raiapu of New Guinea, that includes the *te* ceremony (Bus 1951; Waddell 1972: Fig.2). One of the functions of this gift-giving ceremony is the distribution of locally scarce resources such as salt, tree oil, feathers, shells, cassowaries, drums and stone axes (Waddell 1972: 107-108). In Botswana, Southern Africa, there is a Kula-like ceremony among the !Kung San called *hxaro* (Weissner 1977).

Sometimes a complicated network of exchange was developed, as was the case of the exchange of the *Spondylus* shell of the Gulf of Guayaquil, Ecuador, that was traded over hundreds and even thousands of kilometers by sea and land routes during the period of the Spanish conquest by a sort of merchants' league or guild called *liga de mercaderes* (Murra 1997:741-744).

Fortunately, we have significant database from archaeological excavations in the Southern Levant on shells. On the other hand, there are few published works on the exchange of fish (e.g. Reese**,** Mienis and Woodward 1986), mainly because there is limited data on fish from archaeological sites in the Southern Levant in general, the main reason for this being the methods of excavations which preclude sieving with a fine mesh (cf. Colley 1990). In addition, there are many methodological problems with the identification of fish remains that must be considered. Most importantly is the fact that some species are found both in the Mediterranean and Red Sea. Furthermore, due to the fact that fish bones are sometimes not well preserved, it is difficult to arrive at a clear identification of family, genus and species, such that a great degree of uncertainty exists in the identification of many remains of marine fauna (and see Lernau and Golani 2004:2456).

Distribution

In this section we will present the distribution of shells and fish from the Mediterranean and the Red Sea (Table 15, Map 16). In addition, we will also present the Nilotic *Chambardia rubens acuata* (formerly *Aspatharia* or *Spathopsis rubens* (Mienis 2004), because we believe that the exchange of these mother-of-pearl shells exceeded regular trade with Egypt and became a commodity integrated into the internal Canaanite circulation of luxury items.

Galilee

In the Hullah Valley, two unidentified fish bones were found in the EB II stratum at Tel Dan (Wapnish and Hesse 1991: 14, Table 4). At Tel Gadot, *C*ypraea sp. –a cowrie shell originating in the Mediterranean or the Red Sea - was found in a tomb dated to the EB. Further to the west, at Kabri (Area B), 47 fragments belonging to 9 taxa of molluscs were ascribed to the EB strata (Mienis 2002: 404). While most of the taxa at this site originated in the Mediterranean, one fragment of *Chambardia rubens* originated from the Nile. However, no stratigraphic attributions for each specimen are given in the report. Kabri has also produced fish bones belonging to the Serranidae, Mugilidae and Moronidae families (Lernau 2002: Table 13.3). Unfortunately, aside from one vertebra of a Mugilidae that appears in Tomb 1105 (EB IA), there are no stratigraphic attribution to these bones. All three families are found along the Mediterranean coast (*idem*, 411-412, 415-416). A total of 350 marine shells were found at Qiryat Ata in EB IB and II contexts, among them 182 *Glycymeris insubrica*[89]; 89 were found near a basalt tournette in an EB II context (Reese 2003). Other Mediterranean shells found in EB II contexts are C*erastodermata edule glaucum*, *Donax trunculus*, *Patella caerulea*, *Murex trunculus*, *Murex brandaris*, *Conus mediterraneus*, *Phalium* (helmet shells) and a *Lambis/Stombus. Glycymeris* and *Cerastodermata* were also found in some EB IB contexts in Area A. Most of the examples from these contexts were perforated, probably to be used as ornaments. The only species reported from the Red Sea is *Tonna sp*, found in EB II contexts (*idem*).

On the shores of the Sea of Galilee, *Clarias* bones were found in Tel Kinrot (Ziegler and Boessneck 1990). This fish could have its origin in the Nile or from local coastal rivers, as suggested by Lernau (1986/7).

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[89] Known previously as *Glycymeris violascens*. I own this information to Henk K. Mienis to whomI am indebted.

Table 15. Mollusca according to their provenience and period.

Table 16. Fish remains according to periods.

Jezreel Valley

At Yiftahel a relatively large number of marine shells were found in Strata II (EB I), and in mixed fills (Bar-Yosef Mayer 1997b). Most of the shells from the EB I are derived from L60, which has been identified as a courtyard or utility area in an open space. They belong to two main species: *Glycymeris insubrica* and *Acanthocardia tuberculata* (*idem*, Table 23.1), with some of them bearing perforations.

A similar range of species was recovered from the EB I and EB II-II strata at Tel Qashish (Bar-Yosef Mayer 2003a). Specimens of *Conus mediterraneus*, *Cerastoderma glaucum*, *Dona trunculus*, were also found, all deriving from the Mediterranean Sea. Interestingly, one fragment of *Tonna sp*. found in an EB II context, is derived from the Red Sea (*idem*, 420). At this site, small bones from a flat-headed gray mullet (*Mugil cephalus*) dating to the EB I were identified, and a sea bream (*Sparus aurata*) from an EB II context. These species both originate in the Mediterranean Sea (Lernau 2003).

At Megiddo three shells from the EB IB strata represent examples of long-distance trade. One is a Red Sea *Dentalium sp.* bead.[90] Another Red Sea shell is represented by two fragments of *Pinctada margaritifera*, a mother-of-pearl. The third is a fragment of *Chambardia rubens* from the Nile River (Bar-Yosef Mayer 2000: 480-481, Table 16.1). Fish remains were also found of species probably originated in the Mediterranean (Lernau 2000). *Chambardia rubens* is known also from Tel Taanakh (EB II?) (Ezzughayyar and Al-Zawahra 1996). At this site, remains of *Epinephelus* fish were also identified, probably from the Mediterranean Sea (Al-Zawahra 1999).

Jordan Valley

In the Jordan Valley, the excavations at Tel es-Saidiyeh (Tubb 1988) have produced (for the seasons of 1985-1987) two ground-down and perforated *Nerita*, a perforated *Engina*,

[90] Similar specimens were found in the *nawamis*, in southern Sinai (Bar-Yosef Mayer 1997a, 1999a).

and two *Conus annulus*, the last three from burials (Reese 1991: 161). All these shells originate in the Red Sea, and probably date to the EB III.[91] At Tel Abu al-Kharaz, several species of *Nassarius* were found in the main phase of the EB II occupation in the site, among them *N. circumcinctus* and *N. gibbosulus* (Fischer 1993: Pl.III:1). All these species come from the Mediterranean Sea.[92] All specimens are perforated and described as belonging to a necklace strung together with other beads (Fischer 1993: 285).

Jericho has probably produced the most varied range of marine shells in relation to other EB I to III sites. From the Mediterranean, dozens of *Glycymerys insubrica* and *Cerastoderma glaucum* are represented (Biggs 1960:386; 1963:125).[93] Most of them are preforated, part were found in caches, and reconstructed by Biggs (1963:Fig.1 a, b) as necklaces. In addition, there is a worn and perforated *Murex trunculus* (?), and a perforated *Murex haestoma*. Three *Donax trunculus* were also found, some of them showing signs of chipping on the edge. Red Sea species represented are two *Nerita sp.*, perforated at the beginning of the whorl, six *Murex anguliferus*, one fragment each of *Cypraea turdus*, a *Cypraea erosa* lip, a *Conus arenatus* with a broken apex, a perforated example of *Conus taeniatus*, and *Terebra* (Biggs 1963:126-127; Reese 1991:164). A specimen of *Cypraea* from the Mediterranean or the Red Sea was found in Tomb A 127, and dated to the EB II (Kenyon 1960: Fig. 28:3; Reese, *idem*). One of the *Nerita* was found in Tomb A 94 and dated to EB IB, the second one was retrieved from Tomb F 3,

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[91] Shells from later seasons are not been published yet (e.g. Tubb and Dorrell 1994: 63).

[92] The shells from Ai, Givatayim, Wadi Fidan 4, and part of those from Tel el-Farah (N) and Bab edh-Dhra were identified by Henk K. Mienis, to whom the author is indebted.

[93] In the report by Biggs (1963:125), they are reported as *Cardium edule*, which is actually the Atlantic parallel of this species. I own this information to Henk K. Mienis.

and dated to EB III (Kenyon 1981: Fig. 55:1E). A trapezoidal-shaped pendant made of a shell (no species is noted) was found in Tomb F4 (EB III; Kenyon 1960:146, Fig. 48:4).

Central Hill Country

In the Central Hill Country, at Tel el-Farah (N), in Tombs 5 and 14, dated to the EB IB, five shell bracelets of *Cypraea monata*, one necklace composed of dozens of *Glycymeris sp*. and one worn *Phallium granulatum undulatum*, all coming from the Mediterranean Sea, were found (de Vaux and Steve 1949: 126, Pl. VIb:1-3, 6-7; de Vaux 1952: 582, Pl.XVII:1-2; Reese 1989: 37). Furthermore, seven fragments of *Asphataria rubens*, many of them perforated originating in the Nile River were found in EB IB Tombs 9, 11-13 (de Vaux and Steve 1949: 126, Pl. VIb:4-5; de Vaux 1951: 572-587, Pls. XXVIa:3,b:17, XXVIIb:1; 1952: 577, Pl. XVIIb:3,8)

A cache of shells, identified as *Cerastoderma glaucum*, was found at `Ai Area C VII (Callaway 1980:125, Fig.85). The cache consists of 19 perforated pieces from Phase V, i.e. EB II, and must belong to a necklace. Another perforated shell, identified as *Glycymeris glycymeris,* was found in the sanctuary in Area AII (Callaway 1972: Fig. 33:31, Pl. XVIII:2). It belongs to Phase III, dated to the terminal phase of EB I. Both species come from the Mediterranean Sea.

At Jerusalem (City of David), two molluscs were reported from EB I Stratum 20.[94] One is a small fragment of a pendant made from *Conus textile neovicarius*; it was found in Floor 2612. This species originates in the Red Sea (Mienis 1992:124). The second is represented by three shells found on Floor 2167, and identified as *Glycymeris insubrica* (one has a perforated umbo). This is the dominant bivalve on the shores of the Mediterranean Sea, representing a 85% of the *Glycymeris sp*. *Glycymeris glycymeris* represents only a 15% of the species (Mienis 1992:125-126; pers. comm).

[94] Unfortunately, no fish bones are reported for the EB.

Coastal Plain

A jar dated to the Canaanite EB IA, originating in Egypt but with some hybrid characteristics, was found submerged off the coast of Atlit, in the lee of the northern ridge of the cape (Galili et al. 2002). In this jar numerous *Chambardia rubens* shells were found, most of them complete and with their periostracum, a dark organic layer covering the shells, still intact (*idem*, 161, Fig.4). The shells were carbon dated to (calibrated) 3720-3380 BC. This example, together with the numerous fresh water mussels (*Unio*) found at Tel Qashish (Bar-Yosef Mayer 2003a), are the only definite evidence for consumption of shells in the EB. *Chambardia rubens* was also found at En Assawir, in the Wadi Ara (Bar-Yosef Mayer 2002:130-131).

At Givatayim, perforated shells were found in Tomb 4, dated to the EB IB. Among them, are two *Nerita sanguinolenta*, originating in the Red Sea, and two *Cypraea sp*. originating in the Mediterranean or Red Sea (Sussman and Ben-Arieh 1966:Pl.VIII:4). Recent excavations in Tel Aviv (Kaplan Junction) revealed specimens of *Cypraea sp*. in caves dated to the EB IB (E. van den Brink, pers.comm.).

At Azor, a relative large number of shells was found in a small excavation conducted by Golani and van den Brink (1999), dated to the EB IA. Most of the shells originated in the Mediterranean Sea, while some came from the Red Sea and the Nile River (Bar-Yosef Mayer 1999c). Among those originating in the Mediterranean are *Glycymeris insubrica* (*idem*, Fig. 18:3-4), and *Donax trunculus*. From the Red Sea, a fragment of a bracelet made from *Lambis truncata* was found *(idem*, Fig,18:1). This bracelet is of the "Canaanite" type of bracelets cut from the body of the shell; hundreds of parallels to these bracelets were found in the nawamis at Southern Sinai (Bar-Yosef Mayer

2002:131-133).[95] *Chambardia rubens* is a Nile shell (*idem*, Fig. 18:5). From the EB IB a broken shell of *Chambardia* was found in Tomb 4 excavated by Ben-Tor at the same site (Ben-Tor 1975a: 28, Pl.24:3; Reese, Mienis and Woodward 1986: 80), while some 20 beads from Tombs 1 and 4 are made of small pierced shells (*Dentalium* sp.?; Ben-Tor 1975a:23, Fig. 12:20-22). A bone of *Epinephalus sp*. (Serranidae), was found during the excavations of Golani and van den Brink (1999) (EB IA) and originates from the Mediterranean Sea (Horwitz 1999:36).

In the Ayalon-Lod Valley, one fish bone was found at Tel Dalit in Area B, Stratum IIa (EB II), but no species is given (Horwitz, Hellwing and Tchernov 1996:196, Tables 2-3, Fig. 3). In the 2000 excavation season at Lod (Yannai and Marder 2001), several shells were retrieved from what appears to be the terminal phase of the EB IB and the EB II. The shells were identified by D. Bar-Yosef Mayer as *Chambardia rubens*, *Nerita sp*., *Glycymeris insubrica*, *Conus sp. and Cerastoderma glaucum*, all of them from the Mediterranean Sea, though the *Conus* could also be from the Red Sea. A perforated piece of *Cerastoderma* (probably a pendant) was found in Area C. In Area A2 a cache of *Glycymeris insubrica* was found containing dozens of shells; it is dated to EB IB (Figure 18).

Hundreds of *Glycymeris sp.* were found at Palmahim, and were associated with round installations in Stratum I (EB IB; pers. observ.). *Chambardia sp.* was also encountered at this site in Stratum I (Bar-Yosef Mayer, forthcoming). Several *Glycymeris insubrica* were found at Lachish (Bar-Yosef Mayer 2004:2493).

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[95] According to observations made by Bar-Yosef Mayer (2002:132), bracelets of the Canaanite type were cut from the body of the large *Lambis truncata* and therefore have a somewhat triangular or twisted shape. Some of the sites in southern Sinai, like Wadi Watir VIII, contained the same type of bangles, together with bangles manufactured from the same mollusc but made in Egypt .

Further to the south at Afridar (Ashkelon), *Chambardia rubens* was found together with other shell species in Area G (Braun and Gophna 2004:219).[96] Fish remains from Areas E, F and G (Lernau 2004) provide information about five families, four from the Mediterranean Sea (Serranidae, Sparidae, Sciaenidae and Elastomobranchi) and one (Centopomidae), a *Lates niloticus* (Nile perch), that originated in the Nile River.[97] These bones must be dated in general to the EB IA, although there is a possibility that in Area E and F some of them appear in mixed Chalcolithic-EB IA contexts. According to Lernau (*idem*, 301-302) there are several indications that the fish remains of Area E were processed by drying, salting or smoking. In this area fish bones represent 8% of all animal bones; moreover, the state of preservation of the bones is much better here than in other areas of the site.

Chambardia was found as well at En Besor (Reese, Mienis and Woodward 1986, Bar-Yosef Mayer 2000:481, Horwitz et al. 2002:118-120). At this site a serrated tool made of *Chambardia rubens* was identified as a fish scaler. Similar objects were reported by McDonald (1932:Pl.XXIII:33,35) from his excavations at Nahal Besor (Site H).

Next to the coastal shores and the junction with Nahal Besor, Taur Ikhbene (EB IA and IB) produced 31 shells of Mediterranean origin in addition to one *Chambardia rubens* (Horwitz et al. 2002:116-117, Table 6). The EB IB strata at Tel es-Sakan yielded Mediterranean taxa such as *Glycymeris sp., Ostrea edulis, Cerastoderma glaucum, Donax trunculus* and *Nassarius circumcintus* and Chambardia sp. (de Miroschedji et al. 2001:90).

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[96] The collection of shells will be published by D. Bar-Yosef Mayer (pers.comm.).

[97] It should be noted that until recently it was thought that *Lates niloticus* may have lived in the rivers of the Southern Levant (Lernau 1986-87). For this reason DNA studies on the bones of this fish were recently carried out (Arndt et al. 2003). Their results prove that *Lates* derives only from Egypt.

Shephelah

At Lower Horvat Illin near Bet Shemesh (Braun and Milevski 1993, Milevski 1993), several fragments of *Chambardia rubens* were found. A few kilometers to the south, Tel Yarmuth yielded the following molluscs in the excavations by Ben-Tor (1975b:73): *Cytracea*, *Glycimeris, Cerastoderma glaucum, Cardium tuberculatum,* and *Natica sp.,* all of them from the Mediterranean Sea. Only one shell, *Nerita sp.,* derives from the Red Sea. Fish vertebrae were also found, but no specification about species is reported. The excavator related these finds to the EB III.

Tufnell et al. (1958:323-324) reported several EB shells from the NW caves and the NE section at Lachish. Almost all originated in the Red Sea (e.g. *Planaxis, Nerita,* and *Ancilla ovalis*), while one Mediterranean species, *Pectunculus* sp. was found in the NE section. A single *Nassa circumcinta,* found in one of the caves, could come from either the Mediterranean or the Red Sea. None of these finds has a clear chronological attribution within the EB.

A recent salvage excavation near the western part of Horvat Ptora produced several fragments of *Chambardia* sp. from EB I layers (pers. observ.), as did Tel Erani (Bar-Yosef Mayer 2002).

Further to the south, Tel el-Hesi yielded some fish bones and sea shells. They are described as originating in the Mediterranean but no specific species are given (O'Connell 1978:89; Toombs 1983:44).

Northern Negev

At the Halif terrace ("Silo site") examples of *Glycymeris sp* and *Cardium sp*. were found in Stratum II, dated to late EB IB, as well as a shell of *Strombus sp.* (Alon and Yekutieli 1995:181, Fig. 28:1). The former two originated in the Mediterranean Sea, while the latter comes from the Red Sea. The report by Zeder (1990:27-28, Table 8), mentioned also fish from the EB IB and EB III strata but these remains were scarce. They probably originate in the Mediterranean.

At Arad several *Glycymeris insubrica* (Figure 19:1) and fragments of *Chambardia rubens* were found in EB IB and II strata (Reese, Mienis and Woodward 1986: 82, Bar-Yosef Mayer 2002) (Figure 19:2). A juglet was found *in situ* together with a pendant and several beads made of mother of pearl (Amiran et al. 1978: Pl. 119). A *Terebra* shell (Bar-Yosef Mayer 1999a) was found also at Arad (Amiran et al. 1978: Pls. 68:19, 118:11,13) together with other Red Sea species (Figure 19:3). Another specimen of *Terebra* shell was found in an EB II locus[98] at Rekhes Nafha 396, north of the Ramon Crater in the Negev hills (Saidel 2002: 57, Fig. 14:12) .

Dead Sea Plain and Aravah

Tomb A76A at Bab edh-Dhra has produced a shell bracelet made from *Lambis truncata sabae* (Rast and Schaub 1989:310-312, Fig. 183). This shell originated in the Red Sea and is dated to EB IA. From Charnel House A 21 at this site (EB II-III), there are several exemplars of *Ancilla sp.* (*idem*, 463-464, Fig. 266, 2nd and 3rd rows) that originate from the Red Sea, as well as *Glycymeris insubrica* and *Glycymeris sp.* (*idem,* 3rd and 4th rows). Dozens of *Conus* shells were found in Charnel houses A 21 and A 51 (e.g. *idem*, 467-468, Figs. 266, 3rd row; 269, 1st row; 270) and could derive either from the Mediterranean or the Red Sea. Some of the *Conus* were polished at both ends. Hundreds of shell beads were also found in the tombs. Charnel House A 8 contained a trapezoid made of mother-of-pearl from the Red Sea, probably *Pinctada margaritifera* (Haas in Schaub and Rast 1989:456, Fig. 262:1),

Another large assemblage of shells was found in the EB IA site of Wadi Fidan 4. It includes 317 molluscs from 13 different species, comprising marine, fresh water and land

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[98] The dating to the EB II is not certain since EB IV remains are also present in the site.

varieties (Adams and Genz 1995: 16, Fig. 7:9-10; Adams 1999: Fig. 5.27). Of these, five species of marine shells were used for ornamentation, including bracelets and pendants/beads. These included *Glycymeris insubrica* (7) and *Cypraea spurca* (1) from the Mediterranean and *Lambis truncata* (5), *Nerita polita* (2), *Pteria sp.* or possibly *Pinctada sp.* (2), from the Red Sea. The fragments made from *Lambis truncata* were found as five pieces of a shell bracelet (Adams 1999: Fig. 5.27: 5–9), and five of the *Glycymeris* shells had been perforated, possibly for use as pendants/beads (*idem*, Fig. 5.27: 1–4).

Further to the south, at Biqat Uvda, shells of 31 different species originating in the Red Sea were found in Site 911 (Mienis 1990). The site contains a mixed assemblage of EB II and IBA pottery (Reich 1990). It is probable that part of the shell sample belongs to the EB II occupation period of the site. Among the species represented are *Nerita*, *Strombus*, *Morula*, *Conus* and *Glycymeris arabica* (idem, Table 1). In addition one bead made of a *Dentalium elephantium* (Beit-Arieh 2001: Fig. 4:30.) was encountered in an EB II context at Site 917. The shell most probably originates in the Red Sea.

Discussion

It is suggested here that marine shells found in sites located far from the Mediterranean and Red Seas were collected as a product of different forms of exchange: 1) direct collection of the shells, 2) exchange of the shells from the coast with local populations conducted by middlemen, 3) gift-giving by people from the coast in exchange for other gifts from people of the interior region, but not part of a whole system of gift-giving.

According to the distribution patterns (and see Map 16) it does not seem plausible that a Kula-like system existed in EB Canaan. But even gift-giving ceremonies had the intention of advancing the economic interest of the populations, since without these ceremonies no economic trust could exist (Weiner 1992:131-148). Besides, even with the existence of the Kula institution, other forms of barter existed in the Tobriand Islands that included fish and other commodities. It seems possible that during the EB in the Southern Levant, not all the shells had the same value and use, and for this reason different circulation patterns probably existed that are difficult to track in the archaeological record.

It is clear that *Murex* shells found at Qiryat Ata and Jericho could not be part of the exploitation of the species in purple-dye or lime production, since such industries need thousands of shells (cf. Reese 1979-80, 1987). It is more likely that in EB Canaan single *Murex* shells were worn as pendants, or used as containers or votive objects in tombs together with other exotic molluscs. Small bivalves and cockleshells such as the *Murex* could be used as containers for cosmetics as in the cases described by Kenoyer (1997) in the Indus Valley.[99]

Chambardia and *Pinctada margaritifera* mother-of-pearl shells may have been collected for aesthetic purposes. It seems that the exchange of *Chambardia* coincides with Egyptian influence, beginning with the EB IA and becoming fully developed in the EB IB. *Nassarius* and other species were utilized to make beads.

No debris from working these shells was found in EB sites as at Ebla, where there appears to have been a workshop for the manufacture of shell and mother-of-pearl objects, among other special fine crafts (Akkermans and Schwartz 2003: 271-272). Adams (1999:127) has pointed out that the fact that no debris of mother-of-pearl was found in Levantine sites, taken together with the non-local nature of the species, suggests that these

[99] In the Ur III period, these types of shells were used for cosmetics as well (Danti and Zettler 1998). White, green, blue yellow, red purple and dark brown/black pigments occur in the cockle shells, with green and black pigments being the most common. XRD and XRF techniques were used to determine the composition of the pigments found in those shells. The green material seems to be copper, the black kohl for the eyes (Bimson 1980:75-77).

items arrived as finished items. However it is more likely that these shells arrived as "raw material." *Chambardia* is a very soft shell and is probably best suited to be used as an inlay, although whole shells are often found rather than cut pieces. It is possible that they were consumed as in the case of the contents of the jar found off Atlit suggests.

Bar-Yosef Mayer (2002) suggested that the *Lambis truncata* bracelets that arrived in Canaan followed a Sinai route, up through the Negev and the Aravah. All the Red Sea species arrived through the Aravah Valley and were distributed to the west and north through the valleys and *wadis* running to the Mediterranean and the Jordan Valley. The other route originated in Lower Egypt and transportation was along the Northern Sinai route which followed the Mediterranean coast. On the other hand, we have confirmation from some of the settlements of the coastal shores of Canaan that *Chambardia* may have arrived from Egypt via a maritime route. If there was also transportation along the Northern Sinai route, it is interesting that it did not deviate southwards, since not a single fragment of *Chambardia* was found in the *nawamis.* There are, however, many artifacts made of *Pinctada margaritifera* which is also a Red Sea species. These primarily include a few hundred disk beads and other unique artifacts and pendants (Bar-Yosef Mayer 1999b).

Numerous shells exhibit perforations (whether natural or not) including numerous *Glycymeris sp.* examples. We suggest that the several cases where *Glycymeris* were found in caches of dozens and hundreds of items (e.g. Palmahim, Lod and Qiryat Ata) may be interpreted in two ways: either they were stored for future exchange, or else used in the fabrication of lime, as in the case described by Reese (1979-1980). The fact that the cache of Qiryat Ata was found near a tournette for pottery fabrication could imply that *Glycymeris* (and other ?) shells were crushed to be mixed as temper into the clay of the vessels. Bar-Yosef Mayer (pers. comm) has also suggested that *Glycymeris* caches were used for floor make–up since they are lighter than stones and have a raised middle part so that water could drain off.

The Mediterranean shells arrived in the east of the country through the same valleys and *wadis* as the Red Sea species arrived to the Mediterranean coastal plain and the Shephelah. These shells reached the Hulah Valley in the north and Wadi Fidan in the eastern Aravah in the south.

Based on the outline of the chronological framework (cf. Table 15), it is apparent that the spatial distribution of shells changes during the course of EB II and EB III periods, when not only the Egyptian *Chambardia* almost disappear, but also the Mediterranean and Red Sea shells decrease in number. Jericho is the only site that may have been at the center of the network during the whole EB, having species from the Mediterranean and the Red Sea, but not from Egyptian origins. It is possible that the *Chambardia* shells that arrived in the eastern Jordan Valley utilized a route that went across Tel el-Farah (N) and not the route going through the Shephelah and the Judean mountains down to Jericho. *Chambardia* did not reach the Southern Negev, the Dead Sea Plain or the Aravah. The southernmost site where this species was found is Arad. This is further proof of the existence of two separate circulation networks: Red Sea species on the one side and Nilotic species from the other (whether they arrived by terrestrial or maritime routes).

Fish remains are few and in some cases were not identified. Most of the species originated in the Mediterranean, with one case only of Nile perch. In general the sites where fish bones were found are near or on the shores of the Mediterranean. Tel el-Hesi and Tel Halif are at a distance of ca. 30 and 50 km respectively from the sea. While we have a limited amount of information, we can suggest that fish transported beyond a certain distance would have been processed before shipping, either by drying or smoking.

From later periods we have abundant data on these processes as well as salting[100] (e.g. Curtis 1984, Desse-Berset and Desse 2000, Delussu and Wilkens 2000, de Grossi Mazzorin 2000). From the Akkadian dynasty and UR III in Mesopotamia (fourth quarter of the 3rd millennium BC) we have descriptions and values of exchange for smoked fish (Zaccagnini 1976:555-557).[101]

It seems that species coming from Egypt must surely have been treated before they arrived in Canaan. As described by Lernau (2004), Afridar could have also been a locus of fish preparation.

HIPPOPOTAMUS AND IVORY OBEJCTS

This section will deal with the remains of *Hippopotamus amphibius* and ivory objects, mainly bull heads made of hippopotamus teeth. It is assumed that hippopotamus was exploited in herds on the coastal plain where suitable conditions existed for these beasts, thousands of years after the earliest hippopotamus invaded the Southern Levant from Africa during the Pliocene. This is documented in the archaeological records (Tchernov 1988, Horwitz and Tchernov 1990).[102] A last invasion of hippopotamus could have occurred during the maximum glacial period (ca. 18,000 BP) with populations of hippopotami reported from Northern Syria in the Orontes Valley (Horwitz and Tchernov, *idem*). In the Southern Levant *H. amphibius* seems to have become extinct by the Iron Age (Tchernov 1988).

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[100] It is generally accepted that the earliest forms of preserving fish were sun-drying and smoking, and that salting is a later method.

[101] Other references to the acquirement of fish from Dilmun appear in the Summerian literature (Pettinato 1972:93), together with edible molluscs.

[102] Cf. Martínez-Navarro 2004: 43.

Although ivory finds from the EB are rare, in contrast to the previous Chalcolithic period (e.g. Perrot 1959, Bar-Adon 1980:16-23,152 Barnett 1982:23-24), the production and exchange of these objects during the EB II-III has been the object of several studies (e.g. Ben-Tor 1968:125-127, de Miroschedji 1993, Beck 1995:21-25). We have to bear in mind that ivory objects in Canaan were made of hippopotamus teeth (e.g. Caubet and Poplin 1987, 1992, 1995). The advantage of hippopotamus teeth over the elephant tusks is that they retain their whiteness over time. In addition, hippopotamus tusks are also smaller in size and are locally available in contrast to the elephant which was already extinct in this region by the EB (Horwitz and Tchernov 1990:67).

In light of new faunal data that we will present in the following section, and the distribution of the ivory bull heads, it seems that we have to expand the habitat areas of the hippopotami in Canaan to the Jordan Valley during the EB.

Hippopotamus remains

Several excavations have yielded bone remains of *H. amphibius*. Some finds were ascribed to the EB even though they are not dated with certainty (Map 17**,** Table 17).

The northernmost appearance of *H. amphibius* is the excavations of P. Bar-Adon, O. Yogev and E. Eisenberg at Bet Yerah, currently being prepared for publication by R. Greenberg (L.K. Horwitz, pers. comm.). Long bones and two canines were found in a context tentatively dated to EB II or III. Close to this site, hippopotamus remains were found on the shores of the Sea of Galilee, near the beach of Kibbutz Ginossar (R. Rabinovich, pers. comm.). These remains prove that the lake was once the habitat of hippopotamus.

Table 17. Hippopotamus faunal remains according to sites.

(*) indicates that the date of the remains are not sure.

Sites	***EB II***	***EB III***
Bet Yerah	+?	+?
Kinneret*		
N.Hataninim*		
Yarkon River*		
T.Aphek	+	
T.Dalit	+	
`Ai	+	
T.A. al-Kharaz	+?	+?
Jericho		+
T. el-Hesi*		
Arad	+	

Other surface finds of *H. amphibius* from Nahal Hataninim and the Yarkon River in the Central Coastal Plain (Horwitz and Tchernov 1990: Fig. 4 quoting Bytinski-Salz 1965). A metapodial bone from an EB II context belonging to a hippopotamus was reported at Tel Aphek also, in the Yarkon River basin, (Hellwing and Gophna 1984: Table 2, Hellwing 2000:305-306, Table 15.19). Further to the southwest, two bones (a metacarpal and a phalanx) were recovered from Tel Dalit in Area B. These bones were found in a broadroom in Stratum II (EB II; Horwitz Hellwing and Tchernov 1996: 197, Table 2, Fig. 3). At Gezer some hippo remains were reported but no dates were given (Horwitz and Tchernov 1990: 71-72).

In the Central Hill Country, a tusk was retrieved at `Ai from a fill outside the east wall of Building C in Phase III, which is dated to EB II (EB IC in the terminology of the excavator). The exact date of the tusk remains uncertain. It was identified by I. Cornwall as a lower right canine (Callaway 1972: 112-113, Pl.XII:1).

In the eastern Jordan Valley, hippopotamus tusks have been reported by P. Croft from Tel Abu al-Kharaz, ca. 4 km east of the river, but is not clear from the report (Fischer

1997:160) if they belong to the EB levels. However on the basis of the presence of a cylinder seal or a necklace bead made of hippopotamus ivory and dated to the EB II/III (Fischer and Herrmann 1995**,** Fischer 2002:330, Fig.21.3:1), it is suggested that we see the hippopotamus remains as part of the EB assemblage at the site.

Further to the southwest, the recent excavations of the Italian-Palestinian team at Jericho produced some remains of a hippopotamus. Several fragments of a calcaneum and fragments of other long bone were found in a residential area of EB III (Alhaique 1999: 298, Table 1).[103]

In the Shephelah, Horwitz and Tchernov (1990:71-72) document remains from Yeivin's (1957) excavations at Tel Erani supposedly dated to EB, and they report undated remains of hippopotamus from Tel el-Hesi that eventually could have derived from the EB III occupation period of the site.

Finally, at Arad two lower incisor fragments of *H. amphibius* were found in Stratum II, i.e. EB II (Davis 1976: 163).

Bull's Heads from Ivory and other materials

Besides the hippopotamus faunal remains, several carved objects made of hippopotamus teeth were found in EB II-III contexts. They represent a bull's head with carved round eyes with incision lines above them, lateral perforations depicting the ears, and holes in the base of the neck. Some of them have a perforation for the horns. It is assumed that eyes and horns were inserted into the holes. A triangle was engraved on the forehead and the neck, which is hollow and exhibits skin-folds in the middle of it (Figure 20:1-5). In addition, similar objects made of bone (e.g. Figure 20:6) and stone were found. The distribution of these heads reveals the following (Table 18, Map 17):

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[103] I thank Rivka Rabinovich and Liora K. Horwitz for referring me to this information.

Table 18. Bull's heads from ivory and other materials according to sites.
Types correspond to de Miroschedji 1993:Table 1.

Sites	*Type*	*Material*	*EB II*	*EB II/III*	*EB III*
B. Yerah	1B	Ivory			+
`Ai	2	Ivory	+		
	1B	Ivory			+
Jericho	1B	Stone		+	
	1B	Ivory			+
T. Yarmuth	1A	Bone	+		
B.edh-Dhra	1B ?	Bone			+
Arad	1B	Ivory	+		

At Bet Yerah an ivory bull's head was recovered from the EB III stratum at the site (Bar-Adon 1957, 1962). The bull's head is 4.4 cm in height and 3.4 cm in width**.** It has holes for inlaid eyes, ears and horns.

At `Ai two bull's heads (Ben-Tor 1972:24) were discovered, originated in Room 116 of Sanctuary A (Marquet-Krause's 1939:20-21, Pl. XCIV), dated to EB IIIA. The second was found in the excavations of Callaway (1980: 123, Figs. 83, 91:21) in Phase V, dated to EB II.

Jericho has yielded two bull's heads as well. One (Figure 20:3), made of ivory, came from the Garstang excavations (Cleveland 1961). It is very similar to those from Bet Yerah and `Ai (Sanctuary A) and dated to EB III. The second bull's head is made of stone, and was found in EB III tomb D 12 (Kenyon 1960: 125-126, Fig. 40:2, Pl. VII:2) in Layer 1. It has a triangle of bone inlaid in the forehead, and it has holes for inlaid eyes, ears and horns.

At Tel Yarmuth a fragment of a bull's head made of bone was found in level B-IV, late EB II (de Miroschedji 1988: Pl.48:1, XXIV:1). The upper part is missing, while it has holes for an inlaid nose, and incised parallel lines above the holes.

At Arad a similar fragment, also from the lower part of the head, was found in Locus 748, which was defined as belonging to stratum III or II, i.e. EB II. It is made of ivory and was defined by the excavator as “a decorated ivory handle” (Amiran 1978: Pl.120:9). The incised lines of the nose can be seen, but no holes for inlay are present.

At Bab edh-Dhra (Wilkinson 1989b: 456, Fig. 262:2) a bull’s head made of bone was found in Charnel House A 21. It was found near a group of skeletal remains and dated to EB III.

Discussion

As has been observed (Beck 1995) the distribution of the bull’s heads sculpted in ivory and other materials is concentrated in the Rift Valley and adjacent areas such as the Central Hill Country, the northwestern Negev and the Dead Sea Plain. This distribution is more understandable with the new data from the findings of hippopotamus remains in Bet Yerah, Tel Abu al-Kharaz and Jericho. Bone and stone were used instead of ivory due to the rarity of ivory in the country.

Until now the proposed habitat for these animals was the Mediterranean coast and perhaps the rivers of the Central Coastal Plain including Nahal Hataninim, the Yarkon River, Nahal Lachish and Nahal Shiqma. In this setting, it was clear that the tusks found at Arad and `Ai were the result of exchange with the areas where the hippopotamus lived. The existence of faunal remains of hippopotamus other than teeth at Bet Yerah and Jericho suggests that at these places hippopotamus herds also existed. Alternatively, it is interesting to note that at both Jericho and Bet Yerah the finds are foot bones which could have remained with a skin that was transported to these sites[104] or else the bones could have arrived as a luxury food item.

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[104] This is common for antelopes which often have the foot bone still attached to the skin in order to stretch the skin. I owe this suggestion to Liora K. Horwitz.

As was pointed out in Chapter 3, it was a change in the sphere of distribution of northern pottery in the Southern Jordan Valley and the Dead Sea area (e.g. Jericho, Bab edh-Dhra), that was expressed in the absence of MW in this area. This change in the distribution northern pottery reverts back in the following EB III. The distribution of ivory and bulls heads is consistent with the new situation in the EB III, although it begins in the EB II.

The phenomenon of the bulls heads in Canaan is a local one, even if reminiscent of a northern influence (cf. de Miroschedji 1993:38). Both from an iconographic point of view (Beck 1995: 23) and the carving technique (Caubet and Poplin 1995:489), the Canaanite workshop(s) worked with a quite different approach from those of Syria and the region of the Euphrates, which manufactured other objects. We prefer to see in the bulls heads the result of several workshops rather than one (cf. Ben-Tor 1972) because the iconographic, chronological and raw material features of the different items are not exactly the same (cf. Table15b). It is clear that the hollow in the base of the heads facilitated the head to be fixed, most probably to a stick. It is most likely that the bull's heads were the upper part of a scepter (de Miroschedji 1988: 87, 1993; Beck 1995: 24), and not a decorative element of furniture - a chair for instance, as proposed by Garstang (1932:18) - since no pairs of these objects have been found. As the bull's heads were recovered mostly in cultic or burial contexts, it must be assumed that they were utilized in certain ceremonials or rituals. As Beck (1995:25) has pointed out, the figure of the bull has numerous identifications with deities in the Ancient Near East, and is associated with the royal authorities (cf. Ornan 2001; Borowski 2002: 407-408).[105] At

[105] Other representations of bulls are found on a stone statue at Arad, which finds a parallel with a bull's statue from Ebla (Amiran 1980b, 1986), and abundant clay figurines representing cows (e.g. Greenbeg 1996:

Ugarit, for instance, the bull is the most frequently encountered animal appearing as the epithet for the gods El and Baal (Foster 2002:299, Borowski, *idem*).[106]

There are, however, several possibilities about the way in which the production and exchange of the bull's heads were conducted by the workshops. One possibility is that a number of workshops existed during the EB II and III in the Rift Valley, and that these workshops provided bull's heads for scepters for the authorities of the cities. This option includes the possibility that workshops existed near the hippopotamus herds or that tusks were acquired from hippopotamus hunters. The second option assumes that the central powers of the cities controlled the artisans or that these authorities "imported" the tusks from distant sites, including those from the coastal plain, as in the case of `Ai and Arad. A third possibility was pointed out by Barnett (1982:11) and de Miroschedji (1993:39); namely the existence of itinerant carvers who brought with them the raw material and did the work on demand. This possibility is also plausible, but less probable in the light of the recent findings of hippopotamus remains at Bet Yerah and Jericho.

Fig. 3.38:6-8; Yadin et al. 1964: Fig.155:31-35; de Vaux 1952: Pl.XIV; Kenyon 1960: Fig.40:1; Amiran et al. 1978: Pl. 117)

[106] At Tel Brak , for instance, a human-headed bull was found in temple SS and is perhaps associated with the god Shamash (Oates and Oates 1991a; Akkermans and Schwartz 2003: 280, Fig. 8.27)

Chapter 9

MINERALS

Minerals as exchanged commodities, other than stones for flint and ground-stone tools, are presented in this chapter. The main mineral described here is bitumen, for which we have good information on its geological sources and archaeological find spots.

Carnelian is the second most important mineral. Unfortunately, the data here are restricted to finds; there is no clear proof of the sources that supplied the EB people with raw materials for beads. Other minerals are even less in evidence in the archaeological record.

Sulphur is reported in the preliminary reports from Tel el-Hesi (O'Connell 1978:89) but no analysis of the material was given, and it is suggested that it originated, as did bitumen, in the Dead Sea (Amar 1998). Ocher was reported from Tel Halif ("Silo site"; Alon and Yekutieli 1995:181). For all these materials we have no sufficient data.

Salt has been suggested as one of the raw material exchanged between the Dead Sea region and other parts of the country via Jericho (Anati 1962). However, there is no archaeological proof for such exchange.[107] Kahal (stibium) is registered in the known paintings of Beni Hasan (beginning of the Canaanean MB IIA) (Newbery 1893, Wilson 1955:229), and it probably originated in the Hermon mountains (Miron 1990), but no remains of this material have been registered from the EBI-III in Canaan.

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[107] The exchange and trade of salt has been the focus of considerable research in the archaeological, anthropological and historical fields (Rathje 1972:390-391, Godelier 1977, Guichard 1997, Amar 1998.)

1. BITUMEN

MATERIAL AND SOURCES

Natural occurrences of bitumen are in two forms in the Dead Sea Basin: either as massive blocks that can weigh several dozens of tons, and which occasionally float to the surface of the lake; or as veins and seepages within rocky outcrops in *wadis* draining into the south-west corner of the basin, between Mount Sedom to Massada (Nissenbaum 1978:838-839; Nissenbaum and Goldberg 1980: Fig.4). While the appearance of blocks in modern times is extremely sporadic, it is likely that they may have appeared much more frequently in antiquity (Nissenbaum, Aizenshtat and Goldberg 1980:157).

Collection of bitumen has been described by classical historians and geographers, such as Diodorus Siculus, Strabo, Josephus Flavius and Pliny (cf. Nissenbaum 1978), who refer to the material as an important trade commodity especially to Egypt. Reports of Dead Sea bitumen from the Middle Ages until recent times are scarce, but both the Persian traveler Nasir-I-Khausrau and the Crusader period monk Burchard of Sion mention its use and trade. Robinson (1841) and others (and see Nissenbaum 1978: 841) reported the appearance of large quantities of bitumen on the surface of the Dead Sea in 1834 and 1837, when the local Jehalin Bedouins on both occasions sold some 3,000 kg of this material in Damascus.

Systematic studies of the chemical composition and early use of bitumen were initiated by Nissenbaum et al. (1984) on samples recovered from Arad and Small Tel Malhata, demonstrating that they are similar in composition to some large floating blocks of this material recovered from the Dead Sea. Chemical analyses were made by conventional microanalytical techniques, plus infra-red spectrometry separating the bitumen into classes of compounds (*idem*,158).

In a more comprehensive study of bitumen samples from the site of Maadi[108], near Cairo, and from EB I sites (Wadi Gazzeh/En Besor Site H, Palmahim, Tel Erani), and IBA (EB IV) sites (Ein Zik, Nahal Rephaim) of the Southern Levant, all were shown to have a common origin in the Dead Sea floating bitumen blocks as well (Connan, Nissenbaum and Dessort 1992). In this dissertation as in a previous work (Milevski, Marder and Goring-Morris 2002), we assume that archaeological bitumen found in EB sites originated in the Dead Sea.

DISTRIBUTION

A review of bitumen found in archaeological contexts at EB sites is presented in **Table 19.** Map 18 reveals the following situation:

Bitumen Lumps

At Lod numerous bitumen lumps, sickle blades and pottery sherds smeared with bitumen were found in Late EB IB/II, and probably Early EB IB contexts (van den Brink 1999: 64; Yannai and Marder 2001). Lumps have been found in a pit in Area A2 and could be dated to the late EB IB (pers. observation). The Late EB IB levels are notable for yielding quantities of Egyptian pottery and flints among other finds.[109]

In the Southern Coastal Plain, the site of Palmahim Quarry has produced two lumps of bitumen from stratum III dated to the EB IA (E. Braun pers. comm.; e.g. Figure 21:1). This locus was defined as debris above the floor of one of two oval houses. One of these lumps was tested by Connan, Nissenbaum and Dessort (1992) and found to match,

[108] This site is contemporary with Early EB I (i.e. EB IA) of the southern Levant.

[109] Since preparation of the final report on excavations at Lod are in progress, frequencies according to strata and occupation areas cannot be provided.

Table 19. Distribution of bitumen and bitumen related objects.

Roman numbers relate to periods within the EB, I=EB I, II=EB II, and III=EB III.

	Lumps and objects				***On pottery***				***On flint tools***			
Sites	***IA***	***IB***	***II***	***III***	***IA***	***IB***	***II***	***III***	***IA***	***IB***	***II***	***III***
B. Shean										+		
T. Dalit						+	+					
Shoam		+				+				+		
Lod		+				+				+		
Jericho									+?	+?		
B. edh-Dhra									+?	+?		
H. Illin		+				+				+		
N.Yarmuth		+										
T. Yarmuth			+	+								
Lachish	+											
H.Ptora	+				+				+			
T.Erani	+	+										
T. el Hesi				+								
T.Hebron				+								
T.Halif	+	+										
Arad			+							+	+	
S.T.Malhata		+										
Palmahim	+	+							+?	+		
Nizzanim	+	+										
Afridar	+								+			
Site H	+											
B. Uvda											+?	
B. Nimra					+							

in its chemical content, bitumen from floating blocks of the Dead Sea. At Nizzanim, dated to EB IA (Yekutieli 1992:76; Yekutieli and Gophna 1994:180), bitumen is reported but no quantities are given. At Ashkelon several bitumen lumps were found in three excavated sites of Afridar Area A (dated EB IB; R. Gophna, pers. comm.), Afridar Areas F and J (dated EB IA; H. Kahlaily and Y. Baumgarten, pers. comms.), and Afridar G (dated Early EB I or EB IA; E. Braun, pers. comm.).[110] At Nahal Habesor (Site H), a lump of bitumen was retrieved from a level dated to EB IA (Gophna 1976, 1995a:17).

In the Shephelah, at Horvat Illit, some 40 lumps (ca. 2.7 kg**)** of bitumen were recovered from strata III, IV and V, all of which can be assigned to the Late EB IB (e.g. Figure 21:2). Some of these lumps were knapped and display signs of faceting (Marder, Braun and Milevski 1995).[111]

Tel Yarmuth is the only site where objects made of bitumen were found. One is a small bowl (de Miroschedji 1988: 87, Pl. 47:2) similar to a ceramic vessel found at the site, in level A-5 (EB II) (idem, Pl. 47:4). The second bitumen object is probably the remains of a plastered surface found in level C-IV (EB III), with an impression of a vegetal-like motif (de Miroschedji 1988: Pl.48:17).[112] At the nearby site of Nahal Yarmuth (EB IB, E. Eisenberg, pers. comm.), several lumps of bitumen were found.

In the NW area of Tel Lachish, small lumps of bitumen were found in Caves 1534, 1557 and 1556 (Tufnell et al. 1958: 71). While Cave 1534 probably dates to EB IA (Yekutieli 1992: 31), the other caves should be assigned to EB II and EB III, respectively, on the basis of associated pottery finds. Bitumen lumps were found in EB I buildings at Horvat Ptora (pers. observ.; Figure 21:3). Bitumen was found also at Tel Erani - EB IB - (B. Brandl, pers. comm.), in the frontier between the Shephelah and the Southern Coastal Plain.

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[110] For reports on the excavations see Gophna 1968; Brandl and Gophna 1993; Braun and Gophna 2004; Baumgarten 2004; Khalaily 2004; Golani and Milevski 1997; Golani 2004.

[111] Preliminary observations by A. Nissenbaum indicate that the bitumen lumps and smears of bitumen on Canaanean blades from the site (see below) seem to originate from the Dead Sea shores.

[112] A similar object was found in Stratum II at Arad (EB II) (Amiran et al. 1978: Pl. 120:20). It is described as roof plaster with reed impressions, but the material is not specified.

At Tel el-Hesi (EB III) lumps of bitumen in considerable quantity are noted in the preliminary reports of the 1977 and 1981 seasons (O'Connell, Rose and Toombs 1978:89; Toombs 1983:44).

The only site in the Central Hill Country for which we have information is Tel Hebron where bitumen lumps were found in what appear to be EB III contexts (Eisenberg, forthcoming).

In the Northern Negev at Arad, lumps of various sizes were found in the dwelling area of EB II (Strata II and III).[113] At Small Tel Malhata lumps of bitumen were found in Area C in the EB IB level of occupation, as well as in the EB II level (Amiran, Ilan and Arnon 1983: 77-80). Furthermore, at Halif Terrace's Site 101, phase 6B - EB IB - (Seger et al. 1990:4) the presence of bitumen is reported but no specific quantities are mentioned. Bitumen lumps were also found at Tel Halif ("Silo site") in Strata III and II, dated to the Early EB IA and Late EB IB respectively (Alon and Yekutieli 1995:181, Y. Yekutieli, pers. comm.). Bitumen was also found at Bab edh-Dhra in EB III contexts. There it was mainly used as an adhesive in walls and entrances of tombs (W. Rast, pers. comm.).

Bitumen with Pottery and Flints

In addition to the occurrences of raw bitumen described above, the following information on use of this material can be added. Bitumen-coated pottery sherds have been found. These occurrences are noted mostly on rims of holemouth vessels that can be definitively dated to Late EB IB. They were found at Horvat Illin (Marder, Braun and Milevski

[113] For example, lumps were found not only in the so-called sacred area within the Small Double Temple, but also in kitchens and regular rooms (Amiran *et al*. 1978:58, Amiran and Ilan 1993:87, Abb. 86). Additionally, remains of bitumen are reported on the inside of a bone handle of a copper awl in Arad stratum II - EB II - (O. Ilan pers. comm., and see Amiran and Ilan 1993: Abb. 69; Nissenbaum et al. 1984:158).

1995), Shoham (Y. Nadelman, pers. comm.), Tel Dalit in Stratum V (Gophna 1996: 134), where a dozen of sherds coated with bitumen were also reported belonging to jars and holemouth jars from both areas A and B, dated to the EB II,[114] and at Horvat Ptora (pers. observ.). Dozens of additional pottery sherds with bitumen were also found at Lod (pers.observ.) but their dating is uncertain. They probably date to Late EB IB or EB II (Yannai and Marder 2001). Figure 21:4 shows bitumen coating the interior part of a hemispherical bowl found in a pit in Area A3 at Lod dated to EB II. Bitumen adhering to sherds appears mostly on the interior surfaces of the vessels, although at Tel Dalit it also appears on their exteriors (Gophna 1996: 134). Bitumen-smeared pottery sherds were found also at the Halif Terrace “Silo site” in Strata III and II (Alon and Yekutieli 1995:181, Y. Yekutieli, pers. comm.). A necked jar, dating to the Early EB IA (Sebbane and Avner 1993: 34, Yekutieli 1992), was found in a tomb at Biqat Nimra (near Eilat) coated with an organic residue identified as bitumen (supposedly from the Dead Sea area, but still not analyzed).

Bitumen was also used as a means of fixing flint blades in hafts. Thirty eight Canaanean sickle blades from Horvat Illin (late EBIB), constituting a high proportion of the sickle assemblage, bear traces of bitumen (Marder, Braun and Milevski 1995) (Figure 21:5). At Lod, too, various sickle blades were found with bitumen smears (pers. observ.); most of these show the remains of hafting with bitumen present in fine but distinctive lines, but others retain lumps of this material, rather than just stains or smears.

Canaanean sickle blades with bitumen, although in lesser numbers, were also found in the EB IA occupation at Afridar, Area G (Zbenovich 2004b) and at EB I Horvat Ptora (pers. observ.). During EB IB they appear at Bet Shean (Bankirer and Marder, forthcoming), Shoham (Y. Nadelman and F. Sontag, pers. comm.), Tel Halif (Nahal

[114] The bitumen from Tel Dalit was tested, and the analyses carried indicate that its source is the Dead Sea.

Tillah) (between Site 101 and the "Villa" Site) (T.E. Levy and D. Alon pers. comm.), Arad (Schick 1978: 60),) and Bab ed-Dhra` (McConaughy 1979: 55, 2003:479). Probably they were also found at Jericho (Crowfoot Payne 1983: 720, Pl. 36:1-3).

SUMMARY AND DISCUSSION

Bitumen from EB contexts has been found mainly at EB I sites. However, it has also been noted, albeit to a considerably lesser extent, in EB II and III strata. This could suggest that bitumen may not have been as readily available in later EB phases as it was in the preceding period. After all, the major source for this material is the Dead Sea, in which lumps of it appear. These lumps are the result of occasional or episodic releases of it, apparently from fissures located below. It is possible that during EB II and EB III the material was less available. Alternately, this bias could merely result from a dearth of available information on bitumen utilization in the later periods. Notably, bitumen has been associated with several sites dating to EB IV/IBA (Connan, Nissenbaum and Dessort 1992; Nissenbaum, Serban and Connan 1999, U. Avner, pers. comm.). This might indicate that during the middle of the third millennium BC, the appearance of bitumen was rare.

The spatial distribution of bitumen changed during the course of EB IA and EB IB (Milevski, Marder and Goring-Morris 2002: Table 2) (Table 19). During EB IA (mainly Early EB IA) there is a concentration of bitumen lumps and smeared tools in the Central and Southern Coastal Plain; an exception is found at Biqat Nimra in the Eilat area.[115] This is probably also a time when bitumen was exported to Egypt where it is found at Ma’adi.

The EB IB period, especially its last phase, exhibited the highest density of sites in southern Canaan yielding bitumen samples (Milevski, Marder and Goring-Moris,

[115] Since the samples from Jericho and Bab edh-Dhra` have been dated only to the EB period in general, they may affect the spatial distributions by sub-period.

idem). However, it is important to note that during the entire EB I period there is a relatively equal distribution of modest quantities of bitumen through the sites and the sub-regions presented here.

The bitumen trade must have been quite restricted in scope, especially if we compare this commodity to0 others that had wider geographic circulation, such as ceramic vessels and flint tools. This is probably due to the sporadic availability of the raw material itself. It is suggested here that for this reason its value may have been high. The case of third millennium BC Ebla, which acquired bitumen from Northern Mesopotamia may be analogous. The value of each shekel of bitumen was 1/3 of that of a silver shekel (Pettinato 1981:187, Table VII, 7) the same value as lapis lazuli, and 18 times the value of copper.

It is suggested that those involved in the procurement and distribution of bitumen during the fourth millennium B.C. were local inhabitants, analogous to the Nabateans or, more recently, the Bedouin who peddled the material as far as Damascus (see above). They would have monitored the south end of the Dead Sea in search of bitumen and would have extracted it whenever it appeared. The exact routes by which the bitumen was dispersed within this trading network are difficult to pinpoint at present. However, it seems most probable that the primary network extended from the shores of the Dead Sea through the Arad and Beersheva valleys northwards to the Shephelah, and thence to the coastal plain. On rare occasions it extended further, to Egypt. Subsidiary networks extended north and south along the Great Rift Valley.

Since the amounts of bitumen recovered at any one time would not have been great, a few donkeys would have sufficed for its transportation. Certainly, it appears that the main concentration of bitumen was in southern Canaan. Bitumen used for hafting and other purposes was found mainly within an area up to 75 km from the sources.[116] The principal routes for bitumen distribution within this core area were: the Ayalon-Lod Valley, Nahal Sorek, the southern Shephelah (Nahal Lachish), the northern Negev including the Arad area in the east (Beersheva valley), and the Southern Coastal Plain through Wadi Ghazza/Nahal Habesor.

To the best of our knowledge there are no reports of bitumen utilization during the EB I-III in Canaan north of the Lod Valley or south of the Beersheva Valley, with two exceptions, Bet Shean and Biqat Nimra.[117] Both exceptions probably reflect natural and easily travelled routes from the Dead Sea along the Rift Valley. Both the Jordan Valley and the Aravah were routes through which various merchandise (pottery, shells, and copper) circulated (and see below). Bitumen found at Maadi, Egypt, is part of a secondary area of distribution that probably extended during the EB IA from the Southern Coastal Plain through northern Sinai to Egypt.[118]

[116] In sites where no bitumen was found, other kinds of adhesive or resin seems to have been used for hafting (cf. Bar-Yosef 1987).

[117] During the IBA, bitumen and flint tools with bitumen appear at Ein Zik (Connan, Nissenbaum and Dessort 1992; Nissenbaum, Serban and Connan 1999), and Biqat Uvda (U. Avner, pers. comm.), adjacent to the Aravah Valley, and probably represent an independent network route to the Red Sea.

[118] There is evidence of this route during EB I (cf. Oren 1973, 1989; Yekutieli 1998). It was mentioned in texts already in the First Intermediate Period and it existed during the New Kingdom (cf. Gardiner 1932). However, Egypt was not a primary objective of a bitumen exchange network (Milevski, Marder and Goring-Morris 2002), as was suggested by Connan, Nissenbaum and Dessort (1992: 2744, Fig.1). According to these scholars, Arad was the center of the network, which distributed the material from the Dead Sea area to Egypt. However, as is evident from data presented here, Arad was not occupied during the EB IA, when bitumen reached Maadi.

2. CARNELIAN

DEFINITION

Semiprecious stones such as carnelian, turquoise, hematite and other brightly colored minerals were used for pendants and beads during the EB Age (Figure 22). In Egypt, carnelian, like other semiprecious stones, was thought to represent deities and to guarantee immortality.[119] Because carnelian was the most commonly found, brightly colored stone as it is, there is sufficient data available for studying it within the context of this work.

The best typological division of beads is still the work by Beck (1928). We will simplify his types as biconic, barrel-shaped, disc-shaped or cylindrical-shaped, in order to facilitate the understanding of the finds.[120]

SOURCES

Carnelian is a form of chalcedony, one of the best-known materials for bead preparation in antiquity. The attraction of this stone is due to its red-orange color, its hardness and the fact that it can be worked to obtain many forms (Clark 1986:70-72). In the southern Levant there are rare occurrences of carnelian in the Lower Cretaceous basal conglomerate in the Large Crater and Ramon Crater in the Negev (N. Porat, pers. comm.; McGovern 1985:105; Zuckerman 1996b:277). However, this source was not confirmed. Some scholars point to an Egyptian origin for carnelian (e.g. Scheftelowitz 2002b:360 quoting

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[119] The use of carnelian and other semiprecious and precious stones and minerals has been the subject of several Egyptological studies relating these materials to divinities and burial practices (e.g. Andrews 1994:100-106, Aufrère 1997, Bianchi 1997).

[120] For production techniques of beads in Mesopotamia and Egypt, including carnelian beads, see Chevalier, Inizan, and Tixier (1982), Stocks (1989), and Holmes (1992).

Lucas (1962:391-392)[121]. That the carnelian found in the southern Levant derives from sources in the Far East, i.e. Afghanistan and the Indus region via Mesopotamia (and see Pettinato 1972:74, Potts 1993:389-390), is very difficult to accept, but it is considered in the discussion below.

DISTRIBUTION

Distribution of carnelian beads according to periods, sites and types is presented in Table 20. The geographical distribution is presented in Map 19. Below is a succinct description of the finds and their archaeological contexts according to regions and sites.

At Gadot, in the Huleh Valley, a tomb cave yielded one disc shaped carnelian bead originating from the EB I burial phase (Greenberg 2001b). In Western Galilee a short barrel type carnelian bead was found in one of the EB IB tombs at Kabri (Scheftelowicz 2002b:356, Fig.10.6:4). Further south, a disc-shaped and a cylindrical bead were discovered in an EB II tomb at Asherat, close to Bet Haemeq (Smithline 2001:Fig.28:1-20. At Qiryat Ata (EB II) a group of six beads were found within a jug. Three are made of carnelian and are long and short cylindrical shaped (e.g. Golani 2003:223, Fig. 7.11:1, 2).

In the Jezreel Valley, seven biconical beads made of carnelian were found in Tomb 33 at Hazorea in an EB IB phase (Meyerhof 1986:Pl. 30). Megiddo (Sass 2000:392, Figs. 12.30:2,4) has yielded two cylindrical, biconical beads of carnelian from EB IB contexts. At Khirbet Kerak (EB II) beads made of carnelian are also reported (Ben-Tor1971b: opposite 114).

Beads in the shape of a disc was found at Tel el-Farah (N) in the Samaria area, in Tombs 3 and 5 (de Vaux and Stève 1949: 108,126, Pl.IVb:17) together with pottery dated to EB IB.

[121] See Aston, Harrell and Shaw 2000:26-27.

Table 20. Distribution of carnelian beads according to periods and types.
(+) stands for unknown numbers.

Types *Sites*	*Bicone and barrel*	*Cylinder*	*Disc*	*Varia*
EB I				
Gadot	1			
Kabri	1			
Megiddo		2		
Hazorea Tomb 33			7	
K.Monash			+	
E.Hanatziv			+	
T. Farah (N)			+	
Jericho Tombs A127 K2			1 339, 53	
Givatayim		+		
T. Aviv		+		
T.Dalit			2?	
Lachish 1535			1?	
Bab edh-Dhra Tombs	11	1	Ca. 190	
EB II				
B.Yerah			+	
Q.Ata		6		
T .Dalit			2?	
Arad			20	
EB III				
Jericho Tomb F3 Tomb F2	4	3	1	1
EB I--III				
Jericho (Tel)			1	
Lachish 1535	1			

Interestingly, carnelian beads appeared in the hoard of Kfar Monash in the Central Coastal Plain (Hestrin and Tadmor 1968:285, Fig. 15; R. Gophna, pers. comm.). They are flat disks perforated biconically. Hestrin and Tadmor (*idem*) compare them with those from Givatayim (see below) and similar beads from Tarkhan, Egypt, where apparently copper tools similar to those from the hoard were found. In the Central Coastal Plain, carnelian beads were found as well in cemeteries; for example, at Givatayim dated to EB

IB (Sussman and Ben-Arieh 1966:39, Pl. 8.5) and at Tel Aviv (Kaplan Junction; E. van den Brink and E. Braun, pers. comm.).

In the Jordan Valley, a tomb at En Hanatziv (EB IB), south of Bet Shean (Amiran and Sebbane 1986), yielded some carnelian beads (Ilan 2002:98). At Jericho, Tomb K2, dated to the EB IB, yielded 339 carnelian beads in Phase I and 53 beads of the same material in various sizes in Phase II (Kenyon 1965: 19-26, Fig. 6:1-3, 11) (e.g. Figure 22:1) In addition, beads of barrel, disc and cylindrical shapes were found in Tomb A127 (EB I). Tomb F3 (EB III) (Kenyon 1960: Figs. 28:1, 55:1-6). Tomb F2 (EB III) contained a bead made of carnelian in the shape of an animal head (Kenyon 1960: Fig. 65:2).

In the Ayalon-Lod Valley, two disc-shaped carnelian beads with biconical drilling were reported from Tel Dalit (Sadeh 1996:Fig. 70:11,12), but unfortunately they are unstratified, so we can relate them either to the EB I or the EB II strata at the site. At Lod, excavations produced several beads, some of them made of carnelian (pers. observ.); we cannot at this stage of the research assert if they belong to the Late EB IB or the EB II stages at the site. In the Shephelah, at Lachish, one barrel-shaped carnelian bead, among hundreds of beads in the site, was reported from Cave 1535 (EB I-III?; e.g. Tufnell et al. 1958:73, Pl. 29:6).

In the Eastern Negev, 20 disc-shaped beads were found at Arad in Strata I, III (EB II) (e.g Amiran et al. 1978: Pls. 68:4, 69:6, 15; 118:10b) among dozens of beads of different materials (Figure 22:4). Carnelian beads from Bab edh-Dhra were retrieved from the cemeteries of areas A (e.g. Figure 22:2) and C (e.g. Figure 22:3) (EB IA) and from the charnel houses of the EB IB (Wilkinson 1989a) and EB II-III phases (Wilkinson 1989b:461-470). Beads from the EB IA were found together with bone piles, within vessels or related to vessels or basket fragments. The major concentration revealed some 200 carnelian beads of barrel, cylinder and disc shape in Tomb A 72S, together with hundreds of beads made of other materials (Wilkinson 1989a: 303-304). While most of the beads of the EB IA tombs were found in secondary burial find spots, the beads from the charnel houses were found together with articulated burials in their original position.

SUMMARY AND DISCUSSION

Since no carnelian raw material or workshops have been found it is also difficult to pinpoint the probable sources and centers of production, if they existed at all in Canaan. Nevertheless, we can offer some preliminary conclusions based on distribution of carnelian beads and their utilization.

Most of the beads were encountered in burials and their ritual character seems certain. In several cases the beads belong to a necklace.

According to the distribution pattern of carnelian beads in all periods (Table 20, Map 19) under discussion, there is a concentration of sites in the Central Coastal Plain and in the area near the Carmel in the western Galilee and Jezreel Valley. The Jordan Valley again seems to be one of the routes of distribution, but there are no clusters of sites alongside the route. Rather there are scattered sites where beads have been found. The Jericho burials are the main locale for the beads from EB I to EB III. Interestingly, Bab edh-Dhra has produced the largest quantity of beads in tombs dated to EB IA.

In the light of the above-described evidence we suggest two main possibilities for the production and distribution of carnelian beads:

1) The carnelian beads were sourced and produced from local outcrops in the Ramon Crater area and distributed through the coastal plain and the Jordan Valley as the main areas of supply (the black arrows in Map 19). The problem with this hypothesis is that aside from the fact that no quarries or workshops have been found, sites of the Negev (as the Camel Site; S. Rosen, pers. comm.) around this probable source are totally devoid of carnelian beads. One of the plausible explanations for the fact that these small finds were

not preserved in the archaeological record can be found in the difficulty in identifying floors or living surfaces and the probably brief existence of these sites. Since no EB burial sites have been found in the Central Negev, the odds of finding beads there are also considerably decreased.

2) Carnelian beads were imported from Egypt, whether along a terrestrial route (during the EB I) or by maritime means along several points on the coast (the red arrows in Map 19). The problem with the assumption that carnelian or carnelian beads originated in Egypt is that during EB I-III in the southern Levant beads are relatively scarce -only a few hundred are known- while their occurrence is greatly multiplied during the IBA, as is attested by tens of thousands of beads. During that period relations with Egypt were almost totally interrupted.

At any rate the distribution of carnelian beads was part of the southern Levant circulation of commodities, in this case, destined for aesthetic and ritual purposes. If carnelian was derived from sources in the Negev, the raw material or the beads could have been transported together with local pottery and/or sandstone tools that were distributed northwards to the center region.

Most of the beads can be dated to EB IA and EB IB and were found in tombs at Jericho and Bab edh-Dhra. No visible typological differences in the distribution of the beads was observed. Actually, most authors claim that beads are usually not chronologically diagnostic and that from the fourth to the second millennium the same shapes (circular, barrel, ellipsoid), materials, and perforations (biconical for circular and short barrel beads, drilled straight from two sides for long barrel beads of hard minerals, and plain perforations for frit barrel beads) are consistently present (e.g. Ilan 1992). In sum, as long as we do not have chemical confirmation of the sources and archaeological remains of the production centers for carnelian beads in the Southern Levant, only general conjectures can made for the exchange of these objects.

PART III

TRANSPORTATION, MERCHANTS AND NETWORKS

Chapter 10

TRANSPORTATION AND THE CULT OF EXCHANGE

This chapter discusses utilization of domesticated donkeys (*Equus asinus*) for local exchange and its ideological aspects on EB Age society. It reviews data concerning the extent of use of these animals as beasts of burden and and the existence of a specialized social stratum or group of persons related to their use. Amiran (1985) and Ovadia (1992) have previously suggested that domestication of donkeys began in this period, and with it the innovation of pack transportation by animals, was likely to have engendered such a class of people related to it, and to a special cult reflecting their activity. This interpretation is based on both faunal remains and miniature, artistic-cultic representations from the archaeological record and bolstered with additional ancient Near Eastern sources thought likely to represent analogous situations.

While the donkey is not understood in this work as a commodity *per se* (see Chapter 8), it is evident that as a beast of burden it was meant not only to be used by its owners but was also an object of value that could be exchanged (Zaccagnini 1976: 545-582; Buccelatti and Kelly-Buccelatti 2002 with particular attention to bibliography). There are several examples in historical sources from Mesopotamia and Ebla (*idem*) for the breeding of expensive, equid hybrids. Ethnographic sources show that the breeders of donkeys could exist separated from the users of the animals as in the case of the Solubba of the Arabia Peninsula who breed donkeys for other tribes (Betts 1989). While we do not know if such separate groups existed in the EB, we might assume that if they did, both would have been participants in cultic activities of their related occupations.

Despite the fact that the value of donkeys in the EB for the region under discussion remains unknown, it is possible to make comparisons with other regions of the Ancient Near East where documents existed on this matter. Values of donkeys changed from place to place and according to the period, from ca. 11-20 silver shekels in Akkad during the second half of the third millennium BC, to 6 silver shekels in Nuzi in the 15th century BC. Their value lay between 3 and 4 silver shekels (30-40 *deben*) in Egypt during the 12th-11th century BC (cf. Zaccagnini 1976:545-582), while at Ugarit (14th century BC) donkeys were exchanged for amounts ranging from 10 shekels of silver to 2 talents of bronze (Heltzer 1978:22).

In the Old Assyrian period (18th century BC) the caravan procedures report values of about 16-25 silver shekels for each donkey; some of the values include the harness and the fodder (Larsen 1967: 151). During the Neo-Babylonian period (7-6th century BC) the value of donkeys rose to 30 silver shekels. The only biblical reference to this subject is in relation to a period of crisis in Samaria when donkeys were priced at 80 shekels (2 Kings 6:25; Foster 2002:291). These values must be adjusted because the silver shekel differed from place to place. The Mesopotamian standard was 8.4 gr (per shekel) while Anatolian and Syro-Palestinian standards were closer to 11.5 gr (per shekel).

1. DONKEYS AS MEANS OF TRANSPORTATION

This section considers the physical evidence for use of donkeys. Unfortunately, data are somewhat problematic because faunal samples from many EB sites, especially those published more than three decades ago, are non-existent or inadequate (see Ducos 1968; Horwitz and Tchernov 1989). Most information comes from later fieldwork by scholars who collected faunal samples (cf. Appendix in Hesse and Wapnish 2002).

It is uncertain where donkeys were first domesticated. Domestication may have taken place in Africa which would indicate that *Equus africanus* is the probable progenitor of the domestic ass (*E. asinus*), but if it took place in Asia (cf. Davis 1987: 131; Clutton Brock 1992:61-63) then its ancestor would be *Equus hemionus* (hemiones), the wild ass of northern Asia. While it used to be assumed that hemiones were domesticated (cf. Zeuner 1963), more recent archaeozoological and textual data have shown that they were probably never domesticated (Gilbert, Lowenstein and Hesse 1990:46; Clutton-Brock *idem;* Hesse and Wapnish 2002:471; Croft 2004:2284).

Equids are most often classified by archaeozoologists according to enamel patterns of their teeth, but because they are not always found in excavations, distinctions between types of equids are often not possible from the faunal record. Sometimes even without teeth, distinctions between wild African donkeys, wild hemiones, domestic donkeys and horses are possible to achieve by measuring long bones (Clutton-Brock 1992:18-22). However, such bones need to be complete to make such fine distinctions and instances of such good preservation tend to be rare. An additional problem in identification is also found in comparisons of overall measurements of bones. Although different groups tend to fall within different ranges, there is always some overlapping in size and some specimens, due to natural variations in individual animals[122], may fall between groups or even be misidentified.

For instance, it has been hypothesized that horses (*Equus caballus*) were not introduced into the Levant and Egypt until the second millennium BC (Clutton Brock 1992:81-84). Davis (1976:160-162), however, has argued that an equid metacarpus from

[122] For the method of radioimmunoassay (RIA) in order to distinguish between different taxa of equids see Gilbert, Lowenstein and Hesse 1990. Unfortunately we do not know of any results of RIA applied to equids in our region.

Arad could possibly belong to a small horse. Horwitz and Tchernov (1989:290) have cast doubt on that identification because no teeth identifiable as horse or mule were recovered at the site. Other reports (Josien 1955) even recorded horse remains at the Chalcolithic site of Bir Abu Matar. According to measurements of equid long bones and phalanges, small domestic horses are reported to have been present in the Chalcolithic period in the northern Negev (Grigson 1993), but in the absence of teeth, similar doubts may be posed for such identifications. At any rate, horse specimens seem to have been an isolated occurrence during the Chalcolithic and EB periods, probably representing wild species.

Domestication of donkeys, as that of horses and camels, was part of a third phase of domestication when humans began to exploit animals for their secondary products: power, milk, wool, dung, etc. (Sherratt 1981).[123] Equids and camelids were mainly used as beasts of burden or for harnessing their power i.e., for carrying people, goods and for traction. Domesticated donkeys were used for plowing by the third millennium in Mesopotamia (Postgate 1986) and as draft animals (Jans and Bretschneider 1998), but it seems likely that in the Levant cattle would have been used more frequently than donkeys (cf. Clutton-Brock 1992: 80ff; Grigson 1995), and the latter species was used as pack animals. The predominance of asses for these purposes is suggested based on zoomorphic figurines and later Egyptian depictions of Canaanites, and texts describing highly organized donkey caravans carrying goods to Egypt from the Southern Levant (cf. Partridge 1996:95-99, see below).

[123] Diffusion of donkeys to other sites and regions, as they were used for long distance travel, may be reflected in the archaeological record as Ovadia (1992:20) has pointed out, but there are still problems both in the definition of the faunal remains and the statistical data.

ZOOARCHAEOLOGICAL DATA

According to archaeological data from the Southern Levant, equids were uncommon during the Neolithic and Chalcolithic periods, while an increase in their presence took place in the EB. At Chalcolithic sites such as Bir Safadi (Ducos 1968), Gilat (Levi 1981) and Shiqmim (Grigson 1987), equid bones represent only ca. 0.5 % of the total number of bones (Table 21), while at EB sites there is an increase of the equid remains to ca. 4% of the total of animal bones (e.g. Lernau 1978; Horwitz 1985; Meyerhof and Sadeh 1993). One site, Afridar Area E, yielded a much higher percentage, with equids representing ca. 20 % of the total number of bones (Whitcher Kansa 2004).

Following is a brief review of the data on equid remains from the EB. Table 21 presents frequencies of donkeys and hemiones at EB sites in relation to the total number of identified bones. Table 22 calculates their frequency relative to cattle bones (i.e. the frequency of equids in relation to the total of identified bones of both cattle and equids) the only other potential beast of burden at this time. The breakdown of available data is given by region in a north to south progression.

Gamla, the only site in the Golan for which data are presently available, has produced 3 donkey bones out of a total of 109 (Horwitz and Tchernov 1989: Fig. 2; L.K. Horwitz pers. comm.). In the Western Galilee a few bones were found in EB II contexts at Kabri (Horwitz 2002: 397) but no frequencies are given. At Bet Haemeq, *E. asinus* remains represent 4% of the total bones from stratum III (EB IB) (Meyerhof and Sadeh 1993).[124] To the south, at Qiryat Ata, very few bones of *Equus asinus* were dated to late EB IB and EB II in Areas A-G and L (Sadeh 2000; Horwitz 2003a:229-230, Table 8.2), with frequencies of 0.5% and 0.8%, respectively. Further to the east at Tel Kinrot *E.*

[124] No remains of equids were found in the Chalcolithic stratum VI, nor in the other EB IA and EB II-III strata (V, IV, II and I).

asinus represents 0.8 % (n=3) of a total of 341 identified bones found in EB I-II strata (Hellwing 1988-89).

In Lower Galilee, at Yiftahel (EB IA), *E. asinus* bones appeared in Stratum II at a rate of 1% of the total number of bones (Horwitz 1997) while at En Shadud in the Jezreel Valley (late EB I or EB IB), diagnostic bones, 4 (4.1%) were found belonging to a donkey or a hemione (Horwitz 1985) within a small sample of 97 bones (see Figure 23:1). At Tel

Table 21. Relative frequencies of equids at EB sites.

D=donkey, H=hemione. (+) denotes presence but frequencies are not given

Period *Sites*	*EB IA* *%*		*EB IB* *%*		*EB II* *%*		*EB III* *%*		*EB I-III* *%*	
	D	*H*	*D*	*H*	*D*	*H*	*D*	*H*	*D*	*H*
Gamla									2.7	
T. Na`ama					+					
T. Kinrot									0.8	
Kabri					0.5					
B. Haemeq			4.0							
Q. Ata			0.5		0.8					
Yiftahel	1.0									
E. Shadud			4.1	?						
T. Qashish							0.4			
Megiddo			+?	+?						
Pella									O.1?	0.1?
T. esh-Shuneh	?									
T. A. al-Kharaz									0.5?	0.5?
T. Aphek			2.2		2.1					
T. Dalit			0.5		2.2					
Shoham (N)			10.5							
Lod			+		+					
Gezer				+						
Azor	8.0									
`Ai					+					
Jericho									3.9	
T. Yarmuth					+		+			
Lachish							+			
T. Erani									5.0?	5.0?
T.Halif (Tillah)	1.2	2.0	2.1	1			+			
Afridar Area E Area F Area G Area L	20.9 14.9 1.7 6.8									
T. Ikhbene	8.0		7.5							
Site H	25.0									
E. Besor			9.5							
T. es-Sakan							+?	+?		
Arad			0.8		3.3					
B.edh-Dhra									13.0	
Numeira							0.9			
B. Uvda 917					+?					

Qashish (Horwitz 2003b:433, Table 39) only one bone of an ass, probably *Equus asinus* (0.4% of total bones in the stratum) was identified in an EB III context. Remains of what was defined as small equids were found in Tombs 903, 910 and 100 at Megiddo, but they have not been defined as either donkey or hemione (Bate 1938:211). It has been suggested that some of these remains may have belonged to a horse, but this suggestion is based on the size of the limbs and not on remains of teeth (see above) and so is subject to doubt. East of the Jordan Valley the information is very incomplete. Preliminary reports on excavations at Tel esh-Shuneh cite equid remains as “sporadically represented in the Chalcolithic-EB I faunal repertoire” (Croft 1994:131), while equids are mentioned (0.5 % of total bones) as being present at Tell Abu al-Kharaz but their stratigraphic contexts are not given (Fischer 1997:Table 1). Excavations at Pella (Tabaqat Fahl) have yielded one equid bone out of a total of 835 bones dating to EB I or II (Bourke, Sparks and Sowada 1994).

At Jericho differentiation of equid remains was difficult because of the small number of bones (N=19), but according to Clutton-Brock (1979:144-145), enamel patterns of teeth[125] suggest that they are most probably of *Equus asinus*. In the Central Hill country, a donkey’s jawbone is reported from Phase IV of the sanctuary at `Ai (Callaway 1972:190).

Tel Aphek in the coastal plain has yielded only ten identified bones of *Equus asinus* from EB IB contexts and a single bone from an EB II level (Hellwing 2000:304, Tables 15.2, 15.16). They represent ca. 2% of the total bones in both periods (see Hellwing and Gophna 1984). In the Ayalon Valley, remains of donkeys were found at Tel Dalit (Strata II-V of Area B). In Stratum V (EB IB) they represented 0.5% of the total

[125] Zeuner (1963, quoted by Clutton-Brock 1979:145) and Grosvenor Ellis (1960), believed that most of the remains belong to *E. hemionus.*

number of bones; in Strata IV-II (EB II) they represent between 0.5 to 2.2% (Horwitz, Hellwing and Tchernov 1996).[126] Donkey remains (ca. 10% of total individuals) were present as well at Shoham (N) Cave 2 where they were dated to the EB IB (Sadeh and Horwitz, forthcoming). At Lod (Yannai and Marder 2001), a complete donkey skeleton (probably intentionally buried in a pit) was found in Area A2 in an EB II context (pers. observ.). The vertebral column was broken behind the skull, but the reason for that breakage is not clear (Figure 23:2). It is possible the donkey was intentionally sacrificed, although this interpretation is far from certain.

Further to the south, at Gezer, a left tibia of an *E. hemionus*, still attached to the astragalus and calcaneum, were found in Cave I.3A (EB IB; Legge 1988:39). Donkey remains were also found in the Central Coastal Plain at the EB IA settlement of Azor (Horwitz 1999: Tables 8,10) in relatively high frequencies (8%). Faunal remains from Tel Yarmuth (seasons 1980-1983) include bones from *E. asinus* (Davis 1988:144-145) from EB II and EB III contexts, but no statistics are reported. Equids are referred to in the EB strata of Tel Erani (Horwitz and Tchernov 1989:290) and Lachish (EB III, Bate 1958) but no species or frequencies are given.

At Tel Halif (Zeder 1990) in the northern Negev, equids, apparently donkeys, are present in the EB I and EB III strata, but their frequency is difficult to calculate from published data. At the same site (also called Nahal Tillah; Levy et al. 1997: 24-25), donkeys appear in an EB IA Stratum (III) in a ratio of 1.2 %, and in an EB IB Stratum (Ia/b) as 2.1% of the total number of bones. Notably, they were not present in Chalcolithic Stratum IV. It is notable that at this same site equid bones (without differentiation) appear at a rate of 7.6 % in the EB IA level and 2.6 % in the EB IB phases. One equid bone (not definitively identified as a donkey) is present in Stratum IV.

[126] For a previous report on the faunal remains of Tel Dalit see Hellwing and Gophna 1984.

Continuing southeast to Arad, remains of donkeys were present in several strata in different percentages of the total number of animal bones: Stratum IV (EB IB, 0.8%), Stratum III (EB II, 2.2%), Stratum II (EB II; 3.3 %). In Stratum I (EB II) the rate falls to 1.0 % (Lernau 1978: Table 2). Notably, no bones of donkeys were found in Stratum V (Chalcolithic).

In the Dead Sea Plain, *E. asinus* was found at Bab edh-Dhra in most of the fields at the town site. Statistics for the site are haphazard. Donkey bones totaled 13% of all animal bones from Field XIV (Finnegan 1976:51, Table 1; 1979: Table 1) but no further frequencies and stratigraphic ascriptions are provided. At Numeira (EB III), donkey remains are only 0.9% of the total number of animal bones at the site (Finnegan 1979: Table 1).

The highest rates of equids, nonetheless, are found in the Southern Coastal Plain at EB IA Afridar (Ashkelon) Areas F and E (Whitcher Kansa 2004). The equid remains, probably *E. asinus* or *E. hemionus*, reach 13% and 18% respectively. This is a surprisingly high proportion when contrasted with the other EB sites quoted above, as Whitcher Kansa (*idem*) pointed out.

While the sample size of Area F *per se* is too small to determine whether the bones represent wild or domestic population, the presence of other domesticated animals in that area suggests that equids were hardly hunted for subsistence. Furthermore, the majority of equids in Area E survived to adulthood, and therefore were not part of the diet (*idem*).

Further to the south in the Coastal Plain, at Taur Ikhbene, bones of *E. asinus* were found in EB IA and EB IB contexts representing ca. 8 % of the total number of animal bones (Horwitz et al. 2002: 116, Table 5). To the east, in the Nahal Habesor basin, Site H produced an almost complete articulated ass buried in a pit dated to EB IA (idem, 110-111, Figs. 2-3). It is most probably a domestic donkey, although several bones distorted *in* *situ* could indicate that they belong to wild equids. At the nearby site of En Besor, a few bones of a donkey were found representing 9.5% of the total bones during the EB IB (Horwitz et al. 2002: 119, Table 2). At Tel es-Sakan, a site south of Wadi Ghazzeh, equid bones comprise up 3% and 0.6% (EB I and EB III respectively) of the total bones found. In the EB III stratum, one complete skeleton of a donkey was found buried in a room of a building complex (de Miroschedji et al. 2001:97), interpreted here as likely to be a structure of public significance. In the southern Negev, a fragment of a proximal metacarpal of an equid, probably *E. asinus*, was found in an EB II context at Biqat Uvda 917 (Horwitz, Tchernov and Mienis 2001: 122).

DONKEY FIGURINES AND OTHER REPRESENTATIONS

Equid figurines have been found in a number of EB contexts. They appear to be part of a long tradition[127] (see below). In light of the evidence discussed above, they are assumed to represent donkeys. Following is a discussion of each of these figurines (see **Table 23**, Map 20) by site, in a geographical progression from north to south.

At least two figurines representing donkeys carrying two jars were found at Tel Dan at the northern limits of the Huleh Valley. These objects, made of MW, were found in EB II levels at the site (Greenberg 1996b: Fig.3.38:5; Greenberg and Porat 1996:Fig. 4:3; here Figure 25:6). A probe at Meona unearthed the head of what appears to have been a donkey.[128] It was found in fill above a stone construction atop bedrock, and has no definitive chrono-cultural context (E. Braun, pers. comm.). Meona has yielded EB I and EB II pottery as well as material from later periods. Although the date of this object

[127] Figurines of such type also continued to appear albeit with different beasts of burden, and produced by techniques and in different styles, in much later periods (e.g. Ben-Arieh 2004:23; Figs. 2.56:61, 2.57:61).

[128] For the first season see Braun 1996a, who notes a similarity between the object and one from Tel Dan (Greenberg 1996b: Fig. 3.38:11).

remains obscure, its ascription to the EB Age is a reasonable supposition, especially in light of another equid figurine with a similar head found at Qiryat Ata Area G, in Stratum I (Golani 2003:Fig.7.4:1), dated by the excavator to EB II.

A figurine dated to EB I, depicting a donkey laden with containers was found at Tel Qishyon (Cohen-Arnon and Amiran 1981; Arnon 1982) in the Jezreel Valley. An incised or scratched drawing on a sherd from Megiddo (Engberg and Shipton 1934:20, Fig. 10.L) is probably a representation of a headless donkey, although its excavators preferred to interpret it as a camel (Figure 25:1) because the back of the animal seems to suggest a kind of hump. However, the opinion of this writer is that there is a line separating the hump from the back of the quadruped which could depict a saddle or even part of a load in place. The proportion of the legs in relation to the body as well as their position suggests that the animal depicted in the sherd is indeed a donkey. The object probably was part of a bowl or jar and was ascribed to Stage VI, dated by the excavators as Chalcolithic (Engberg and Shipton 1934), but now recognized as late EB I (Braun 1985: 63).

Table 23. Distribution of donkey figurines

Periods	***EB IB***	***EB II***	***EB III***
Sites			
T. Dan		+	
P. Hayarmuk	+		
Meona		+?	
T.Qishyon	+		
Q.Ata		+	
Barkai		+	
K. ez-Zeraqon		+?	
K. Mahruq		+?	
Givatayim	+		
T. Aphek		+?	
T.Bareket		+	
Lod		+	
Jericho	+		+
B. Yam	+?		
Arad		+	

Further south additional figurines are known. One is from the northern Sharon at a site south of Kibbutz Barkai near En Assawir. There Yannai (2001) found a pottery figurine of a donkey burdened with two open containers in a burial cave dated to EB IB, (Figure 24:4). Near the northern bank of the Yarmuk River, at the site of Pithat Hayarmuk, Epstein (1985:59, Fig.11) found a head of a bridled equid, probably a donkey (Figure 25:2). The object, a surface find, may have originated in the EB I settlement at the site, although earlier Chalcolithic and Neolithic activity there could account for it as well. Further to the east and south of the Yarmuk river, a human figurine riding a donkey was reported from Khirbet ez-Zeraqon (Figure 26:4). It is claimed as originating in a cultic context dating to EB II-III (Ibrahim and Mittmann 1987:5).

In the Central Jordan Valley, another figure was found at Khirbet Mahruq (Hizmi 2004; here Figure 26:1). Virtually unpublished excavations at the site (Yeivin 1977b; Eisenberg: pers. comm.) have yielded evidence of a well-preserved, probably fortified settlement dating to EB II. This figurine is particularly interesting because it has a saddle attached with strings to the posterior of the animal.

Further south along the rift is Jericho, where the only known donkey figurine confidently dated to EB III is known. It came from Tomb D12 (Kenyon 1960:124, Fig. 40:1, Pl. VII:3; here Figure 26:3). The figurine is of pinkish-buff ware with grey grits, similar to fabrics of common pottery of types datable to EB III found in the tomb. The same tomb yielded examples of KKW[129], together with other ceramic types dated within EB III (see Kenyon 1960:94-96). This donkey figurine lacks baskets or jars on its back but its back is represented by a wide, slightly concave surface that could be interpreted as a saddle or could have been used to support a container. Two additional figurines (Figure 24:5-6), dated by the excavators (Kenyon and Holland 1982: 555, Figs. 225: 6-7) to the

[129] For abreviations on pottery wares in Parts III and IV see Chapter 3.

Iron Age should, in the opinion of this writer, date to EB I and be identified as donkeys with panniers or jars on their backs (cf. the similarity between Figures 24:4 and 24:6, mainly in the panniers).

Several figurines, dated to EB I, depicting donkeys bearing burdens have been found in the Central Coastal Plain. Two figurines of a donkey with jars or bags were found at the foot of Tel Aphek (Eitan 1969:51, Fig. 3:1-2; Figure 25:3-4). An additional two figurine fragments were recently found at Tel Bareket in EB II contexts in salvage excavations conducted by the IAA and Tel Aviv University (R. Gophna and H. Törge, pers. comm.). They are similar to a figurine found at EB II Arad (see below).

A fragment of a figurine found in Area B at Lod (Yannai and Marder 2001) (Figure 26:2) appears to be the posterior part of donkey and probably dates to EB II. The fragment includes the upper part of the legs. Two strings are attached to the animal in a way similar way to the figurine of Khirbet Mahruq (Figure 26:1).

Advancing westward to the Mediterranean littoral there are additional figurines. One, is a laden donkey from a burial cave at Givatayim (Kaplan 1993; Figure 24:3).[130] Another two, have two containers. They were found in tombs 10 and 60 at Azor (Druks and Tzaferis 1970:578, Pl.40:B) dated to EB I. While Figure 24:1 represents a donkey with two open containers (bag-shaped), Figure 24:2 is an animal without head, carrying two necked jars, similar to the EB IB amphoriskoi. Another figurine was found by R. Gophna in a surface survey at Bat Yam (Figure 24:7**)**. It has vessels relatively similar to those from Figure 24:1 **(**Azor) and its date, based on iconographic resemblances, is

[130] It was dated to the Chalcolithic (Epstein 1985) on the basis of Chalcolithic pottery in the cave. Nearby caves (Sussman and Ben-Aieh 1966) yielded Chalcolithic and EB I pottery and other finds. On the basis of iconographic similarities to EB Age donkey figurines, the Givatayim figurine should also be dated to the EB Age, indicating that the cave where it was found was probably reutilized during EB I.

assumed to be EB I (Gophna 1974:45, Pl.13:19). Only one example of a figurine of this type comes from a southern context. It is a fragmentary pottery figurine from Stratum I dated to EB II, at Arad. It represents a donkey carrying two bag-shaped containers (Amiran 1978: 54, Pl.117:6; Figure 25:5).

CONTAINERS AND THEIR RELATIONSHIP TO DONKEYS

This section discusses the use of pottery vessels as containers for commodities and not as commodities in themselves. While a classification system according to capacity and forms is beyond the scope of this dissertation (e.g. Schaub 1996) some questions concerning utilization of pots as containers are addressed.

There is little evidence in the archaeological record of the Southern Levant of the EB Age for the use of containers to exchange dry or wet commodities (e.g. oil, wine, grain, etc.) with exception of some studies on residual material from jars that are mainly related to international exchange.[131] For instance, analyses of the contents of EB II "Canaanite" jars (some of them fashioned of MW) from the Tomb of Djer at Abydos indicate that they contained remains of vegetable oil (Serpico and White 1996). Reportedly, some MW jars from Giza were found sealed, indicating that they probably contained some sort of liquid. Two of them contained a fragrant resin of a coniferous tree (Reisner and Smith 1955:75), suggesting to Esse (1991:124) that the jars were routinely coated with pitch or resin to make them more suitable for storing liquids.

Bitumen has been found adhering to some pottery containers, mainly holemouths (see Chapter 9). However, most evidence derives from sherds that were likely to have been portions of vessels utilized for melting the material.

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[131] For collared-rim pithoi of the LB/ Iron Age I as containers see Artzy 1994 and Wengrow 1996; for an opposing view see Cohen-Weinberger and Wolff 2001:654.

Other evidence for utilization of jars for transference of commodities during the EB Age is found in two ebony labels and two ivory inlays from tombs at Abydos showing "Canaanites" (i.e. people of south Levantine visage/iconography) carrying so-called "Canaanite" (i.e. EB I-II) jars (Amiran 1969b; Figure 27:1). The tombs are dated respectively to the reigns of Narmer and Hor-Aha, i.e. to latest Dynasty 0 and earliest Dynasty 1.[132]

The two personages from the ivory inlays referred to above must be interpreted as Canaanites transporting the small jars with some commodities within. Of course we cannot identify the contents of the vessels and since the inlays are broken we cannot reconstruct the general composition and historical background in which the Canaanites are presented. In each one of the inlays a double line separates the Canaanites from other personages. In any case it seems that Canaanites are carrying and offering vessels as part of a general tribute (as suggested by de Miroschedji 1986:19-20) or a general operation of exchange with Egyptians.

[132] The vessels represented on the wooden labels and ivory inlays were interpreted by Petrie (1901:19-22) as of stone and the persons depicted as Lubians. However, Amiran's (*idem*) comparative study seems to present a more likely interpretation. She judged the representations of this pottery to be of similar morphology to types she found at EB I sites, and the iconography of the people represented as more fitting of Asiatic prisoners. However, in this writer's opinion, at least one of the jars could be EB II in date. Perhaps corroborative evidence for this type of utilization of jars for transport may be derived by analogy from a stele from Serabit el-Khadem (here Figure 26:5) dated to the reign of Amenemhet III (1844-1794 BC). It shows a person in the lower register, probably an Asiatic ruler on a donkey conducted by a servant. Behind him is a person carrying a jar in his left hand in a position similar to that of the man in one of the ivory inlays noted above (from Figure 27:1; Staubli 1991:Abb. 16). The vessel seems to have the characteristics of an MB IIA storage jar with flattened base (e.g. Amiran 1969a: Pl.31:4) suggesting a south Levantine origin.

Pottery

Evidence from the donkey figurines discussed above is not conclusive regarding the utilization of pots as containers in the animal's burden in EB Canaan. Most of the cases show a open and deep bag-shaped container. As Amiran (1985:192) has noted, the vessels of Figure 24:1 have no good parallels in the pottery repertoire of the period. She suggested that they are probably imitations of baskets. For Figure 24:2 Amiran (1985:191) has suggested that these containers symbolize necked jars containing a costly liquid such as olive-oil. Figures 24:3-6, however, are more similar to holemouth jars. Necked jars had a capacity between ca. 25-110 liters. Holemouth jars had a capacity between ca. 20-70 liters, depending on the type of vessels. If we take into account that the donkeys of the Ashur caravans to Anatolia had two containers with a so-called *muttatum* ("halfpack") of about one talent each (ca. 35 kg) and one container called *elitum* ("toppack") of about half talent (ca. 17.5 kg) (Larsen 1967:149), it is probable that only small or medium holemouth or necked jars could serve as burden containers.

On the other hand, the containers could be also panniers made of a different organic material. Similar panniers are found in Cyprus, for instance, in a donkey model found in the Troodos mountains, an area rich in copper mining sites (Knapp 1992:58). This author has interpreted the model as a proof of the presence of the donkey as a means of transporting copper from the production centers to other sites that processed it within the island (*idem*).

Baskets

A second possibility is the utilization of bags or baskets carried by hand or loaded on donkeys. While we have no remains of leather bags (see below), there are a few remains of basketry from the Levant during the EB. Basketry is referred here following Adovasio and others (2003:599 with bibliography therein) as several kinds of items including rigid or semi-rigid baskets, matting and bags made by twining, coiling or plaiting.

These remains come from relatively dry areas such as the Cave of the Warrior, in Wadi Makukh (Schick 1998:26-27). The basket (Figure 27:2) could have an estimated volume of 18,000 cc, according to its reconstructed dimensions. The basket was made with the coiling technique and was reinforced by a leather string. Aside from this find, the fact is that leather is not preserved in the archaeological record. However this does not discard the possibility that other pack items were made of leather.

At Bab edh-Dhra two basket impressions of wall fragments (Figure 27:3) were found together with other weaving artifacts in the settlement, and dated generally to the EB IB-III.[133] Adovasio and others (*idem*, 621) attributed the use of flax (*Linum sp.*) to process fibers for basketry. Flax was found at Numeira, as well as at other sites such as Tel Abu al-Kharaz, Jericho, En Besor and Arad (Figure 17:7E; see Table 14).

Relevant for our research is the work by Stager (1990) on the relationship between the LPGW and basketry in Canaan (here Figure 7:5-10). He argues that LPGW imitated the basketry and matting of that time, which are a continuation of the Neolithic and Chalcolithic basketry techniques (e.g. Bar Adon 1980:91; Schick 1988, 2002). Pottery vessels with sieve or twill patterns could be ceramic skeuomorphs for real baskets.

In this sense it is most probable that some of the containers found on donkey figurines represent real bags or baskets.[134] A representation of Canaanite donkeys in Egypt

[133] Mat fragments were found into the EB IA tombs at the site (Luffman Yedlowski and Adovasio 1989:531, Fig. 302).

[134] For instance, today's donkeys in Ireland are loaded with the help of large baskets (Clutton-Brock 1992: Fig. 4.12).

shows them with packs tied with a net and hanging to the sides of the beast as in the Beni Hasan paintings (ca. 2000 BC) (Newberry 1893) (Figure 26:6). Ethnographic studies on the alabaster workshop in Sheikh Abed el-Gurna, Egypt focused on the production of alabaster vessels (see above), but also related to the transportation of the raw material to the workshop. In the description, the pre-forms of alabaster are burdened on donkeys with net-like carrying bags on the animal (Hester and Heizer 1981:Pl. 1:2-3).

2. Discussion: The Cult of Donkeys and Exchange

THE DOMESTICATION AND UTILIZATION OF THE DONKEY

Frequencies of donkeys in relation to potential beasts of burden (i.e. cattle *vs* donkeys; Table 22) indicate a major difference between animal utilization in the Chalcolithic and EB IA periods that implies domestication of that beast in the latter period. It further indicates for the later period an important technical advantage in methods of transportation. These beasts of burden were capable of carrying appreciable loads over considerable distances for repeated journeys (see below) making transportation of heavy commodities considerably easier than it had been in former times. This development would have been a vital factor in the economy of EB societies. For instance, donkeys would have greatly facilitated transportation of copper and other materials from far away areas which were previously difficult to access. Thus, reduction of costs (i.e. outlay of labor and all that is involved) would provide easier access to commodities that formerly were rare and difficult to obtain.

Some ethnoarchaeological studies indicate the importance of the donkey as a beast of burden. A study of similar phenomena in pre-Columbian Mesoamerica shows that “cargadores” (i.e. transporters of cargo) could only carry about 45 kg on their own (i.e.

two lower and four upper grinding stones), but with the introduction of donkeys as beasts of burden they could transport greater loads on each trip, perhaps as much as two times what men could transport, for over much greater distances and far greater spans of time. According to documents concerning Assyrian caravans to Cappadocia in the second millennium BC, the standard weight carried by a donkey was ca. 75 kg (Larsen 1967: 141-155). A study of an alabaster workshop at Sheikh Abed el-Gurna by Hester and Heizer (1981: 36-37) indicated each donkey was loaded with two pieces of alabaster, each 30-35 kg, or with several chunks of the material that reached a maximum load of 80 kg.

The large numbers of equids at Afridar and at Bab edh-Dhra suggest that these sites may have been associated with industries requiring extensive amounts of raw materials or, alternately, they were large stations associated with exchange networks. These bones further suggest that donkey-based transportation in Canaan was conducted in the form of caravans, as described in sources of the Old Assyrian period for northern Mesopotamia and Anatolia (Larsen 1967) and pictorial representation at Beni Hasan, Egypt of a later period (MB II, ca. 1900 BC; Newberry 1893; Figure 26:6). Addition examples of such activity have been documented in ethnographic studies (e.g. Hester and Heizer 1981).[135]

High frequencies of donkeys at Afridar could also be related to the introduction of the domestic ass in the Southern Levant from northeast Africa. As investigation of the archaeological record moves northward, the frequency of donkeys in relation to the total number of identified animals drops. This is especially true for EB I but the same tendency is also visible in EB II and EB III (Table 21; Map 20). This is also true if we consider the frequencies of donkeys in relation to potential burden beasts (Table 22). In both cases

[135] And see also ethnographic descriptions of caravans of 120 donkeys among the !Kung from South Africa (Lee 1980:403-404).

frequencies of donkeys are higher in the Coastal Plain and the Western Galilee than in the Jordan Valley.

Interestingly, sites in the Huleh Valley have not produced unequivocal remains of donkeys during the EB.[136] This may be due to the limited samples available for study and need not necessarily be an accurate picture of utilization of this beast of burden in that region. The authors of the faunal report on the EB Age occupation at Tel Dan (Wapnish and Hesse 1991:28-29) credit this lack of information to the limited exposure from which the data were obtained. Horwitz (2001:188), analyzing the faunal remains from Tel Teo, also considers the fact that limited areas were excavated from the EB and that the architectural remains unearthed were domestic structures. The EB II donkey figurines from Tel Dan suggest that donkeys were likely to have been used as beasts of burden in the Huleh Valley during the EB Age.

ICONOGRAPHY

The existence of numerous donkey figurines during the EB Age and the increase in faunal remains of *E. asinus* are interpreted as clear proof for domestication of the donkey. Such an important innovation, with its great advantages, must have had far-reaching social significance that eventually was simply rendered into artistic expression in the form of a particular iconographical motif, the donkey figurine.

The representation of animal figures laden with receptacles of different types is not an invention of the EB Age in the Southern Levant but began in earlier times, although different animals were represented. Several Chalcolithic period sites in the Southern Levant yielded laden figurines, mainly sheep and goats. At the En Gedi sanctuary a

[136] There is a remote possibility that the one bone from an *E. asinus* found at Tel Na`ama in an IBA context has mixed material from the EB II at site (Greenberg et al. 1998:29).

pottery figurine of a ram bearing on its back two churns was found (Ussishkin 1980), while at Gilat a ram bearing three cornets was found (Alon 1976: Pls.33,34). At Tel Turmus an incomplete basalt figurine represents a ram with a bowl on its back (Epstein 1985: Fig.2a,b), while a fragment of a pottery figurine found at Ghassul (North 1961: Pl.10) is probably similar to that from Ein Gedi.

Alon (1976), Amiran (1976) and Epstein (1985) have interpreted the animal figurines as vessels used in rites to promote fertility, like other types of figures. The Chalcolithic figurines represent vessels used in milk product preparation (churns) and probably milk libation (cornets) and therefore it is not surprising to find these figurines in sanctuaries (En Gedi, Gilat). These vessels may have been used to promote fertility and success in sheep/goat-raising, as seems likely in the case of several miniature churns and figurines with churns probably found in Chalcolithic ritual contexts (e.g. Perrot 1961: Fig. 39:1,3, Pl. 9:11,14; Alon 1977: Pl. 36; Milevski 2002).[137]

Notably, no donkey figurines were found in secure Chalcolithic contexts. As was mentioned above it is likely that the donkey figurine from Givatayim belongs to the EB horizon and not to the Chalcolithic period. While the churn and related figurines were dedicated to a cult of herd raising and milk production (Milevski, *idem*), the *Sitz im Leben* of the donkey figurines was the economic importance of these animals as a means of transportation, and the probable social significance of being a tradesman or a person dedicated to exchange of commodities over short or long distance transactions.

Amiran (1985) was the first scholar to propose that donkey figurines represent a ritual offering in a tomb of EB merchants. She based her assertion on Chalcolithic parallels, figurines having ritual connotation and found in ritual contexts. The cultic aspect

[137] Amiran (1976) has even suggested that these figurines must be related to a Dumuzi-like myth and cult, since this deity is related *inter alia* to the “power in the milk”.

of donkey figurines is drawn from the fact that several of them were found in tombs. Actually all the figurines with a clear context were found in burials, i.e. Barkai, Givatayim, Azor and Jericho or as the case of Khirbet ez-Zeraqon, within the settlement.

We do not know what the relationship between the "users" of figurines and their "producers" was, with one exception claimed. The relation between the laden donkey figurines from Tel Dan (made of MW) and the jars of the EB II (also of MW) for long distance trade and exchange, both as containers and commodities themselves, has been pointed out by Greenberg (1996b; Greenberg and Porat 1996)[138] We do not know if this fact should be interpreted as a social relationship between traders and potters or whether MW material was chosen for aesthetic or quality reasons.

In addition, there is an evolution in the utilization of the donkey from a burden beast during the EB I-II to the riding of the donkeys during the EB II-III, as can be seen in the appearance of a saddle in several of the figurines and even a rider as in the case of the example from Khirbet ez-Zeraqon. Besides, from the beginning of the Canaanean MB II, artistic representations portray some supposedly high-ranking personages riding on donkeys, as in the Egyptian stelea of Serabit el-Kadem in southern Sinai (e.g. Gardiner and Peet 1952: Pls. XXXVII, XXXIX, LXXXV) (Staubli 1991:100-107; see Figure 26:5).[139]

RITUAL PRACTICES

Regarding the cultic character of the figurines, we have some cases of donkey burials in Lod, Tel es-Sakan and Site H (Nahal Habesor). At `Ai, a donkey's jaw bone was found in

[138] In other cases cases we have no petrographic description of the figurines. At Arad, for instance, the description of the clay from Stratum I seems to fit that of the necked jars (Glass 1978a).

[139] Another representation of donkeys occurs in a probable IBA context (ca. 2200-2000 BC) in a rock engraving near `Ain el Gudeirat in the Negev (Haiman 1996: 21, Fig. 15).

a building identified as a sanctuary. The cult and sacrifice of donkeys is well known in the Ancient Near East. For instance, in Mesopotamia the sacrifice of a donkey was a form of signing an agreement, as analyzed by Finet (1993) and Anbar (1998),[140] with its Biblical parallels (see Scurlock 2002b: 392; Borowski 2002:417). Donkey tombs were found in several sites in Mesopotamia (e.g. Clutton-Brock 1986, 1989; Clutton-Brock and Davies1993) and Egypt as well (e.g. Petrie 1914; Clutton-Brock 1992).[141] At Tel Brak the donkeys were buried in a small temple in complex FS probably dedicated to the god Shakkan (Oates and Oates 1993:162-164).[142] This deity is though to have had a special relation with equids, defined as the cattle god since Enki entrusted animal life on the plains to that god in the story of "Enki and the World Order" (Kramer 1961).[143]

The excavators have interpreted the complex as a caravanserai or way station based on the buried donkeys, and the references to equids on bullae found in the complex. (Oates and Oates *idem*, Oates et al. 2001).

The cult of burden beasts remind us of cultic practices in the Andean region. In that area the burden beasts are the llamas and other camelids. Ritual ceremonies of the herdsmen in the Andes are the *herranza* and the *mesa*, where people gather in a drinking feast making gifts, which, among other aims, are intended to protect the llamas and increase their number (Flannery, Marcus and Reynolds 1989).

The *mesa* is a ceremony related to ritual offerings (Flores Ochoa 1997). Actually, the word indicates the religious principle, the objects utilized in the ceremony and the shamans (*alto misayuq*) that participated. The *mesa* could refer to several questions. All of

[140] I am indebted to Jorge Silva Castillo, El Colegio de Mexico, for this reference.

[141] The bones of the donkeys have been radiocarbon dated according to 4,390 ± 130 BP, i.e. parallel to the Canaanean EB IB.

[142] The temple is dated to ca. 2,200 BC, i.e. the beginning of the IBA in Canaan.

[143] See Scurlock 2002a:385.

them include the invocation of the *wamani,* one of the supernatural owners of all animals, to protect the camelid livestock.[144] In several cases, the ceremony is related to the burial of a person and includes several personal objects such as pottery and other artifacts. In the case of the *llameros* (llama caravaneers) the ceremony includes llama and alpaca figurines (Figure 28:1-2) which are included in the burial site, covered with textile sheets. A different phenomenon of the cult of camelids in the Andean region is the existence of some sanctuaries devoted to these animals along the routes, such as that of Yuraj Cruz, Bolivia (Nielsen 1997-98) (Figure 28:3), where the caravans of llamas are depicted as rows of standing stones in front of the altar.

The dangers in the routes were always present. These risks and perils were augmented with the absence of military control along the ways, and we do not have any proof of this control, at least for the EB I. But even in cases where the authorities possessed some military units as in the case of Mari in the second millennium BC, the robbery of donkey caravans was frequent (Joannès 1996:331). However, we do not have to exaggerate the weight of the thefts because sometimes the documents have political connotations that reveal ethnic abhorrence against nomads, mountainous population, etc. (e.g. Foster 2002:285-286).

Of course, military activities could also interfere in the transportation along the routes when wars or simple battles existed (Joannès 1996:332). Besides, natural obstacles

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[144] One of these ceremonies in the region of Ayacucho (Peru) was described by Flannery, Marcus and Reynolds (1989:151-182). One of the herders is depicted staying in a rocky peak believing that the *wamani* related to his terrain lived there and the caves are the entry and exit for this *seňor de los animales* (lord of the animals) (Flannery, Marcus and Reynolds 1989:154). A song from the time of the Incas (a Situa hymn) also addresses the appeal of the herders to the gods, in this case Viracocha, to protect their flocks as well as the agricultural produce (Brotherson 1989:247): *Let me live in peace/ and safety,/ Father Viracocha/ food and sustenance/ maize and llamas,/ with all manner/ of skills.*

existed, such as the severe weather conditions in the semi-desert and desert regions. The Egyptian literature registered these cases in some narratives like the "The Protests of the Eloquent Peasant," where the donkeys and transported goods of the itinerant Khuanup were robbed in his way (Wilson 1955:407-410), and the "Satire of the Trades" where the itinerant merchant was "slain" by the gnats and the sand flies made him "miserably miserable" (Wilson 1955:432). All these circumstances naturally influenced the merchants to search for the protection of the deities for them and their livestock in the routes of the country. We suggest an interpretation of the donkey figurines found in burial contexts similar to that of the camelid figurines found in burial contexts in the Andean region, against the background of ritual ceremonies including the worshiping of the burden animals as symbol of transportation.

Despite the fact that we have no knowledge of deities related to transportation and exchange during the EB in Canaan, we are acquainted with a few references to probable deities in the local EB (e.g. Amiran 1972a,b; see above bull ivory heads in Chapter 8). Furthermore, there are additional references to deities related to trade and exchange in the Ancient Near East.

Of relevance is the work of Brody (1998) who has exemplified the cult of Canaanite and Phoenician seafarers, i.e., the cult of a particular type of merchant whose means of transportation was across the sea. Among others, these sailors worshipped marine deities and protector gods and goddesses (Brody 1998:22-37). Sanctuaries near the coast, a sacred space consecrated within the ships, and religious ceremonies characterize this worship (Brody 1998:39-94).

One of the deities, Milqart was probably assigned as a protector of trade and exchange, not only of seafarers. Milqart was associated with the Greek Herakles, considered a guardian of the voyagers (Lacroix 1974). Herakles/Milqart were the parallels for Hurrian Irshappa, who is also identified with the Canaanite Reshep (Vattioni 1965; Fulco 1976, Laroche 1976:124-125; Cornelius 1994), Ugaritic *eršp* (Schaeffer 1968:521) and Mesopotamiam Nergal (Albright 1968:128, 145, 243; Lambert 1973; Brody 1998:37, 98). [145]

Most relevant are the references to a deity associated with trade and exchange appearing in two texts from Bogazkoy, where Irshappa appears as the "god of the merchant" (*tamgar-(š)še*) (Brandenstein 1934: Vs. II 23; Ehelolf 1944:102 II 13; Boehmer 1979: XXVII:I rev. ii 23; XXXIV:102 ii 13).[146] Nergal (the Mesopotamian equivalent for Reshep and Milqart) is also referred to as the "lord of commerce" or "lord of the market place" in one of the texts of Emar (Arnaud 1986:373, 378).

Other god related to trade or transportation is Min from Egypt, the deity of Coptos. In one of his characters he is related to the protection of voyagers and explorers, and indirectly with traders. In a late text (Yoyotte 1952), Min appears as the explorer of the oriental deserts connecting Coptos to several mineral sources near the Red Sea.[147]

In sum, we suggest that the sociological background for the donkey figurines is the existence of a group of merchants or donkey caravaneers, existing from the EB I onwards, specialized in the transportation of commodities and deriving benefits from their knowledge in the management of the domesticated donkey. This group practiced a special

[145] It is surprising that at Ugarit, in spite of the quantity of documents related to trade and exchange (e.g. Rainey 1963; Heltzer 1977, 1978) no deity is related to this activity. The only Ugaritic deity associated with a particular economic profession is Kotar wa-Hasis, a craftsman god, comparable with the Hephaistos of the Greeks (Smith 1985**,** Barré 1983:85-86).

[146] Moran 1992:102, n.4; Haas 1994: 369-370; Brody 1998:37, and bibliography therein.

[147] See the probable connections of Min with Reshep (Shoemaker 2001). Other deities like Hathor and Maat are destined to the protection of the mines of lapis lazuli and turquoise in Sinai (cf. Aufrère 1997:125-126, 132-133).

ritual or ceremony related with the donkey as mean of transportation; the clearly identifiable evidence for this ritual are the figurines found in the human burials and the burial of these equids in certain places. As we do not have evidence of special deities related to trade and transportation in Canaan, it is difficult to associate a particular god to these supposed ceremonies, and we can only theorize that the Levantine Resheph was the most probable candidate for this task, or a local variant of the Mesopotamian Shakkan. Alternatively it is suggested that the donkey figurines could have been ceremonial, supernatural protectors of livestock, as in the case of the *wamani* of the Andean world. As donkey figurines with saddles and riders appear also in Levantine cultic contexts from EB II onwards, it is probable that they were intended to emphasize the general character of the donkey as a means of transportation with which donkey herders were involved.

Chapter 11

EXCHANGE NETWORKS

In Part II, different kinds of goods were discussed with a view to their sources, likely centers of production, and patterns of exchange as understood from archaeological finds that indicate their dispersal over distances. Those last observations, although obviously incomplete, are the only and consequently the best sources for understanding routes and patterns of exchange in this bygone period.

While most of the commodities presented in this research are utilitarian goods, a few may be classified as either valuables or luxury items. These last include a handful of ivory objects, shells and fragments of shells and tiny carnelian beads (see Chapter 12, Section 3). The present section describes these commodities and defines the areas in which they were exchanged and their likely centers of distribution. The routes these objects traveled are reconstructed from patterns of distribution of commodities. Since regional divisions proposed by Gophna in his main works (e.g. Gophna 1974, 1984; Broshi and Gophna 1984; Gophna and Portugali 1988; Gophna 1995b; Getzov, Paz and Gophna 2001) best characterize the southern Levant, the discussionfollows the lead of these scholars by treating the evidence in the same way. Maps 21-28 present these results visually.

While synthesizing the data described in the previous chapters (i.e. the characteristics of exchange networks of the EB Age in the southern Levant), this research outlines some parameters for exchange proposed by Plog (1977:128-129). Results of this research on which this dissertation is based suggest that there was no economic centralization in this period, but rather a number of independent production and exchange networks.

Unlike traditional theory on networks (cf. Plog, *idem*) that understood the different components of an exchange network as a fixed formal structure, it is suggested here that they should be understood as reflecting economic relations (in the archaeological record) between manufacturers and consumers (cf. Marx 1970:195-205), within a given territory, called networks. Although these networks are far from having the characteristics of "markets" as in modern capitalist economies, it is within the exchange network that producers' surpluses were realized.

1. NORTHERN REGIONS

UPPER GALILEE

Upper Galilee is poorly represented in the data base of sites that participated in EB exchange. However, a modicum of information is available for the region. It is likely that during EB IA Upper Galilee sites received GBW from sources in Western Galilee and the Huleh Valley, indicating that goods were exchanged or circulated along an east to west axis. Information on exchange in EB II comes from only three sites, Meona, Tel Qedesh and Tell Ruweisa, all recipients of MW. During EB III, KKW, probably originating at Hazor, reached Western Galilee, suggesting that Upper Galilee was the region through which KKW crossed to northern coastal sites such as Rosh Haniqra (Western Galilee).

The actual routes are not always evident because of the few relevant finds from this period. Nevertheless, it may be assumed that such natural routes as Nahal Betzet, Nahal Keziv, Nahal Hilazon and other easily traveled *wadis* were the byways through which these commodities circulated. There is some suggestion that the area of Gush Halav was the locale of a Canaanean blade workshop (during the EB II?). If that interpretation is correct, then it may well have supplied sites in the region, and the routes would have been similar.

Beachrock tools from the northern Coastal Plain found at Hazor must have also been brought through the *wadis* of Upper Galilee.

HULEH VALLEY

The Huleh Valley was a north-south axis of distribution which showed signs of significant activity during EB IA in the exchange of the locally produced GBW Family-Ie. The Jordan River Valley was apparently the principal recipient of goods of this family, but there is also evidence of exchange between the Huleh Valley and Western Galilee, as determined by some exemplars of GBW, Family-If. This indicates exchange along a north-south axis as well as an eastern-western axis through Upper Galilee. The Huleh Valley was also active during EB II when MW was widely distributed, especially at the urban settlements of Tel Dan and Tel Hazor. Notably, those sites are also known to be centers of production and distribution of KKW in middle EB III. Indeed, these sites were two of the most important centers of the EB II and III in Canaan, and their location at the intersection of routes to the northern Levant and the westernmost regions of Galilee must have played a key role in their development (cf. Greenberg 1996a, 2002). From the appearance of donkey figurines at Tel Dan, Meona and Qiryat Ata, all from EB II contexts, it is possible to conjecture the existence of a relatively developed group of merchants utilizing the donkey as a beast of burden, although zoological data are very meager on this matter (see above).

The fact that metal weapons, probably originating in one of valleys east of the Aravah (Feinan?), made their way to the Huleh Valley (Hazor and Tel Dan), is an important aspect of interregional exchange using the Jordan Valley as one of the main lines of circulation, with probable outposts or way-stations at Jericho and Beth Yerah (see below). Tel Gadot is the northernmost site where carnelian beads were found; considering their southern origins we can also explain the northern location of this raw material by the fact that the Huleh Valley, is a continuation of the Jordan Valley, a main thoroughfare for exchange.

GOLAN HEIGHTS

This study has dealt with the Golan plateau in a very limited manner since little information on excavations is published, and the extensive survey coinducted by the IAA is still unpublished. The Golan was dependent for several aspects of pottery consumption on other northern locales during EB II and III, but probably this region had its own sources for some flint tools and ground stone tools. Sites such as Gamla probably acquired Canaanean blades from other western and southern regions. The donkey figurine found at Pithat Hayarmuk (EB I) on the northern bank of the Yarmuk River Gorge, a main route at the southern border of the Golan plateau, is surely a representative of the cult of transportation described above.

WESTERN GALILEE

Western Galilee, also called the Northern Coastal Plain apparently participated in the production, distribution and acquisition of the GBW (Family If and Families Ia, Ie and III respectively) in EB IA and EB IB. This region also probably produced at least some of the beach-rock tools found in other northern, inland regions. During EB IA, and to some extent during EB IB, a significant exchange developed between Western Galilee, and the Jezreel and Huleh Valleys.

Some commodities such as basalt and metal tools made their way to Western Galilee from greater distances such as Wadi Arab and probably Wadi Feinan in Transjordan. During EB I and II shells arrived both from nearby Mediterranean shores and the Red Sea. Kabri is the northernmost site where Nilotic mother-of-pearl has been found to date. Western Galilee shares with other northern regions a wide distribution of MW types during EB II. In EB III, KKW reached as far as Rosh Haniqra. The same site also yielded metal tools, apparently derived from the eastern Aravah. Qiryat Ata and Kabri probably were two centers of redistribution along the northern coastal route. The former site, located near the Jezreel Valley, linked the valley with the northernmost centers in northern Canaan and the Northern Levant along the Mediterranean littoral.

LOWER GALILEE

Lower Galilee is one of the main protagonists in the production and exchange of GBW in the EB IA. Yiftahel and the Bet Netofa Valley are candidates for centers of production of two variants of Family I. This area connects Lower Galilee with almost all the northern and central regions of the country.

The area of the Sea of Galilee, part of the Great Rift Valley, participated in the exchange of pottery from the EB I to the EB III with GBW, CW, MW and KKW. These wares show connections mainly with the Jezreel and the Beth Shean Valleys. Maritime exchange across the lake (see below), with the Golan may only be hypothesized; land routes (especially along the southern and eastern shores and via the Yarmuk Gorge) could have been alternate routes to the probable maritime routes leading to the Golan Heights. The area around the lake is an obligatory route for commodities coming from the south to sites in the Huleh Valley; that is apparently the reason why metal objects originating in the Feinan area are found there. Bet Yerah was the main center of population and most likely benefited from its location at the intersection of several routes and regions (cf. Esse 1991:100-101).

To what extent agricultural exchange existed is difficult to say, since data on crops in the northern region are few. However, it should be stressed that the granary at EB III Beth Yerah which, according to Kempinski (1979:29), could have held 800 tons, indicates considerable accumulation of foodstuffs, some of which were probably surpluses used for exchange. If hippopotamus remains imply herding or utilization for production of ivory items, then Bet Yerah may have been a center of production of the ivory bull's heads found at more southerly EB II-III urban centers.

JEZREEL VALLEY

The Jezreel Valley is a good example of a region that is in itself a route of exchange. It connects the Jordan Valley with the Central and Northern Coastal Plains. The connection with the Jordan Valley is made through Nahal Harod and the Bet Shean Valley. The connection with the northern coastal plain is made through the Qishon pass, and with the central coastal plain through Wadi Ara (Nahal Iron).

The Jezreel Valley appears to have been the core area where GBW was most plentiful during EB IA and EB IB (Affula), and the likely location of at least one of its centers of production. Some pottery wares from the Jordan Valley, the Central Coastal Plain and even the Shephelah also reached several sites in the Jezreel Valley. The Jezreel Valley contains the most outstanding evidence in the southern Levant for a workshop producing Canaanean blades at Har Haruvim. Though still unexcavated, the site has produced a plentiful supply of cores found in surface surveys. Exchanged goods found at Megiddo include Egyptian objects as well, such as mother-of-pearl shells and Egyptianized pottery.

The Jezreel Valley, rich in EB sites including Megiddo, one of the largest or perhaps the very largest EB I site in the region.[148] Megiddo was a major center in EB III that could control production workshops of the nearby sites. Imported and exotic finds from the site suggest that it was large enough to have produced surpluses that could be exchanged. Its population would have needed food supplies that might have been obtained from smaller, satellite settlements of the sort found at Tel Qashish. Excavations at that site yielded evidence for several kinds of crops as well as Mediterranean shells and fish and Red Sea shells. Containing GBW and MW during the EB IB and II like most of the sites

[148] The existence of Megiddo during the EB II has been questioned in recent years (cf. Greenberg 2003b).

in the region, Tel Qashish is strangely the only important site in the Jezreel Valley without KKW (cf. one of the possible explanations in Zuckerman1996a).

2. CENTRAL REGIONS

JORDAN VALLEY

The Jordan Valley, part of the Great Rift Valley, a fertile region filled with sites and a natural road, may be called the backbone of exchange between north and south Canaan. Evidence of exchange is found in patterns of circulation of different types of pottery. Connections to the north are found in the presence of GBW, MW and KKW. Central pottery groups such as EC forms, Dolomitic LPGW, and TAB of the EB IB-II are also frequently encountered at Jordan Valley sites, both west and east of the Jordan River. In addition, some southern wares, albeit in minute quantities, made their way to the region.

Local wares of EB I circulated at Jordan Valley sites (SDS, UHW) but also made their way as far away as the central hill country and the Jezreel Valley (UHW). Bitumen and metal objects circulated to the north, as apparently did some basalt tools originating in the outcrops to the east of the Dead Sea and Red Sea shells coming up through the Aravah. If carnelian beads originated in the Negev (see below), then it is reasonable to suggest that the Jordan Valley was also part of the trajectory by which they were distributed to sites in the Bet Shean area and the Huleh Valley.

Jericho, at the southern end of the Jordan Valley, could also have been a source of hippopotamus ivory and possibly the production focus of bulls' heads. Without doubt, Jericho was the main center in the Jordan Valley, controlling exchange that passed through the valley from all directions. Surely interregional exchange favored economic development, as has been suggested by Anati (1962). Equid remains and donkey figurines stand against the background of the exchange and ritual activities related to Jericho. In addition, Jericho was probably a locale for a religious center (for the Moon cult?) together with Bet Yerah (Hebrew "House of the Moon"), on the basis of the linguistic root of the word Jericho, related to the moon (Hebrew ירח) (Brown, Driver and Briggs 1978:698; cf. Albright 1942:83).[149] Both cities were located at the center of the Rift Valley and participated in the exchange through this natural route.

CENTRAL HILL COUNTRY AND SHEPHELAH

The Central Hill Country has been represented in this study in a limited way because of the limited number of sites and the limited available data on exchanged commodities. The picture that has presently emerged from studying patterns of exchange there indicates that the whole region took part in exchange in a passive way. This is deduced from evidence of restricted locally produced commodities of the region against the “imports” from other regions, aside from some pottery groups, crops and wood probably “exported” from the Hebron hills to the Northern Negev. Local pottery groups include GBW Family II during EB IA, which originated in the Samarian hills near Nablus, and Dolomitic wares of the EB IB, which spread to the Jordan Valley, the Northern Negev and the Dead Sea Plain. EC and TAB arrived at central and northern sites during EB IB-II. A few examples of MW and KKW as well are attributed to EB II-III contexts. Flint tools, metal objects, Mediterranean and Nilotic shells, and bitumen were also found in the region. Tel el-Farah (N) and `Ai (in the Ramallah area) were the most important centers and in the region. To date, they have yielded, the greatest concentrations of exchanged goods. Hebron may also have been a center of exchange for the southern regions during EB III, if a metal hoard retrieved from looting of the site is any indication of activity there.

[149] For the cult of the moon in Canaan see, among others, Albright 1938 and Key 1965. For the relation between the bull and the bull's image (Chapter 8) and the moon cult see Ornan 2001.

That the Shephelah acted as an interface region between the Hill Country and the Coastal Plain is better represented in this study by evidence of considerable circulation of pottery wares such as the EC, DW and TAB in patterns that form contiguous areas. For example, there are three sites along Nahal Lachish during EB I, Lachish, Horvat Ptora and Tel Erani, from east to west. Almost all the same commodities are found at these three sites, showing that they were part of the same exchange network. During the EB II and III, Lachish and Tel Erani yielded most of the commodities discussed in this work.

Northern types of GBW are unknown in the Shephelah during EB I, but MW did make its way there in EB II, probably through the Central and Southern Coastal Plains. If the KKW found in the center and south of the country originated in the north, it problably made its way there through the Jordan Valley. However, if more southerly centers for production of KKW existed (as suggested by de Miroschedji 2000c), one of these centers may well have been located in the Shephelah. Precisely how and from where this ware was distributed is unclear. One option suggests that itinerant potters produced it in different locales, which might explain some greatly varied petrographic profiles obtained from different examples.

Copper objects made their way to the Shephelah but not in great quantities. Shells, mainly from the Mediterranean, but also the Nilotic *Chambardia,* are well represented, as well as Egyptian or Egyptianized pottery. The presence of thes items are thought to be the result of redistribution from sources in the Southern Coastal Plain. Canaanean blades probably have their own sources (Gezer, the Yarmuth area), but they also could have been acquired from sites further south such as Gat Guvrin and Tel Halif.

Communication between the coastal plain and the inner mountainous regions took place through east-west *wadis* (Nahal Soreq, Nahal Guvrin, Nahal Lachish and Nahal Shiqma) which provided relatively easy passage. Sites of the Southern Shephelah were often located where different geographic regions converged. They appear to have been strategically placed for encouraging exchange. Lachish took advantage of this exchange, as did other sites such as Tel Yarmuth, in the area of Nahal Yarmuth and the basin of the Soreq.

CENTRAL COASTAL PLAIN

The Central Coastal Plain was a corridor through which products from the coastal shores were distributed to the interior. Examples of this type of exchange are found in beachrock tools and shells (both from the Mediterranean and the Nile) which were encountered in eastern regions. Some carnelian beads found in cave tombs in the Central Coastal Plain may also be evidence of this. The series of donkey figurines found along the Central Coastal Plain and the Yarkon-Ayalon-Lod basin, where also donkey remains were encountered, indicate that several groups of merchants were active in this region.

Pottery did not circulate from north to south or *vice versa*, except for the case of GBW which originated in Lower Galilee and the Jezreel Valley and made its way to the Coastal Plain through the Wadi Ara route. The donkey figurine found in a tomb near En Assawir could be related to merchants active in that region.

The area of Nahal Alexander seems to have been a location of metallurgical activities and exchange; probably the metal objects arrived there and to other sites in the Central Coastal Plain via the central hill country. A sub-region, part of the Central Coastal Plain is the Ayalon-Lod basin which appears to have exchanged pottery with the Jordan Valley. During EB IA, SDS pottery from the eastern Jordan Valley made its way to that sub-region, while during the EB I-II pottery groups originating in the Central Coastal Plain, such as TAB, circulated in the Shephelah, the Central Hill Country and the Jordan Valley.

SOUTHERN COASTAL PLAIN

The Southern Coastal Plain is contiguous with the Southern Shephelah and in turn with the route that leads to the Negev, through Nahal Habesor and Northern Sinai. These routes appear to have been used during EB I, II and III (see Gophna 1974:160, 165; 1984:29), although temporal fluctuations in the amount of traffic along them may be assumed.

EC pottery had a limited radiation from its core area, the Southern Shephelah, spreading as far as the Southern Coastal Plain and in some few instances to the Central Hill Country and Jericho. Mediterranean shells and beachrock tools were distributed to the east, as well as Nilotic *Chambardia* shells. DW originated in the Hill Country and was found in the Southern Coastal Plain, surely after passing through the Shephelah. Bitumen arrived there from the Dead Sea via the same route.

While most of the donkey figurines were found in the Central Coastal Plain, the site of Afridar in the Southern Coastal Plain produced the largest quantities of equid bones. These finds probably indicate it a relationship to production and exchange of metal artifacts. In such a situation the advantages offered by these beasts of burden, especially if they had to transport heavy ore or fuel, are obvious.

EASTERN DEAD SEA PLAIN AND ARAVAH

The eastern Dead Sea Plain includes the major site of Bab ed Dhra. In EB I there is litle evidence (e.g. LPGW) for interaction between it and more distant regions. However, later in EB II and EB III, it appears to have been engaged in exchange, especially of ceramics. By EB III the more southerly site of Numeira was settled and there is evidence of extensive exchange between it and Bab edh-Dhra of some pottery wares, as may be inferred from the very specific tempers used.

Bab edh-Dhra and Numeira were connected with the northern Negev and the Aravah. These sites were likely indirect sources of several pottery wares from central-western Canaan and Mediterranean sea shells found at more southerly sites. Perhaps specialized flint tools and crops as well as some luxury items such as ivory, carnelian and Red Sea shells were also exhanged along the same route. Bitumen was certainly obtained from the Dead Sea; metal objects from Wadi Feinan and basalt from northern nearby sources of Mujib/Kerak, Sweimeh and Ma'in and would have made their ways to points distant via the Dead Sea and Aravah segments of the Great Rift Valley. If the Jafr basin area was the producer of tabular scrapers during the EB, then it is likely that Wadi Feinan was a station for these tools on their way to Arad and western Canaan. It must be pointed out that eastern Aravah is isolated from the northern wares during the EB I, II and III.

The eastern Aravah dominated production and distribution of metal objects, with its center in Wadi Feinan. During EB II, Arkosic vessels widely distributed in the Negev were also produced in that region. Those items were exchanged for flint tools, agricultural produce and shells. Some basalt tools found at the Wadi Feinan sites apparently originated nearby to the east, in the area of Dana/Tafila, but were imported from sources in northern Transjordan, suggesting they came to the Wadi Feidan through Bab edh-Dhra, at least during EB I (see Chapter 5, Section 2).

It is possible that Bab edh-Dhra (during the EB I, II and III) and Numeira (during the EB III) acted as trading posts for metal objects produced at Wadi Feinan. They were probably distributed in Transjordan through a route going east of the Dead Sea. The relatively large frequencies of donkey remains at Bab edh-Dhra might attest to it as a way-station or depot in the exchange network.

3. SOUTHERN REGIONS

NORTHERN NEGEV

The Northern Negev was also a region that became a main route for exchange between east and west and between north and south. The primary axes of the region are Nahal Habesor, Nahal Grar and Nahal Beersheva. Sites along Nahal Habesor performed an important role in the exchange of goods during EB I.

Tel Halif, located near the Hebron Hills and the Shephelah seems to have been another site with important exchange associations in EB I. During EB II, Arad was a center of distribution for several southern pottery groups, recognizable by their fabrics and tempers. They include: Arkosic vessels from the eastern Aravah, Fine quartz and Chert groups from the north-western Negev (e.g. Tel Halif) and a Fossil shell group from the Uvda Valley. Arad's exchange network included the exportation of locally made pottery of the Calcite group to several sites of the Negev and to `Ai. Arad was also a center of redistribution for metal objects as well as a settlement where metallurgical activities also took place. The aforementioned materials and activities represent exchange relations between the northern Negev and the eastern Aravah along routes leading to the Dead Sea and southwards. It also seems to have been a route for the distribution of bitumen (cf. Yekutieli 2004). Bitumen has been found to the west at sites like Small Tel Malhata and others further south. Again it should be noted that if the Jafr basin area was producing tabular scrapers in the EB Age, then Arad must also have been a redistributor of these objects to western Canaan.

In exchange the less arid northern regions provided Arad with grains and wood, part of which were probably redistributed to the south. Arad was most probably not only a "gate to the desert" (Amiran, Ilan and Sebbane 1997) but also a gateway between the Negev and all surrounding areas. *Chambardia* shells and Egyptian pottery found their way to Arad, probably through networks distributing other, local goods. Amiran, and Ilan (1996: 67-73,142; Pls. 37:1, 2; 86) have suggested that the open spaces at Arad can be related to market (i.e. bazaar) activities. Equid remains and donkey figurines are additional indications for the transportation and exchange of commodities noted above. During the EB III Tel Halif seemed to have played an important role in the distribution and exchange of pottery and Canaanean flint blades and tabular scrapers.

CENTRAL AND SOUTHERN NEGEV

The central and southern Negev comprises a series of sub-regions, including the Negev Highlands, the Ramon Crater and contiguous crater areas, the Uvda Valley and the southern Aravah. Exchange activities in the EB II are mainly documented at sites in the Negev Highlands and the Uvda Valley. Pottery groups from the Negev were exchanged, with the site of Arad acting as a redistribution center. Unfortunately, as we saw above, the date of the tabular flint sources at Har Qeren, in the western highlands, is not well established, but they may have been active during EB II. Trade in tabular scrapers must have linked that region with the Southern Coastal Plain and the southern Negev. The Ramon Crater was the center of production of sandstone tools, mainly for sites in the nearby Negev but also for sites further to the north. Carnelian sources existed in the Ramon Crater, and it seems that this stone (whether as raw material or as elaborated beads) arrived in the north via two main routes, one across the coastal plain and the other through the Jordan Valley.

Sites in the Uvda Valley yielded evidence for exchange of Red Sea shells and timber and probably agricultural produce from more northerly sites. While we do not know the exact sources of tabular scrapers (and the few Canaanean blades found at Biqat Uvda), it is most probable that they arrived from the northwest or northeast. The contiguous area of the Aravah was surely the main axis of exchange. Through this route bitumen was likely to have made its way to Biqat Nimra and Biqat Uvda. The exchange of products in this region, which includes relatively long distances in comparison with other regions of the country, probably included Bedouin-like traders as an important component (see Bienkowski and van der Steen 2001 for a discussion of similar activity in later periods).

4. Local Riverine and Coastal Maritime Traffic?

The likely existence of a maritime, coastal route Mediterranean following the shore has been pointed out during the last decade by Gophna (Gophna and Liphschitz 1996; Gophna 1997, 2002a), based on the presence of Cedar of Lebanon and Turkey oak at Afridar Areas G and E1 respectively (Liphschitz 2004a) and the remains of metallurgical activities at coastal sites. Afridar has been hypothesized to have had a harbor from which metallurgical items were transported or distributed, perhaps event to Egypt (Gophna and Milevski 2003).

There is a small body of evidence to suggest that Mediterranean voyaging took place from the Neolithic onwards (Marcus 2002b). Baumgarten (1993) has suggested that one of the Chalcolithic ossuaries found at Azor (Perrot 1961a: Pl. 23:3, Pl. IV), a site on the Mediterranean littoral quite near the shore, exhibits a drawing of a ship (but see Marcus 2002b:406). An Egyptian vessel was found off the coast of Atlit in the lee of the northern ridge of the cape (Galili et al. 2002) with Nilotic *Chambardia rubens*. That extraordinary find suggests maritime activity dating to the period of Ma'adi, approximately correlated to EB IA. A contemporary settlement at the coastal site of Tel Megadim could have been involved in such activity. Boat representations from Megiddo indicate they were used in the EB (Beck 1995:11, Fig. 7a, Marcus 2002b:406; Figure 27:4). Anchor-like objects (Hebrew: *shfifonim*) were found outside the EB II gate of Bet

Yerah (Wachsmann 1985:395-396, Figs. 3-5) and it is suggested they were related to boating on the Sea of Galilee and a cult associated with it (see also below).

Recent excavations at Tell es-Sakkan in the Gaza Strip have added greatly to our knowledge of remains of the EB on the southern coast (Gophna 1997). The site, dating to EB I and EB III (de Miroschedji and Sadeq 2000, de Miroschedji et al. 2003) seems not to have been settled in EB II. Its location on the south bank of Wadi Ghazzeh (Nahal Habesor), quite near the coast, as well as its size, would have made it a likely port or at least a convenient place to stop for coastal maritime activity. It may have even served as a center for distribution of Egyptian and Egyptianized materials to sites further north, perhaps by sea. EB I pottery sherds identified at the Jaffa excavations directed by Z. Herzog (Gophna 2002a:420, n.1) could indicate another coastal site in this early period. Further north, EB I remains were also reported at Tel Megadim (Wolff 1998), Tel Akko (Dothan 1992:226) and Rosh Haniqra (Tadmor and Prausnitz 1959) which could have functioned as anchorage points in the Canaanean coast.

Documents from Ebla (ca. 2500 BC) mention cities on the Canaanean coast (Pettinato 1979:185). These documents probably include the names of south Levantine sites such as Akko, Jaffa, Ashdod and Gaza, together with Megiddo and Lachish (but see Archi 1980:5-8). The assumption is that a series of coastal sites served as harbors for Mediterranean trade and exchange with the southern Levant. The question posed here is whether these coastal harbors were not only part of a Mediterranean external trade but may also have been utilized as local exchange routes involving those sites. For instance, did some of the northern pottery wares make their way to the Southern Coastal Plain by boat from a harbor located opposite the Carmel, or did copper tools and weapons arrive via a maritime coastal route to the north of Canaan from Afridar?

Unfortunately, present data do not support the idea of a coastal maritime route and its very existence remains open to question. Nor is there proof of fluvial transportation along the Yarkon, Nahal Alexander, the Yarmuk or the Jordan Rivers, such as existed in Mesopotamia (Finet 1969, Joannès 1996) and Egypt (Partridge 1996), although these streams were navigable for small craft with little draft. However, the Sea of Galilee was eminently navigable (for the transport of KKW to sites in the Golan?), as was the Dead Sea for transporting other goods (e.g. DW, Map 7; Canaanean blades,Map 8; and bitumen, Map 18**)**. These sizable bodies of water may well have been used, at least partly, for the transportation of goods within networks of exchange.

PART IV

CONCLUSIONS

Chapter 12

CONCLUSIONS AND PERSPECTIVES

1. ASPECTS OF THE EXCHANGE NETWORKS: CENTRALIZATION, DIRECTIONALITY AND SYMMETRY

Interpreting patterns of exchange through data from the archaeological record can, at least for certain commodities, be extremely difficult and the results somewhat tentative because of limitations of available data. This work, using such data, attempts to do so despite the problematic nature of the task. The approach to such questions, outlined below taken in this work is one that factors in a number of different parameters that allow for such limitations, while permitting reasonable interpretation.

By researching exchange of commodities during the EB Age some important observations may be made. Primarily, it may be stated that no centralized or unified network of exchange existed, rather there were several lines or paths of circulation that at times converged into something approaching networks some of which eventually displayed evidence of regional centralization. Separation of networks is sometimes clearly observable, as that between the north and south-central regions, where little interaction or mutual exchange is noted. However, some networks actually linked different regions, as those of the Hill Country and the Shephelah, and those of the Southern Coastal Plain with the Shephelah, so that in different time spans and in associations with different commodities, intercourse between different regions did take place.

Economic aspects of these networks are notable in patterns discerned. They indicate each branch of production had a defined network of distribution sometimes associated with related commodities as in the case of Canaanean blades and bitumen in the center and southern regions.[150] Other patterns suggest sympathetic networks for more than one commodity, as in the case of Arkosic holemouth ceramic vessels and metal objects in the northern Negev during EB II.

In particular, networks of pottery distribution showed well-defined patterns. The outstanding characteristic of pottery distribution networks in most cases is in the existence of concentric areas of circulation radiating from core areas where it appears pottery was produced. In addition there are some cases of pottery exchange networks in which distribution of specialized wares remained within a very restricted zone. Such patterns shifted over time and accordingly chronological parameters are all important in understanding networks of pottery exchange during the EB Age. In general there appears to be a major trend from a general decentralization of production during EB IA towards regional centralization in EB II with a return to less centralization in EB III.

Exchange of Canaanean blades similarly indicates some type of centralization dominated by regional centers that distributed blades in relatively closed networks. However, the distribution of Canaanean blades differs from that of pottery circulation because it involved several stages through which objects passed between the workshop of the knapper and the end user, the agricultural worker who received the blades and sickles (i.e. retouched tools). This type of network circulation could also be relevant for metal objects that may have passed through a number of stations. Presumably they derived from copper sources in the Feinan area and passed through metallurgical workshops before finding their way to end users. There is, however, a major difference in the locales of these networks. Metal sources seem to be only in the Eastern Aravah, while Canaanean flint

[150] A similar observation may be made concerning the appearance of Nilotic shells in association with Egyptian pottery. That subject, concerning exchange with external regions is however, beyond the scope of this study.

segments originated in numerous locales in the center and northern regions. Such examples differ considerably from the pattern suggested by distribution of tabular scrapers. These specialized tools appear to have been exchanged over long distances from supposed centers of production. Notably, scrapers gradually decrease in appearance at sites from south to north as the distance from the sources of material grows greater.

Simple networks, such as those concerning distribution of raw materials (bitumen, carnelian) and shells were characterized by more direct patterns of exchange. Of course they were also subject to chronological variations. Such commodities of diminutive size and/or small quantity, derived from specialized sources and had relatively simple, more or less linear distribution networks. It is likely they represent some kind of “down-the-line” model of exchange of the type proposed by Renfrew (1975) in which they travel through successive settlements and regions by subsequent exchanges.

It is difficult to express in general the relative abundance or lack of exchanged commodities per network or region since quantitative data is available in only some few instances. Generally this information is confined to objects such as flints and zooarchaeological and archaeobotanical remains. Nevertheless, attempts have been made to calculate parameters of absolute or relative abundance of given commodities (e.g. Earle and Ericson 1977: 6) as a function of distance from sources, weights or quantities of artifacts or raw materials. Such attempts allow for estimates which then may be further factored with estimates relating volumes of excavated areas to quantities or frequencies of specific commodities.

This work has attempted to take into account the problems of limited data noted above and then consider distances from the sources or between locales of exchange, not just in linear terms, but also by taking into account topographical features that add to the expenditure of energy and costs (see Chapter 3, Section 1). These social factors (i.e. energy expended and costs in terms of outlay of resources) were likely to affect entire communities to the extent their inhabitants were involved in production and exchange of a commodity (Petréquin and Petréquin 2000: 364-366). Such economically oriented activity would have direct effects on these early societies of the EB Age.

With all the above considerations in mind it is possible, at least to a limited extent, to address questions of quantites of the different commodities locally exchanged during the EB Age. It is assumed that in all cases, abundance of pottery types defines core areas, while lesser quantities in more distant zones indicate pottery distributed from core areas. This interpretation seem to be borne out by observations from the archaeological network. In general all morphological types of particular wares or groups of wares tended to be found within core areas, while few variants seemed to have made their way to more distant locales and those that did were generally the smallest and easiest to transport.

Basalt and ground stone tools seem to be most evenly distributed and they were relatively abundant in relation to distances and their weight. Canaanean blades had a restricted area of distribution although distances from the flint sources were not great. By contrast, most metal objects were concentrated in the south-central regions, close to the sources in the Wadi Feinan area, although some few were found in northernmost sites such as Rosh Haniqra and Tel Dan.

Directionality of the networks, i.e. the direction in which commodities flow, is sometimes difficult to establish from the archaeological record. When it could be observed it indicated a diversity of patterns that not necessarily oppose one another, although sometimes it is difficult to follow the circulation outlines of some commodities. The Huleh Valley, the Jordan Valley, the Aravah and the Central and Southern Coastal Plains acted as the major south Levantine conduits for exchange along a north-south axis in accordance with their geographic parameters. Galilee, the Jezreel Valley, the Central Hill

Country and the Shephelah tended to be regions in which east-west tracks were observed. The Negev and southern regions appear to have fostered exchanged networks showing mixed directionality. In particular cases such as that involving exchange of Canaanean blades, as far as may be understood, there are multidirectional networks, dependent on location of sources, sites and the extent of particular areas in which exchange took places.

Symmetry and directionality of exchange networks during the EB Age show unequal patterns. Exchange networks during the EB Age show unequal patterns that were sometimes symmetrical (i.e. bi-directional with commodities going back and forth between regions) sometime uni-directional. Several examples indicate the types of patterns. Notably, pottery of northern origin (i.e. GBW, MW and KKW) has been found at southern sites, while virtually no southern pottery wares (e.g. the Negev wares) have been found in northern sites. Utilization of bitumen for hafting flint tools is well known at south-central sites and, significantly, is unknown at sites in the north. Prestige or luxury items such as shells have a long range of distribution and are found both in southern and northern regions, but these goods do not seem to affect the exchange networks. Flint tabular scrapers that most probably originated in southern areas were brought in small amounts to sites in the north. Although poorly represented there, they are evidence of that some of those objects could be exchanged over long distances. It can also be suggested that these scrapers found their way through networks that were primarily devoted to other commodities.

The only areas that show a degree of symmetry in the circulation of goods are the Jordan Valley and to a lesser degree the Aravah. Patterns of exchange in the Jordan Valley underwent change over time with most circulation of commodities occurring during EB I and EB III. The Central and Southern Coastal Plains also illustrate a certain degree of symmetry, having their connections with the eastern areas of the Shephelah, the central

Hill country and the northern Negev. In the cases of the Jordan Valley and the Coastal Plain, there is a predominance of northern products, indicating much stronger links with that region of the country rather than with the south. Lack of symmetry within exchange networks and between different ones is understood to be the most significant factor for explaining why no centralized or unified network of exchange ever existed in the EB Age of the Southern Levant.

Galilee, the Huleh Valley and the Jezreel Valley exhibit decentralized exchange of pottery during the EB IA. To judge from distribution pattern of types (i.e. families) of GBW (see Chapter 3, Section 2) exchange was not symmetrical. Main centers of production of GBW (Families Ia-d) appear to have been in the Jezreel Valley and Lower Galilee, while other types, (Families Ie-f) were apparently produced in centers in Western Galilee and the Huleh Valley. Asymmetrical also are network relations between north and south during EB II. MW arrived at southern sites but southern pottery groups of the Negev did not reach the central and northern regions (with the exception of `Ai). Furthermore there is no correspondence between the appearance of MW and the TAB, although both groups are notable for having common forms (i.e. small carinated bowls).

It must be emphasized that decentralization and the diversity over the varied areas of exchange of the Southern Levant during the EB Age are the main characteristics of exchange networks that could be observed. Indeed, the Southern Levant may best be characterized in regards to exchange as a mosaic of regions loosely held together with skeins of far-flung networks that, at certain peak periods of activity, showed evidence of regional centralization. Plog (1977) has defined similar phenomenon that may be used to describe the southern Levant in EB I (as was already noteb by Joffe 1993:53) as well as in EB II-III.

2. VARIATION IN PATTERNS OF EXCHANGE OVER TIME

The EB I present in general the most variegated forms and number of networks. Exchange networks of the EB I are the most numerous and varied for the entire EB Age. Some appear in the very beginning of the EB IA. They include a system responsible for distribution of tabular scrapers (probably an outgrowth of an earlier Chalcolithic network), one for dispersion of GBW, one for shell distribution (including Nilotic *Chambardia*) and another (albeit to a lesser extent) for distribution of metal objects involving centers at Wadi Feinan and a workshop/center at Afridar. Distribution of basalt vessels and tools shows some degree of continuity from Chalcolithic times, although typology of objects and distribution patterns are different. During EB IB the multiplicity of commodities and networks reached its peak. If it were possible to measure the degree of exchange according to Earle and Ericson’s (1977) parameters, the abundance of commodities in this period could be judged by counting artifacts from the archaeological record. Notable in this period is an increasing number of pottery types greater circulation of raw materials (e.g. bitumen, carnelian) and a standardized network of production and distribution of Canaanean blades and tabular scrapers indicating longer travel over greater distances. This is reflected in another, albeit smaller way in the archaeological record. It is interesting to note that while the EB IA yielded higher frequencies of donkey remains, it was not until EB IB that the first representation of these animals in figurines appear, and then mostly in ritual contexts. This is probably the result of a guild of merchants that came into being only at the end EB I.

Noted increases in exchanged goods from EB IA to EB IB could be the result of population growth in the latter period (Gophna and Portugali 1988:20). However, by EB II there was a decreased number of commodities interchanged that may have been reflected also in reduced quantities of goods (e.g. pottery, metals, agricultural produce and minerals). These changes may be the result a reduced number of settlements in EB II that tended to have larger concentrations of population (Portugali and Gophna 1993:169-175). When interpreting this information there is a likelihood of bias because the reduced numbers of sites may be perceived as evidence of reduced exchange, although quantitatively this may not have been the case, but rather a function of an incompletely understood or preserved archaeological record. It is possible that very large population centers, not extensively excavated, would not have yielded data on this matter. Centralization in distribution of some pottery wares such as MW surely reflects this tendency.

Development of exchange seems to follow the same pattern of ups and downs as urbanization during the EB Age. According to Getzov, Paz and Gophna (2001:41-45) in Upper Galilee, the Northern Coastal Plain and the Northern Hill Country, a severe crisis occurred at the end of EB II and these regions became and remained almost deserted in EB III. In the Huleh Valley and Lower Galilee the crisis was less severe and some centers continued to exist. In the Jezreel and Jordan Valleys and the Central and Southern Coastal Plains the number of urban settlements was more or less stable during EB II and III. But the greatest stability of urban centers occurred in the Shepelah and the Southern Hill Country, with the exception of Arad in the Northern Negev, that ceased to exist by the end of the EB II.

One of the changing aspects of the shifting from villages to towns and cities and the development of the exchange between these settlements must have been the rise of “imports” into these locales. Ziadeh (1995:1007) has pointed out that the most changing aspects of material culture lie in the shift from a self-sufficient economy to an economy based on wage-labor and are reflected in domestic artifacts. For instance, traditional pottery from the Palestinian village Ti`innik (Taanakh) was replaced mainly by aluminum, glass and plastic artifacts. These objects were acquired through exterior relationships (*idem*).

It is probable that during EB II and III, urban centers acquired ceramic groups such as TAB, MW, Arkose pottery and KKW that replaced local, coarser wares. From the beginning of the EB Age, metal tools such as axes, adzes and chisels replaced similar flint tools. That process was not the direct result of urbanization but involved evolution of metal production during the Chalcolithic period and the development of exchange networks and a probably distinct division of labor in EB I (see Rosen 1996c).

On the basis of the sparse evidence presented in Chapter 6, it seems that during EB II and III metallurgical activities were concentrated at only a few urban sites. Genz, however (2001) explains this in two possible ways. He suggested that additional information from other centers is unavailable because it has either not been excavated within these sites or metallurgical activity took place in extra-mural locations. He further suggested the possibility that it was associated with smaller, non-urban centers of population that remain unexplored. Such a reality as noted in the former possibilities may differ substantially from arrangements in the preceding EB I period when metallurgical activities were associated with numerous sites.

Dependent upon the alternate scenarios suggested above, methods and networks of distribution may have been quite varied. One possibility is that in EB II-III, urban centers controlled production and distribution of metals. Alternately, they may have only had control of distribution, with indirect control of production associated with a large number of smaller producers that obtained materials from the sources.

The exchange of ceramics in EB III differs from that associated with metal. Postulated, on the basis of KKW, is the existence of several centers of production during EB III. Distribution of this specialized ware suggests decentralized lines of exchange mostly centered in the north, but with some additional evidence of a more southerly distribution. Notably, this is only one ceramic group of the middle EB III period. Unfortunately, we do not have much information about the circulation of other wares in EB III, besides evidence for restricted exchange of DSP pottery, and in general archaeological records indicating exchange are lesser.

In summary, there is a gradual tendency towards centralization of exchange along the chronological trajectory of the EB Age. In EB I the number of commodities is greatest as are the number of exchange networks and centers from which they radiate. By EB II they are significantly reduced in number and probably more centralized. By EB III there appears to be evidence that exchange was lessened and non-centralized.

3. Specialized Commodities

Zaccagnini (1987:58), in his treatment of gift-giving in the Ancient Near East, has proposed the value of a luxury item (that eventually could be a gift-item) to be a combination of its exchange value in the regular way of other standard commodities plus a symbolic connotation attached to the artifact. Only three such types of commodities appear to fit into this catgegory in the EB Age of the southern Levant, ivory objects, carnelian objects and shells.

The three luxury or prestige items or valuables that we can point out among the commodities that circulated during the EB Age are: ivory, shells and carnelian.[151] It appears that ivory bull's heads were paraphernalia directly related to ruling classes (representing palace or temple based institutions during EB II-III). These objects appear to

[151] Other valuables such as bed models (Beck 1995), decorated bones (Zarrzecki-Peleg 1994) and alabaster objects (Amiran 1970) have not been considered in this research since there is no clear information on their proveniences or they are Egyptian imports.

fit the definition of valuables known from written sources of the Ancient Near East of the second millennium BC that were exchanged within the framework of elite relations between Egypt, Anatolia, Syria and Mesopotamia (Zaccagnini 1987:60). However shells and carnelian beads, presumably of lesser worth and more easily obtainable, appear to have been exchanged within the framework of village societies as early as EB I.

Donkey figurines in this study were not interpreted as a simple commodity, but rather as symbolic objects of a cult involving merchants or people linked with the use of donkeys as means of transportation and beasts of burden. In this sense they can also be called prestige artifacts. According to this suggestion these figurines may have circulated only among these people and were therefore, not objects of exchange in regular networks.

Gifts or objects of special significance of the figurine type are, unfortunately, not sufficiently observable from available data for patterns of exchange to be ascertained with any certainty. However, some likely hints of this type of specialized exchange may be observed from finds of shells from the Red Sea at sites in the Mediterranean coastal plain and vice versa. In addition, some specialized pottery wares may actually have been objects within a system of gift exchanges, although no specific archaeological indicators of such type of exchange can be discerned. Similarly, it is possible to interpret some patterns of exchange of GBW during the EB IA, exchange of part of the pottery southern groups in the Negev during the EB II, and the exchanged pottery of Bab edh-Dhra and Numeira in EB III as examples of gift-giving. However, as in the example of the diamond quoted from Marx in Chapter 2 (n. 4), it is difficult to determine from the physical attributes of a find, if it was considered to be a regular commodity or a valuable.

4. LOCAL EXCHANGE AND MERCHANTS

We cannot precisely establish the social existence of middlemen or merchants during the EB Age, though it is probable that they existed as an intermediary social caste. Such status, it appears, would sometimes be related to producers, sometimes independent of them. In all instances, it is suggested they were related to the social classes in power, whoever they were (elites or burgeoning rulers in the EB I, rulers and their administration in EB II-III, etc).

If merchants were part of the communities and settlements where producers resided, they must have been dependent upon the rule of local authorities and upon the ability and willingness of producers of commodities to provision them. If, on the other hand, they resided outside of settlements or centers of production (i.e. in separate locales or were itinerant) they would have been a condiserably more independent class. Historical examples of such social classes operating within the parameters of the Ancient Near East appear to be found in such groups as the biblical Kenites, Rechabites and Midianites, or artisans living in the “Valley of Artificers” of the Persian period (and see Chapter 6, Section 1). The term “Canaanite” (meaning a stranger; Is. 23:8; Job 40:30; Prov. 31:24), possibly a synonym for trader during the Iron II, may be another example of this class of middlemen.

In instances where exchange was pursued in restricted circuits, as in the example of pottery exchange between Bab edh-Dhra and Numeira during EB III, it was probably accomplished by producers that controlled temper and clay extracted from the vicinity of some sites. Similarly, populations close to sources of raw materials (copper, flint, rocks, bitumen, etc.) or near the sea (for molluscs and fish, for instance), and those possessing a specific technology (as that of the Canaanean blades) would have been involved with specific aspects of exchange. EB II and III urban centers with their large populations could have possessed their own group of merchants as in the case of Ebla palatial economy of the third millennium BC (Pettinato 1979) or that of second millennium merchants in Ugarit (Rainey 1963). Such likely analogies suggest that the existence of a cult related to donkeys as beasts of burden was related to the existence of a group socially differentiated from the rest of the population by its economic activities, i.e. merchants and/or donkey herders.

The existence of a cult related to donkeys may have a parallel in later periods in the region of the Andean Mountains connected with shamanist practices (Gilead 2002, 2004-05). Donkey burials (sacrifices?) may have begun as early as EB I, but it seemed to have developed during the EB II and III (e.g. Lod, Tel es-Sakan); however it is not clear if these burials were done within sacred complexes as in Mesopotamia.

Later developments in the region contrast with the EB Age reality, suggesting differences, some substantive but which presage developments in trade. A change seemed to have occurred during the MB Age and onwards when a series of temples have been existed on the Coastal Plains and their internal routes, the Jordan Valley and the Aravah (Kochavi 2004-05). These temples produced relatively large quantities of imports and they have been probably served as sanctuaries related to trade and exchange with deities that protect the merchants and their economic activities (*idem*). This dissertation assumes that such types of temples were not present in the EB archaeological records because the inter-regional exchange was not so developed as in the MB Age.

The iconography of donkey figurines, seal impressions and bull's heads in the EB Age, reflects what Panofsky (1955:27-29) has called artistic motifs and subject matters representing a "conventional meaning" adapted to social, temporal, cultural and geographic backgrounds. This dissertation proposes that a significant part of the "conventional meanings" of the iconography of the EB Age allegorizes social groups or social role's activities represented by animals and icons. Donkeys are representative of exchange, the bull is representative of governorship, while cultic scenes and buildings in seal impressions (i.e. Ben-Tor's 1978 Classes I and III) are representatives of governorship or priesthood. Such iconography reflects a society divided into economic, social and political groups, one in which it may be assumed traders and/or donkey herders occupied at least a place in the social order.

5. LOCAL EXCHANGE AND THE ECONOMICS OF THE EB AGE

Earlier studies have focused on the effects of political and economic changes during the EB Age in the Southern Levant. They have drawn mainly on developments and settlement patterns (de Miroschedji 1989b, Joffe 1991, 1993, Portugali and Gophna 1993, Finkelstein 1995) and information from pottery studies (e.g. Greenberg 2000). For other areas of the Near East (mainly Anatolia and Mesopotamia) some interesting conclusions for the EB Age have been extracted from the archaeological record and from texts. It has been suggested that in the middle of the third millennium BC the circulation of goods of accessible materials previously produced either by households, or by independent specialists, fell under state control. However, by the end of the third millennium BC, when numerous urban centers were abandoned or considerably reduced both in size and population and the number of villages increased (Wilkinson 1990:102-103) there may have been a reversion to less centralized production.

Wattenmaker (1994:197) has pointed out that during times of strong political control, elites were provided with subsistence products by non-elite populations. As noted in Chapter 8, texts from Mesopotamia (Steinkeller 1992), Ebla (Pettinato 1981), and Ugarit (Heltzer 1976, 1978) record movements of animals and agricultural products from countrysides to centers of population. In the area of Lagash the archaeozoological data suggest movements of goods to regional centers during the Early Dynastic period (3rd

millennium BC) (Mudar 1982). In Iran at Malyan, during the 2nd millennium BC, animals were probably brought from villages to an urban center (Zeder 1991).

Could these examples have relevancy for the Southern Levant during the EB Age? Yes and no. It appears that while some of the features described above are similar to the phenomena that took place in the Southern Levant, others are very different. According to the present research, urban centers of the Southern Levant register a certain concentration of commodities; however there were no administrative records to explain on which basis these commodities were acquired and circulated.

It is surmised that urban or urbanized centers of sufficient population could benefit from strategic locations between different regions, as in the case of the *metateros* of Central America (see Chapter 5). Arad, near the Hebron Hills and the northern Negev and the Aravah route could reflect just such a case, while the Wadi Feinan area of copper production may be a further case. In addition its location could have allowed it to profit from exchange of tabular scrapers, if as is suspected, the Jafr basin was indeed functioning as a producer of these tools during the EB Age, or if they were contemporaneously produced in the Har Qeren area.

Arad apparently controlled exchange of southern ceramic wares in the Negev during EB II, although Jericho may have been equally influential because of its special situation (e.g. Anati 1962, Dorell 1978). Notably, almost all commodities described in this dissertation are found in Jericho. Authorities of these urban centers could take advantage of traffic of merchants taking tribute for transit through an urban center of population or region under its control, or by means of exchange of commodities (i. e. as intermediaries, perhaps at a point of re-distribution). In all such cases ruling classes would benefit by extracting some of the value from exchange (i.e. surplus) of commodities.

A second form of appropriation of surplus through exchange occurs when authorities have control over an artisan's production as in the case of potters, knappers, smiths, etc. Such workshops could exist within population centers (cf. Ilan 2001) or at smaller settlements. For instance, characteristic pottery wares such as GBW, MW and KKW could have been made at workshops around population centers such as those known at Affula, Tel Dan, Hazor, Bet Yerah and Bet Shean. Flint workshops at Har Haruvim could have been controlled by Megiddo. In the case of Tel Halif it is probable that a secondary workshop could have existed within the EB III city.

A third form considers distribution of ceramic types such as GBW, EC, MW and KKW in which two or more networks are involved. Similar networks of distribution are notable for carnelian objects as well as exotic imports including Nilotic mollusca and fish remains and Egyptian and Egyptianized products.[152] Carnelian was concentrated in two or three zones (Chapter 9, Section 2), while *Chambardia* was distributed throughout the southern Levant (Chapter 8, Section 2).

Although valuables or prestige objects were dispersed in quite different patterns from those observed for utilitarian commodities, nevertheless, their circulation networks may well have been identical. The weight and bulk of prestige items allowed them to be exchanged more easily and over great distances. It is surmised that this was accomplished with extant networks of exchange of utilitarian commodities such as pottery vessels.

Tabular scraper exchange seems to have been a continuation of the Chalcolithic period into the EB Age, while Canaanean blades were distributed through a different system throughout the EB Age. At the same time pottery groups developed and changed in almost

[152] Egyptian and Egyptianized pottery is primarily found in the Southern Coastal Plain and the Shephelah and rarely in the north, although exceptions may be found at Megiddo (Ilan and Goren 2003).

each sub-period of the EB Age, with different regional centers of production and different distribution networks coming to the fore.

Domestication of the donkey seemed to be a factor that not only helped with the procurement of raw materials and the exchange of commodities between distant regions, it also must have lowered costs of commodities relative to the Chalcolithic period, prior to the domestication of this beast of burden. Accordingly, if herding and ownership of donkeys was the realm of a restricted group of communities or populations in the EB Age, this factor must have benefited the owners of donkeys or given rise to them.

Off course rulers of EB communities, whether they represented a village, a town or an urban center, derived economic advantages in the form of the administration of exchanges. It can be suggested that an urban center and its relative wealth was based on profits deriving from the exchange of commodities of other communities passing through its territory. A surplus could only be realized when an "inequality" occurred in the exchange of commodities as a result of the differences in the division of labor between one community or region with another; i.e. as a result of the differences in the costs of production and transportation of the commodities between different sites or regions.

Archaeological remains from settlements dating to the very end of the EB I through III seem to confirm part of this phenomenon in the existence of public buildings, some of them characterized as palaces, temples or granaries, and fortification systems, e.g. Tel Dan, Hazor, Khirbet ez-Zeraqon, Megiddo, Bet Yerah, `Ai, Jericho, Tel Yarmut and Arad (Joffe 1993:82-83; Herzog 1997:42-97).

It appears as if two main types of urban centers existed during the EB II-III *vis-à-vis* exchange systems:

1) Those that took advantage of the sources and had some kind of monopoly on a given production branch (pottery, flint, raw materials, etc).

2) Those that took advantage of their situation near trade routes or passes, acting as intermediary agents between diverse regions.

This work suggests that a lack of written documents indicates the degree of exchange remained at a relatively low level. This was perhaps due to a lack of integration of networks that did not favor exchange in the EB Age of the Southern Levant nor allow them to coalesce into a major system as it did in other, more populous regions of the Ancient Near East. Accordingly, unification of medium exchanges was not necessary and the transactions were not recorded.

This situation is reflected in a lack of evidence for the existence of weight-standards and consequently a local system of weights, while metrology seems to have existed as a system of linear measures (de Miroschedji 2001). Crucial for understanding any exchange system is an ability to determine concrete values or information concerning its standard system of weights. Such systems are identifiable in objects and the literature of the Ancient Near East. Legal documents of the Old Babylonian period and the El Amarna Letters offer, amongst other information, testimony to fraud and contamination of precious metals in commercial transactions (Zaccagnini 1976:560) emphasizing the importance of such standards.[153]

In Mesopotamia numerical records existed in the form of tokens prior to the advent of cuneiform records (Schmandt-Besserat 1983, 1992), but these kind of artifacts have not been found in the Southern Levant. By the Uruk period (fourth millennium BC) clay tablets found at Habuba Kabira contained numerical symbols revealing that some aspects

[153] The *topos* of the merchant that complicates himself with weights in order to cheat appears not only in the Mesopotamian literature (Lambert 1960:132-133; Finet 1973:70, § P) but also in the Biblical sources (Lv 19:35; Dt 25:13-16; Am 8:5).

of a bureaucratic administration in the Upper Euphrates existed (Akkermans and Schwartz 2003:194, Fig.6.9).

Of course it can be suggested that a system of accountability existed based on organic (non-surviving) materials, such as the system of *quipus* in the Inca empire (Quilter and Urton 2002) and that writing was not necessary since its invention need not necessarily be related to economic activities (cf. Postgate, Wang and Wilkinson 1995). However, as Egyptian and Mesopotamian sources revealed, numerical and administrative registration forms existed from the 4th millennium BC onward and there is no reason that south Levantine populations in contact with neighboring cultures did not take advantage of such practices as the need arose. It is difficult to understand why, with the knowledge of how to utilize clay for fashioning figurines and pottery fabrication, why south Levantines did not use it for record keeping as their neighbors did.

The economic life of the EB Age of the Southern Levant was probably at level of exchange or what Pettinato (1979) in his characterization of Ebla called barter or first exchange stage (and see Chapter 1). Urban centers like those of Mesopotamia and Syria exchanged commodities and also utilized weight-measure systems based on metal values. The sole suggestions of administrative local apparatus in the Southern Levant are seals and sealing impressions (Beck 1995).

There is no proof for the existence of exchange media such as metals or specific artifacts in the archaeological record of the EB Age of the southern Levant. Furthermore there is no evidence to support the existence of copper ingots as units of measure as they appear in the later IBA. Had they existed, one would expect to have found some evidence for them. Metal hoards are known and appear to be examples of a primitive form of accumulation of values. Flint caches are additional forms, while metals seem to have a more universal character in the production systems (and see Rowlands 1971, Philip 1988).

More important is that there is no indication that land was considered a commodity, i.e. that an exchange of lands existed during the EB Age in the Southern Levant as the sales of lands and houses documented in Mesopotamia during the fourth millennium BC (e.g. Gelb 1979:68-73). It has been suggested that land was the main means of production for an economy based on agriculture and that the historic development of land-property went from tribal to royal and sanctuary properties, until private estates. Heltzer (1978:115) has pointed out that the relation between exchange-values of the land and basic commodities will indicate the level of economic development of a country. However, there are other factors that could be involved in the exchange-value as the quantity of population in relation to the cultivated lands, the type of crops cultivated in a given terrain, the geographic characteristics of the country, or the existence of other natural resources; all these factors determine the relative social costs invested in the cultivation of the lands in relation to other activities.

Interestingly, Runnels (1988) have suggested that trade as a broad regional phenomenon in the EB Age of the Mediterranean was directed towards accumulation of wealth. By contrast to previous periods, exchange in the EB Age was characterized by an increase in scale and in kind, especially by the addition of copper and copper objects as another commodity. The addition of this commodity is rather a qualitative phenomenon and not an addendum of a simple further commodity since metals were a medium of exchange and accumulation. Some accumulation of wealth seems to have occurred as reflected in public (monumental?) buildings of the end of the EB I, the EB II and III, but the conversion of metals into actual exchange media did not come about until after the end of the EB Age.

It is paradoxical that in the ruralized society of the IBA (EB IV), when the urban centers of the EB Age collapsed, copper ingots appear in a standardized mode (e.g. Dever and Tadmor 1976, Cohen 1999:260-265; Segal and Roman 1999) causing Meshorer (1976) to consider them a first means of institutionalized payment.

EB Age economy seems to have been a loosely organized system of exchange networks with little sense of overall control. Different commodities were exchanged as needs arose and there does not appear to have been any visible equilibrium between different branches of the economic life (pottery production, metal production, flint tool production) of even the most sophisticated societies of the era. These aspects appear to have operated as more or less independent networks in which each commodity may be characterized by its own level of development and sophistication, dependent upon region and chronological niche.[154] This low level of integration is a hallmark of EB Age economy. Accordingly there was no need for a single medium of exchange and it was apparently not developed until the MB Age or later. As economic integration did not exist during the EB Age, political unification did not come about until later periods, after such developments in neighboring areas.

6. PERSPECTIVES ON LOCAL EXCHANGE IN THE SOUTHERN LEVANT

The study of local exchange networks of the EB Age has, until relative recent times, been sorely neglected. Indeed, the entire field of research into socio-economic of prehistoric and proto-historic societies of the Southern Levant is only newly opened. The present work has tried to blaze a path in this field by collating known data on the EB Age and providing an interpretation for them. Since interpretation can only be as good as the data from which it is drawn and, since the present data base is limited in its scope, the present writer understand that readers are likely to question and disagree with the interpretations

[154] For a so-called law of uneven and combined development in history see Novack 1974.

offered in this work. In defense he may only suggest that with further increments in the data base, his interpretations are likely to change, become more complete and engender further debate.

Since the basis for this dissertation is a body of archaeological data with severe limitations, it is important to note that if advances are to be made in understanding exchange in the EB Age, that more and better data must be collected and collated. Since quantitative data are important for the understanding of some phenomena, it is desirable that new publications emphasize quantitative data according to precise chrono-stratigraphic provenience. Of course such data must be collected by rigidly controlled and reliable methods.

Future directions for research that are likely to bring about greater understanding of networks of exchange will all for greater understanding of the structure of EB Age economies in relation to them. Petrographic work on more discrete pottery groups could bring is one branch of study that is likely to give useful results. In particular, the petrography of donkey figurines could reveal whether these artifacts were likely to have been made locally or whether they may have originated in or more workshops.

Additional sampling of basalt objects and determination of their geological sources would provide a real database for study the distribution of these objects. Given present methods, this seems to be a realistic goal. Hopefully, given the present tendency to include specialist studies in excavation reports, information on ground stone tools will indicate what types of raw materials are present in EB assemblages and possibly, their origins may be identifiable. That could lead to some important insights into patterns of exchange.

The search for a method that could identify flint origins for the Canaanean industry and the tabular scrapers is certainly a laudable direction that may well benefit archaeologists understanding of exchange patterns. In particular, excavation of the workshop site of Har Haruvim combined with such studies could provide major insights into the essence of a production center for these specialized tools. That in turn could offer further insights into patterns of their distribution.

Finally, it is hoped that more theoretical work, combined with the use of analogies derived from ethnoarchaeology will be applied to study of the EB Age in general, and particular to its economic aspects that are so tied to networks of exchange. It behooves field archaeologists to further develop field strategies that will allow for collection of wide ranges of data that can also be utilized by other social scientists for studies that will augment more traditional archaeological approaches. From such work it would be possible to derive insights that could be applied to the study of additional periods and regions.

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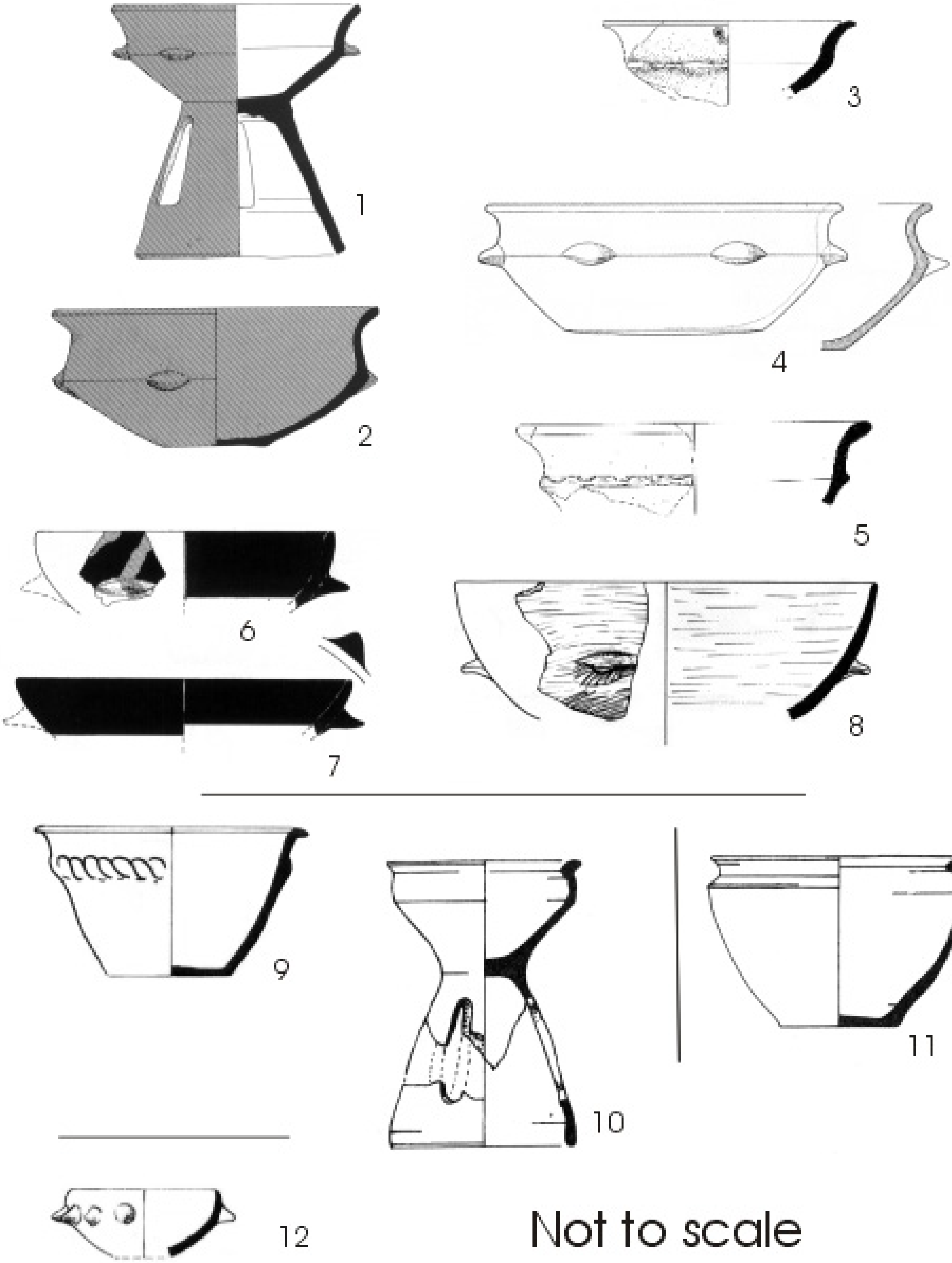

Figure 1. Gray Burnished Ware. 1 and 2. Family Ia, Yiftahel. 3. Type Ib, Yiftahel. 4. Type Ic, Affula. 5. Type Id, Affula. 6 and 7. Family Ie , T.Teo. 8. Family If, Kh.Uzza. 9. Family II, Tel-Farah (N). 10 and 11. Family III, Assawir. 12 Family IV, Affula. After Goren and Zuckerman 2000.

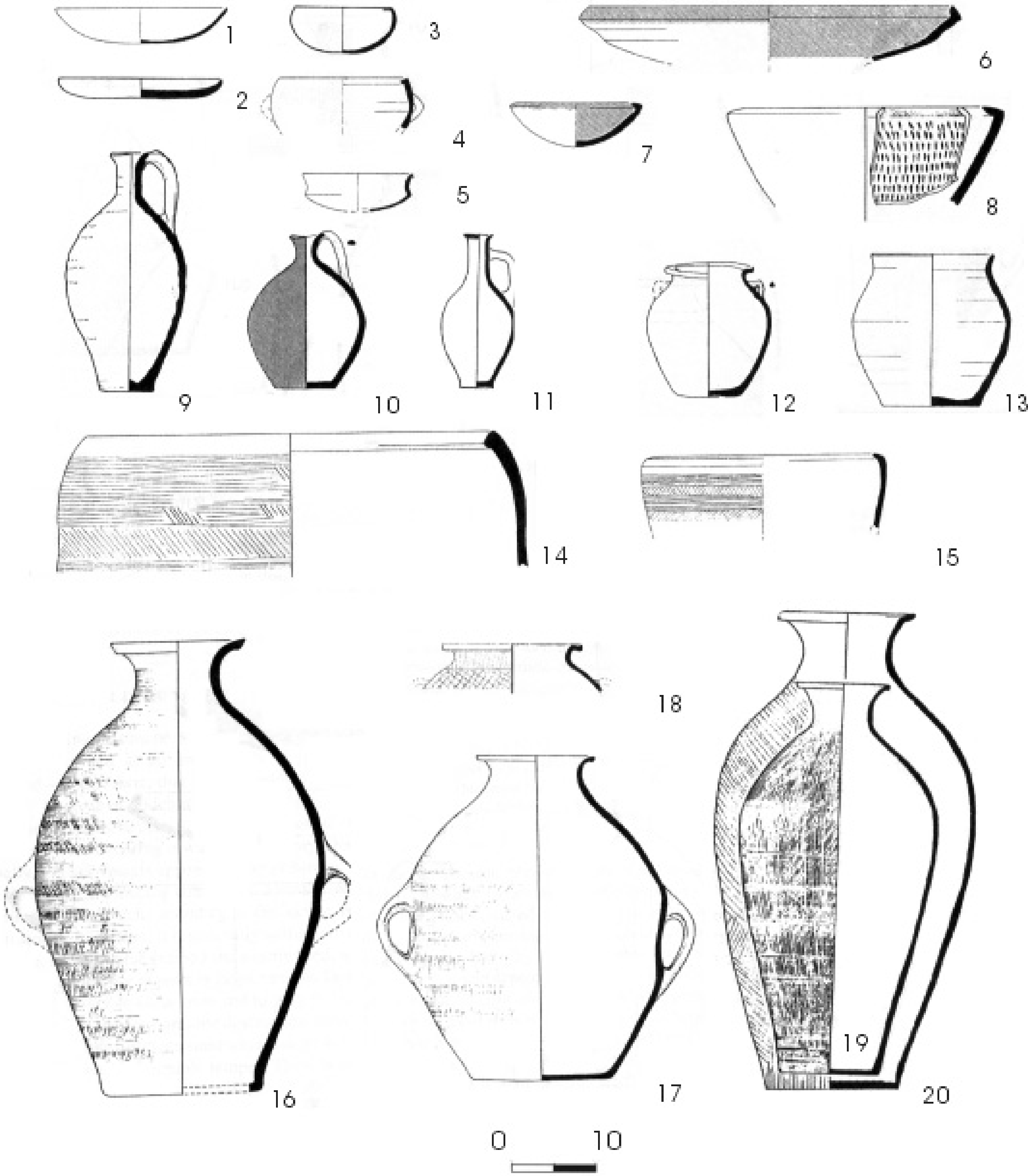

Figure 2. Metallic Ware. 1. Saucer bowl (Type B1a),Tel Teo. 2. Idem, T. Dan. 3. Saucer bowl (Type B1b1), Hazor. 4. Saucer bowl (Type B1b2), T. Teo. 5.Saucer bowl (Type B1c), T. Teo. 6. Platter bowl (Type B2a), T.Teo. 7. Platter bowl (Type B2b1), T. Teo. 8. Platter bowl (Type B2b2), T. Dan. 9. Jug (Type J1a), Kinneret tomb. 10. Jug (Type J1b), T.Dan. 11. Jug (Type J2), Kinneret tomb. 12. Small jar (Type SmJ1), T. Dan. 13. Small jar, (Type SmJ2), T.Dan. 14. Vat (Type V2), T.Dan. 15. Vat (Type V1), T. Teo. 16. Storage jar (Type Sj1a), Tl Dan. 17. Storage jar (Type SJ1b), T.Dan. 18. Storage jar (Type SJ2), T. Dan. 19. Storage jar (Type Sj3a), T.Qashish. 20. Storage jar (Type SJ3b), Hazor. After Greenberg and Porat 1996.

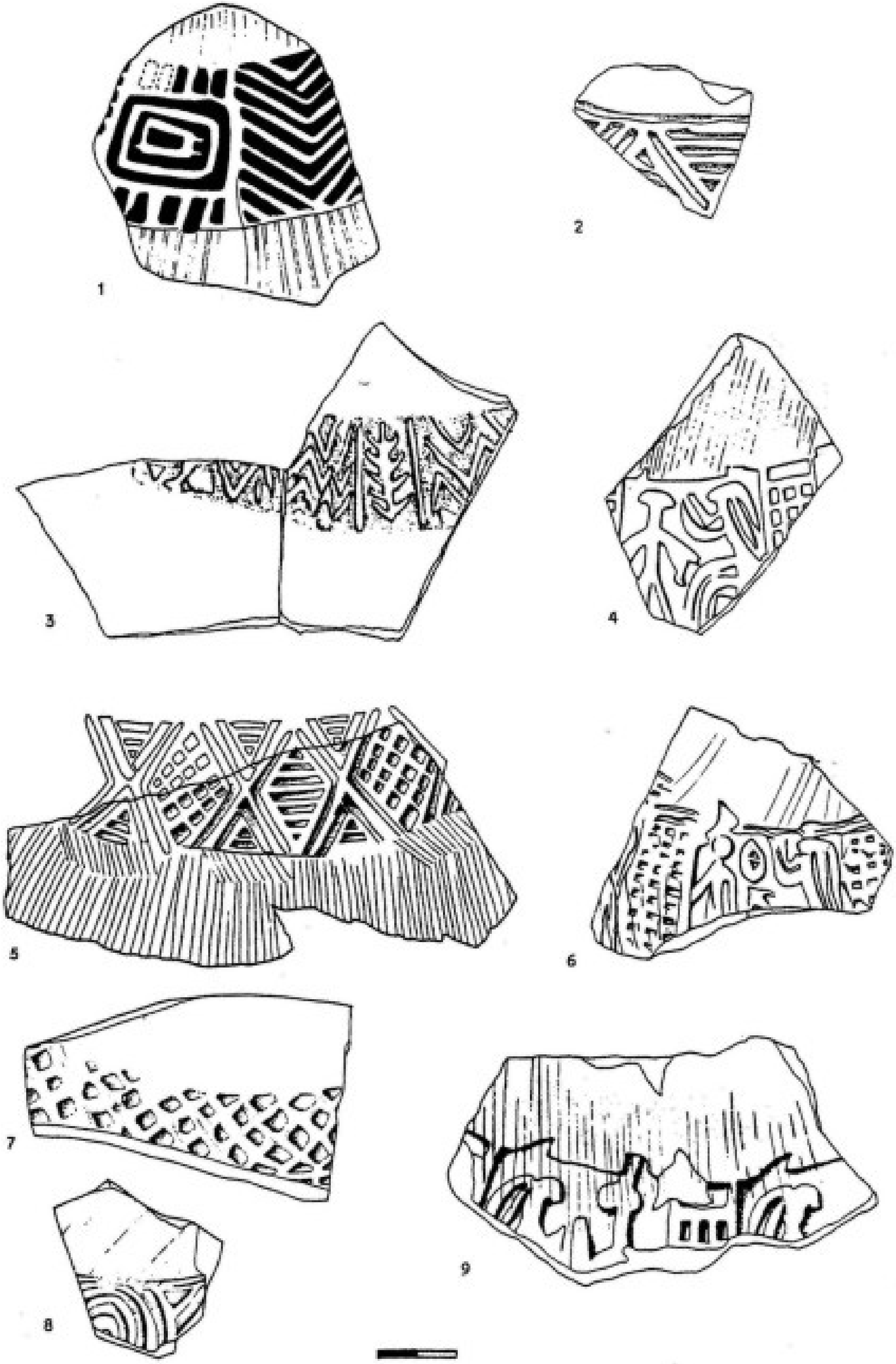

Figure 3. Cylinder seals impressions on MW vessels. Classes I (1-3, 5,7,8) and III (4,6,9). 1-2. Bet Haemeq. 3-4. Tel Qashish. 5-6. Bet Yerah. 7-9. Tel Dan. After Greenberg 2001a:Fig.11.1.

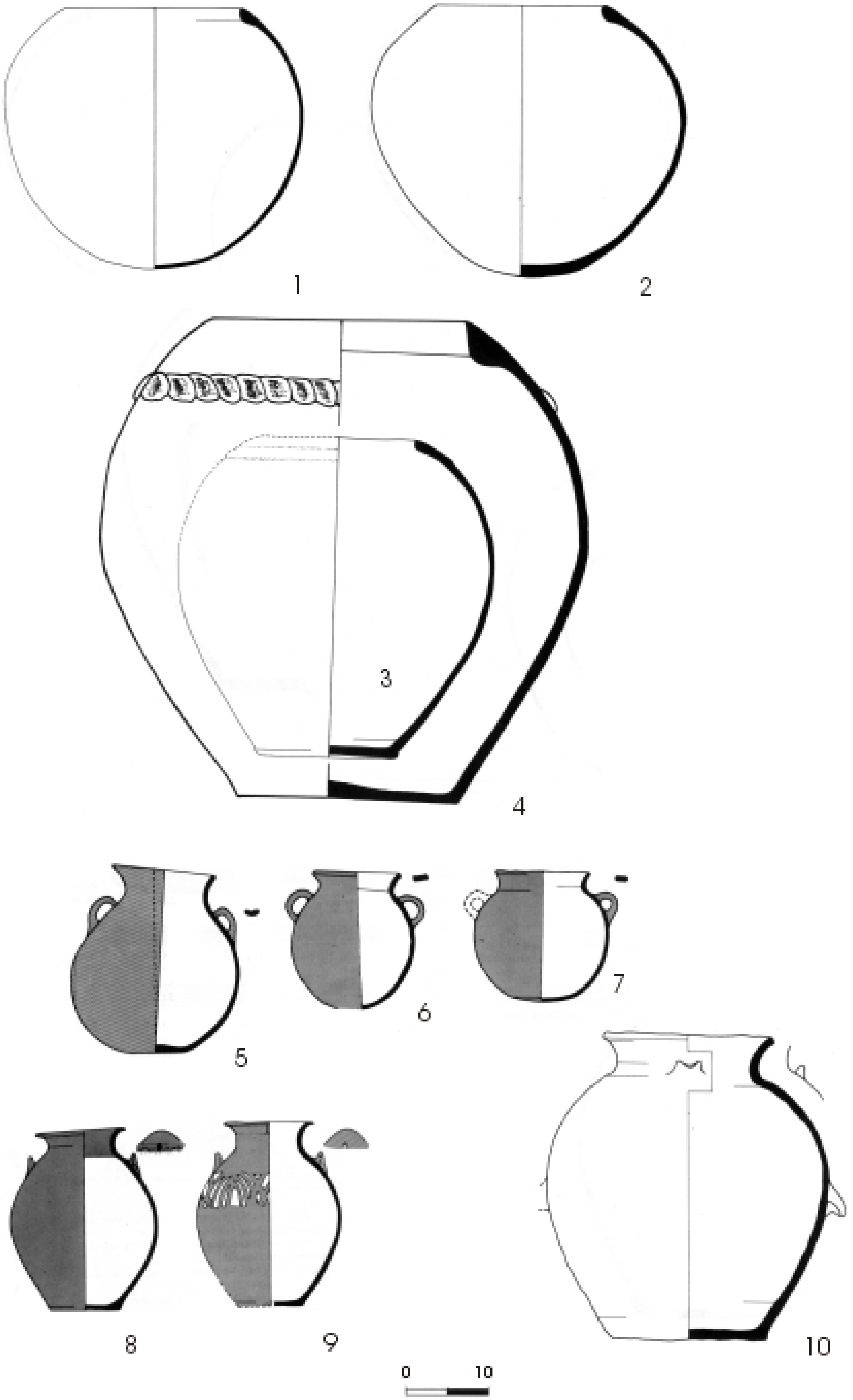

Figure 4. Southern pottery groups, Arad (EB II). 1-2. Holemouths, Arkose group. 3. Holemouth, Fossil shells group. 4. Holemouth, Calcite group. 5-7. Juglets, Fine quartz group. 8-10. Small jars, Chert group. After Amiran et al. 1978.

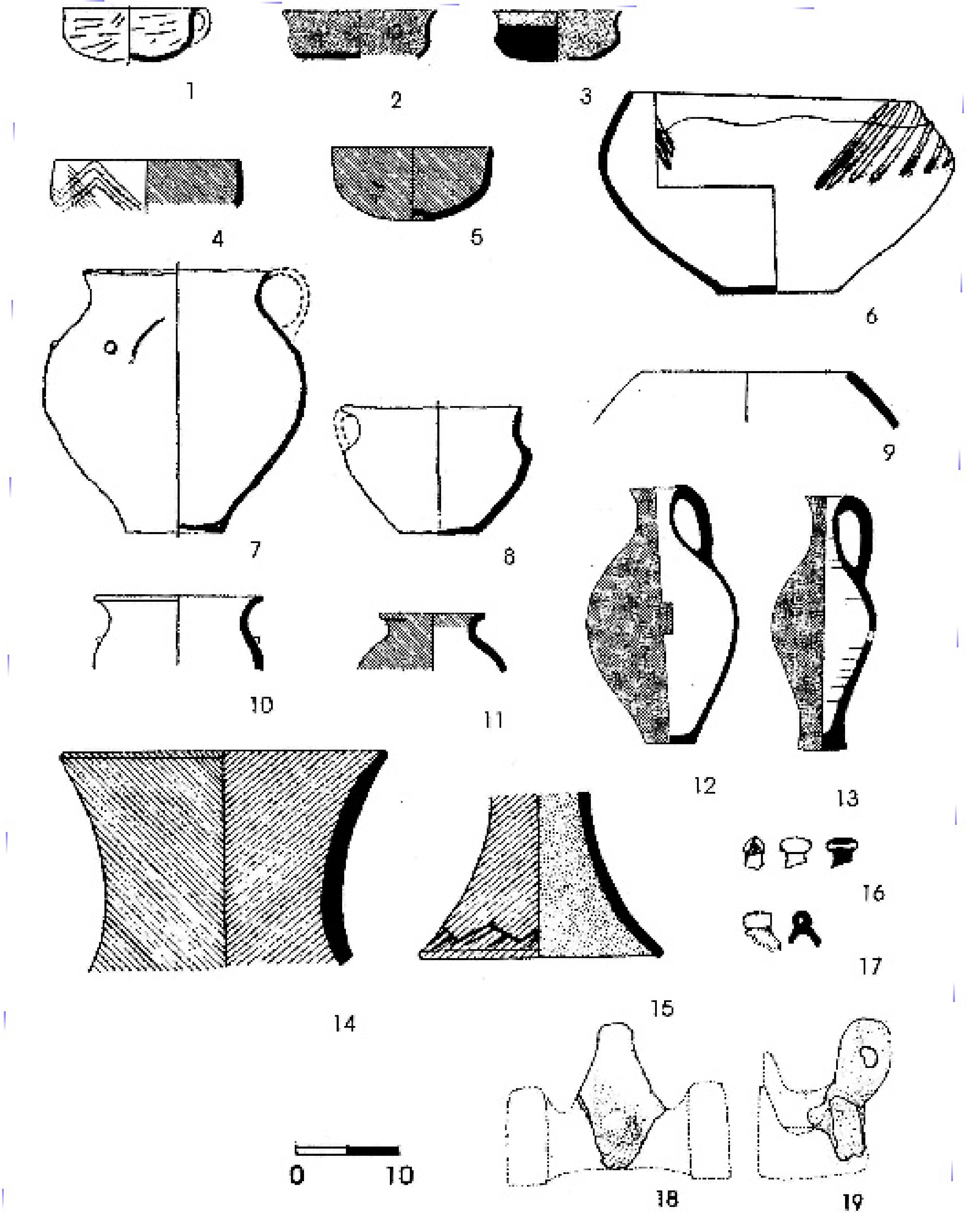

Figure 5. Khirbet Kerak Ware. 1: Small bowls (Type 1), Megiddo. 2. Sinous sided bowl (Type 2), Hazor. 3. *Idem*, T. Yarmuth. 4 - 5. Hemispherical bowl (Type 3), Bet Yerah. 6. Deep bowl or krater (Type 4). 7. Jar (Type 5), Affula. 8. *Idem*, Jericho. 9. Holemouth jar (Type 6), Bet Yerah. 10. Cooking jar (Type 7), Bet Yerah. 11. Necked Jar (Type 8), Bet yerah. 12-13. Jugs (Type 9), Bet Yerah. 14-15. Stands (Type 10), Hazor. 16. Lid (Type 11), Hazor. 17. *Idem*, Bet Yerah 18-19. Andirons (Type 12), Bet Yerah. After Amiran 1952; Greenberg 2000.

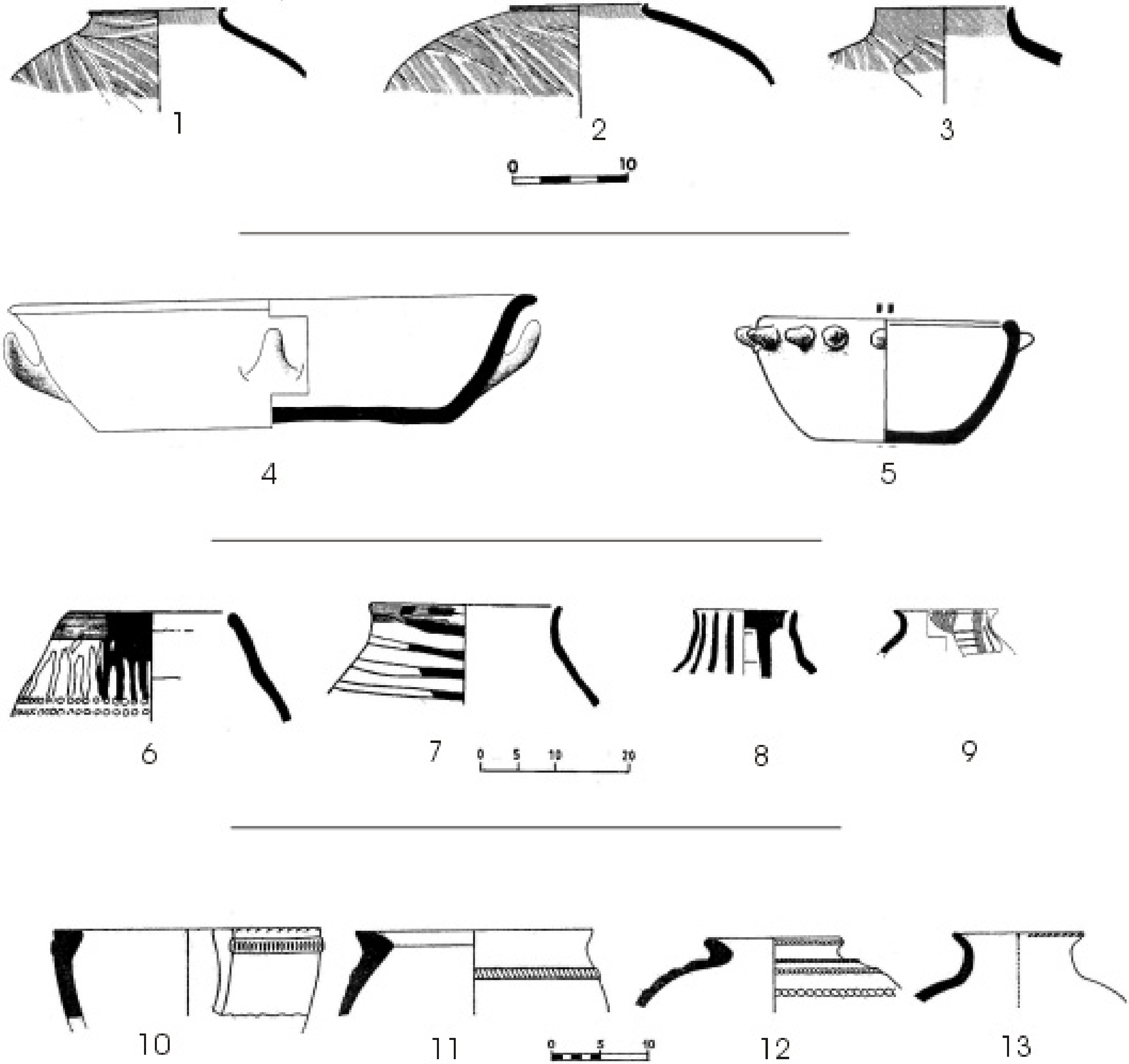

Figure 6. Various pottery groups. 1-3. Grain Wash, En Shadud (after Braun 1985: Fig. 20:8, 10-11). 4-5. "Crackled" Ware, Bet Yerah and Megiddo (after Esse 1989b: Figs.13.d, 15.a). 6-9. Splash and Drip Style Painting, T.U. Hummad, T. Es-Saidyieh and Jericho (after Helms 1987 Figs. 9: 3,5; 13:8; Kenyon and Holland 1982: Fig.132:26). 10-13. Umm Hammad Ware, T. U. Hammad (after de Miroschedji 1971: Fig.14).

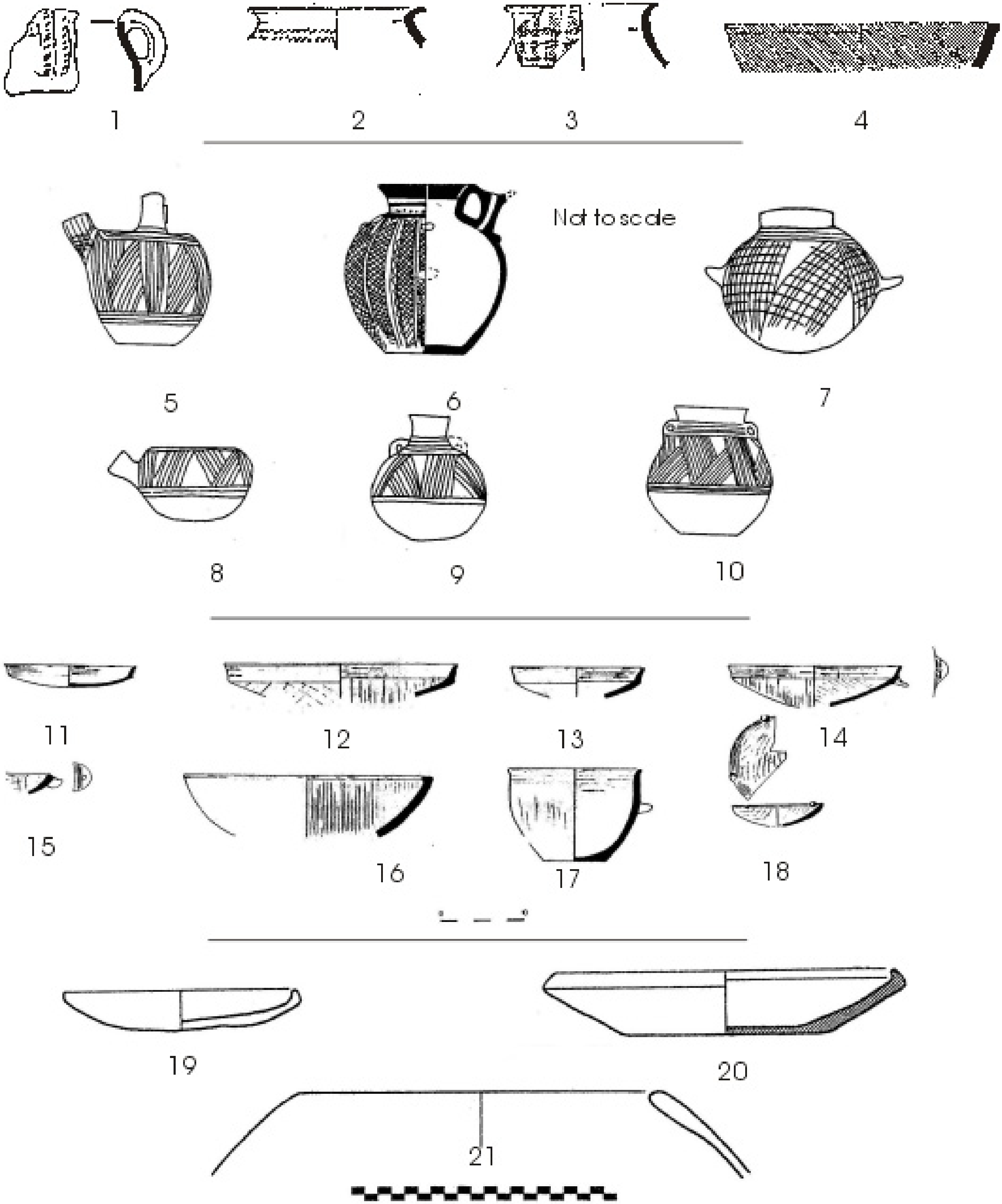

Figure 7. Various pottery groups. 1-4. "Erani C" vessels (after Brandl 1989: Fig.5:3; Kempinski and Gilead 1991: Fig.12:15-16; Yekutieli 2002: Pl.3:4). 5-10. Line Painting Group Ware, `Ai, Bab edh-Dhra and Jerusalem (after Stager 1985:Ill.1:E, F, G, J, L, M). 11-18. "Tel Aphek Bowls", Tel Aphek (after Beck 1985:Fig. 4:1-4, 6-7, 10-11). 19-21.Dead Sea Plain pottery. Bowl, platter and holemouth from Bab edh-Dhra (EB III) (after Rast and Schaub 2003:Figs. 11.7:2, 11.11:16, 19).

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Figure 8. **Har Qeren flint sources.** 1.Flint tabular outcrops. 2. Quarrying flint nodules. After Madsen 2003.

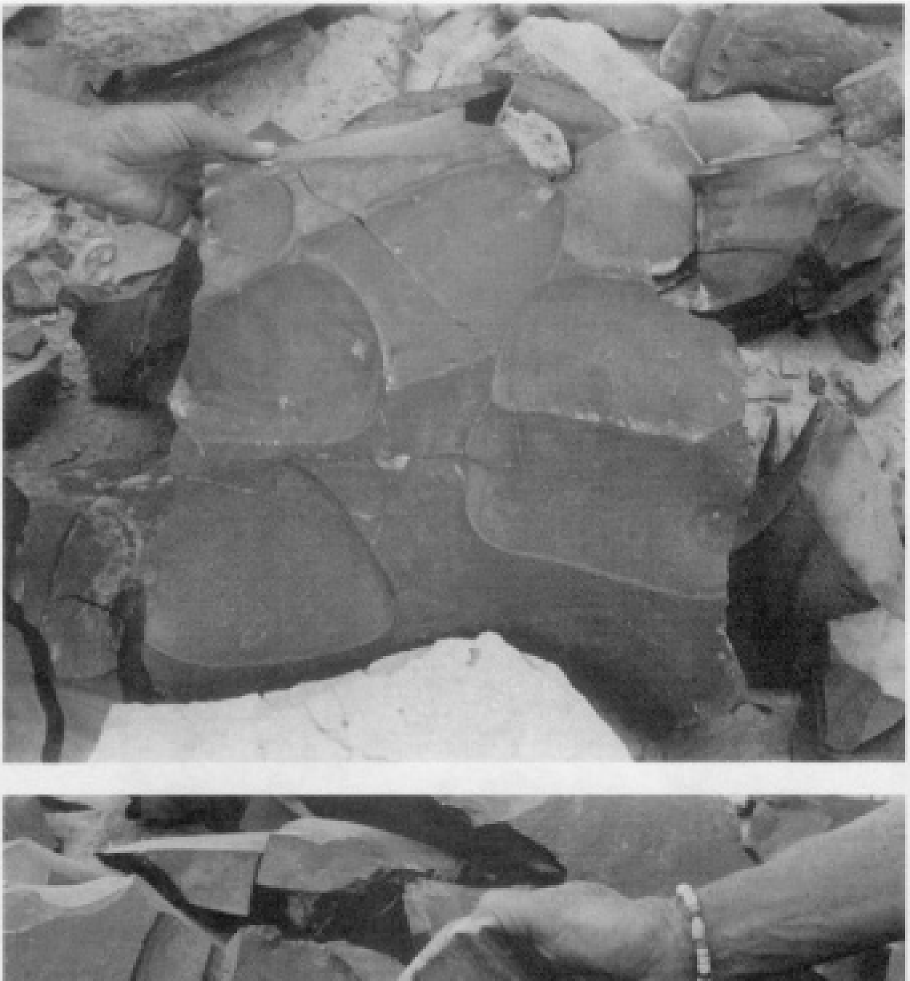

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Figure 9. Blocks of flint debited for tabular scrapers. 1-2. Jafr Basin, Site J41 . After Quintero, Wilkie and Rollefson 2002 : Fig.14.

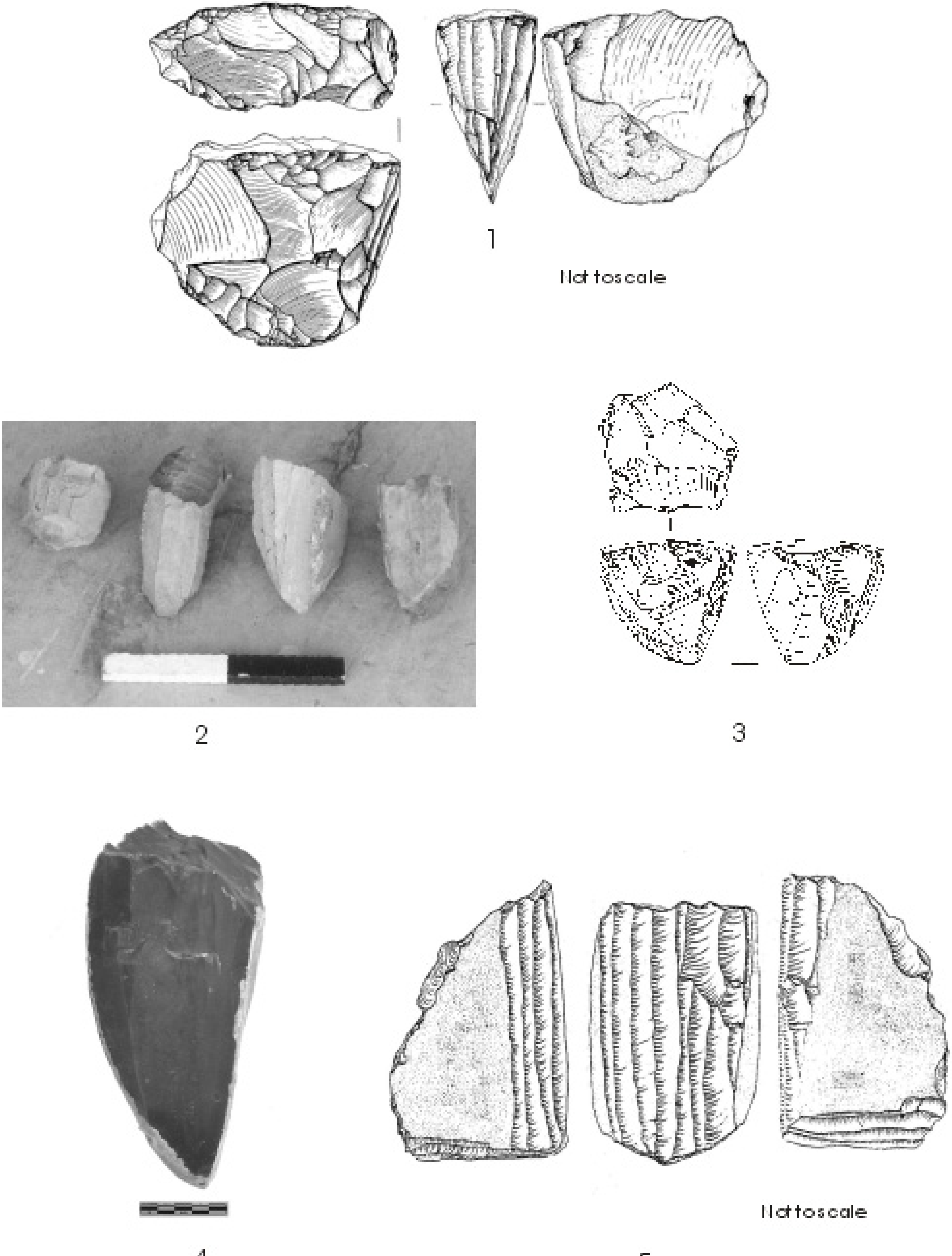


Figure 10. Canaanean blade cores. 1.Core from Har Haruvim (after Shimelmitz, Barkai and Gopher 2000: Fig. 3). 2. Cores from Har Haharuvim (courtesy of the Ramat Hashofet Museum). 3. Exhausted core from E. Assawir (courtesy of E. Yannai, IAA). 4. Core from Fatzael (courtesy of the Prehistoric Branch, IAA). 5. Core from Tel Halif (after Futato 1996:Fig. 4:3).

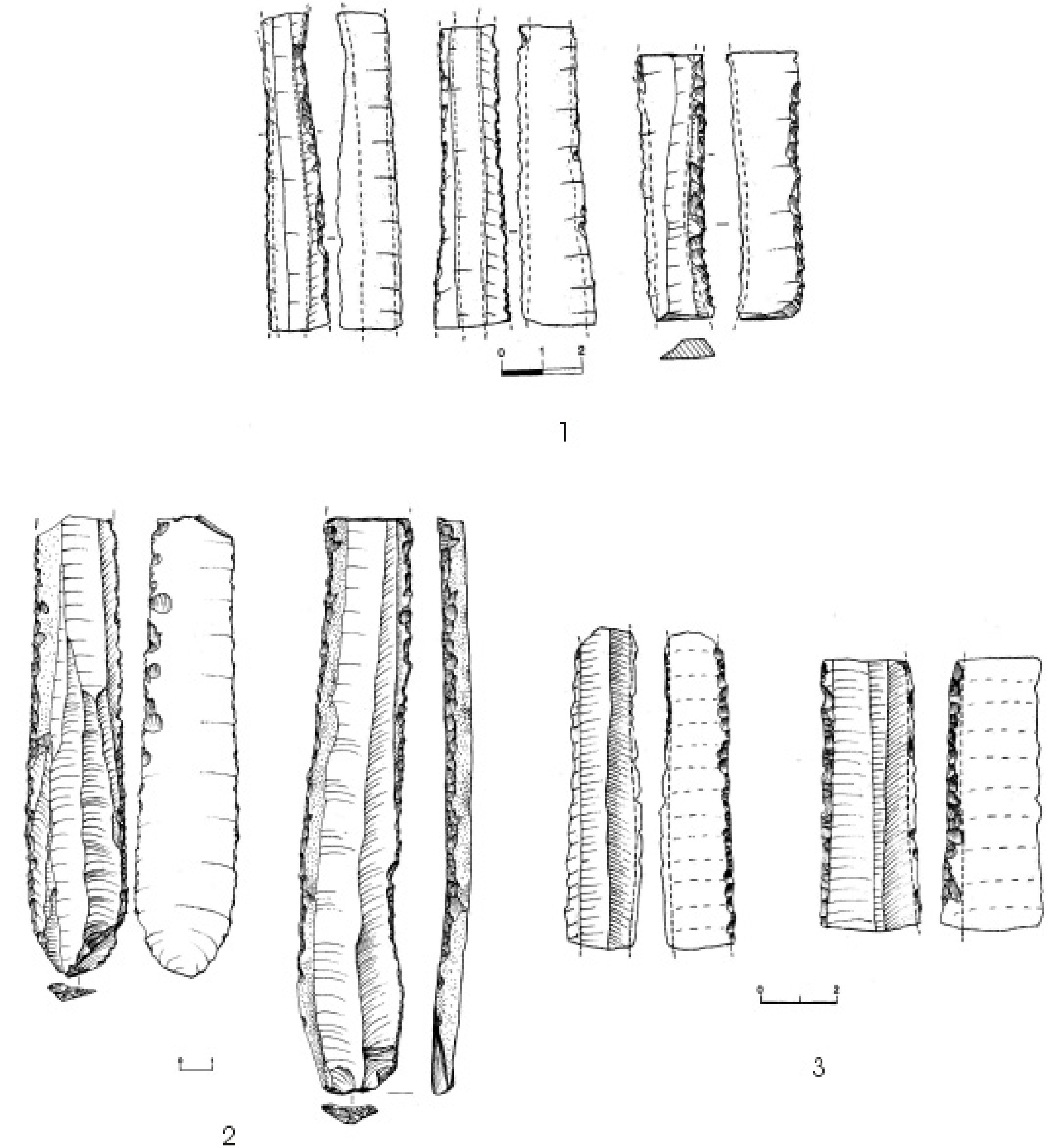


Figure 11. Canaanean blades. 1. Canaanean sickle blades from Horvat Illin Tahtit (after Marder, Braun and Milevski 1995: Fig. 8:5-7). 2. Canaanean retouched blades from Afridar, Area J (after Zbenovich 2004:Fig. 7). 3.Canaanean sickle blades from Arad, Stratum III (after Schick 1978: Pl.85:6-7, 9-11).

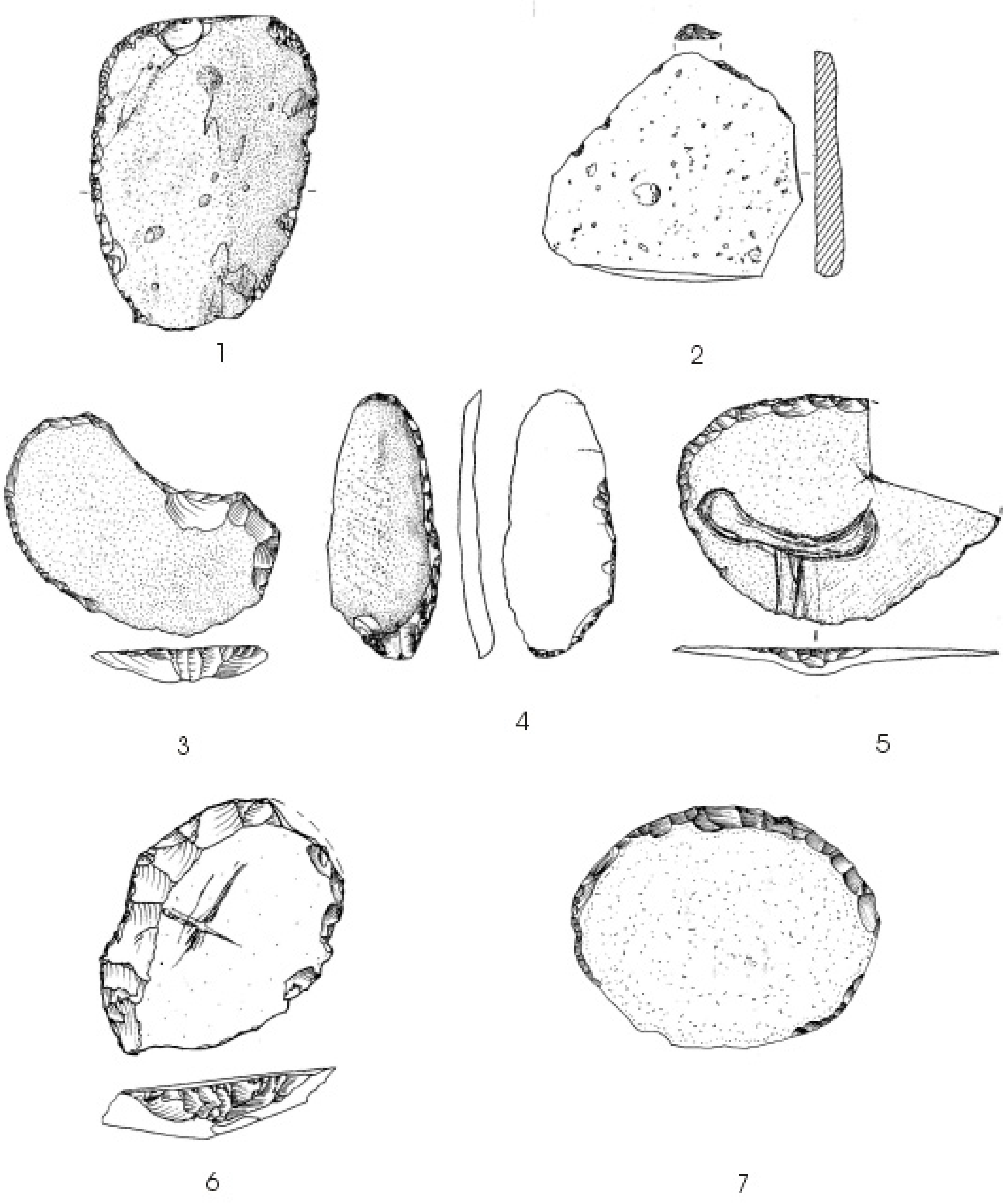
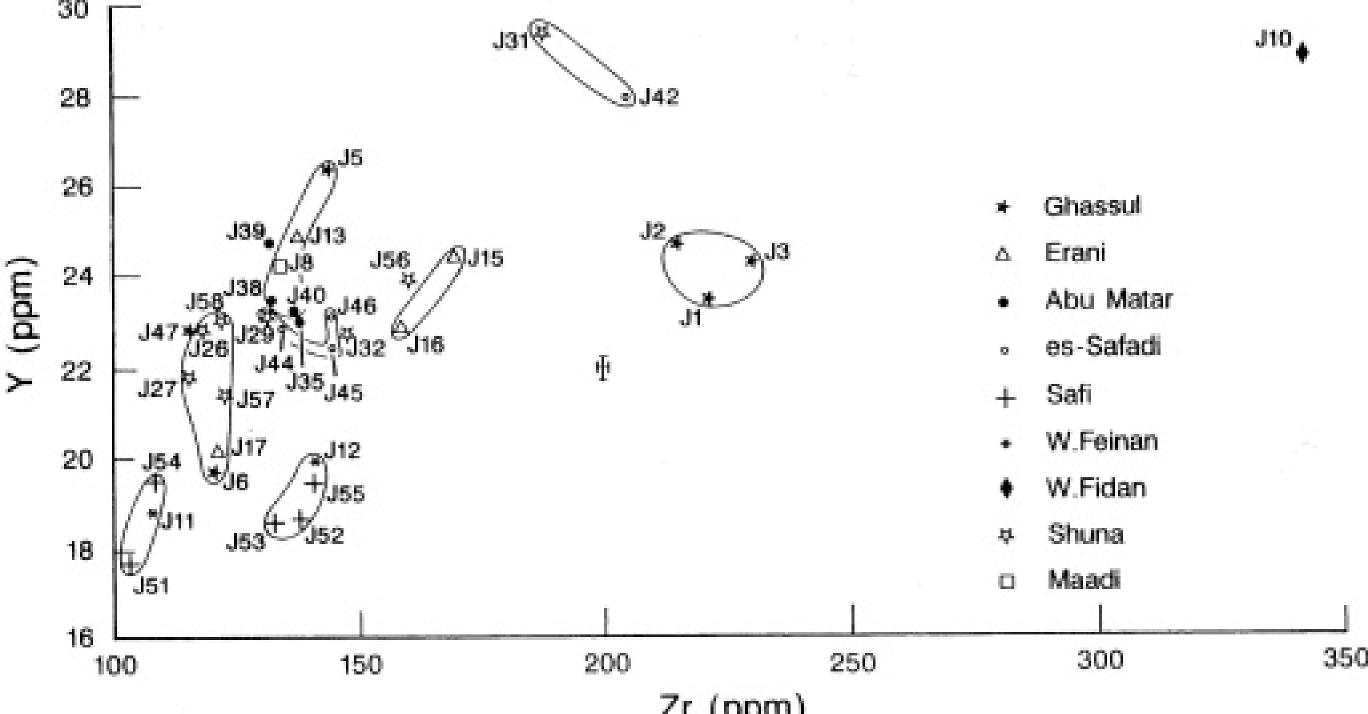


Figure 12. Tabular scrapers. 1 Har Qeren (after Rosen 1983b: Fig.4). 2. Qa` Abu Tulayha West (after Fujii 1999:Fig. 7:11). 3. Meona (after Marder 1996: Fig.3:1). 4. Bet Yerah (after Rosen 1997a: Fig.3.32:4). 5. Horvat Illin Tahtit (after Marder, Braun and Milevski 1995:Fig.11:1). 6. Mitzpe Shalem (after Greenhut 1989:Fig.15:1). 7. Arad (after Schick 1978:Pl.84:1.).



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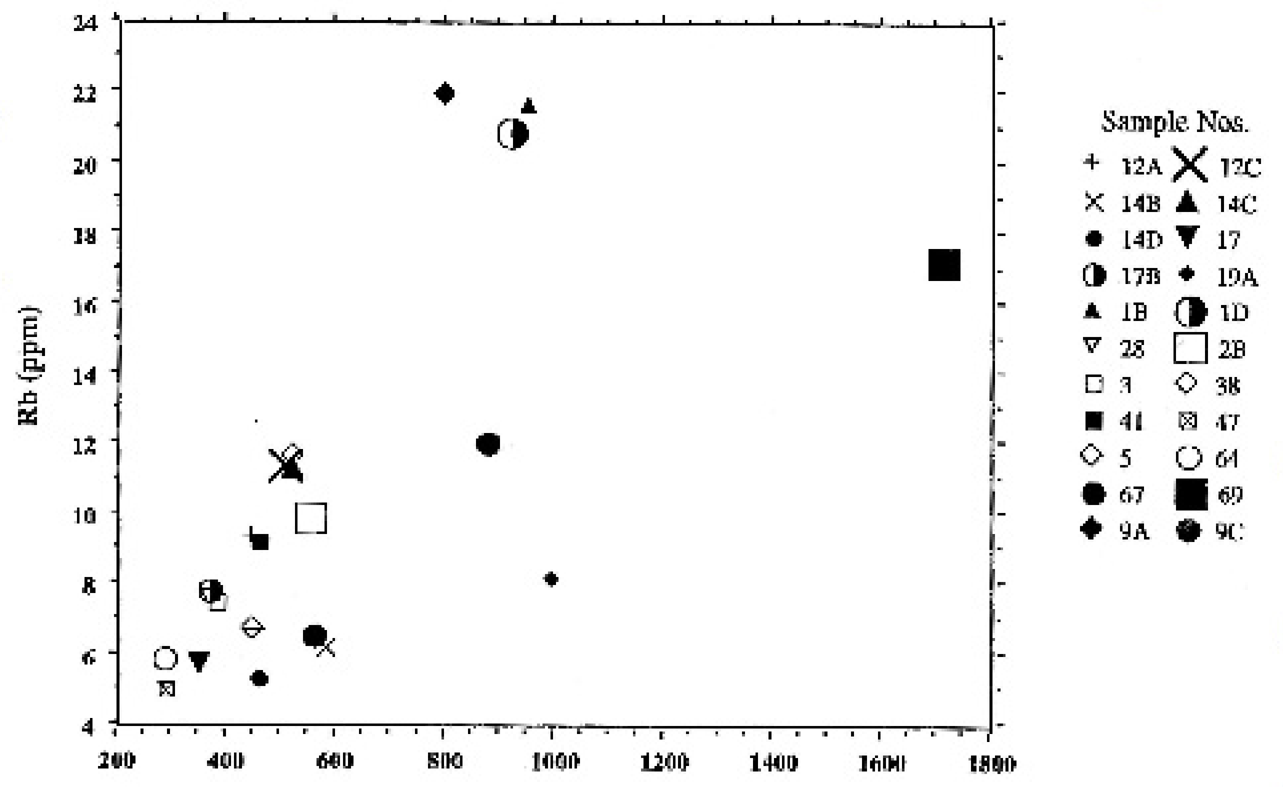

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Figure 13 . Basalt geological and archaeological samples.
1. Graph of Y (ppm) against Zr (ppm) (after Philips and Williams-Thorpe 2001: Fig.2). EB I samples: Erani, Safi, W. Feinan (Khirbet Hamra Ifdan), W. Fidan (W. Fidan 4), T. esh-Shuneh.

2. Graph of Rb (ppm) against Sr (ppm) (after Rowan 1998: Fig.67). EB I samples: 17. S. T. Malhata; 28. Q. Ata; 38. Afridar, Area E. 64. T. Megadim. Sources: 1B-D.Sweimeh; 2A-B. Ma`in. 9A-C. Tafila. 12AC. Mujib. 13A, 14B-D. Kerak. 16B, 17B. Yarmuk area. 19A. Dana.

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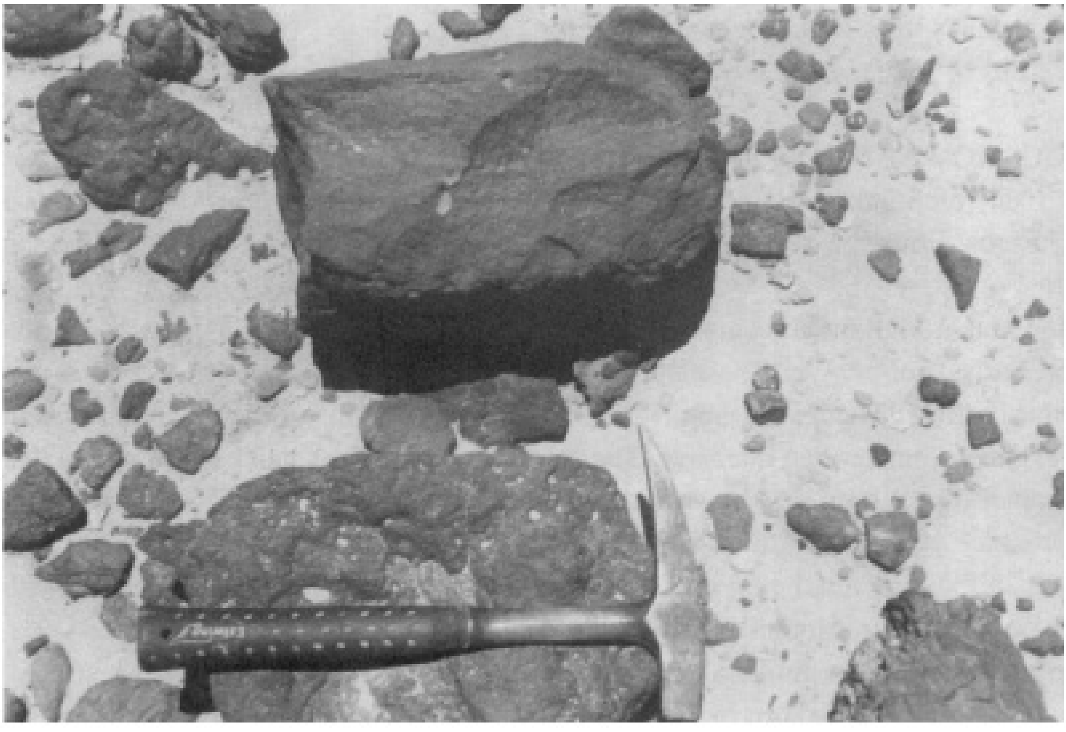

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Figure 14 . Ferruginous sandstone blocks and rough-out.
1. Concentration of sandstone blocks from Ramat Saharonim (N) (after Rosen and Schneider 2001: Fig.2). 2. A sandstone rough-out from Nahal Ramon 204/160 (after Rosen and Schneider 2001: Fig.6).

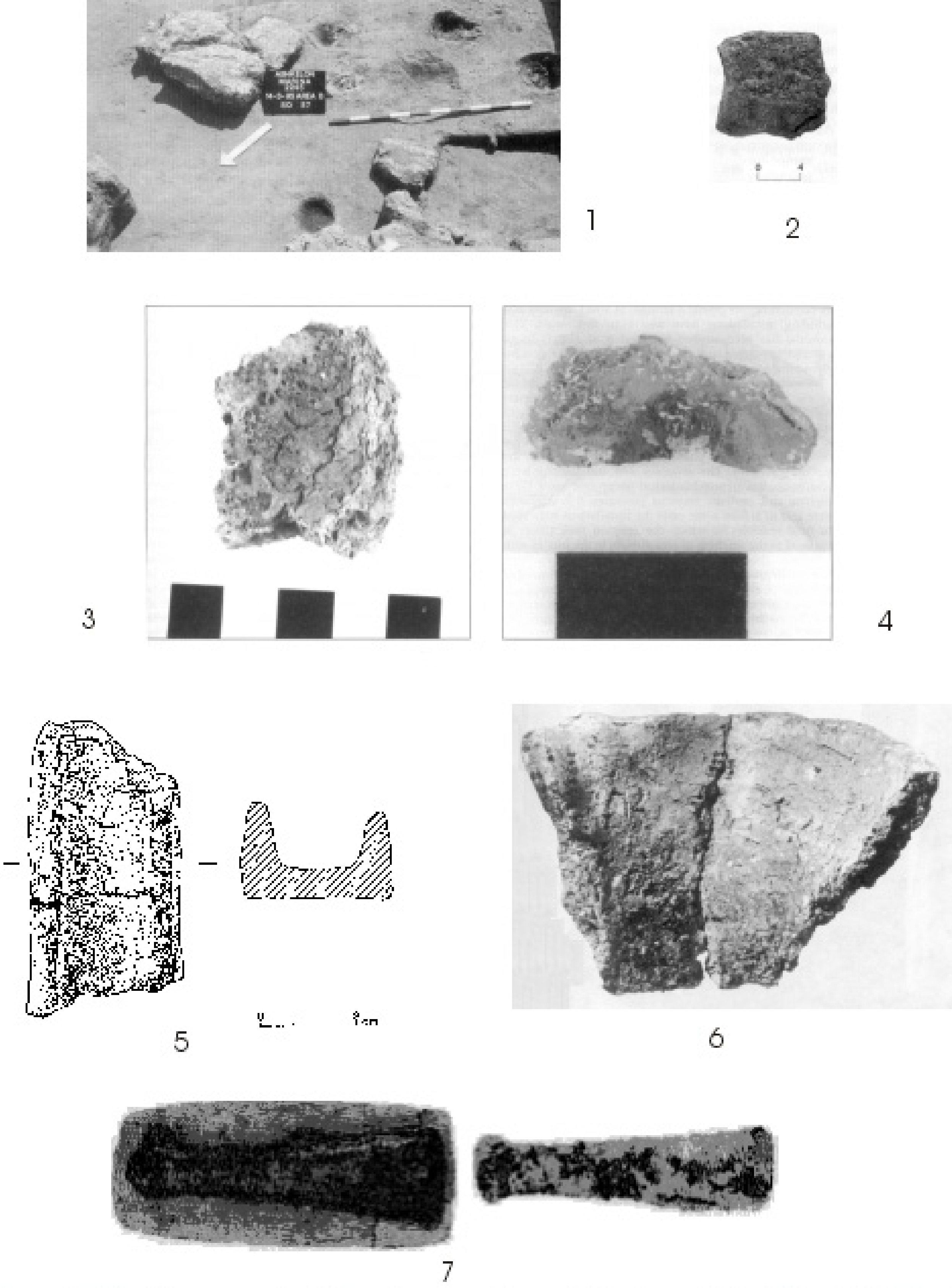


Figure 15. Metallurgy remains. 1. Smelting installations, Afridar Area E (after Golani 2004:Fig. 20). 2. Ingot, Afridar Area J (after Baumgarten 2004: Fig. 19.2). 3.Crucible, N. Tillah (after Golden 2002:Fig. 14.1). 4.Ore, idem (*idem,* Fig. 14.2). 5. Crucible/mould, T. es-Shuneh (after Rehren, Hess and Philip 1997: Fig.2). 6. Crucible, Arad (after Amiran et al. 1978: Pl.121:9). 7. Mould and axe, K. Hamra Ifdan (after Levy et al. 2003: Fig. 3:6-7).

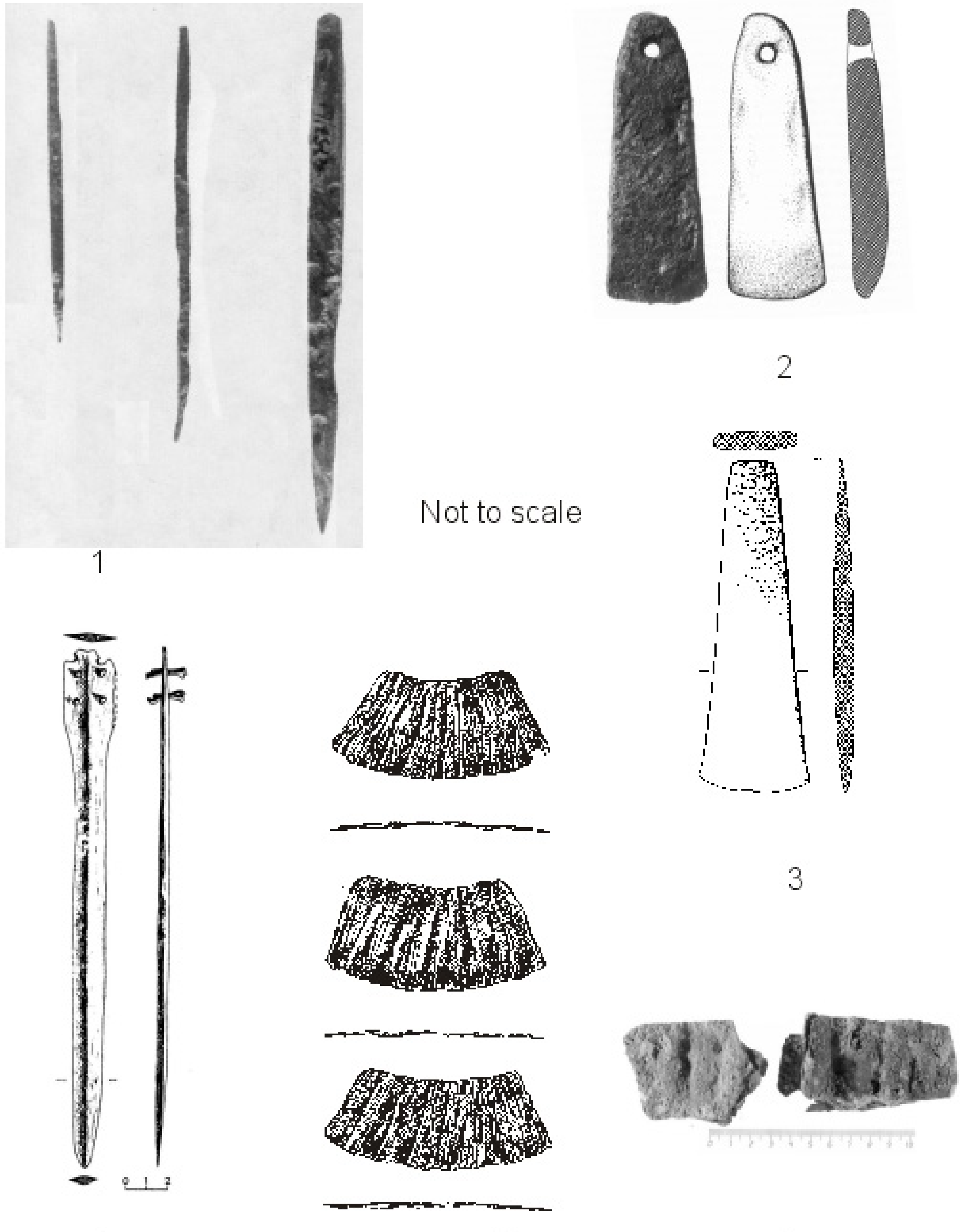


Figure 16. Copper objects. 1. Two awls and a chisel, Arad (after Amiran et al. 1978: Pl. 70). 2. Axe, T. Dan (after Greenberg 1996b: Fig.3.44:2). 3. Axe, Lod (courtesy E. Yannai and O. Marder, IAA). 4. Dagger, Givatayim (after Sussman and Ben-Arieh 1966: Fig.10:1). 5. Copper plaques, K. Monash (after Hestrin and Tadmor 196: Fig. 14). 6. Copper plaques, H. Ptora (courtesy Y. Baumgarten, IAA).

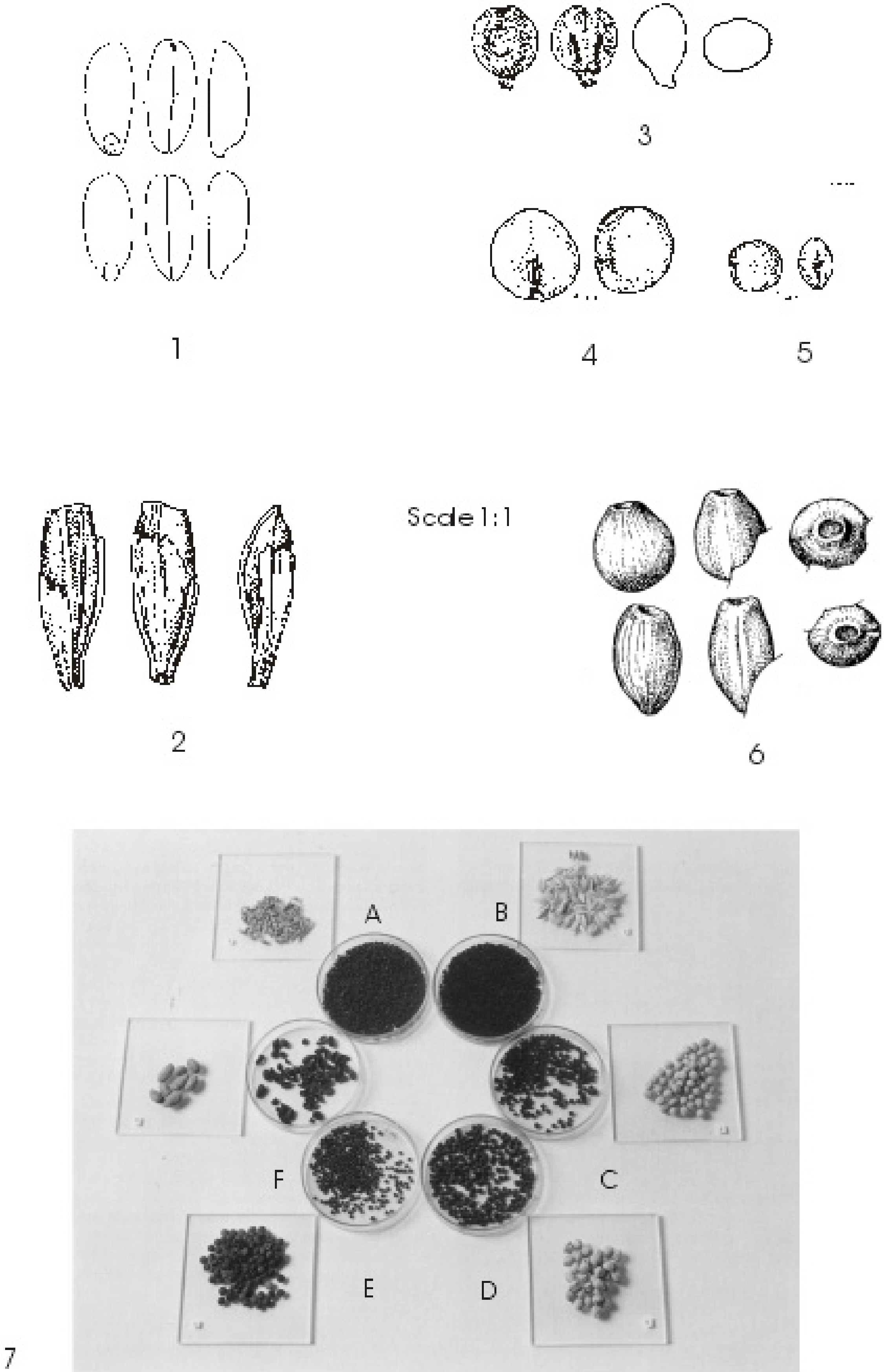


Figure 17. Archaeobotanical finds from Arad. 1 *Triticum diccocum* (wheat). 2. *Hordeum vulgare* (barley). 3.*Vitis vinifera* (grapes). 4. *Pisum sp* (pea). 5. *Lens culinaris* (lentil) 6.*Pistacia atlantica* (Atlantic pistachio). 7. Archaeological samples (charred) and modern species. A. Barley. B. Wheat. C.Pea. D. Chickpea.. E. Flax . F. Olives. (Nos. 1-6, after Hopf 1978; no. 7, after Amiran and Ilan 1993:Abb.24).

Figure 18. *Glycemeris sp*. **from Lod** *in situ* (courtesy E. Yannai and O. Marder, IAA).

Figure 19. Shells from Arad. 1. *Glycemeris sp*. (Mediterranean sea). 2. *Chambardia* (Nile River). 3. Shells from the Red Sea (after Amiran and Ilan 1993: Abb. 45)

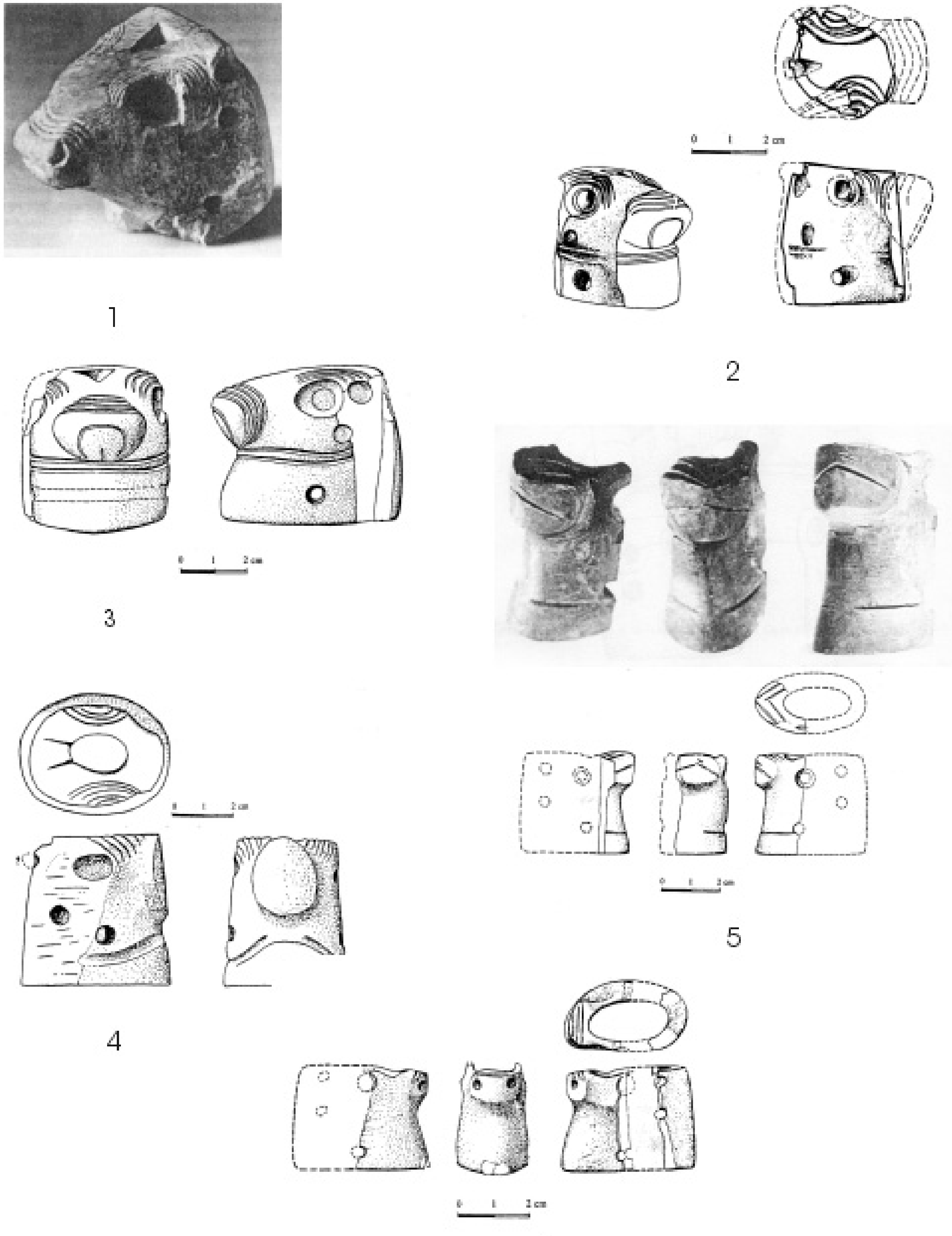
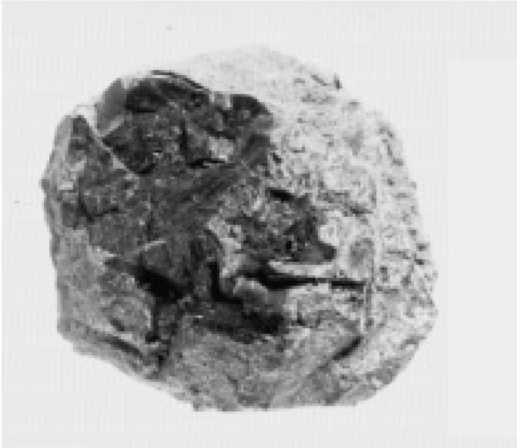


Figure 20. Ivory and bone bull heads. 1. Bet Yerah (after de Miroschedji 1996: Fig.6). 2. Ai (after Ben-Tor 1972:25). 3. Jericho (after de Miroschedji 1996: Fig. 4). 4. Bab edh-Dhra (after Wilkinson 1989b: Fig. 262:2). 5. Arad (after de Miroschedji 1996:Fig.2). 6. Tel Yarmut (after de Miroschedji 1996:Fig. 1).



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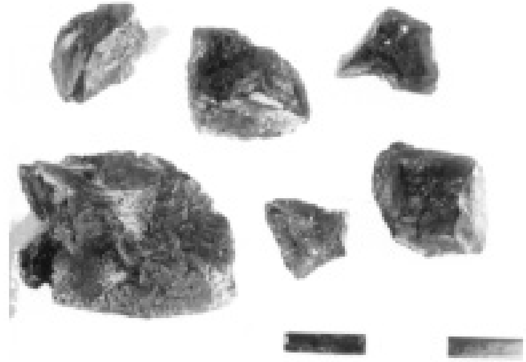

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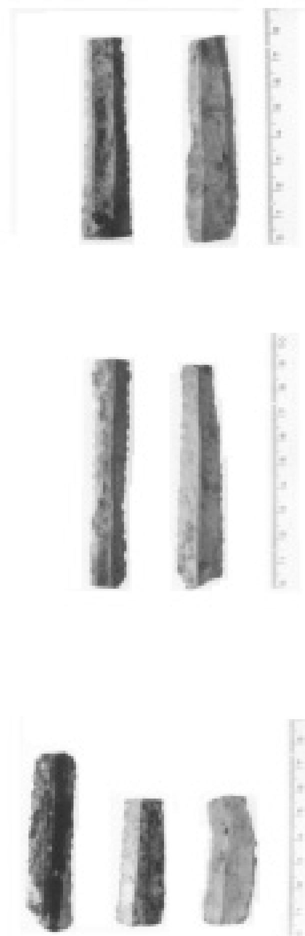

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Figure 21. Bitumen and bitumen on sherds and flints. 1. Bitumen lump from Palmahim Quarry (courtesy of E. Braun, IAA). 2. Bitumen lumps from H. Illin (Tahtit) (courtesy E. Braun, IAA). 3. Bitumen lump from H. Ptora *in situ* (courtesy of Y. Baumgarten, IAA). 4. Pottery sherd coated with bitumen from Lod (courtesy of E.Yannai and O.Marder, IAA). 5. Canaanean blades coated with bitumen (courtesy of E. Braun, IAA).

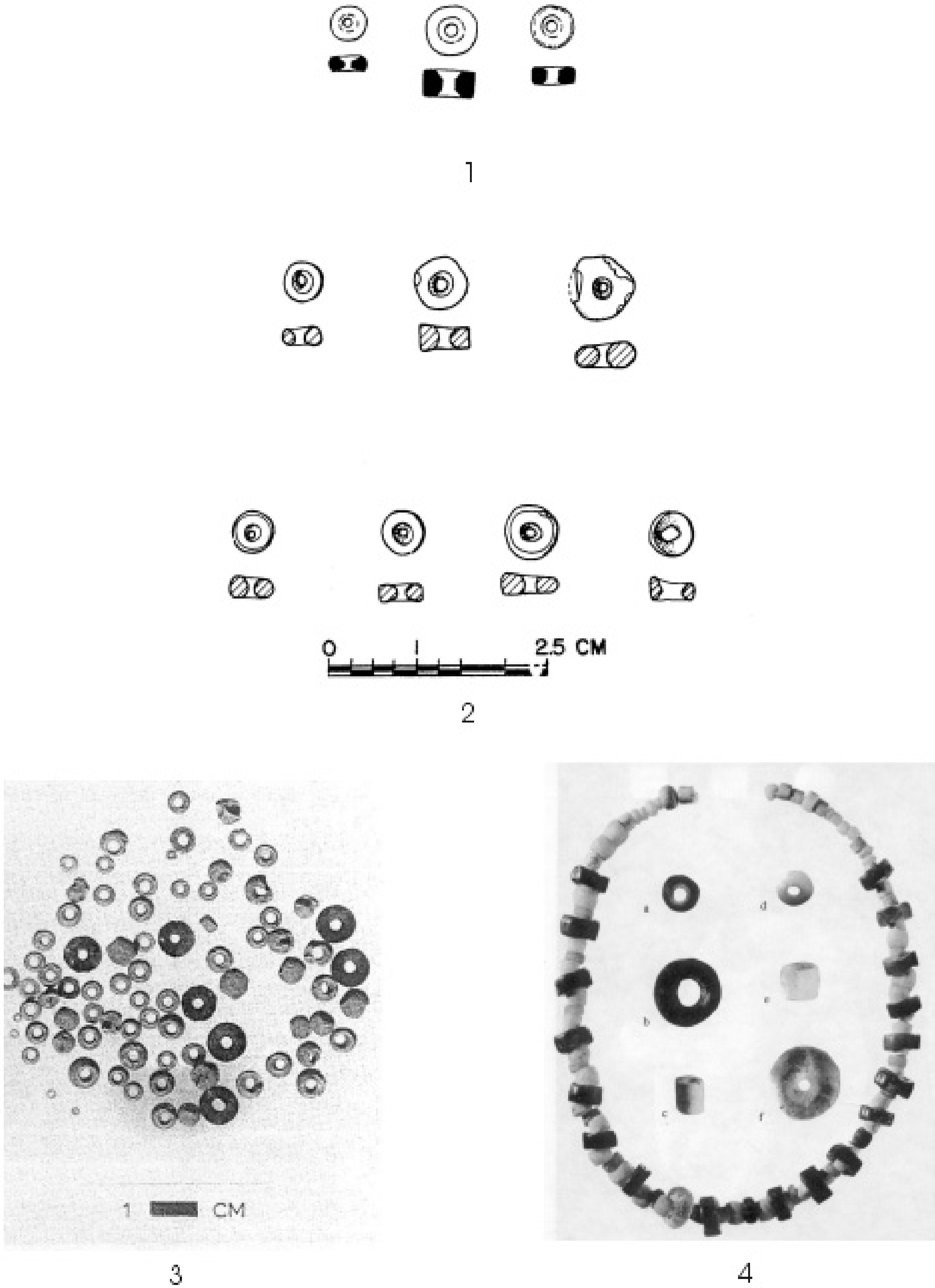
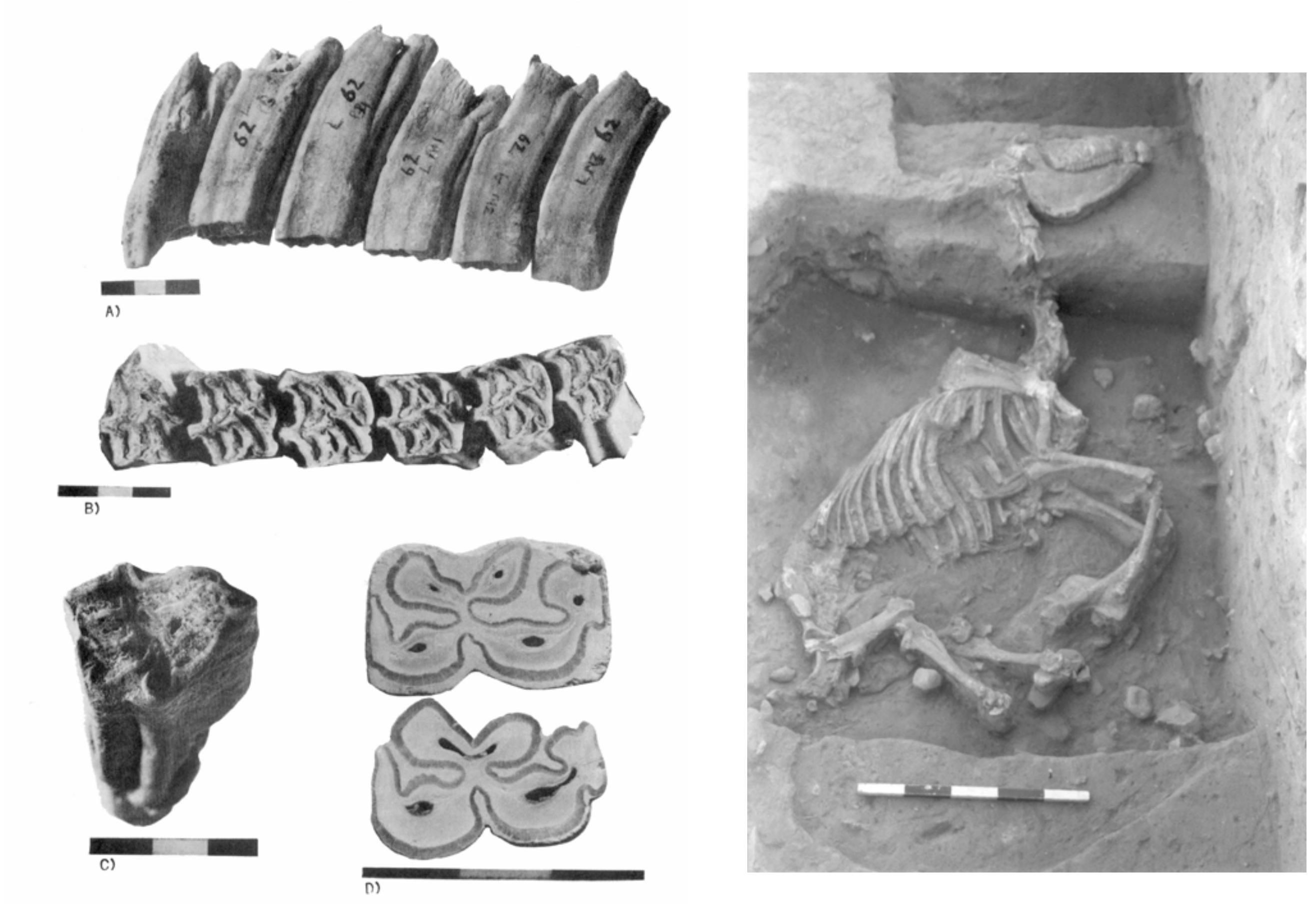


Figure 22. Carnelian beads. 1. Carnelian beads from Jericho, Tomb K2 (after Kenyon 1965: Fig. 6:1). 2. Carnelian beads from Bab edh-Dhra, Tomb A10 (after Wilkinson 1989a: Fig.172:1-3, 5-8). 3. Carnelian beads from Bab edh-Dhra, Tomb C1(after Wilkinson 1989a:Fig.178). The large beads are made of carnelian. 4. Group of beads from Arad (Stratum III). Bead b is made of carnelian (after Amiran et al. 1978: Pl. 118:6)..



1 2

Figure 23. Donkey remains. 1. Teeth of *Equus asinus*, En Shadud, EB I (after Braun 1985:Pl.XIII). 2. Complete skeleton, Lod, EB II (courtesy of E. Yannai and O. Marder, IAA).

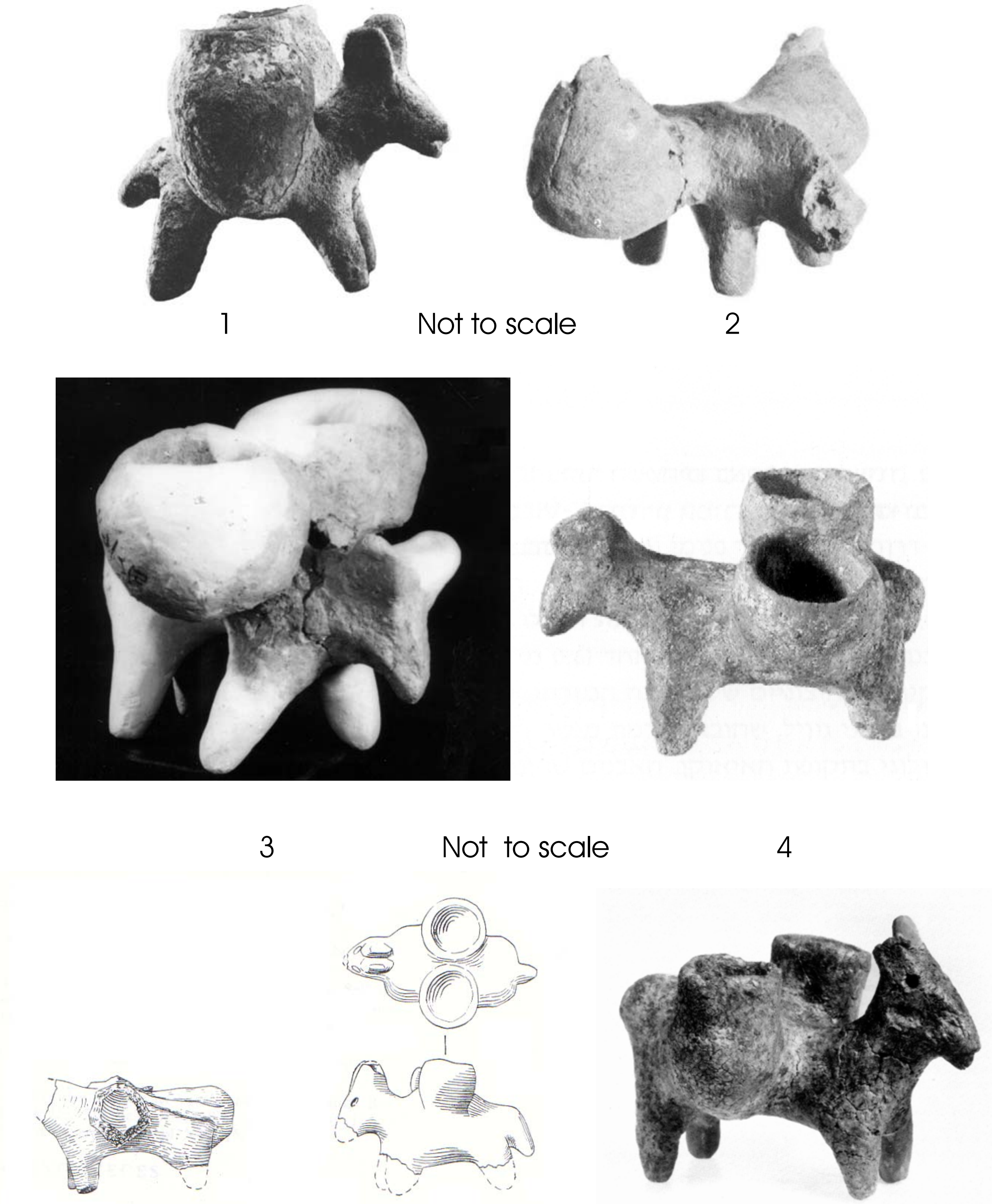


Figure 24. Donkey figurines, EB I. 1-2: Azor (courtesy of the IAA). 3. Givatayim (courtesy of the IAA). 4. Barkai (after Yannai 2001:Fig. 73). 5-6. Jericho (after Holland 1982: 555, Figs. 225:6-7). 7. Bat Yam (Courtesy of the IAA).

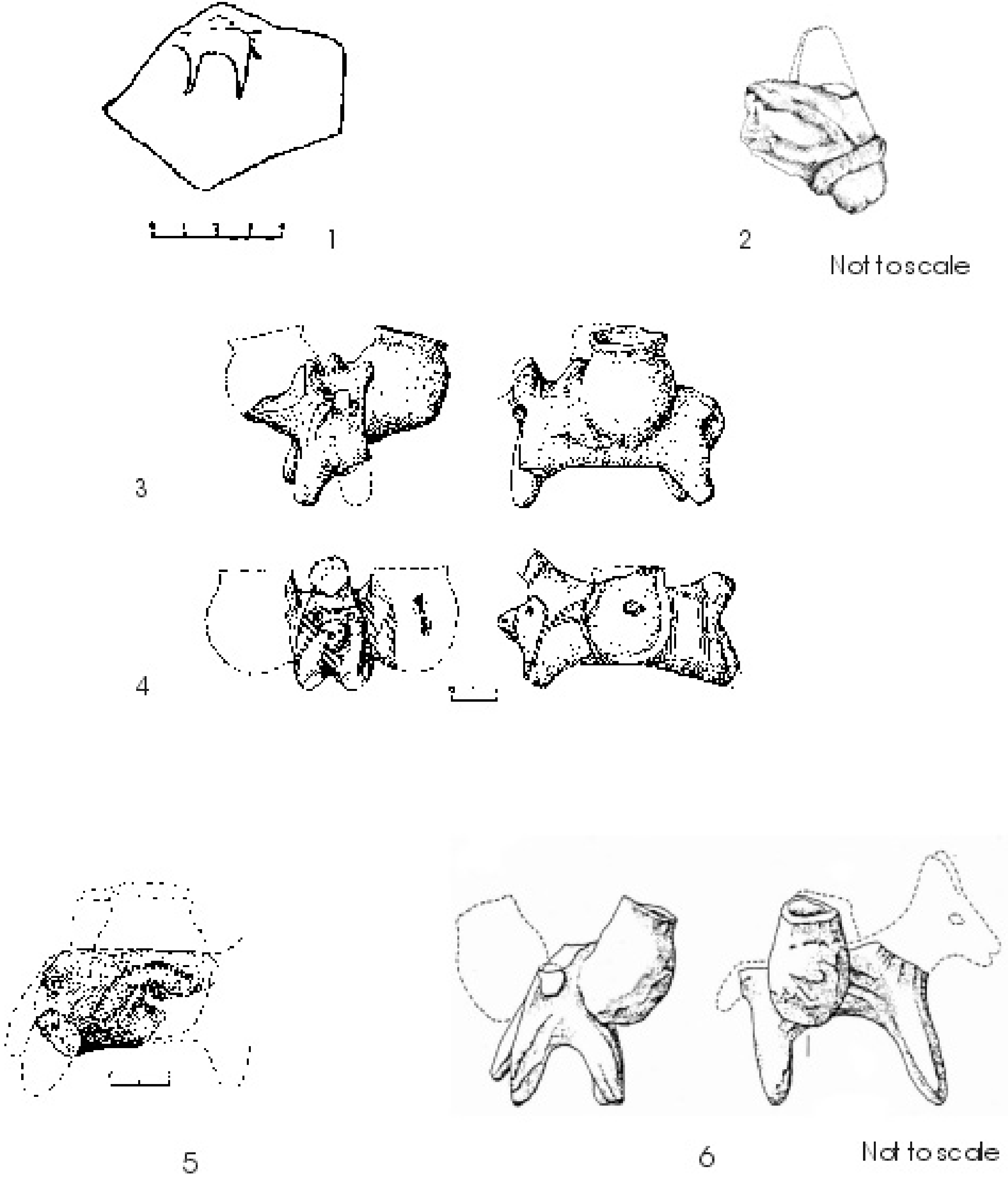


Figure 25. Donkey Figurines, EB I-II. 1. Megiddo (after Engberg and Shipton 1934: Fig. 10, L). 2. Pithat Hayarmuk (after Epstein 1985:Fig.11). 3- 4. Tel Aphek (after Eitan 1969:Fig.3:1-2). 5. Arad (after Amiran et al. 1978:Pl.117:6). 6. Tel Dan (after Grinberg and Porat 1996:Fig.4:3).

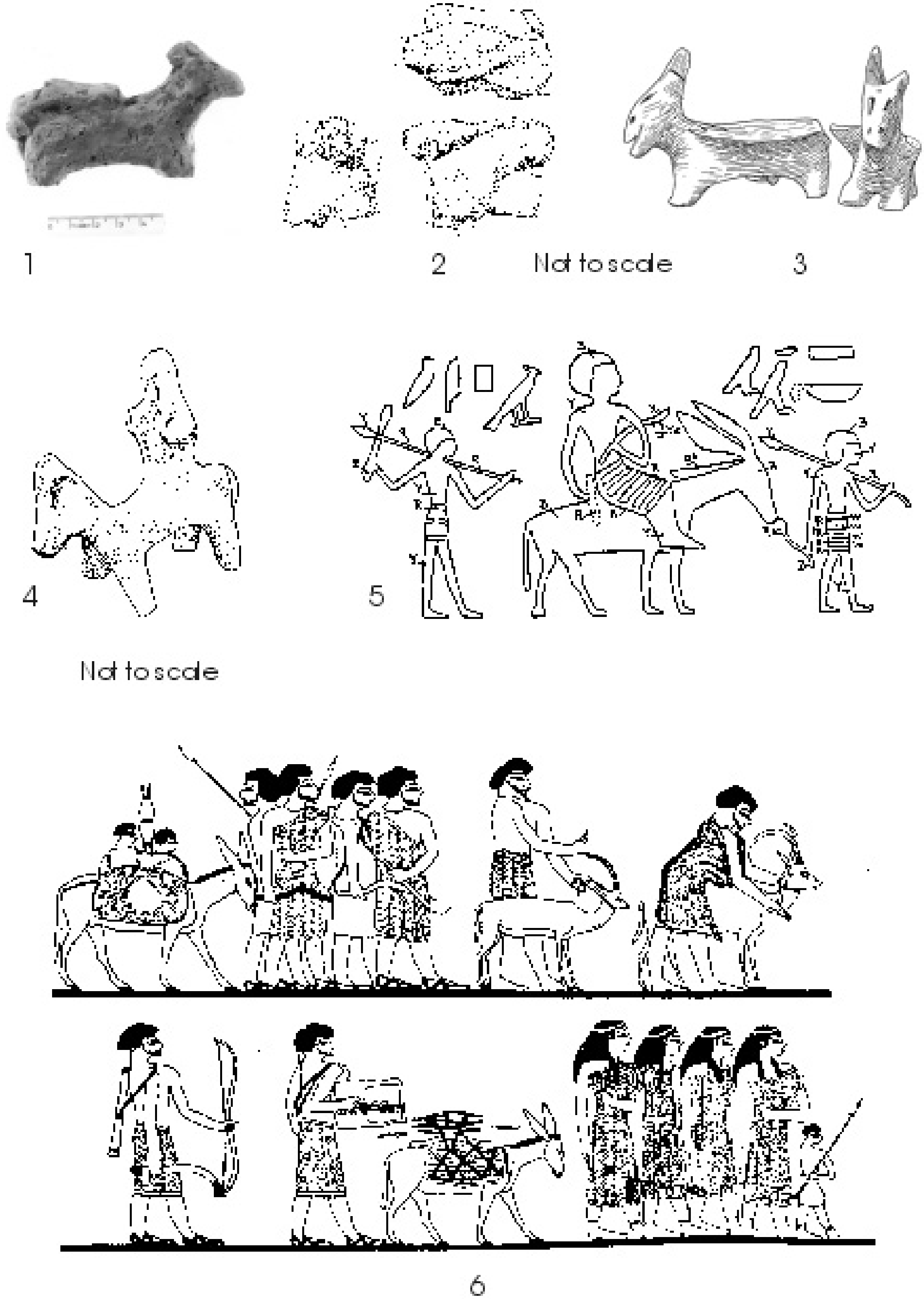


Figure 26. Donkey Figurines and drawings, EB II-MB II. 1. K. Mahruq (Courtesy of H. Hizmi, IAA). 2. Lod (Courtesy E. Yannai and O. Marder, IAA). 3. Jericho (after Kenyon 1960: 124, Fig. 40:1). 4. K. Ez-Zeraqon (after Ibrahim 1988: 32). 5. Serabit el-Khadem (after Staubli 1991: Abb. 18). 6. Beni Hasan (after Shea 1981:225).

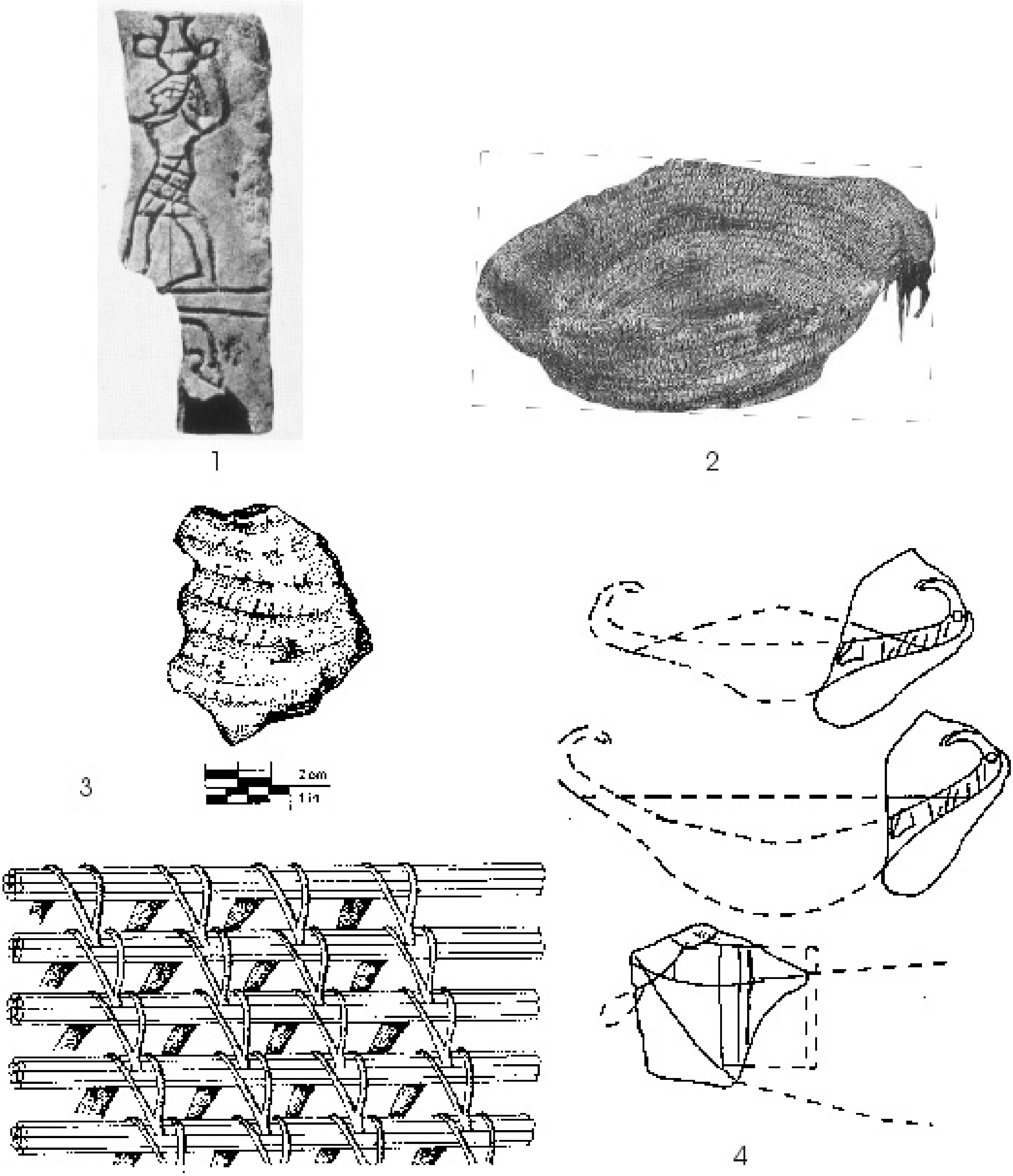
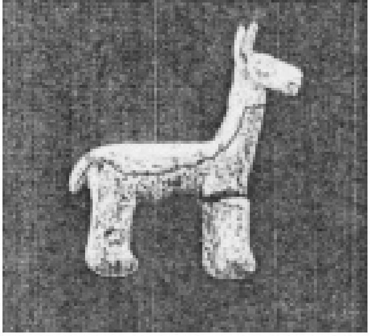
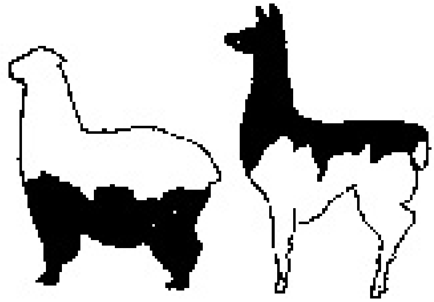


Figure 27. Containers and boats. 1. Ivory inlay from Abydos (after Amiran 1969b: Pl.35:3). 2. Basket remains from the "Cave of the Warrior" (after Schick 1998:Fig. 5:1). 3. Basket impression from Bab edh-Dhra and a schematic tecnique reconstruction (after Adovasio et al. 2003: Fig. 20.1). 4. Boat drawings incised on sherds, Megiddo (after Engberg and Shipton 1934:Figs. 10:G-H).





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Not to scale

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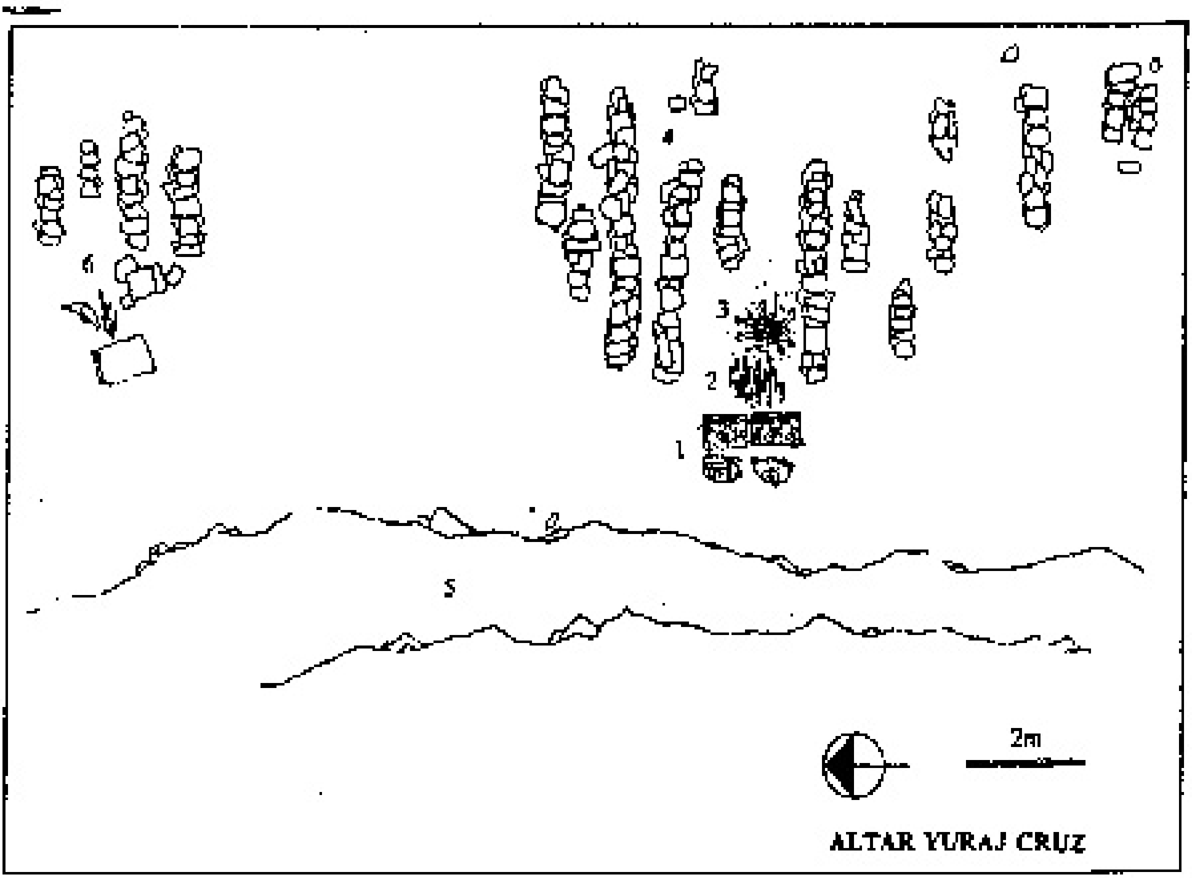

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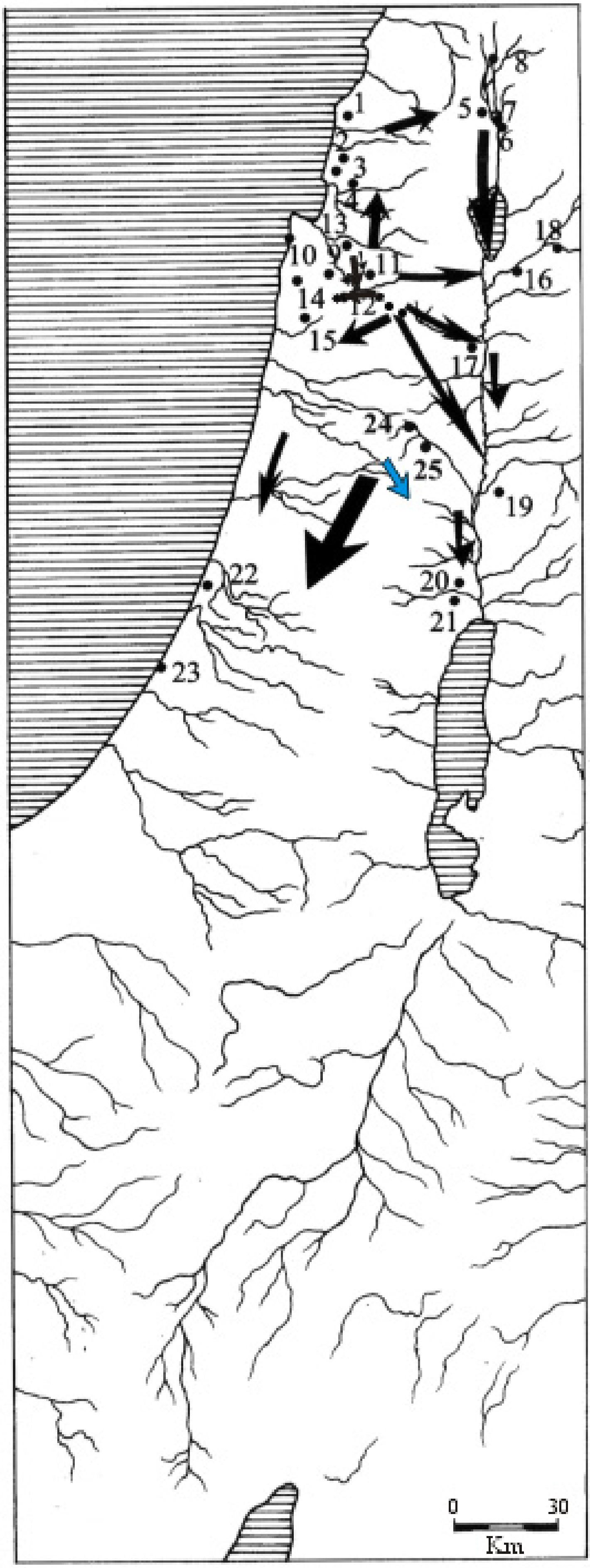
Figure 28. Camelid figurines and sanctuary from the Andean region 1-2. Llama and alpaca figurines (after Flores Ochoa 1997). 3. Sanctuary of Yuraj Cruz, Bolivia (after Nielsen 1997-98). Number 1 represents the altar and number 4 represents the caravans of camelids.

Map 1. Distribution of Gray Burnished Ware. EB IA. Families I ■ and II ■

Sites:

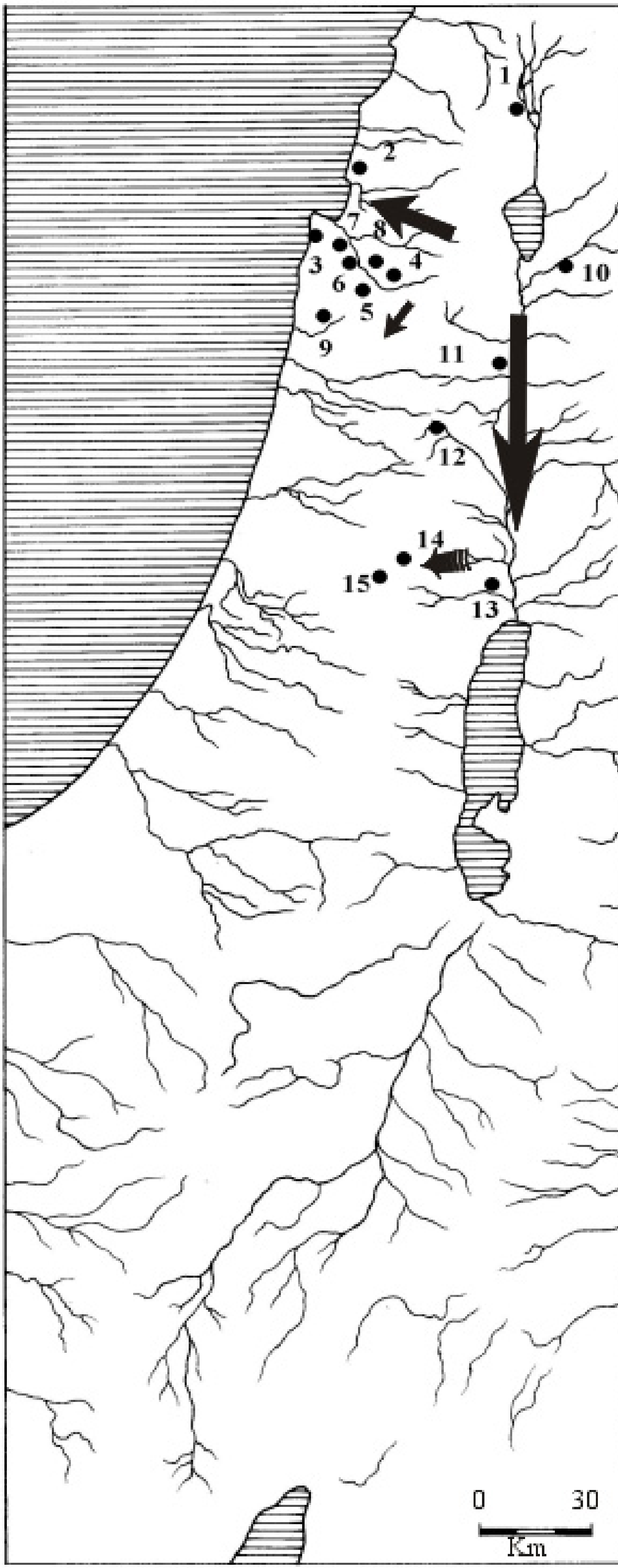
1. R. Haniqra
2. Kabri
3. B. Haemeq
4. K. Uzza
5. T. Teo
6. Gadot
7. Y. Hamaaleh
8. T. Hatzatz
9. T.Qiri and A.Zureiq
10. T.Megadim
11. Affula and T. Jezreel
12. Megiddo
13. Yiftahel
14. Assawir
15. Metzer
16. T. esh-Shuneh
17. Bet Shean
18. A. edh-Dhahr
19. T.U.Hammad
20. Jericho
21. Herodian Jericho
22. Palmahim
23. Afridar
24. T. el-Farah (N)
25. Aqrabanyeh



Map 2.
Distribution of Gray Burnished Ware.
EB IB.
Families III
And IV.

Sites:

1. T. Teo
2. B. Haemeq
3. T. Megadim
4. Affula
5. Megiddo
6. T. Qiri and Hazorea
7. T. Qashish
8. E. Shadud
9. E. Assawir
10. T. Esh-Shuneh
11. T. Shalem
12. T. el-Farah (N)
13. Jericho
14. `Ai
15. T. en-Nasbeh



Map 3.
Distribution of Metallic Ware.
EB II.

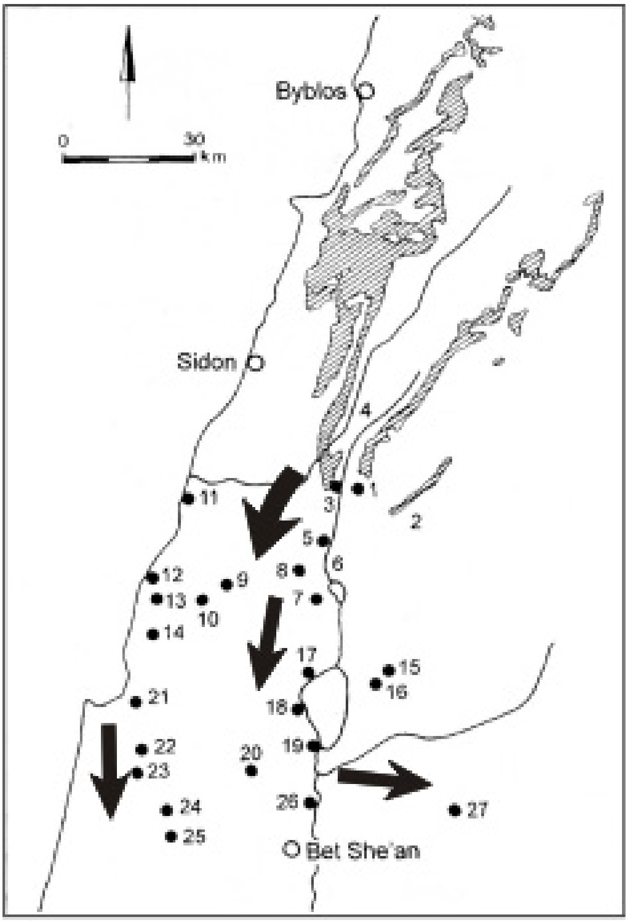
After Greenberg and Porat 1996.

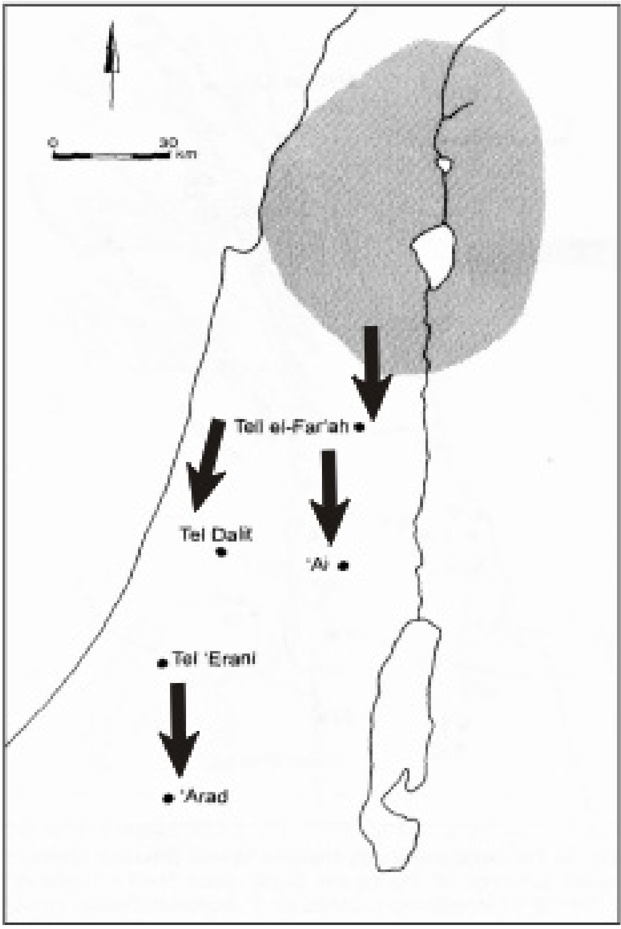
A. Core Area

Sites:

1. T. Dan
2. Golan
3. T. A. Bet-Ma`acah
4. Lebanese Biq`a
5. T. Teo
6. Hulah Valley
7. Hazor
8. T. Qedesh
9. T. Rosh
10. Meona
11. Tyre
12. R.Haniqra
13. Kabri
14. B. Haemeq
15. Gamla
16. Lawieh
17. T. Kinrot
18. T.Reqet
19. B.Yerah
20. T.Qishyon
21. Q. Ata
22 T.Qashish
23. T.Yoqneam
24. Megiddo
25. T.Taanakh
26. T.Yaqush
27. K. ez-Zeraqon

B. Main sites in the center and south of the country

A


B


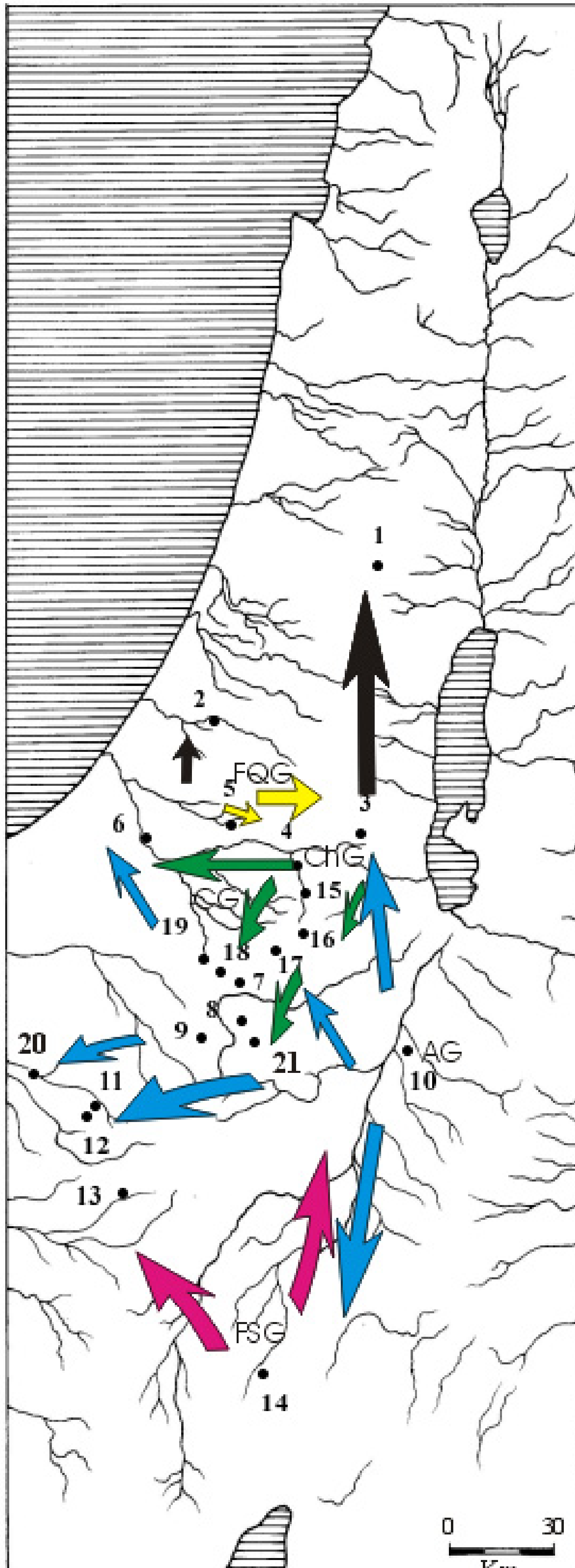
Map 4.
Distribution of southern wares from the Negev.
EB II.

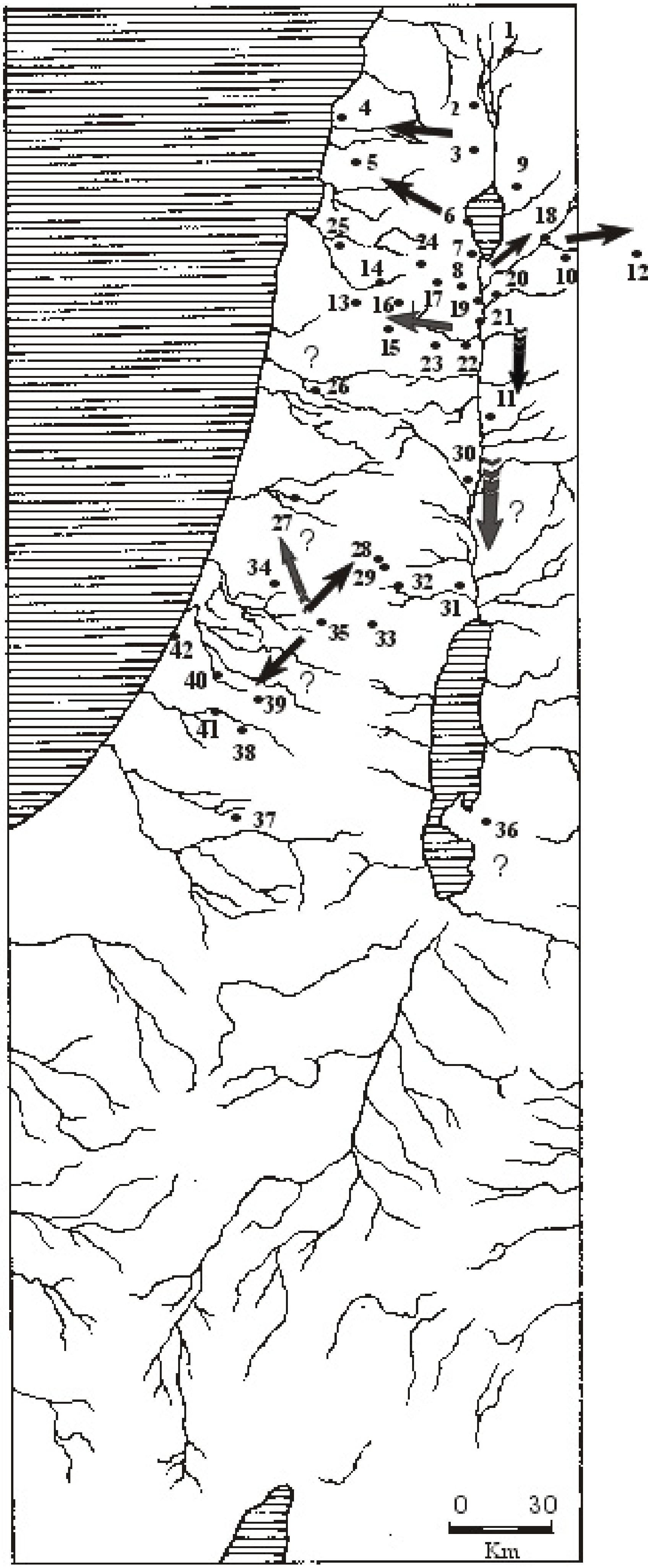
Pottery groups:

■	AG	Arkose group
■	CG	Calcite group
■	ChG	Chert group
■	FQG	Fine quartz group
■	FSG	Fossil shell group

Sites:

1. `Ai
2. T. el-Hesi
3. Arad
4. T. Isdar
5. T. Halif
6. E. Besor
7. H. Yeruham
8. H. Ahdir
9. R. Matred
10. B. el-Hatiye
11. H. Horsha
12. E. Kadis
13. E. Hame`ara
14. B. Uvda
15. K. Telem
16. N. Refet
17. H. Avnon
18. N. Boqer
19. N. Zalzal.
20. K. Barnea
21. R. Nafha 396





Map 5.
Distribution of
Khirbet Kerak
Ware, EB III.

Sites:

1. T. Dan
2. T. Qadesh
3. Hazor
4. R. Haniqra
5. Kabri
6. T. Reqet
7. B. Yerah
8. T. Rechesh
9. Lawieh
10. A. edh-Dhahr
11. T. es-Saidyieh
12. K. ez-Zeraqon
13. Megiddo
14. Affula
15. T. Taanakh
16. E. Jezreel
17. K. Safsafa
18. T. el-Fakhat
19. T. Yaqush
20. T. esh-Shuneh
21. T. Estaba
22. B. Shean
23. T. Yosef
24. T. Qishyon
25. T. Regev
26. T. Magal
27. T. Aphek
28. Bethel
29. 'Ai
30. K. Mahruq
31. Jericho
32. Jerusalem
33. B. Sahur
34. Gezer
35. T. Yarmuth
36. B. edh-Dhra
37. T. Halif
38. T. Nagila
39. Lachish
40. T.Erani
41. T. el-Hesi
42. Nizzanim

Map 6.
Distribution of various ceramic groups. EB IA-B.

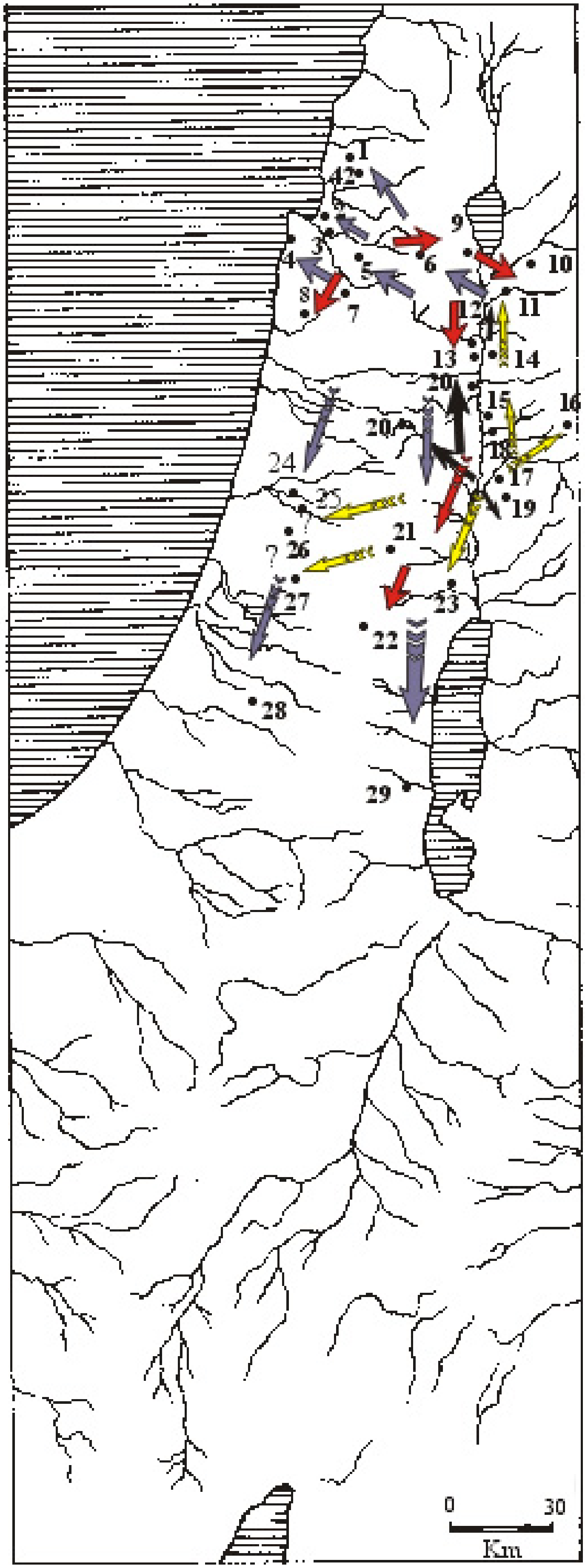
Grain Wash (GW), "Crackled" Ware (CW), Splash and Drip Style Painting (SDS), Umm Hammad Ware (UHW).

Groups:

- GW EB IB
- CW EB IB
- SDS EB IA
- UHW EB IB

Sites:

1. Kabri
2. Q. Ata
3. T. Qashish
4. T. Megadim
5. E. Shadud
6. T. Qishyon
7. Megiddo
8. E. Assawir
9. B. Yerah
10. A. el-Dhahr
11. T. esh-Shuneh
12. Bet Shean
13. E. Hanatziv
14. Pella
15. T. es-Saidyieh
16. T. A. al-Kharaz
17. T. U. Hammad
18. Ruweiha
19. T. Mefaliq
20. T. Shalem
21. T. el-Farah (N)
22. T. en-Nasbeh
23. Jericho
24. T. Aphek
25. T. Dalit
26. Shoham
27. Gezer
28. Lachish
29. N. Mishmar



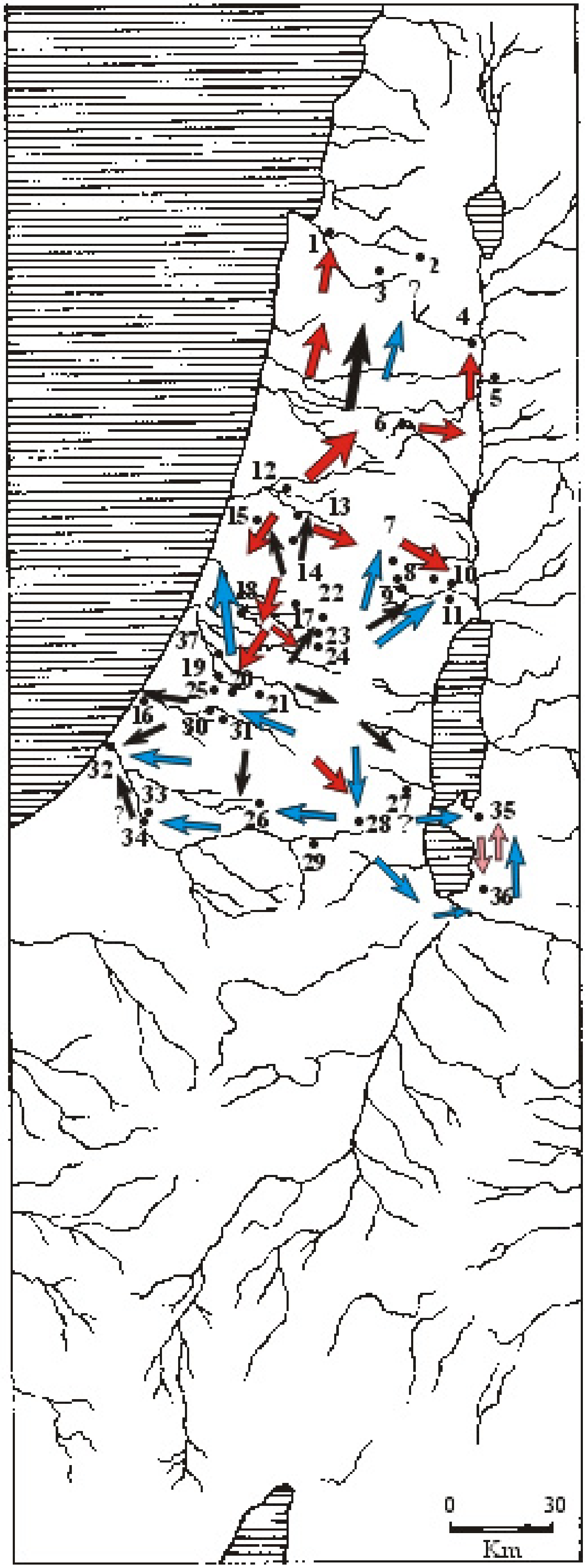
Map 7.
Distribution of various ceramic groups. EB IB-III.

Groups:

- "Erani C" (EB IB)
- Dolomitic Wares (EB IB)
- Tel Aphek Bowls (EB IB-II)
- Dead Sea Plain tempers (EB III)

Sites:

1. T. Qashish
2. T. Qishyon
3. Affula
4. B. Shean
5. T. A. al-Kharaz
6. T. el- Farah (N)
7. `Ai
8. T. en-Nasbeh
9. Jerusalem
10. Jericho (Tel) and J. Quruntul
11. "Herodian" Jericho
12. T. Aphek
13. T. Dalit
14. Lod
15. Azor
16. Afridar
17. Gezer
18. T. es-Safi
19. T. Erani
20. H. Ptora
21. Lachish
22. Hartuv
23. R. B. Shemesh
24. T. Yarmuth
25. T. el-Hesi
26. T. Halif
27. N.Mishmar
28. Arad
29. S.T. Malhata
30. T. Nagila
31. T. Mahaz
32. T. Ikhbene
33. Site H
34. N. Besor
35. B. edh-Dhra
36. Numeira
37. G Guvrin

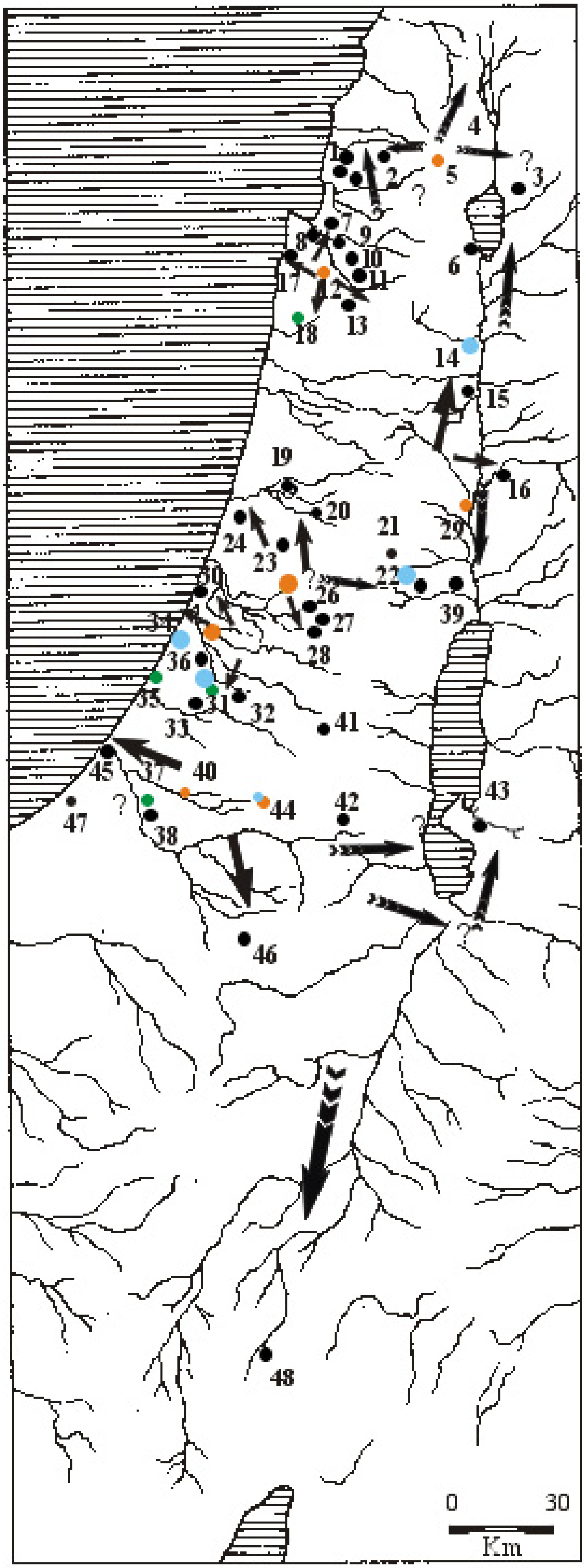


Map 8.
Distribution of Canaanean blades and cores.

- Cores
- Exhausted cores
- Caches
- Canaanean blades

Sites:

1. Kabri, B. Haemeq and K. Uzza.
2. Meona
3. Gamla
4. T. Teo
5. N. G.Halav
6. B.Yerah
7. Q. Ata
8. T. Qashish
9. Yiftahel
10. E. Shadud
11. Affula
12. H. Haruvim
13. Megiddo
14. B. Shean
15. T. Shalem
16. T. U. Hammad
17. T. Megadim
18. E. Assawir
19. T. Aphek
20. T. Dalit
21. `Ai
22. Jerusalem and Motza
23. Lod
24. Azor
25. Gezer
26. Hartuv
27. T. B. Shemesh and H. Illin
28. T. Yarmuth
29. Fatzael
30. Palmahim
31. H. Ptora
32. Lachish
33. Tel-Hesi
34. Nizzanim
35. Afridar
36. T. Erani
37. Site H
38. E. Besor
39. Jericho
40. T. Sera
41. T. Hebron
42. Arad
43. B. edh-Dhra
44. T. Halif
45. T. Ikhbene
46. H. Avnon
47. T. Es-Sakan
48. B. Uvda



Map 9.
Distribution of tabular scrapers

- Sources
- Tabular scrapers

Sites:

1. Meona
2. Gamla
3. T. Teo
4. B. Yerah
5. Q. Ata
6. T. Qashish
7. Yiftahel
8. E. Shadud
9. Affula
10. Megiddo
11. B. Shean
12. T. U. Hammad
13. T. Megadim
14. E. Assawir
15. T. Dalit
16. Jericho
17. Jerusalem
18. Gezer
19. T. B. Shemesh and H. Illin
20. T. Yarmuth
21. G. Guvrin
22. T. Erani
23. Lachish
24. T.el-Hesi
25. Nizzanim
26. Afridar
27. T. Ikhbene
28. E. Besor
29. T.Hebron
30. T. Halif
31. Arad
32. M. Shalem
33. B. edh-Dhra
34. Q.A.Tulayha
35. T. Esdar
36. N. Mitnan
37. K.Barnea
38. H. Horsha
39. E. Hameara
40. H. Qeren
41. W. Fidan 4
42. R. Matred
43. R. Nafha 396
44. B.Uvda 915 and 917
45. T. es-Sakan

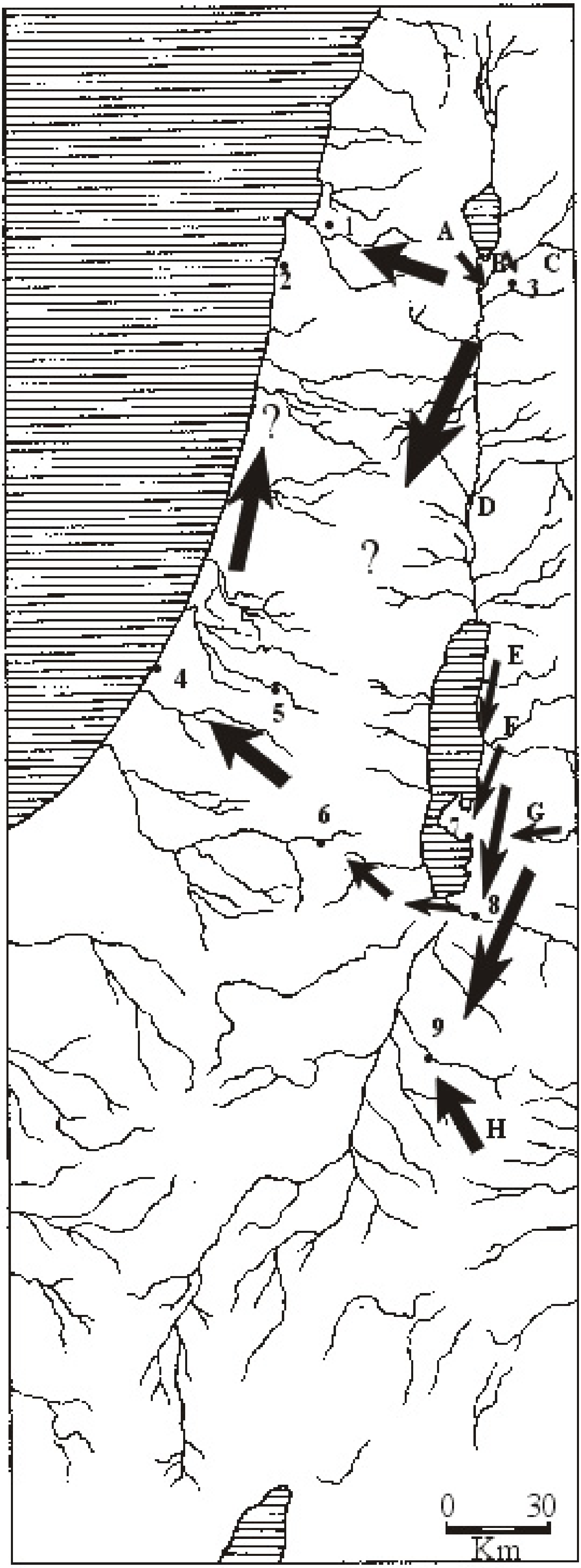
Map 10.
Distribution of basalt objects and sources.
EB I.

Sources:

A. Tiberiah
B. W. Arab
C. Sal
D. Karameh
E. Sweimeh
F. Ma`in
G. Mujib/Kerak
H. Dana/Tafila

Sites:

1. Q. Ata
2. T. Megadim
3. T. Esh-Shuna
4. Afridar
5. T. Erani
6. S. T. Malhata
7. Bab edh-Dhra
8. Safi
9. W.Fidan 4 and K. H. Ifdan



Map 11. Distribution of sandstone and beachrock sources and objects EB I-III.

Sources:

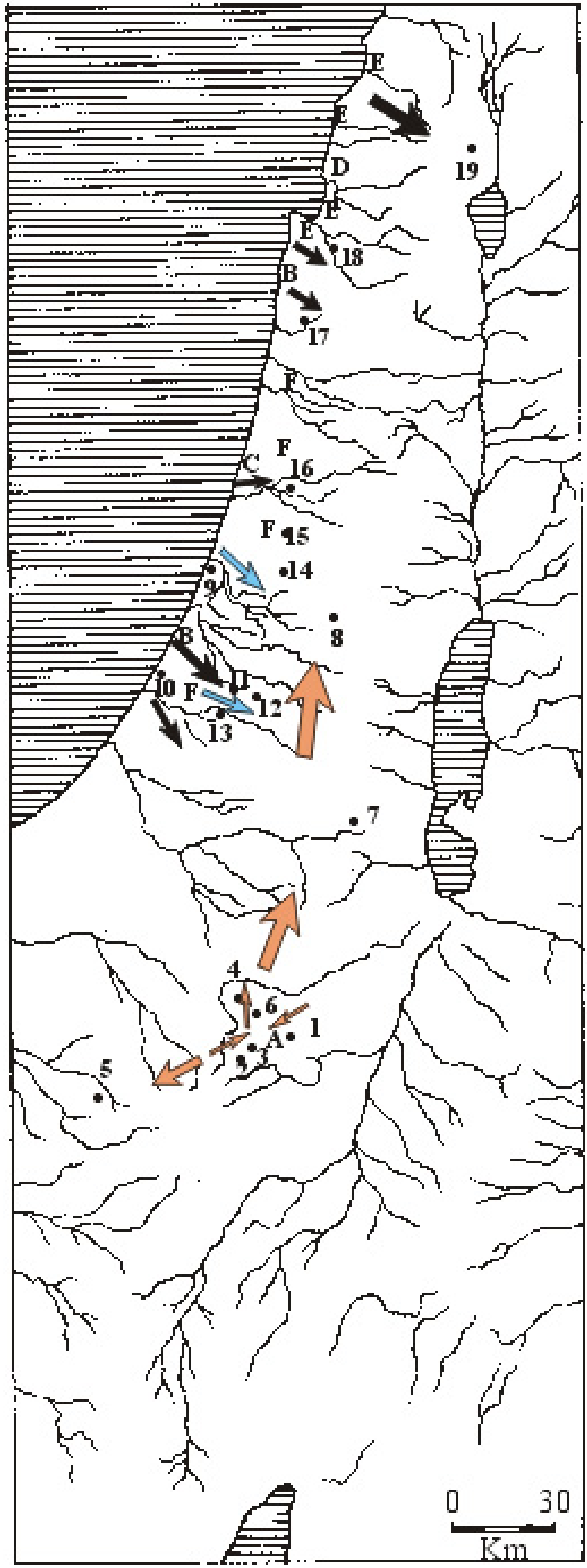
A. Feruginous sandstone

B. Glycemerian beachrock
C. Kurkarian beachrock
D. Calcarnite beachrock
E. Pebble beachrock

F. *Kurkar*

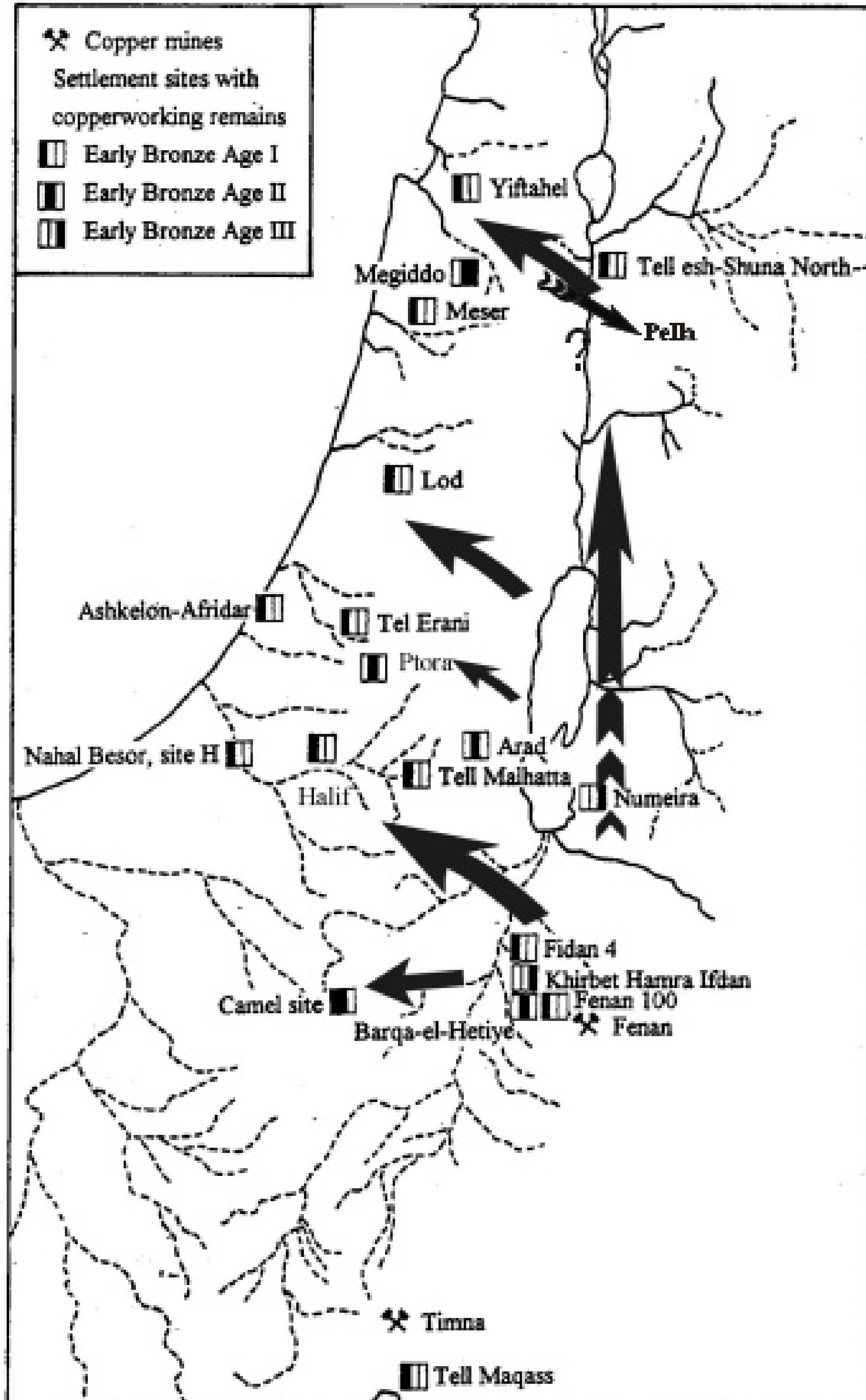
Sites:

1. R. Saharonim (N)
2. N. Ramon 204/160
3. Camel Site
4. H. Ahdir
5. H. Horsha
6. R. Nafha 396
7. Arad
8. H. Illin
9. Palmahim
10. Afridar
11. H. Ptora
12. Lachish
13. T. el-Hesi
14. Gezer
15. Lod
16. T. Aphek
17. E. Assawir
18. T. Qashish
19. Hazor



Map 12. Distribution of copper sources and sites with metallurgical remains. EB I-III

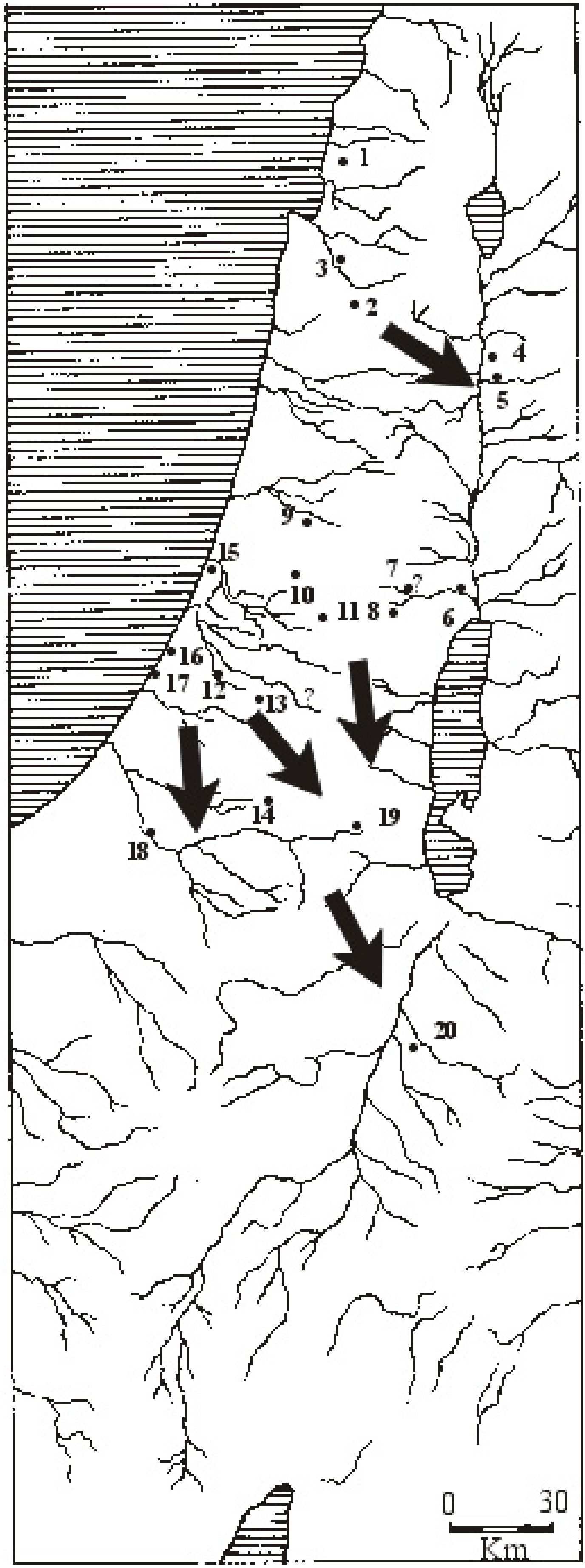
After Genz 2001:Fig.1.



Map 13.
Distribution of crops and woods. EB I.

Sites:

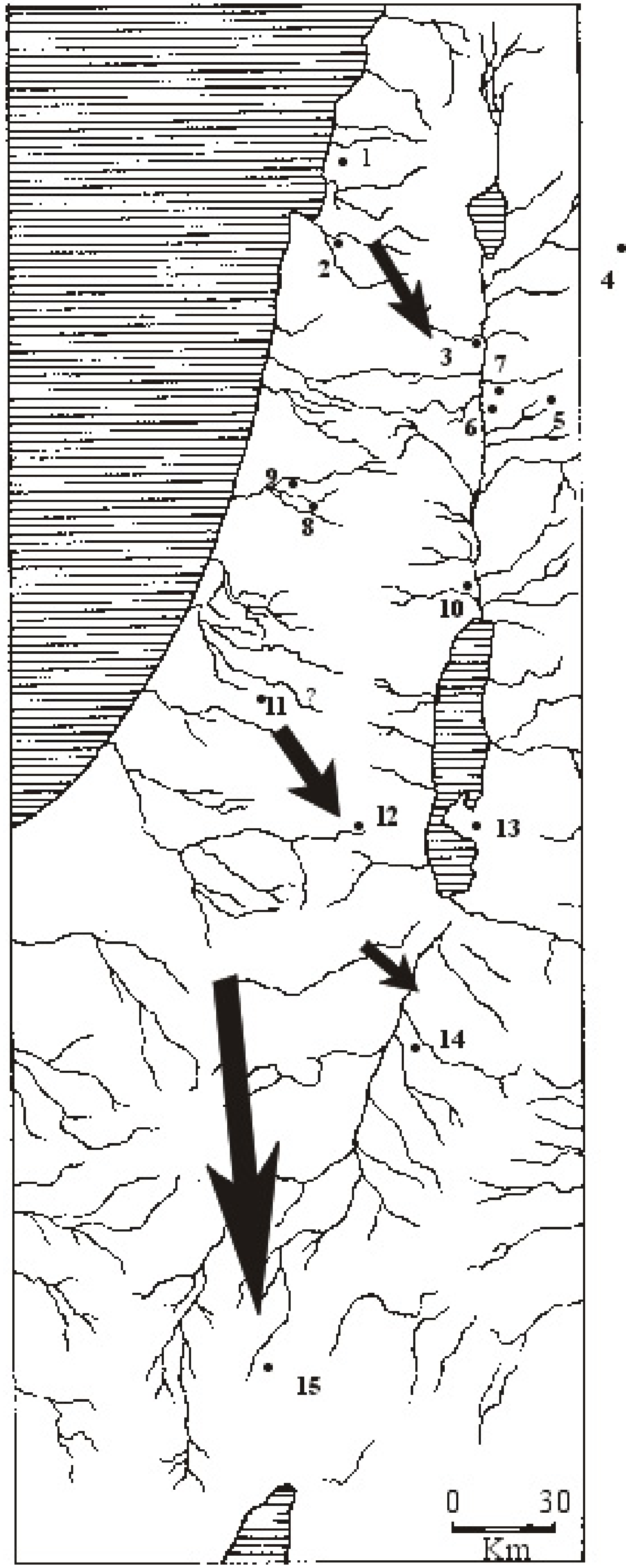
1. Kabri
2. Megiddo
3. Tel Qashish
4. Pella
5. T. A. al-Kharaz
6. Jericho
7. Jerusalem
8. Sataf
9. T. Dalit
10. Gezer
11. H. Illin
12. T. Erani
13. Lachish
14. T.Halif
15. Palmahim
16. Nizzanim
17. Afridar
18. E. Besor
19. Arad
20. W. Fidan 4



Map 14.
Distribution of crops and woods. EB II.

Sites:

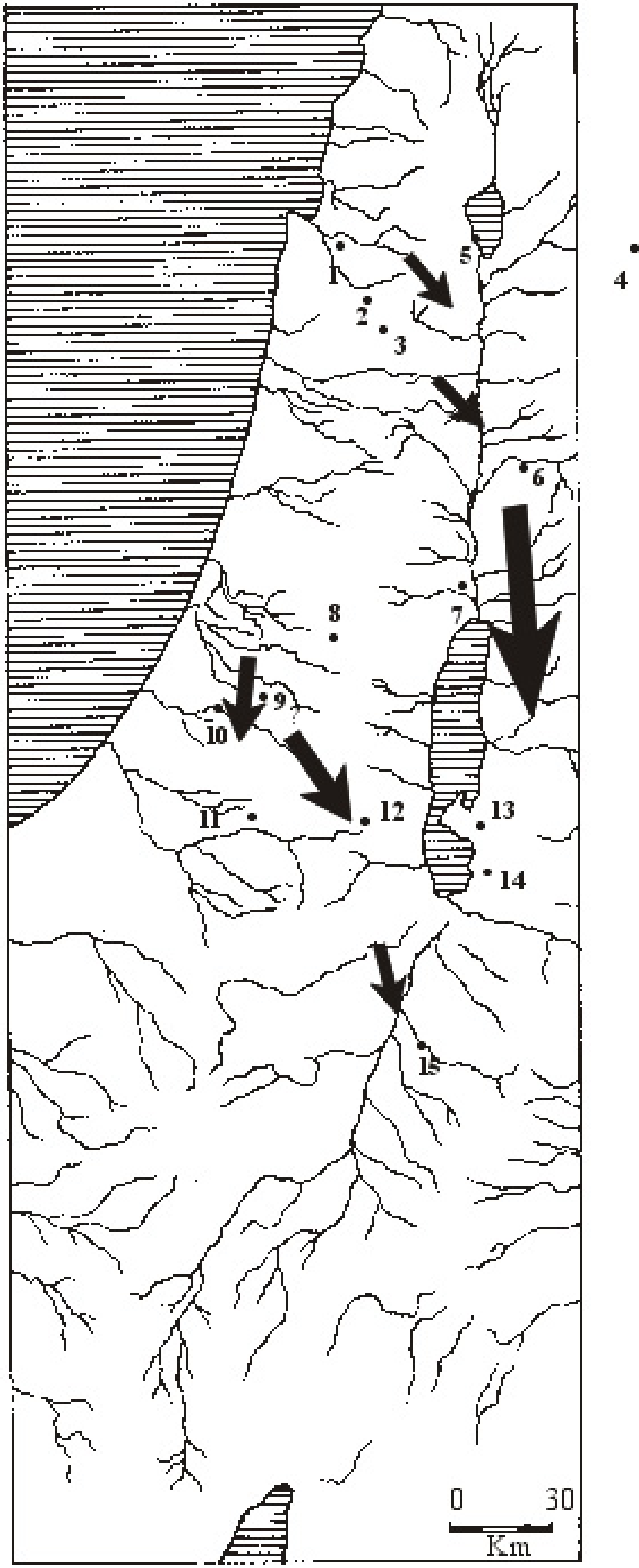
1. Kabri
2. T. Qashish
3. B. Shean
4. K. ez-Zeraqon
5. T. A. al-Kharaz
6. T. es-Saidyeh
7. T. el-Handaquq (N)
8. T. Dalit
9. Aphek
10. Jericho
11. Lachish
12. Arad
13. Bab edh-Dhra
14. Fidan 9 and Fidan 16
15. B. Uvda



Map 15.
Distribution of crops and woods. EB III.

Sites:

1. Tel Qashish
2. Megiddo
3. T. Taanakh
4. K. ez-Zeraqon
5. B. Yerah
6. T. el-Handaquq (S)
7. Jericho
8. T. Yarmuth
9. Lachish
10. T. el-Hesi
11. T. Halif
12. Arad
13. B. edh-Dhra
14. Numeira
15. Fidan 9 and 16



Map 16. Distribution of marine shells and fish.

Sources:

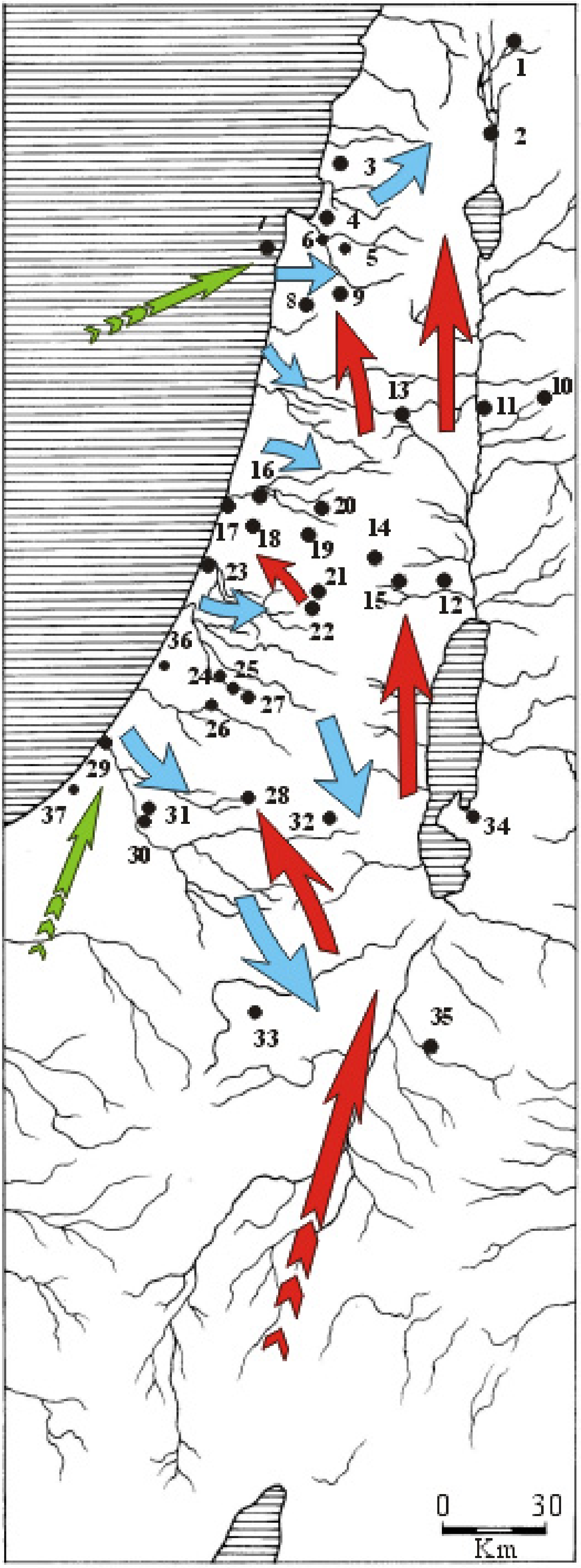
Mediterranean Sea

Red Sea

Nile River

Sites:

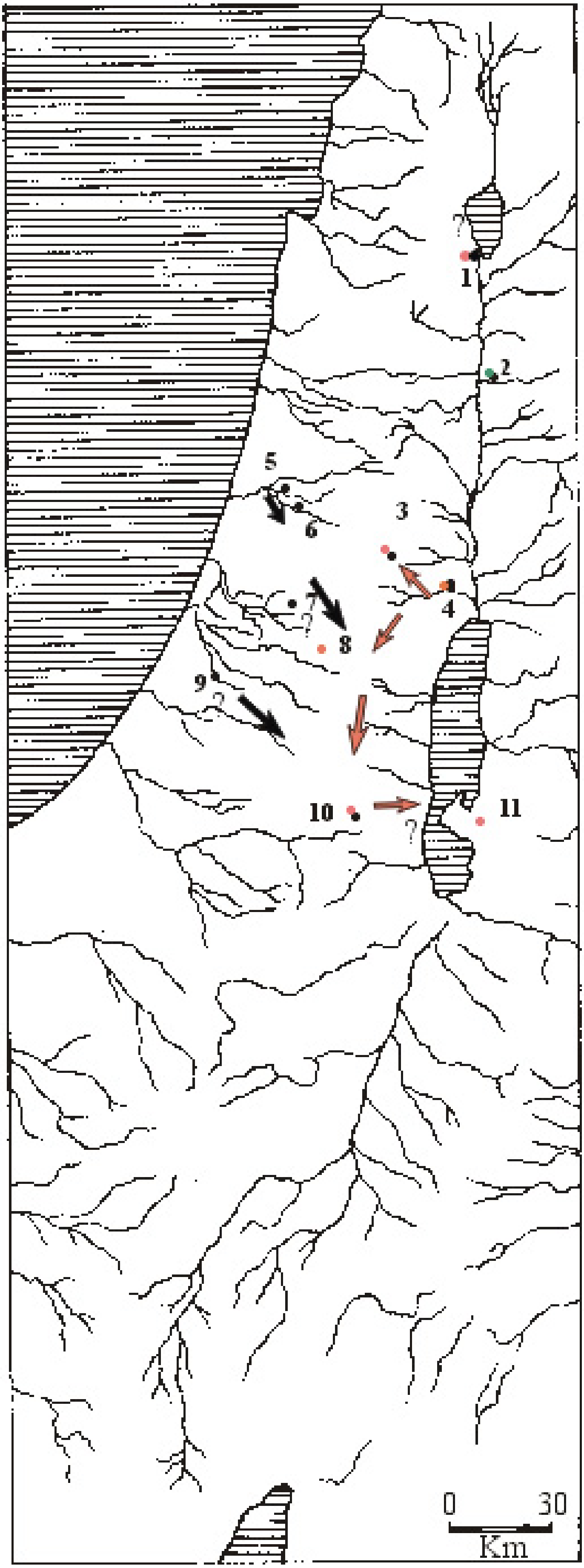
1. T. Dan
2. T. Gadot
3. Kabri
4. Q. Ata
5. Yiftahel
6. T. Qashish
7. Atlit bay
8. E. Assawir
9. Megiddo
10. T. A. Al-Kharaz
11. T. es-Saidyieh
12. Jericho
13. T. el-Farah (N)
14. 'Ai
15. Jerusalem
16. Givatayim
17. Tel Aviv
18. Azor
19. Lod
20. T.Dalit
21. H. Illin
22. T.Yarmut
23. Palmahim
24. T. Erani
25. H. Ptora
26. T. el-Hesi
27. Lachish
28. T. Halif
29. T. Ikhbene
30. E. Besor
31. Site H
32. Arad
33. R. Nafha 396
34. Bab edh-Dhra
35. W. Fidan 4
36. Afridar
37. T. es-Sakan



Map 17. Distribution of hippopotamus remains and ivory objects.

• Hippopotamus remains
• Bull's heads
• Ivory bead

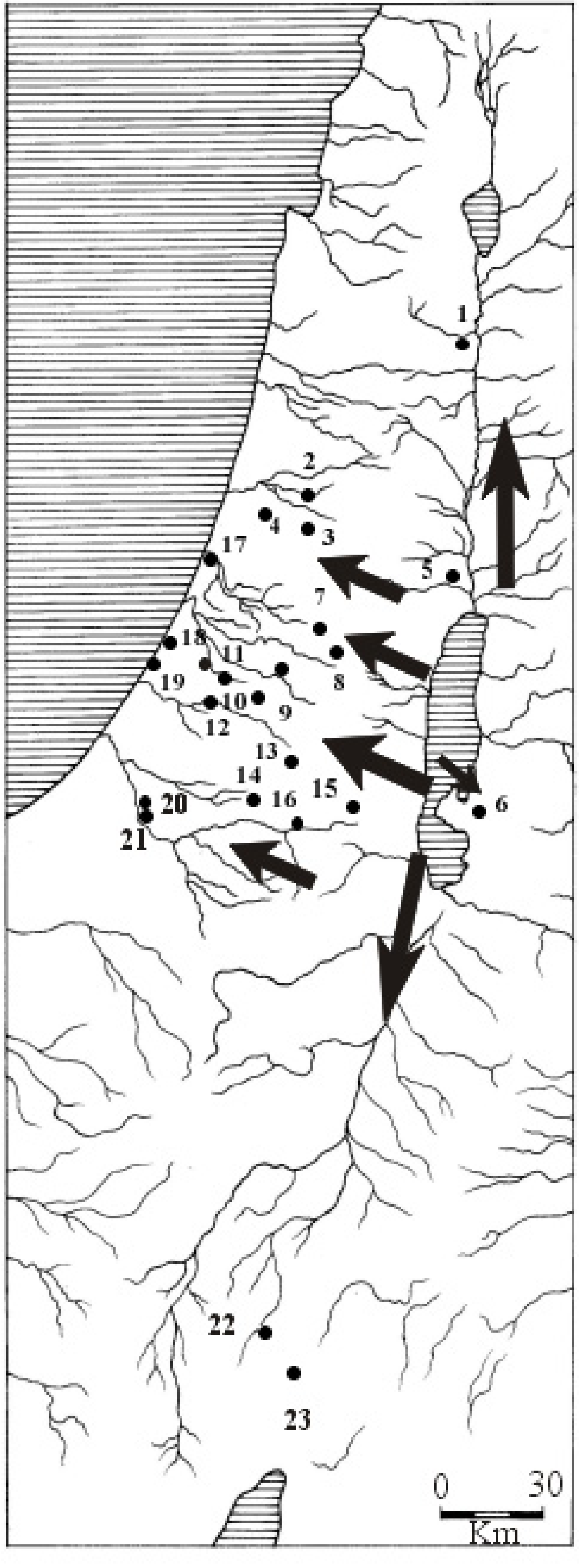
1. B. Yerah
2. T. A. al-Kharaz
3. 'Ai
4. Jericho
5. T. Aphek
6. T. Dalit
7. Gezer
8. T. Yarmuth
9. T. Erani
10. Arad
11. B. edh-Dhra



Map 18.
Distribution of
bitumen and objects
with bitumen.
EB I-III.

Sites:

1. B. Shean
2. T. Dalit
3. Shoam
4. Lod
5. Jericho
6. B. edh-Dhra
7. H.Illin
8. T.Yarmuth
9. Lachish
10. H. Ptora
11. T. Erani
12. T. el- Hesi
13. T. Hebron
14. T. Halif
15. Arad
16. S. T. Malhata
17. Palmahim
18. Nizzanim
19. Afridar
20. Site H
21. E. Besor
22. B. Uvda
23. B.Nimra



Map 19.
Distribution of carnelian beads.
EB I-III

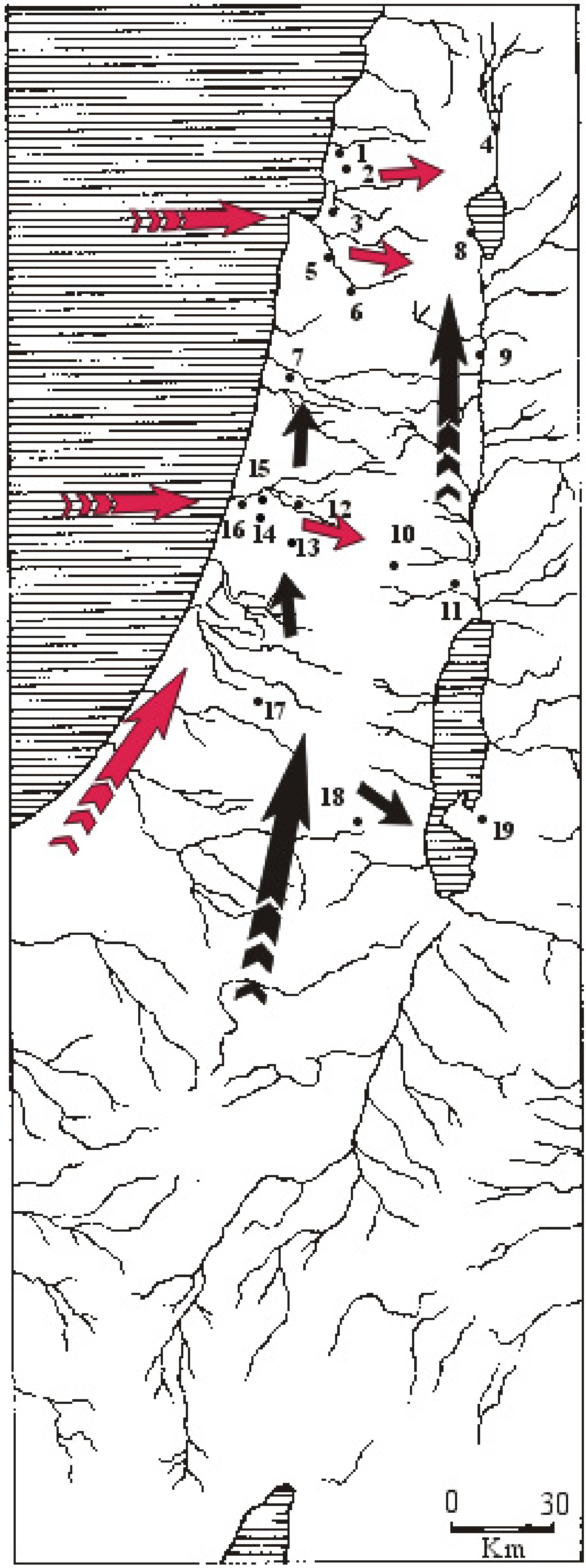
Sources:

Ramon krater?

Egypt?

Sites:

1. Kabri
2. Asherat
3. Q. Ata
4. T. Gadot
5. Hazorea
6. Megiddo
7. K. Monash
8. B. Yerah
9. E. Hanatziv
10. `Ai
11. Jericho
12. T. Dalit
13. Lod
14. Azor
15. Givatayim
16. T. Aviv
17. Lachish
18. Arad
19. B. edh-Dhra

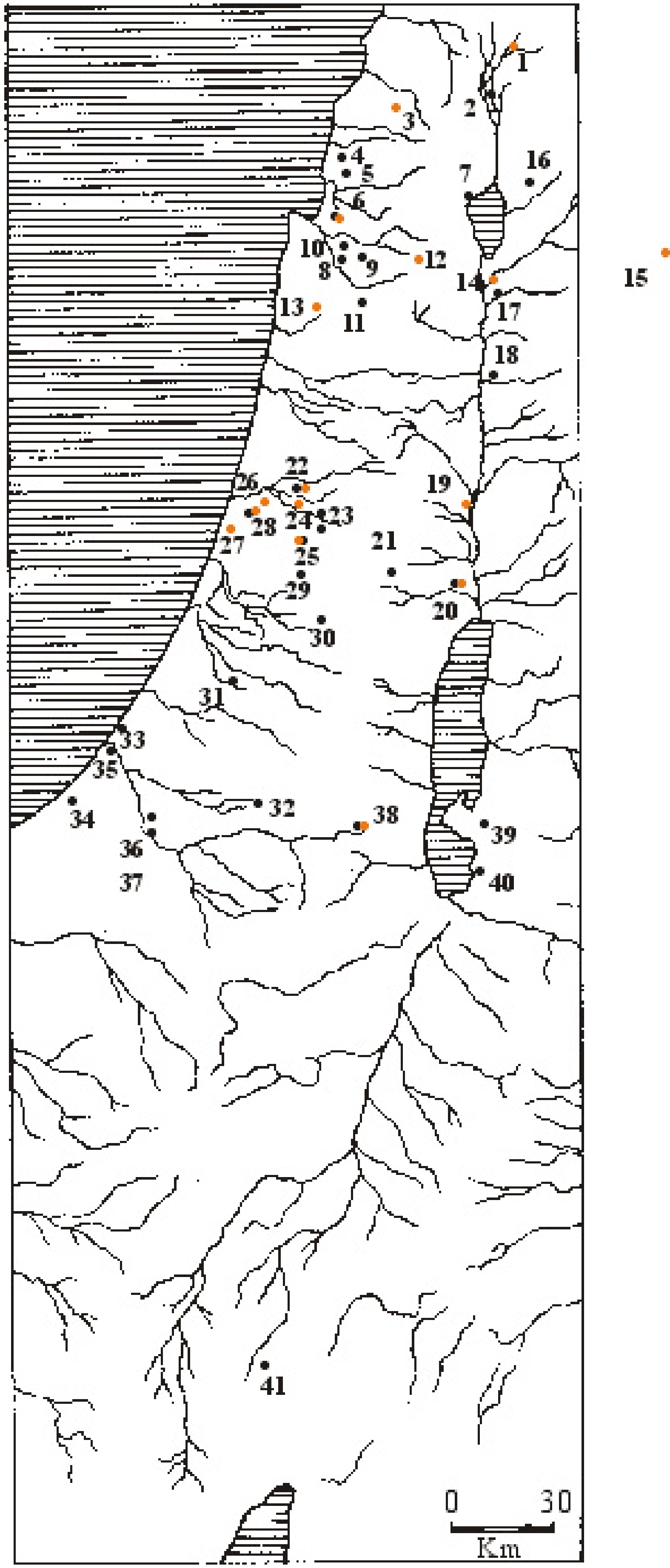


Map 20. Distribution of equid remains and figurines

● Faunal remains
● Donkey figurines

Sites:

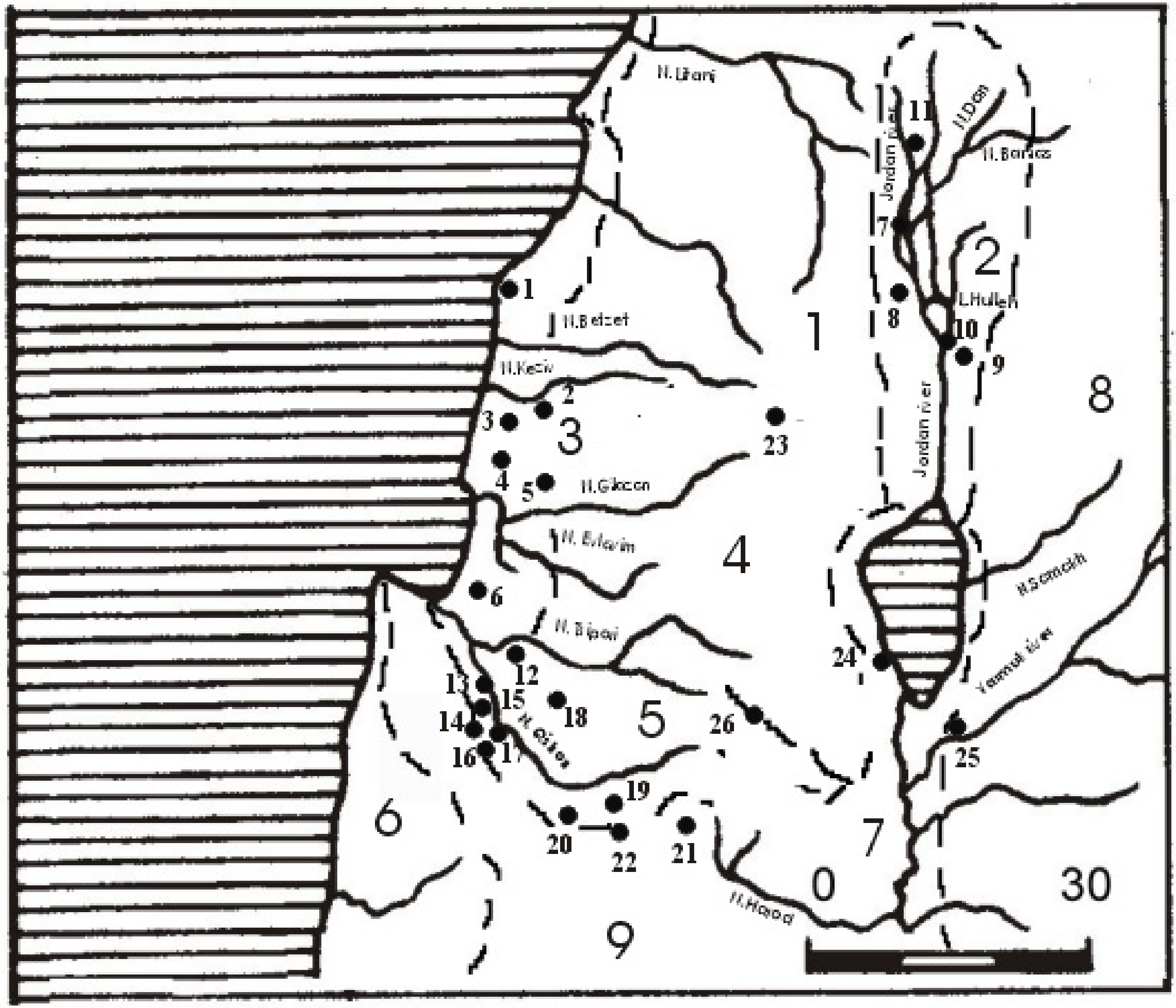
1. T. Dan
2. T. Na`ama
3. Meona
4. Kabri
5. B. Haemeq
6. Q. Ata
7. T. Kinrot
8. T. Qashish
9. E. Shadud
10. Yiftahel
11. Megiddo
12. T. Qishyon
13. Barkai
14. P. Hayarmuk
15. K. ez-Zeraqon
16. Gamla
17. T. esh-Shuneh
18. T. A. al-Kharaz
19. K. Mahruq
20. Jericho
21. `Ai
22. T. Aphek
23. Shoham and T. Bareket
24. T. Dalit
25. Lod
26. Givatayim
27. Bat Yam
28. Azor
29. Gezer
30. T. Yarmuth
31. T. Erani
32. T. Halif
33. Afridar
34. T. es-Sakan
35. T. Ikhbene
36. Site H
37. E. Besor
38. Arad
39. B. edh-Dhra
40. Numeira
41. B. Uvda 917



Map 21. Northern regions, EB I.

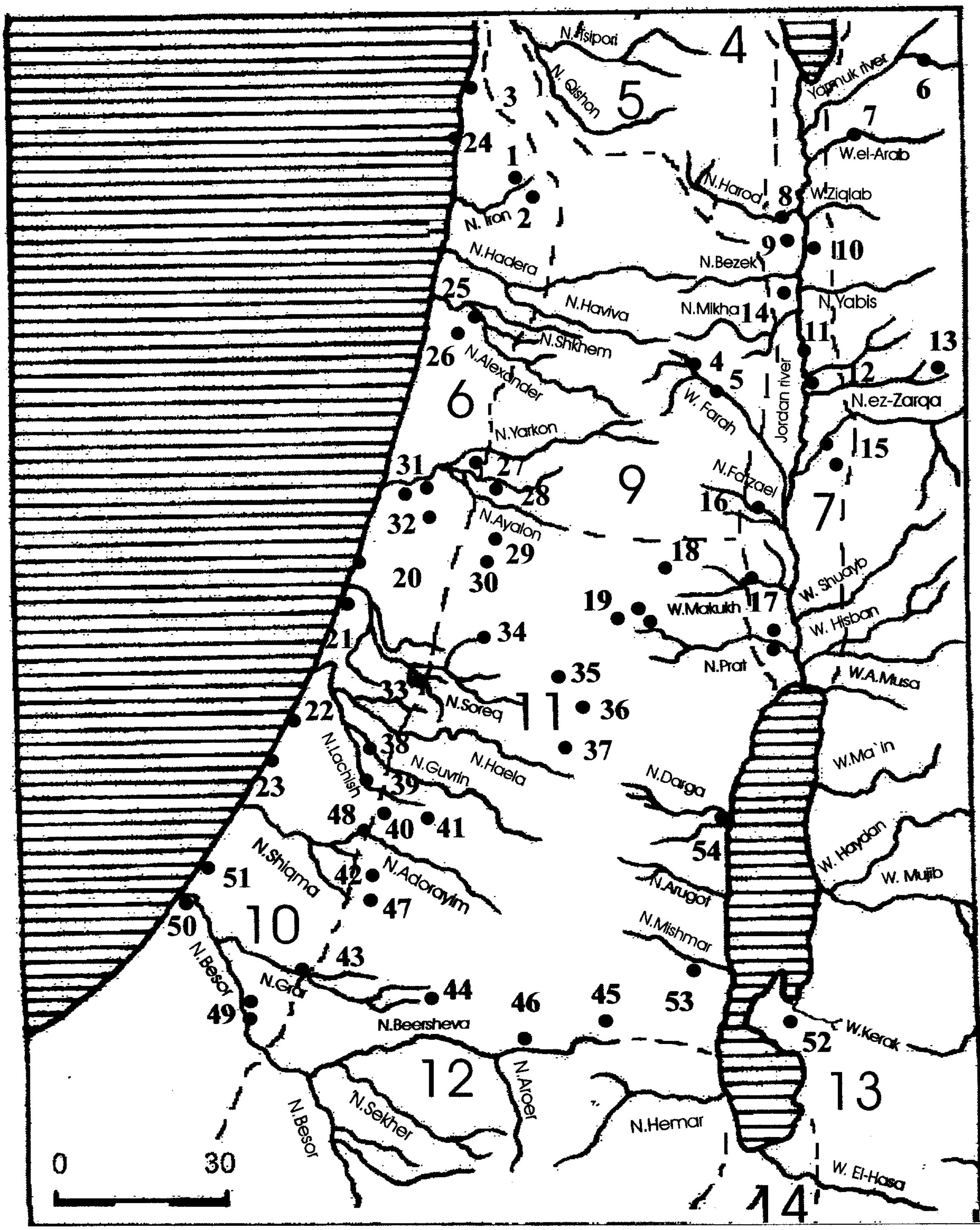
Regions: 1. Upper Galilee. 2. Hulleh Valley. 3. Western Galilee. 4. Lower Galilee. 5. Jezreel Valley. 6. Central Coastal Plain. 7. Jordan Valley. 8. Golan. 9. Central Hill Country.

Sites. See opposite page.



Map 22. Central and southern regions, EB I.

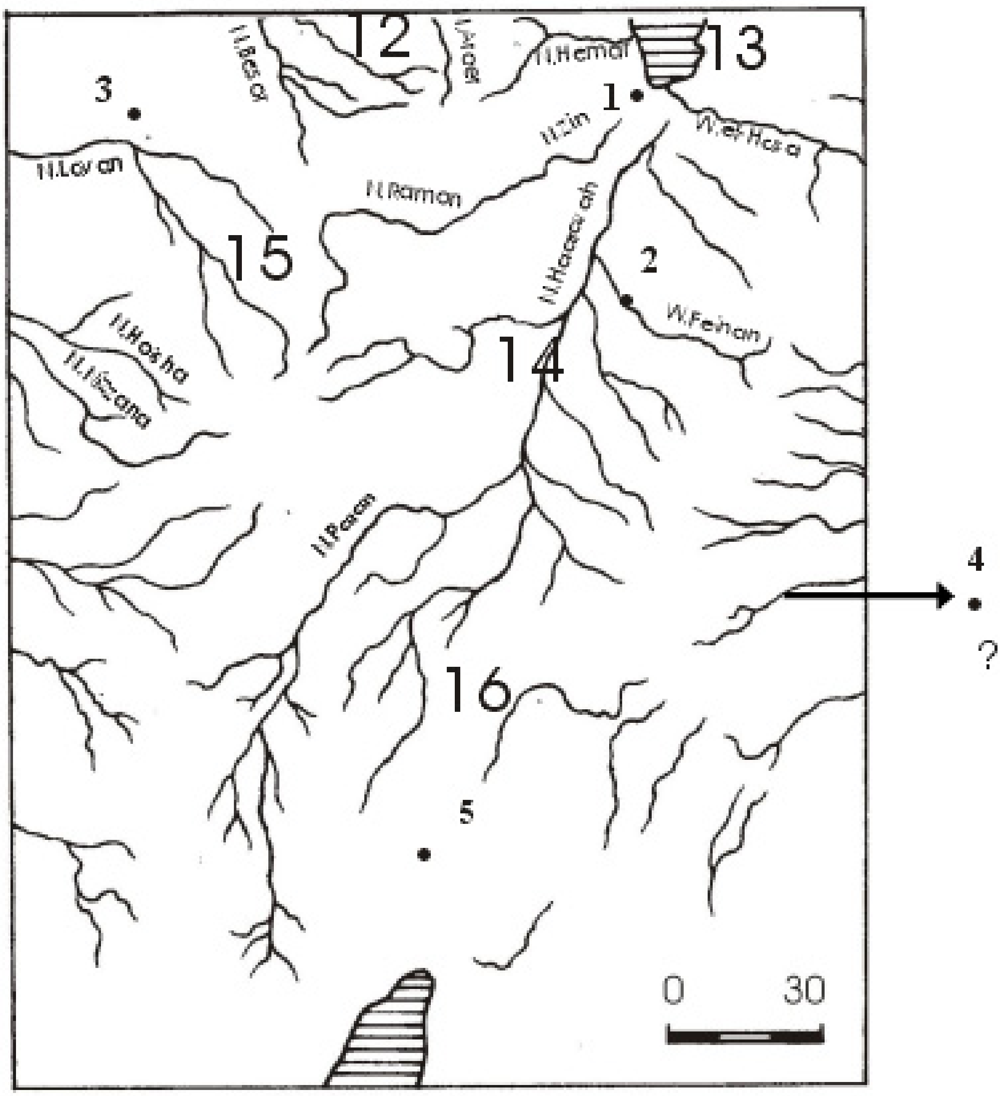
Regions: 4. Lower Galilee.5. Jezreel Valley. 6 Central Coastal Plain. 7. Jordan Valley. 9. Central Hill Country.10. Southern Coastal Plain. 11. Shephelah. 12. Northern Negev. 13. Dead Sea Plain.14 Aravah.



Map 23. Southern regions, EB I.

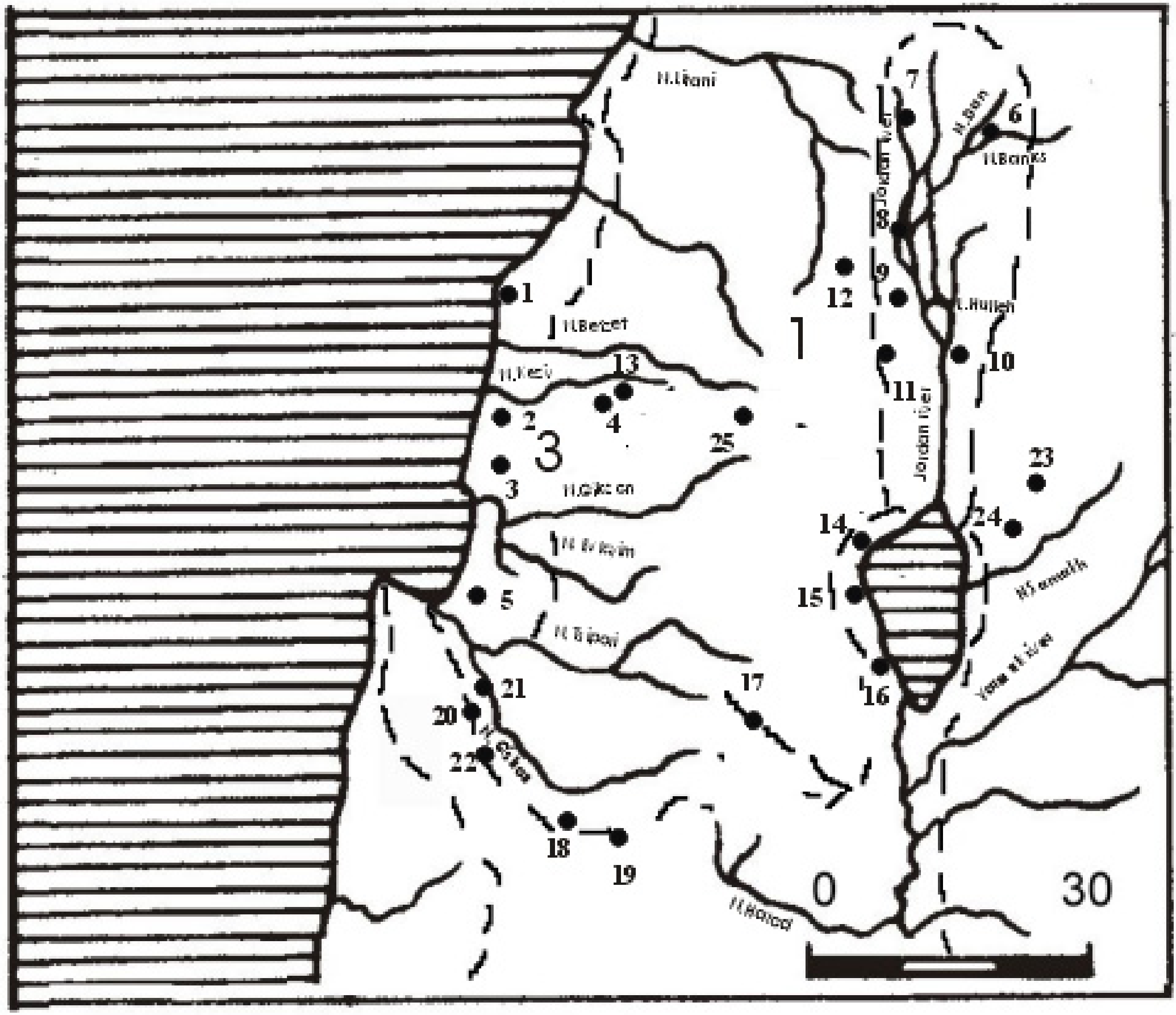
Regions: 12. Northern Negev. 13. Dead Sea plain.14 Aravah.15. Central Negev. 16. Southern Negev.

Sites: See opposite page.



Map 24. Northern regions, EB II.

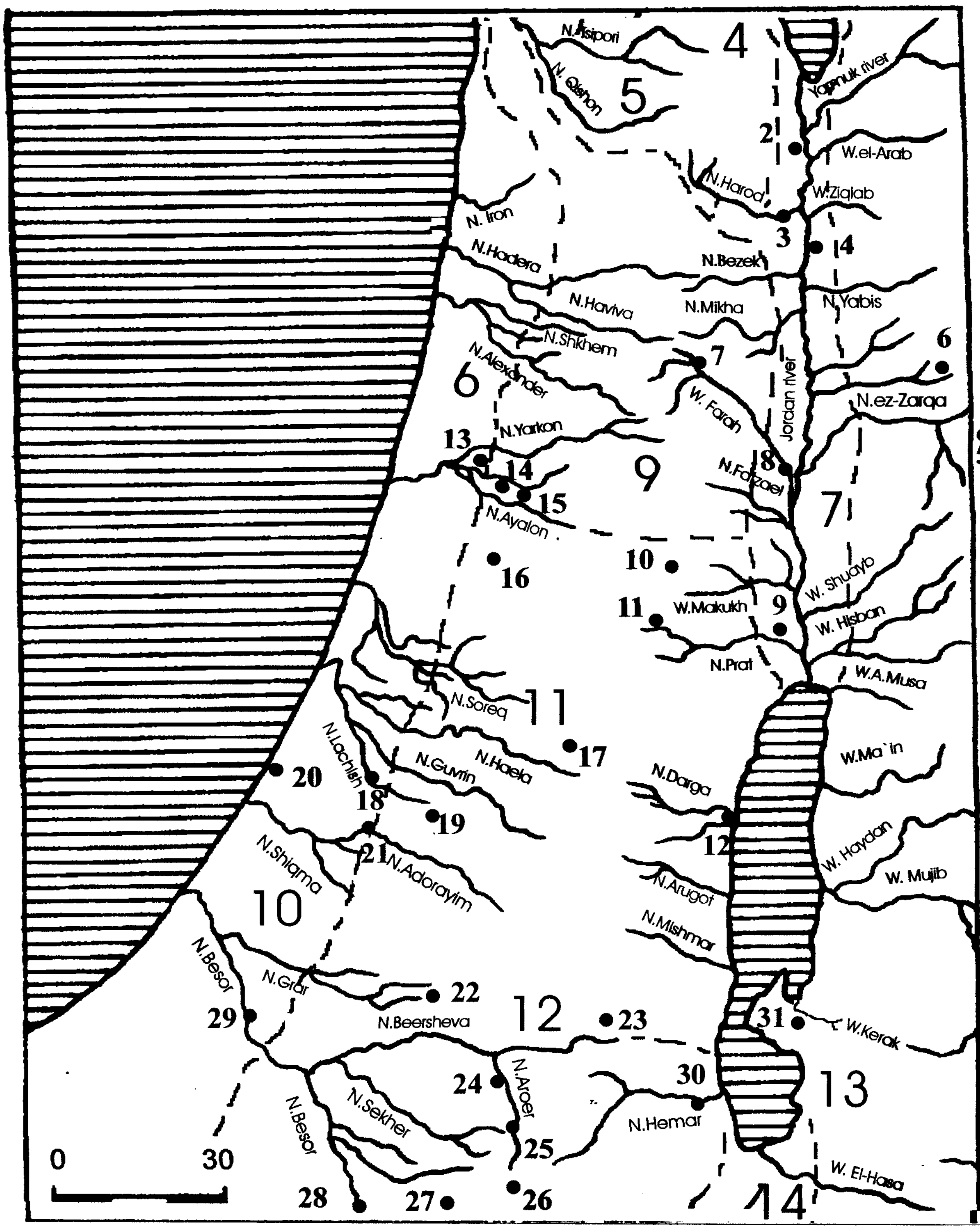
Regions: 1. Upper Galilee. 2. Hulleh Valley. 3. Western Galilee. 4. Lower Galilee. 5. Jezreel Valley. 6. Central Coastal Plain. 7. Jordan Valley. 8. Golan. 9. Central Hill Country.



Map 25. Central regions, EB II.

Regions: 4. Lower Galilee.5. Jezreel Valley. 6 Central Coastal plain. 7. Jordan Valley. 9. Central Hill Country.10. Southern Coastal Plain. 11. Shephelah. 12. Northern Negev. 13. Dead Sea Plain.14 Aravah.

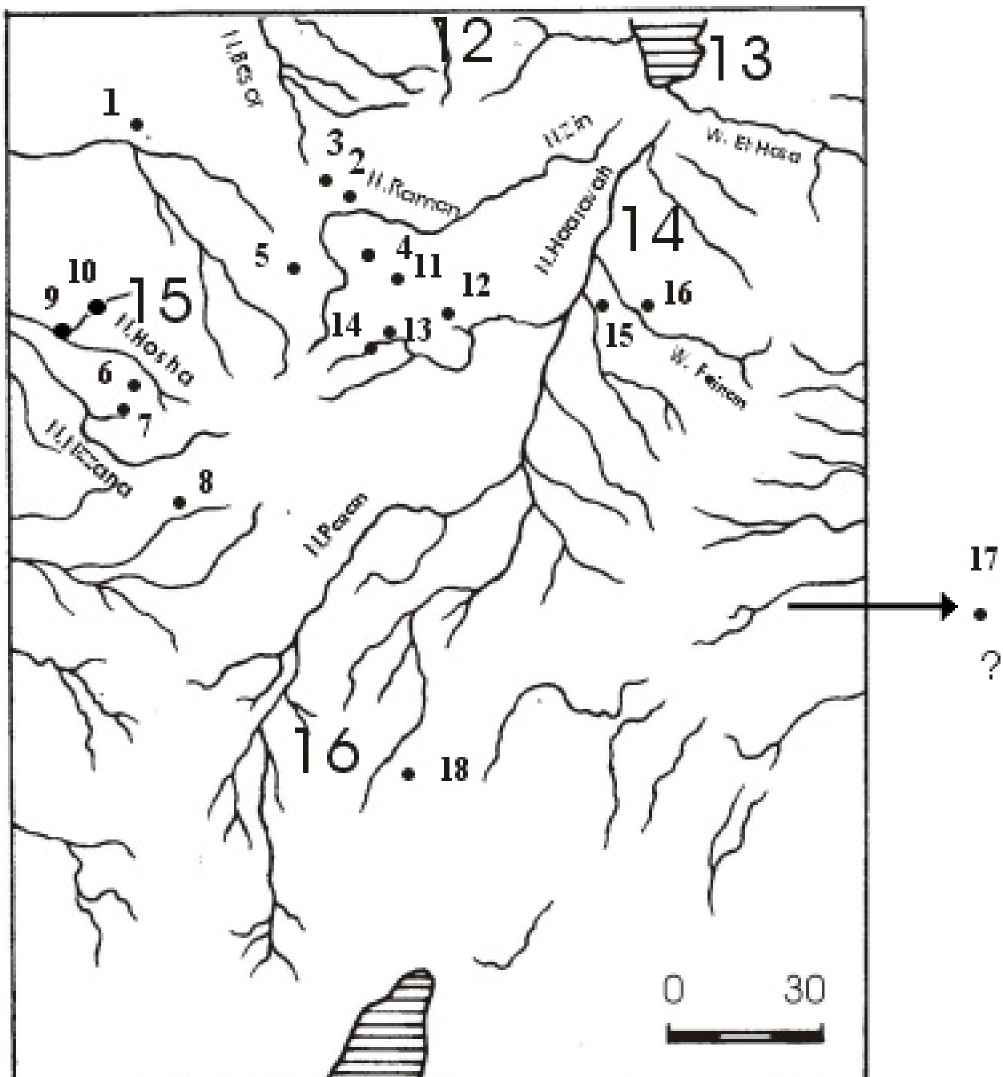
Sites: See opposite pages.



Map 26. Southern regions, EB II.

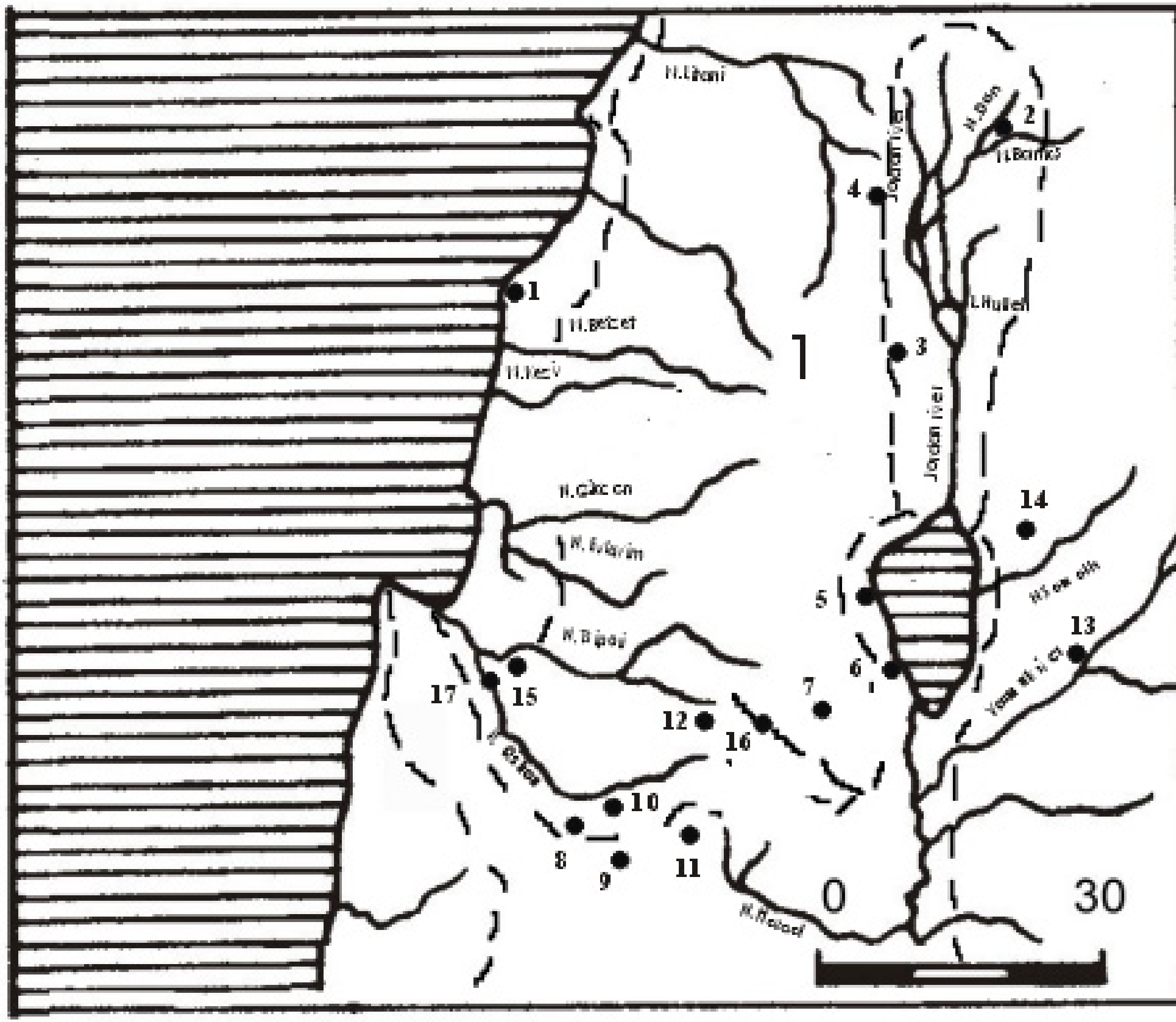
Regions: 12. Northern Negev. 13. Dead Sea Plain.14 Aravah.15. Central Negev. 16. Southern Negev.

Sites: See opposite page.



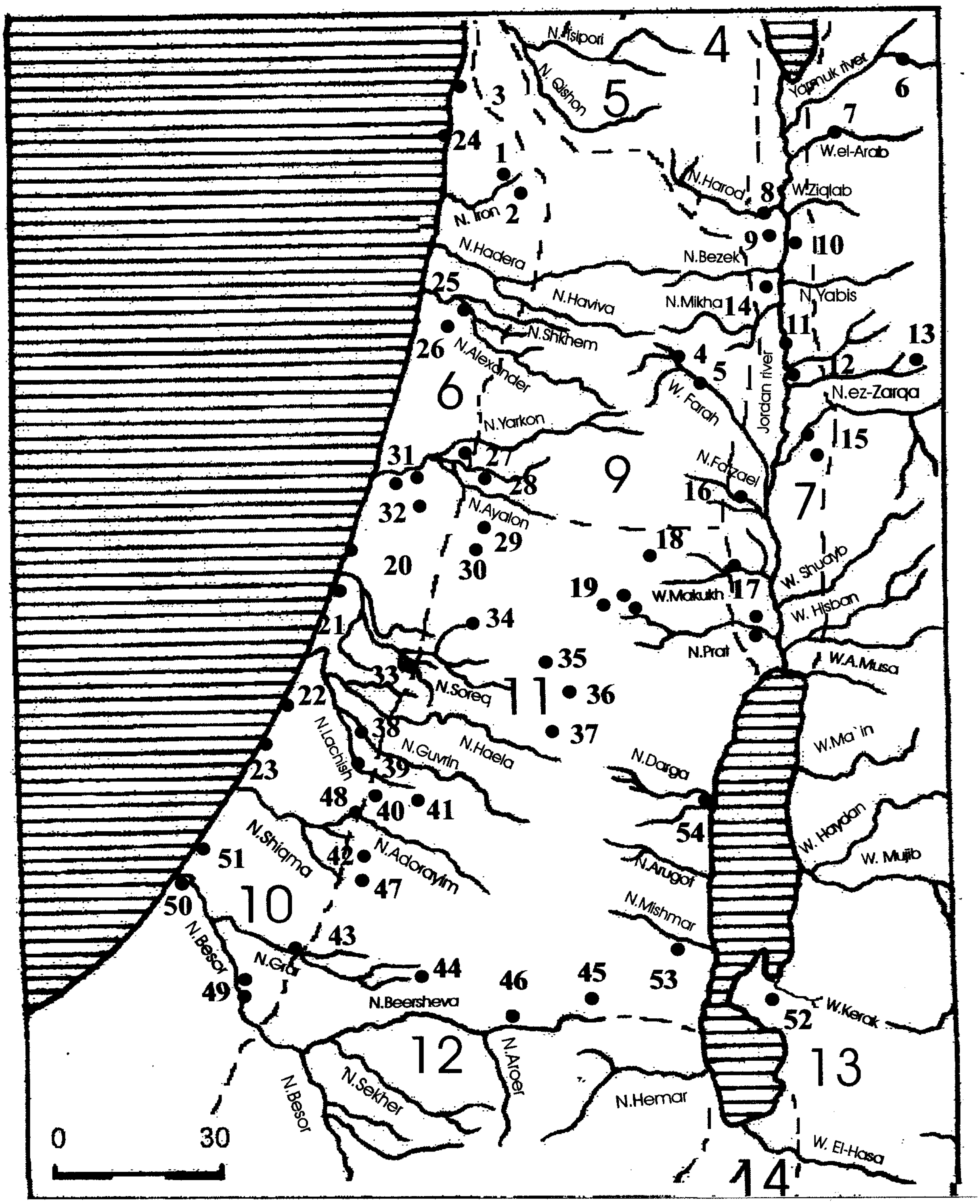
Map 27. Northern regions, EB III.

Regions: 1. Upper Galilee. 2. Hulleh Valley. 3. Western Galilee. 4. Lower Galilee. 5. Jezreel Valley. 6. Central Coastal Plain. 7. Jordan Valley. 8. Golan. 9. Central Hill Country.



Map 22. Central and southern regions, EB I.

Regions: 4. Lower Galilee.5. Jezreel Valley. 6 Central Coastal Plain. 7. Jordan Valley. 9. Central Hill Country.10. Southern Coastal Plain. 11. Shephelah. 12. Northern Negev. 13. Dead Sea Plain.14 Aravah.



Central and Southern Regions, EB I.

Commodities *Sites*	*Gray Burnished Ware I-II*	*Gray Burnished Ware III-IV*	*Splash & Drip Painting*	*Crackled Ware*	*Umm Hammad Ware*	*Erani C*	*Dolomitic Wares*	*Grain Wash*	*Tel Aphek Bowls*	*Canaan. Cores*	*Canaan. blades*	*Tabular scrapers*	*Basalt*	*Beach-rock / Kurkar*	*Sand-stone*	*Metall. remains*	*Metal objects*	*Olive & grapes*	*Trees*	*Pulses*	*Med. species*	*Red Sea species*	*Nilotic species*	*Donkey remains*	*Donkey figurines*	*Bitum.*	*Carnel.*
1.E.Assawir (1)	+	+								+	+	+		+									+		+		
2.Metzer	+																+										
3.T.Megadim		+						+			+	+															
4.T.el-Farah N	+	+			+				+		+	+									+	+					
5.Aqrabanyeh	+	+																									
6.A.edh-Dhar	+			+																							
7.T.esh-Shuneh	+	+	+		+								+			+	+							+(?)			
8. B.Shean	+				+				+		+	+					+									+	
9.E.Hanatziv				+																							+
10.Pella				+				+																+(?)			
11.T.es-Saidyeh			+																								
12.Ruweiha					+																						
13.A.al-Kharaz			+															+		+							
14.T.Shalem		+						+			+																
15.T.U.Hammad	+		+		+						+																
16.Fatzael										+	+																
17.Jericho (2)	+	+			+	+	+		+		+	+					+	+	+	+	+	+				+	+
18.`Ai		+			+	+	+										+				+						
19.Jerusalem (3)	+			+		+	+				+	+					+	+			+	+					
20.B.Yam																									+ (?)		
21.Palmahim	+										+			+		+	+				+		+			+	
22.Nizzanim											+						+	+	+							+	
23.Afridar	+ (?)					+				+	+	+	+	+		+	+	+			+	+	+	+		+	
24.Atlit bay																						+					
25.N.Alexander																	+										
26.K.Monash																	+										+
27.T.Aphek						+		+	+		+																
28.T.Dalit								+	+		+							+								+	+
29. Shoham			+(?)						+		+													+		+	
30. Lod									+															+	+	+	
31. T. Aviv (4)																	+				+	+					+
32. Azor						+	+				+										+		+	+	+		
33. Gezer			+(?)			+	+			+	+																
34. T. es-Safi									+																		
35. Hartuv						+					+																
36. L. H.Illin (5)										+	+	+			+		+	+					+			+	
37.T.Yarmuth(6)											+																
38. G. Guvrin						+				+	+	+															
39. T. Erani						+	+				+	+	+				+	+					+			+	
40. H. Ptora						+				+	+	+		+			+				+		+			+	
41. Lachish						+		+			+	+		+		+		+(?)	+(?)	+(?)		+(?)				+	+
42. T. Nagila							+																				
43. T. Sera										+(?)																	
44. T. Halif							+				+	+	+					+						+		+	
45. Arad							+				+	+				+	+	+			+		+	+		+	
46. S.T. Malhata							+						+			+	+									+	
47. T. Mahaz							+																				
48. T. el-Hesi							+ (?)																				
49. N. Besor (7)						+	+				+	+				+	+						+	+		+	
50. T.Ikhbene							+				+	+									+		+	+			
51. T. es-Sakan																								+			
52. B.edh-Dhra							+				+	+	+					+(?)	+(?)	+(?)		+				+	+
53. N.Mishmar						+		+																			
54. M.Shalem												+															

1) Includes Barkai tomb cave.
2) Includes "Herodian" Jericho.
3) Includes the City of David, Tel en-Nasbeh and Motza.
4) Includes Givatayim.
5) Includes Tel Bet Shemesh.
6) Includes Nahal Yarmuth (Ramat Bet Semesh).
7) Includes Site H.

Northern Regions, EB I.

Commodities *Sites*	*Gray Burnished Ware I-II*	*Gray Burnished Ware III-IV*	*Crackled Ware*	*Umm Hammad Ware*	*Erani C*	*Dolomitic Wares*	*Grain Wash*	*Tel Aphek Bowls*	*Canaan. Cores*	*Canaan. blades*	*Tabular scrapers*	*Sourced Basalt*	*Beach-rock*	*Metall. remains*	*Metal objects*	*Grain*	*Olive & grapes*	*Trees*	*Pulses*	*Med. species*	*Red Sea species*	*Nilotic species*	*Donkey remains*	*Donkey figurines*	*Carnel.*
1. R.Haniqra	+														+										
2. A. Dhahab							+			+															
3. Kabri	+	+					+			+							+					+			+
4. B.Haemeq	+	+					+			+	+												+		
5. K.Uzza	+									+															
6.Q.Ata		+					+			+	+	+			+					+	+		+		
7. T.Na`ama	+									+	+														
8. T.Teo	+	+								+	+														
9. Gadot	+																								+
10.Y.Hamaaleh	+																								
11.T.Hatzatz	+																								
12.Yiftahel	+													+	+					+			+		
13.T.Qashish		+					+	+		+	+		+			+	+	+	+	+	+				
14.T.Qiri	+	+																							
15.A.Zureiq	+																								
16.H.Haruvim									+	+															
17.Hazorea		+																							
18.E.Shadud		+	+				+			+													+		
19. Affula	+	+	+		+					+	+														
20.Megiddo	+	+	+							+	+						+	+				+	+(?)		+
21.T.Jezreel	+																								
22.G.Yonatan				+																					
23. N.G.Halav									+(?)																
24.B.Yerah			+							+	+				+										
25.P.Hayarmuk																								+	
26.T.Qishyon						+(?)																		+	

Southern regions, EB I

Commodities Sites	Tabular scrapers	Basalt	Metall. remains	Metal objects	Grain	Olive & grapes	Pulses	Med. species	Red Sea species	Bitumen
1. Safi		+								
2. W.Fidan 4	+	+	+	+	+	+	+	+	+	
3. Q.A.Tulayha	+(?)									
4. H.Qeren	+(?)									
5.B.Nimra										+

Central and Southern Regions, EB II.

Commodities *Sites*	*Metallic Ware*	*Tel Aphek Bowls*	*Arkosic group*	*Fossil Shells group*	*Calcite group*	*Fine quartz group*	*Chert group*	*Canaan. Cores*	*Canaan. blades*	*Tabular scrapers*	*Beach-rock*	*Sand-stone*	*Metall. remains*	*Metal objects*
1. K. Zeraqon	+													
2. T.Yaqush	+													
3. B.Shean	+	+							+	+				
4. Pella														+
5. T.Handaquq N														
6. A.al-Kharaz	+	+												
7. T. Farah N		+												
8. K.Mahruq														
9. Jericho		+												+
10. `Ai	+				+									+
11. Jerusalem									+	+				
12. M.Shalem									+	+				
13.. T.Aphek		+							+		+			+
14.. T.Dalit		+							+					+
15. T.Bareket														
16. Lod		+							+		+			+
17. T.Yarmuth	+	+							+	+				
18. T. Erani	+													
19. Lachish	+	+							+(?)	+(?)				
20. Ashkelon														
21. T.el-Hesi					+									
22. T. Halif					+	+								
23. Arad	+	+	+	+	+	+	+		+	+		+	+	+
24. T.Esdar			+		+					+				
25. K.Telem			+											
26. N.Refet			+											
27. H.Avnon			+						+					
28. N.Zalzal			+											
29. E.Besor			+						+	+				
30. N. Hemar														+(?)
31. B.edh-Dhra									+	+				

EB II Central Regions (cont.)

Commodities *Sites*	*Grain*	*Olive & grapes*	*Trees*	*Pulses*	*Med. species*	*Red Sea species*	*Nilotic species*	*Donkey remains*	*Donkey figurines*	*Hippo remains*	*Ivory objects*	*Bitumen*	*Carnelian*
1. K. Zeraqon									+				
2. T.Yaqush													
3. T.B.Shean													
4. Pella													
5. T.Handaquq N		+											
6. A.al-Kharaz	+	+		+	+			+(?)		+(?)	+		
7. T.Farah N											+(?)		
8. K.Mahruq									+				
9. Jericho	+	+		+	+	+		+					+(?)
10. `Ai					+			+(?)		+	+		
11. Jerusalem													
12. M.Shalem													
13.. T.Aphek		+						+	+(?)	+			
14.. T.Dalit		+	+	+				+		+		+	+
15. T.Bareket									+				
16. Lod					+	+	+(?)	+	+				
17. T.Yarmuth												+	
18. T. Erani													
19. Lachish		+(?)	+(?)	+(?)	+(?)								+(?)
20. Ashkelon													
21. T.el-Hesi													
22. T. Halif													
23. Arad	+	+	+	+	+	+	+	+	+	+	+	+	+
24. T.Esdar													
25. K.Telem													
26. N.Refet													
27. H.Avnon													
28. N.Zalzal													
29. E.Besor													
30. N.Hemar													
31. B.edh-Dhra					+(?)	+(?)							

Northern Regions, EB II.

Commodities *Sites*	*Metallic Ware*	*Tel Aphek Bowls*	*Canaan. Cores*	*Canaan. blades*	*Tabular scrapers*	*Beach-rock*	*Sand-stone*	*Metall. remains*	*Metal objects*	*Grain*	*Olive & grapes*	*Trees*	*Med. species*	*Red Sea species*	*Donkey remains*	*Donkey figurines*	*Hippo remains*	*Carnel.*
1.R.Haniqra	+								+									
2.Kabri	+			+							+		+		+			
3.B.Haemeq	+																	
4.Meona	+			+	+											+		
5.Q.Ata	+			+	+				+(?)				+	+	+	+		+
6.T.Dan	+			+	+				+							+		
7.T.A.B.Ma`acah	+																	
8.T.Na`ama	+			+											+			
9.T.Teo	+			+	+													
10.Gadot	+																	
11. Hazor	+					+												
12.Qedesh	+																	
13.T.Rweisa	+																	
14.T.Kinrot	+																	
15.T.Reqet	+																	
16.B.Yerah	+			+	+				+								+(?)	+
17.T.Qishyon	+																	
18.Megiddo	+																	
19.T.Taanakh	+																	
20.Yoqneam	+																	
21.T.Qashish	+	+				+				+	+	+	+	+				
22.H.Haruvim	+		+	+														
23.Gamla	+			+	+													
24.Leviah	+																	
25.N.G.Halav			+															

Southern Regions, EB II.

Commodities / *Sites*	*Arkosic group*	*Fossil Shells group*	*Calcite group*	*Fine quartz group*	*Chert group*	*Canaan. blades*	*Tabular scrapers*	*Sand-stone*	*Metall. remains*	*Metal objects*	*Olive & grapes*	*Trees*	*Red Sea species*	*Donkey remains*	*Bitumen*
1. H. Qeren							+(?)								
2. H.Yeruham	+		+												
3. N.Boqer	+														
4. H.Ahdir	+				+			+							
5. R.Matred	+						+								
6. H.Horsha	+						+	+							
7. E.Kadis	+														
8. E.Hameara	+	+		+			+								
9. K.Barnea	+						+								
10. N.Mitnan							+								
11.R.Nafha 396								+					+		
12. R.Saharonim N								+							
13. Camel site								+							
14. N.Ramon 204/160								+							
15. Feinan 9 and 16											+				
16. B.el-Hatyeh	+								+	+					
17. Q.A.Tulayha							+(?)								
18. B.Uvda	+	+		+		+	+			+		+	+	+	+

Central and Southern regions, EB III.

Commodities *Sites*	*Khirbet Kerak Ware*	*Dead Sea Plain Temp.*	*Canaan. Cores*	*Canaan. blades*	*Tabular scrapers*	*Beach-rock*	*Metall. remains*	*Metal objects*	*Grain*	*Olive & grapes*	*Trees*	*Pulses*	*Med. species*	*Red Sea species*	*Donkey remains*	*Donkey figurines*	*Hippo remains*	*Ivory*	*Bitumen*	*Carnel.*
1. K. Zeraqon	+									+										
2.A.edh-Dhar	+																			
3.T.Shuneh	+																			
4.T.Yaqush	+																			
5.B.Shean	+			+	+															
6.T.Estaba	+																			
7.T.Yosef	+																			
8.T. Saidyeh	+								+	+	+			+(?)						
9 .Bethel	+																			
10. `Ai	+			+				+												
11.T.A. Kharaz																	+(?)	+(?)		
12.Handaquq S										+										
13. Jericho	+				+(?)		+	+	+	+	+	+	+	+		+	+	+		+
14. Jerusalem	+				+(?)			+		+(?)										
15. B.Sahur	+																			
16. M.Shalem					+(?)															
17. T.Aphek	+																			
18.Gezer	+				+(?)															
19. T.Yarmuth	+			+	+			+		+	+(?)		+	+	+				+	
20. T. Erani	+														+(?)					
21. Lachish	+			+	+								+(?)							+(?)
22.Nizzanim	+																			
23. T.el-Hesi	+			+	+	+		+	+(?)	+	+(?)		+						+	
24. T. Halif	+		+	+	+					+		+	+		+					
25. T.es-Sakan				+	+										+					
26. T.Ikhbene				+ (?)																
27.T.Hebron				+	+			+											+(?)	
28. B.edh-Dhra	+	+		+	+(?)			+					+(?)	+(?)				+		
29. Numeira		+							+	+	+	+			+					
30. W.Feinan							+	+		+										

Northern Regions, EB III

Commodities *Sites*	*Khirbet Kerak Ware*	*Canaan. blades*	*Beach-rock*	*Metal objects*	*Grain*	*Olive & grapes*	*Trees*	*Pulses*	*Med. species*	*Donkey remains*	*Hippo remains*	*Ivory*
1. R.Haniqra	+											
2. T.Dan	+											
3. Hazor	+		+(?)	+								
4. Qedesh	+											
5. T.Reqet	+											
6. B.Yerah	+	+		+							+	+
7. T.Rechesh	+											
8. Megiddo	+					+	+					
9. T.Taanakh	+				+	+		+				
10. Affula	+											
11. E.Jezreel	+											
12. K.Safsafa	+											
13. T.el-Fakhat	+											
14. M.Leviah	+											
15. T.Regev	+											
16.T.Qishyon	+											
17. T.Qashish					+	+	+		+	+		

TABLES

Table 1. Distribution of Gray Burnished Ware bowls according to family.

Families / *Sites*	*Ia*	*Ib*	*Ic*	*Id*	*Ie*	*If*	*II*	*III*	*IV*	*Miscelanea*
R.Haniqra	+					+				
Kabri						+				
B. Haemeq	+					+		+		+
Kh. Uzza						+				
Q. Ata								+	+	
T.Megadim								+	+	
T.Na`ama					+					
T.Teo					+	+			+	
Gadot					+					
Y.Hamaaleh					+					
T.Hatzatz					+					
Yiftahel	+	+								
T.Qashish								+	+	
T. Qiri				+				+		
A.Zureiq	?									
Hazorea								+	+	
E.Shadud								+	+	
Affula			+	+				+	+	+
Megiddo				+				+	+	
T.Jezreel	?	?								
K.Glickson								+		
E. Assawir				+				+	+	
Metzer				+						
T.Farah (N)							+	+		
Aqrabanyeh							+			
A. edh-Dhahr		?		?						
T. esh-Shuneh			+		+	?		?	?	
T.Bet Shean			+	+						
T.Shalem									+	
U.Hammad			+	+						
Jericho		?	+						+	
`Ai									+?	
T. en-Nasbeh									+?	
Palmahim			+	?						
Afridar										+

Table 2. Distribution of Metallic Ware according to vessel types.

(*) Sites mentioning MW withouth specific types or miscelanous forms.

Types	***Bowls B1***				***Platters B2***				***Jugs J1-2***			***Small Jars SmJ 1-2***		***Vats V1-2***		***Storage jars SJ1-3***					***Seal Impr. Class***	
Sites	***a***	***b1***	***b2***	***c***	***a***	***a1***	***b 1***	***b 2***	***1a***	***1b***	***2***	***1***	***2***	***1***	***2***	***1a***	***1b***	***2***	***3 a***	***3 b***	***I***	***III***
T. Dan	+	+	+	?	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
B.Ma`acah*																						
T. Teo	+	+	+	+	+	+								+								
T.Na`ama	+				+	+		+	?													
Gadot	+	+			+			+	+		+					?	?					
Hazor		+			+			+	?	+		+	+	+		?	+					
Qedesh*																						
T.Ruweisa*																						
Meona																?					+	+
R.Haniqra					+	+						?				?			?			
Kabri	+						+				+					+						
B. Haemeq					+	+													+		+	
Gamla																						
Leviah*																					+	+
T.Kinrot								+	?							?					+	+
Reqet																						
B.Yerah					+	+										+		+	+			
K.Tomb								+	+		+											
Qishyon*																						
T.G.Hefer	+				+				+							+						
Q.Ata																		+			+	+
T.Qashish					+	?										+						
Yoqneam*																						
H.Haruvim																+						
Megiddo						+			+							+						
T.Taanakh																					+	
Kh. Ez-Zeraqon									+								+			+	+	+
Bet Shean*																						
A.al-Kharaz		+							+	+												
T.Yaqush*																						
T.Shalem*																						
T. el-Farah (N)				+	+				+							+			?			
T.Dalit					+	+																
`Ai					?												+					
T. Yarmuth	+			+					+													
T.Erani*																						
Lachish	+							+	+		+	+										
Ashkelon*																						
Arad					+																	
B.edh-Dhra																					?	?

.

Table 3 . Distribution of EB II pottery southern groups.

(*) Sources

Groups *Sites*	*Arkosic*	*Fossil shells*	*Calcite*	*Fine quartz*	*Chert*
`Ai			+		
T. el-Hesi			+		
T. Halif			+	+	
Arad	+	+	+*	+*	+*
E. Besor	+				
T. Esdar	+		+	+	
K. Telem	+				
N.Refet	+				
H. Avnon	+				
N. Boqer	+				
N. Zalzal	+				
H. Yeruham	+		+		
N. Ahdir	+				+
R.Matred	+				
H. Horsha	+				
E. Kadis	+				
E. Hameara	+	+		+	
K.Barnea	+				
B. el-Hatyeh	+*				
B. Uvda	+	+*		+	
Sheikh Muhsein	+?	+?			+
Nabi Saleh	+?	+?			

Table 4. EB II petrographic groups from Arad.

After Porat (forthcoming). Shadowed columns indicate non-local groups. (*)Painted krater, belong to the same group as the painted jars

Clay types	***1***							***2***		***3***		***4***	***5***	***6***	***7***	***8***	
Groups	***1a***	***1b***	***1c***	***1d***	***1e***	***1f***	***1g***	***2a***	***2b***	***3a***	***3b***	***4***	***5***	***6***	***7***	***8a***	***8b***
Pottery types																	
Platters					+												
Metallic platters																	+
Cup bowls																	
Stratum III			+														
Stratum II	+	+															
Lamps		+															
Bowls			+														
Carinated bowls																+	
Kraters			+*	+						+		+	+				
Juglets																	
Small	+																
Large		+													+		
Jugs																	
Globular	+																
Tall			+		+												
Large			+		+												
Metallic jugs																+	+
Small jars																	
Globular	+	+															
Tall					+												
Painted vessels			+							?						+	
Medium jars	?	?			?		+										
Necked jars			+					+			+				+		
Knob-handle jars		+				+		+									
Pillar-handle jars	?	?	+		+												
Pithoi			?					+									
Pink storage jars									+	?	?						
Special jars										?	?		?			+	
Holemouth jars																	
Statum III														?			
Stratum II & I				+						?	?			+		+	
Cooking pots										+		+	+				

Table 5. Distribution of Khibet Kerak Ware types according to vessel types.

(*) Sites mentioning KKW withouth specific types

Types	***Small deep bowls (1)***	***Sinous. bowls (2)***	***Hemispheric bowls (3)***	***Deep bowls or kraters (4)***	***Jars (5)***	***Hole-mouth jars (6)***	***Cooking Jars (7)***	***Necked jars (8)***	***Jugs (9)***	***Stands (10)***	***Lids (11)***	***Andir. (12)***
Sites												
T. Dan			+									
T.Qadesh	+			+							+	
Hazor	+		+	+						+	+	
R. Haniqra*												
Kabri*												
T. Reqet	?	?	?	+								
Bet Yerah	+	+	+	+	+	+	+		+	+	+	+
T. el-Fakhat				+								
A. el-Dhar										+		+
T. esh-Shuneh	+	+	+	+					+	+	+	+
K. ez-Zeraqon	+											
T. es-Sa`idyeh*												
T.Rechesh												
K. Safsafa*												
T. Qishyon	?	+	?	+						+	+	
T.Estaba*												
T.Yaqush*												
T. Regev												
Megiddo	+											
Affula	+		+	+	+				+	+	+	
T.Taanakh	+			+								
E. Jezreel												
T. Yosef Hayeshana*												
T. Bet Shean	+	+	+						+	+	+	+
T. Magal	+		+				+					
Bethel*												
Ai	+		+	?								+
Jericho	+	+	+	+	+							
B. edh-Dhra			+									
Jerusalem*												
B. Sahur	+											
T.Aphek*												
Gezer*												
T.Yarmuth		+	?									
Lachish	+											
T.Erani		+										
Nizzanim	+											
T. Nagila*												
T. el-Hesi	?											
T.Halif*												

Table 6. Other ceramic groups.

CW: “Crakled” Ware (EB IB), GW:Grain Wash (EB IB), SDS: Splash and Drip Style Painting (EB IA). EC: Erani “C” (EB IB). DW-LPGW : Dolomitic Wares – Line Painted Group Ware. TAB: “Tel Aphek Bowls” (EB IB-II), DSP: Dead Sea Plain Tempers (EB III). (*) Sources.

Groups ***Sites***	***GW***	***CW***	***SDS***	***UHW***	***EC***	***DW LPGW***	***TAB***	***DSP***
A. edh-Dhahab	+							
Kabri	+							
B. Haemeq	+							
Qiryat Ata	+							
T.Qashish	+						+	
T.Megadim	+							
E.Shadud	+	+						
Affula					+			
G.Yonatan				+				
T.Qishyon						?		
Megiddo		+						
E. Assawir		+						
B.Yerah		+						
A. edh Dhahr		+						
T. esh-Shuneh		+	+	+				
T.Bet Shean				+			+	
E. Hanatziv		+						
T.Shalem	+							
Pella	+							
T. es-Saidiyeh			+					
Ruweiha				+				
T. A. al-Kharaz			+				+	
T. U. Hammad			+	*				
T. Mefaliq				+				
T. Farah (N)				+			+	
`Ai					+	+	+	
T. Aphek	+						*	
T.Dalit	+				+		+	
Shoham							+	
Lod							+	
Azor					+	+		
Shoam			?					
Gezer			?		+	+		
T. es-Safi							+	
Jebel Quruntul					+			
Jericho (Tel)			+		+	+	+	
Herodian Jericho								
T. en-Nasbeh		+			+	+		
Jerusalem					+	+		
M.Shalem							+	
Hartuv					+			
R.B. Shemesh					+			
T. Yarmuth							+	
Gat Guvrin					+			
T. Erani					+*?	+		
H. Ptora					+			
Lachish	+				+		+	
T. Nagila							+	
T. Halif					+	+		
Arad						+	+	
S.T. Malhata						+		
T. Mahaz						+		
T. el-Hesi						+		
Afridar					+			
N. Besor						+		
Site H					+			
T. Ikhbene					+	+		
N.Mishmar	+				+			
B. edh Dhra						+		*
Numeira								*

Table 7. Dead Sea Plain tempers.

Bab edh-Dhra (EB II-III) and Numeira (EB III). B=Bowls; B1:Fine and plain ware, B2: Creamware; B3: Burnished platter bowls; SJ1: Fine and plain ware; SJ 2:Creamware; SJ3:Coarse ware; HM: Holemouths; J: Juglets (modified from Beynon et al. 1986:Table 1 and Schaub 1987:Fig.1).

Tempers ***Sites***	***Wadi Sand***				***Nubian Sand***				***Limestone***				***Basalt***			
	B1	SJ1	HM	J	B2	SJ2	HM	J	B	SJ3	HM	J	B	SJ	HM	J
B. edh-Dhra	+	+			+	+					+		+			
%	42				4				26				28			
Numeira	+	+		+	+	+	+				+		+			
%	46				14				22				18			

Table 8. Distribution of Canaanean blade cores.

	EB I	***EB I- II***	***EB III***	***EB I-III***
Sites				
N.G.Halav				1
H.Haruvim		Hundreds		
E.Assawir	1			
Fatzael				1
Gat Guvrin	Dozens			
H.Ptora	2			
T. Halif			7	
Afridar	1			
Tel Sera				2

Table 9. Distribution of Canaanean blades.

(*)Mazar excavations, Area M, (**)Mazar excavations, Areas M and R, (***) EB I-II, (****)EB II-III, (*****)Ussishkin excavations

	EB I		***EB II***		***EB III***		***EB I-III***	
Sites	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***
A.edh-Dhahab	2	11.1						
Kabri							8***	15.4
B.Haemeq							2	
K.Uzza	4+							
Meona			10	27.0				
Gamla							604?***	79.1
T.Dan			+					
T.Na`ama							25	
T.Teo	26	33.8	4	25.0				
B.Yerah	20	36.4	7	20.7	24	24.7		
Q.Ata	56	23.3	78	27.9				
T. Qashish							110	45.3
Yiftahel	6	1.4						
E.Shadud	47	11.8						
Affula	47	20.9						
H.Haruvim							24***	4.1
Megiddo	+							
B. Shean	141*	28.9	112*	19.6	58**	20.4		
T.Shalem	+							
T.U.Hammad							7***	11.3
T. Farah (N)	+							
T.Megadim	99	10.8						
E.Assawir	81	6.0						
T. Aphek	4	50.0	10	76.9				
T.Dalit							295***	74.9
Shoham	+							
Lod	+		+					
Azor	14+	26.9						
Jericho							326	11.1
`Ai					+			
Jerusalem							7	6.3
Lod	15	22.7						
Gezer	26+?							
Hartuv	14	8.9						
T.B. Shemesh							+	
L.H. Illin	119	28.7						
T. Yarmuth	3?	42.9	20	66.7	27	21.7		
G. Guvrin	7?							
T.Erani	88?	37.0						
Lachish						49*****		
T. el-Hesi					27	12.0		
Afridar								
Area E	181	67.7						
Area F	99	28.8						
Area G	71	42.7						
Area J	36	66.7						
Area L	19	29.7						
T.Ikhbene							8	12.7
E. Besor	5	18.5	4	12.0				
Site H	22	3.7						
T. es-Sakan	+				+			
T. Halif	+				+			
T.Hebron	24	53.3						
Arad	9	21.4	64	29.5				
B. edh-Dhra	2	7.7					6****	1.5
H. Avnon			1					
B. Uvda							2	

Table 10. Distribution of tabular scrapers from EB sites.

*)Mazar excavations, Area M, **)Mazar excavations, Areas M and R, ***) EB I-II.

	EB I		*EB I-II*		*EB II*		*EB III*		*EB I-III*	
Sites	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***
K.Uzza									3+?	
Meona					3	8.1				
Gamla									16	2.0
T.Teo	4	6.2			4	30.8				
B.Yerah*	1	1.8								
Q.Ata	8	3.3			9	3.2				
T. Qashish									13	5.3
Yiftahel	5	1.5								
E.Shadud	2	0.5								
Affula	8	3.5								
Megiddo	2+									
B. Shean	10*	2.1			18**	3.2	2***	1.2		
T. U. Hammad			8	12.9						
T. Farah (N)	+									
T.Megadim	8	0.9								
E.Assawir	12	0.9								
T.Dalit			17	4.7						
Jericho									9	0.3
Jerusalem									6	5.4
Shoham (N)	1	3.3								
Gezer									5+	
T.B. Shemesh								+		
L.H. Illin	44	10.6								
T. Yarmuth					4	13.3	14	11.2		
Azor	+									
Gat Guvrin	?									
T.Erani	10	4.2								
H. Ptora	+									
Lachish									+	
T. el-Hesi							1	0.4		
Nizzanim									+	
Afridar										
Area E	4	1.2								
Area F	1	0.7								
Area G	7	4.2								
Area L	2	1.0								
T. Ikhbene									1	1.6
E. Besor	5	18.5			1	3.0				
Site H	2?									
T. es-Sakan							+			
T. Halif	+						+			
T.Hebron	7	15.6								
Arad	12	28.0	77	35.5						
M.Shalem									400+	100%
B. edh-Dhra									31****	6.7
W.Fidan 4	1									
Q.A.Tulayha (W)?									30	48.4
T. Esdar					6					
E. Hameara					+					
H. Qeren ?									25	12.5
R.Matred 3					71	20.5				
K.Barnea					2+					
N. Mitnan					10	20.0				
H.Horsha					23	29.5				
B.Uvda 915					4	7.1				
B.Uvda 917					9	10.1				

Table 11. Distribution of basalt objects from EB I sites according to sources

Based on Philip and Williams Thorpe 1993, 2000, 2001; Rowan 1998.

Sources / *Sites*	*Tiberiah*	*W.Arab*	*Sal*	*Karameh*	*Sweimeh*	*Ma`in*	*Mujib/ Kerak*	*Dana/ Tafila*
Q.Ata		+						
Megadim							+	
T. esh-Shuneh		+						
Afridar							+?	
T.Erani		+?	+?					
S. T. Malhata							+	
B. edh-Dhra					+	+	+	
Safi							+	
W.Feinan							+	+

Table 12. Distribution of beach-rock, *kurkar* and ferruginous sandstone artifacts.

Raw material / *Sites*	*Beach-rock*	*Kurkar*	*Sandstone*
Hazor (EB II-III?)	+		
T.Qashish (EB I-III?)	+		
E. Assawir (EB IA)	+		
T. Aphek (EB II)	+		
Lod (EB I-II)	+	+	
Palmahim (EB I),	+		
Gezer (EB I?)	+		
H. Illin (EB IB)			+?
Lachish (EB I?)	+		
H. Ptora (EB I)		+	
T. el-Hesi (EB III)	+		
Arad (EB II)			+
Afridar (EB IA)	+	+	
Rekhes Nafha 396 (EB II)			+
Camel Site (EB II)			+
H. Ahdir (EB II)			+
N.Ramon 204/160 (EB II?)			+
R.Saharonim (N) (EB II?)			+
H. Horsha (EB II)			+

Table 13. Distribution of metal tools and metallurgy from EB sites according to types.

Types Sites	Awls and borers			Axes, adzes and chisels			and Daggers, spearheads others			Metallurgical remains		
	EB I	**EB II**	**EB III**	**EB I**	**EB II**	**EB III**	**EB I**	**EB II**	**EB III**	**EB I**	**EB II**	**EB III**
T. Dan					+							
R.Haniqra				+	+							
Hazor			+						+			
Q. Ata		+		+	+?							
Yiftahel				+						+		
B.Yerah	+				+	+						
Megiddo							?					
T.B.Shean	+			+			+					
T.Shuneh				?						+		
Pella		+			+							
Metzer				?								
N. Alexander	+			+								
K. Monash				+			+					
Aphek					+							
T.Farah (N)	+						+					
Ai	+	+	+									
Azor	+			+			+			+		
T. Dalit		+										
Lod	+				+					+		
Givatayim	+			+			+					
Palmahim	+			+						+		
T.Nasbeh							+					
Jericho				+		+	+	+	+			
Jerusalem			+			+	?					
T. Yarmuth		+	+			+						
T.Erani	+			+								
H. Ptora				+						+		
Lachish										+		
T. el-Hesi						+	?					
T.Hebron			+									
T. Halif										+		
Arad		+			+					+	+	
S.T.Malhata	+									+		
N.Hemar		+?										
B.edh-Dhra						+			+			
Nizzanim	+											
Afridar	+			+			+					
Site H	+									+		
E. Besor	+									+		
W.Feinan	+	+	+	+	+	+	+	+	+	+	+	+
B. Uvda		+										

Table 15. Mollusca according to their provenience and period.

Roman numbers relate to periods within the EB, I=EB I, II=EB II, and III=EB III. Sites without a specific period within the EB are labeled I-III.

Provenience	**Mediterranean Sea**					**Red Sea**					**Nile River**				
Sites	**IA**	**IB**	**II**	**III**	**I-III**	**IA**	**IB**	**II**	**III**	**I-III**	**IA**	**IB**	**II**	**III**	**I-III**
T.Gadot								+							
Kabri		+	+									+			
Q.Ata		+	+					+							
Yiftahel	+														
T.Qashish		+	+	+				+							
Megiddo		+					+					+			
T.Taanakh			+										+		
A. al-Kharaz			+												
T. es-Saidyeh									+?						
Jericho		+	+	+			+	+	+						
T. Farah (N)		+										+			
`Ai		+	+												
Jerusalem		+					+								
Atlit bay											+				
E. Assawir												+			
Givataym		+					+								
Tel Aviv							+								
Lod		+	+				?	?				+	+		
Azor	+	+				+	+				+	+			
Palmahim		+										+			
Afridar	?					+					+				
H. Illin												+			
T. Yarmuth				+					+						
Lachish				?						+					
H. Ptora	+	+									+	+			
T.Erani												+			
T. el-Hesi				+											
E. Besor												+			
Site H											+				
T. Ikhbene	+	+									+?	+?			
T. es-Sakan		+													
T.Halif		+					+								
Arad		+	+					+				+	+		
R.Nafha 396								+							
B. Uvda								+							
B. edh-Dhra			+?	+?		+		+?	+?		+*				
W. Fidan 4	+					+									

Table 16. Fish remains according to periods.

Roman numbers relate to periods within the EB, I=EB I, II=EB II, and III=EB III. Sites with (*) denote unidentified species.

Provenience	***Mediterranean Sea***				***Nile River***			
Sites	***IA***	***IB***	***II***	***III***	***IA***	***IB***	***II***	***III***
Dan*								
Kabri	+							
T.Qashish		+	+					
Megiddo		?						
T.Dalit*								
Azor	+							
T. el-Hesi				+				
T.Halif		+		+				
Afridar	+				+			

Table 17. Hippopotamus faunal remains according to sites.

(*) indicates that the date of the remains are not sure.

Sites	*EB II*	*EB III*
Bet Yerah	+?	+?
Kinneret*		
N.Hataninim*		
Yarkon River*		
T.Aphek	+	
T.Dalit	+	
`Ai	+	
T.A. al-Kharaz	+?	+?
Jericho		+
T. el-Hesi*		
Arad	+	

Table 18. Bull's heads from ivory and other materials according to sites.

Types correspond to de Miroschedji 1993:Table 1.

Sites	*Type*	*Material*	*EB II*	*EB II/III*	*EB III*
B. Yerah	1B	Ivory			+
`Ai	2	Ivory	+		
	1B	Ivory			+
Jericho	1B	Stone		+	
	1B	Ivory			+
T. Yarmuth	1A	Bone	+		
B.edh-Dhra	1B ?	Bone			+
Arad	1B	Ivory	+		

Table 19. Distribution of bitumen and bitumen related objects.

Roman numbers relate to periods within the EB, I=EB I, II=EB II, and III=EB III.

	Lumps and objects				***On pottery***				***On flint tools***			
Sites	***IA***	***IB***	***II***	***III***	***IA***	***IB***	***II***	***III***	***IA***	***IB***	***II***	***III***
B. Shean										+		
T. Dalit						+	+					
Shoam		+				+				+		
Lod		+				+				+		
Jericho									+?	+?		
B. edh-Dhra									+?	+?		
H. Illin		+				+				+		
N.Yarmuth		+										
T. Yarmuth			+	+								
Lachish	+											
H.Ptora	+				+				+			
T.Erani	+	+										
T. el Hesi				+								
T.Hebron				+								
T.Halif	+	+										
Arad			+							+	+	
S.T.Malhata		+										
Palmahim	+	+							+?	+		
Nizzanim	+	+										
Afridar	+								+			
Site H	+											
B. Uvda											+?	
B. Nimra					+							

Table 20. Distribution of carnelian beads according to periods and types.

(+) stands for unknown numbers.

Types ***Sites***	***Bicone and barrel***	***Cylinder***	***Disc***	***Varia***
EB I				
Gadot	1			
Kabri	1			
Megiddo		2		
Hazorea Tomb 33			7	
K.Monash			+	
E.Hanatziv			+	
Jericho Tombs A127 K2			1 339, 53	
Givatayim		+		
T. Aviv		+		
T.Dalit			2?	
Lachish 1535			1?	
Bab edh-Dhra Tombs	11	1	Ca. 190	
EB II				
B.Yerah			+	
Q.Ata		6		
T .Dalit			2?	
Arad			20	
EB III				
Jericho Tomb F3 Tomb F2	4	3	1	1
EB I--III				
Jericho (Tel)			1	
Lachish 1535	1			

Table 21. Relative frequencies of equids at EB sites.

D=donkey, H=hemione. (+) denotes presence but frequencies are not given

Period *Sites*	*EB IA* *%*		*EB IB* *%*		*EB II* *%*		*EB III* *%*		*EB I-III* *%*	
	D	*H*	*D*	*H*	*D*	*H*	*D*	*H*	*D*	*H*
Gamla									2.7	
T. Na`ama					+					
T. Kinrot									0.8	
Kabri					0.5					
B. Haemeq			4.0							
Q. Ata			0.5		0.8					
Yiftahel	1.0									
E. Shadud			4.1	?						
T. Qashish							0.4			
Megiddo			+?	+?						
Pella									O.1?	0.1?
T. esh-Shuneh	?									
T. A. al-Kharaz									0.5?	0.5?
T. Aphek			2.2		2.1					
T. Dalit			0.5		2.2					
Shoham (N)			10.5							
Lod			+		+					
Gezer				+						
Azor	8.0									
`Ai					+					
Jericho									3.9	
T. Yarmuth					+		+			
Lachish							+			
T. Erani									5.0?	5.0?
T.Halif (Tillah)	1.2	2.0	2.1	1			+			
Afridar Area E Area F Area G Area L	20.9 14.9 1.7 6.8									
T. Ikhbene	8.0		7.5							
Site H	25.0									
E. Besor			9.5							
T. es-Sakan							+?	+?		
Arad			0.8		3.3					
B.edh-Dhra									13.0	
Numeira							0.9			
B. Uvda 917					+?					

Table 23. Distribution of donkey figurines

Periods	***EB IB***	***EB II***	***EB III***
Sites			
T. Dan		+	
P. Hayarmuk	+		
Meona		+?	
T.Qishyon	+		
Q.Ata		+	
Barkai		+	
K. ez-Zeraqon		+?	
K. Mahruq		+?	
Givatayim	+		
T. Aphek		+?	
T.Bareket		+	
Lod		+	
Jericho	+		+
B. Yam	+?		
Arad		+	

Table 14. Distribution of botanical remains.

Sites: 1:Kabri; 2:Megiddo; 3: T.Taanakh ; 4: T.Qashish; 5:Bet Yerah; 6: T.Bet Shean, 7: K. ez-Zeraqon; 8:Pella; 9:T. es-Saidyeh; 10:T. Abu al-Kharaz; 11:T. el-Handaquq (N); 12: T. el-Handaquq (S); 13: Jericho; 14: Jerusalem; 15:Sataf; 16: T. Aphek; 17:Tel Dalit; 18:Gezer; 19: H. Illin; 20:T.Yamuth; 21: Lachish; 22: T. Erani; 23:T.Halif; 24: T. el-Hesi; 25: Palmahim 26: Afridar; 27:Nizzanim; 28: E.Besor; 29: Arad; 30:B. edh-Dhra; 31:Numeira.; 32:W. Fidan 4.; 33: Feinan 9; 34:Feinan 16; 35:B. Uvda.

Roman numbers relate to periods within the EB, viz. I=EB I, II=EB II, and III=EB III. Sites without specific periods are marked with +.

Sites / *Species*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*	*33*	*34*	*35*
Wheat				I-III		II			III	I-II			+					+	I		+			+		I		I	II	+	III	I			
Barley			III			II			III				+					+			+							I	II	+	III	I			
Oat													+								+											I			
Lentils			III			II				I-II			+								+		III						II	+	III	I			
Pea			III																									I	II						
Vetch				I		II				I-II							II	+			+								II						
Chick pea													+								+								II	+	III	I			
Grass pea																					+									+					
Flax										I-II			+																II		III	I			
Olive wood	I-II	I, III	III	I,III			II-III		III	I-II			+	+		II	I, II	+	I	III	+					I			I-II			I	II-III	II-III	
Olive pits		I, III		I-III	III		II-III	I	III		II	III			I		II	+		III	+	I	I, III	III		I	I		I-II	+	III				
Grape			III?				II-III		III	II		III	I-III		I			+	+	III	+			III			I	I	II	+	III	I			
Pistachio		III																+			+			+					II	+	III				II
Terebinth		I, III		I-III					III											+		+													
Oak		I, III		I?					III								II			+							I		I						
Turkey oak																											I								
Tamarisk		I, III																		+								I	II	II					II
Aleppo pine		I, III															II						III								?				
Lebanon cedar																											I								
Pomegranate																		+						+					II						
Fig													+					+												+	III	I			
Hawthorn																					+														
Saxaul																																			II
White broom																																			II
Palm													+															I		II					II

Table 22. Equid frequencies in relation to probable burden animals, cattle (C) + equids (E).

Period	***Chalcolithic***			***EB IA***			***EB IB***			***EB II***			***EB III***		
Sites	***E***	***C***	*%*	***D***	***C***	*%*	***D***	***C***	*%*	***D***	***C***	*%*	***D***	***C***	*%*
T..Dan										--	33.0	--			
Meona										--	26.0	--			
Kabri							--	36.0	**--**	0.5	34.0	**1.4**			
B. Haemeq							4.0	20.0							
Qiryat Ata							0.5	30.8	**1.6**	0.8	34.5	**2.3**			
Yiftahel				1.0	23.0	**0.4**									
E. Shadud							4.1	22.0	**1.6**						
T.Qashish							--	16.0	--	--	30.5	--	0.4	56.0	**0.7**
Metzer	0.5	20.6	**2.4**												
Munhata	0.3	31.2	**0.9**												
T. Aphek							7.7	27.9	**2.2**	0.8	38.6	**2.0**			
T. Dalit							0.5	14.0	**3.4**	1.6	22.6	**6.6**			
Azor				8.0	13.0	**32.0**									
G.Guvrin	3.8	36.2	**9.5**												
Afridar Area E				20.9	19.7	**51.6**									
Area F				14.9	29.0	**33.9**									
Area G				1.7	21.8	**7.2**									
Area L				6.8	18.9	**26.5**									
T. Ikhbene				8.0	25.8	**23.7**	7.5	50.0	**13.0**						
Site D	1.6	36.9	**4.1**												
E. Besor							9.5	25.0	**27.5**						
T.Halif				1.2	7.6	**13.6**	2.1	13.4	**13.5**				+		
Arad							0.8	7.7	**9.4**	3.3	7.6	**30.3**			
A. Matar	3.0	19.0	**13.6**												
Shiqmim	0.2	11.5	**1.7**												
Numeira													0.9	--	**100.0**
B. Uvda 917										1.5?	--	**100.0**			

تلخيص

المقايضه كانت الوسيلة الوحيده لتبادل المنتوجات بين حضارات الشرق القديم. فهي نوعا من "التجارة" بدون مقابل مالي بالرغم من ان قيمة المنتوجات كانت معروفة لديهم.

هذه الرسالة عالجت تبادل المنتوجات بمفهومها الشامل عدا عن مراحل الانتاج والاستهلاك عالجت امور اضافية مثل مراكز التجمع او الاسواق وسائل النقل. كثيرة هي الابحات التي عالجت هذا الموضوع من الناحية النظرية, ولكن الابحاث التي استخدمت المكتشفات الاثرية لهذا الغرض هي قليلة واقتصرت على بعض المكتشفات التي وجدت في هذه المنطقة لكن مصدرها كان بعيدا. اختصاص هذه الرسالة اذا هي التبادل المحلي بنطاق منطقة صغيرة نسبيا وهي منطقة كنعان وتشمل معظم المنتوجات التي انتجت واستهلكت محليا كما وتبحث خلالها العلاقات بين مواقع المختلفة للانتاج وللاستهلاك في العهد البرنزي القديم. البحث عالج أيضا عدة مواقع أختصت بانتاج نوعا معينا من المنتوجات مثل الاواني الفخارية او الادوات الصوانية وتابع انتشارها باحثا عدة مراحل. الاولى تابعت فترة ظهور واختفاء هذا المنتوجات والثانية تقدم انتشارها في الاطار المصغر اي حول الموقع مباشره الى الاطار المواسع اي الى ابعد نقطة عن الموقع والاخيرة بحثت وسائل الانتاج وطرق النقل ومراكز التسويق. وعلى هذا المنطلق بنيت العلاقات الاقتصادية والاجتماعية في منطقة البحث والمراحل المختلفة للعهد البرنزي القديم.

في هذه الرسالة اثنا عشر جزأ مجمعين في اربعة اقسام: القسم الاول يشمل على ثلاثة أجزاء تحت عنوان أهداف البحث والنظريات العلمية التي تطرقت الى موضوع التجارة والتبادل المحلي او المقايضه. شمل هذا القسم ايضا جزء مخصصا للمقايضة في عهود ما قبل التاريخ كما ذكرت في عدة ابحاث مختلفة والطريقة العلمية التي اتبعها الباحث في تفسير القيمة والتجارة بالمنتوجات منطلقا من نظرية كارل ماركس والتي طورها غوردون تشايلد في الابحاث الاثرية.

كما واعتمد الباحث في هذا القسم على بعض الابحاث التاريخية والانتروبولوجية امقارنت المعطيات الاثرية التي شملها هذا البحث.

في القسم الثاني سبعة اجزاء عرضت فيها المعطيات الاثرية المكتشفة في كل المواقع المؤرخة للعهد البرنزي القديم في كنعان. تصنيف هذه المعطيات حسب الشكل والقدم ومنطقة الانتاج ثم مقارنتها مع المعطيات القديمة والابحاث الانثروبولوجية. بالمرحلة الاخيرة حددت

منطقة الانتاج واتجاهات تسويقها. البحث شمل كما ذكرسابقا المعطيات التالية: الأواني الفخارية (جزء ٣) والادوات الصوانية (جزء ٤) والاواني الحجرية (جزء ٥) والمصادر المعدنية (جزء ٦) وبقايا البذور (جزء ٧) والعظام الحيوانية (جزء ٨) وفي الجزء الأخير بعضا من مواد الخام ذات الطابع المميز (جزء ٩).

القسم الثالث بحث طرق تسويق هذه المنتوجات والوسائل التقليدية مثل البهائم معتمدا على مكتشفات هياكلها أو أشكالها في فنون العهد البرنزي. وفي الجزء الثاني من هذا القسم انتشار هذه المعطيات وتدوينها على خريطة المنطقة.

القسم الرابع والاخير يعرض نتائج هذا البحث وفي مقدمته نظرية البحث لتفسير المقايضة كعلاقة اقتصادية واجتماعية. فقد وجد الباحث ان العامل الرئيسي لانتشار معظم المنتوجات في العهد البرنزي القديم كان فائض في الانتاج وأن معظم تبادل المنتوجات تم في نقاط تقاطع مناطق الانتاج عدا عن بعض المنتوجات التي تعتبر نادره مثل اصداف البحر الاحمر التي كان انتشارهم واسعا حتى عبر حدود منطقة البحث. ومن النتائج البارزه لهذا البحث وجود طبقه من المختصين قامت بتجميع المنتوجات في مراكز مختلفة او اسواق ونشرها مستغلين المراسم الدينية والاجتماعية.

תקציר

סחר חליפין הוא האמצעי העיקרי שבו מוצרים מועברים ומופצים בין חברות קדומות. מושג סחר חליפין מתייחס בדרך-כלל לסוג מסוים של חילופין בהם לא מעורב כסף או אמצעי-חליפין, אם כי ערכי-חליפין נומינליים היו קיימים.

בעבודה זו המושג "סחר חליפין" מקבל משמעות רחבה הרבה יותר, הכוללת מצבי ביניים בין ייצור לצריכה. מחקרים קודמים רבים עסקו בנושא באזורים שונים ומנקודת מבט תיאורטית כוללת. עם זאת, המחקרים העוסקים בנושא בדרום הלוונט נטו להיות מוגבלים. הם התרכזו בהיבטים הקשורים לממצאים מסוימים, או שהתייחסו לאזורים מצומצמים מאד.

קשרים בינלאומיים או מגע בין דרום הלוונט לבין אזורים תרבותיים שכנים כמו מצרים הקשורים למסחר זכו להתייחסות נרחבת בידי חוקרים של תקופת הברונזה הקדומה. עם זאת, סחר החליפין המקומי בתוך אזור דרום הלוונט, במובן של מערכת העברת מוצרים בין אתרים ואזורים שונים, הוא נושא שלא זכה להתייחסות מלאה עבור תקופה זו, אם כי היה נושא למחקרים רבים עבור תקופות מאוחרות יותר. עבודה זו מנסה למלא את הפער הזה בהבנתנו, על-ידי הצגה של מחקר סינתטי עבור האזור בתקופת הברונזה הקדומה מנקודת מבט מטריאליסטית ודיאלקטית.

הגישה שבה נעשה שימוש במחקר זה הוא לימוד התהליך הכולל של סחר החליפין של סחורות, כולל ייצור והפצה, באופן קשור ודיאלקטי. לשם כך זוהו מוצרים שונים והוגדרו על-פי אתר, אזור ותקופה, בתוך תקופת הברונזה הקדומה. מוצרים אלו כוללים פריטים כמו קבוצות ניתנות-לזיהוי של קרמיקה (למשל כלים)כלי-צור וכלי-שחיקה, קונכיות, חומרי גלם וכמה פריטים נוספים. הם נחקרו כמקרים פרטיים על-פי אתרים, אזורים ותת-תקופות (בתוך תקופת הברונזה הקדומה), אחר-כך נותחו במונחים של היחסים הכלכליים-חברתיים, כלומר דפוסי סחר החליפין עליהם הם מלמדים, ומתוך ניתוחים אלו נבנתה תמונה כוללת לכל התקופה המדוברת.

העבודה מחולקת לשנים-עשר פרקים המקובצים לארבעה חלקים תימטיים. חלק א', פרקים 1 ו-2, מתאר את מטרות המחקר ואת המסגרת התיאורטית עליה הוא נשען. פרק 1 מתאר את הנושא ודן בעבודות קודמות על סחר-חליפין בדרום הלוונט. פרק 2 מזהה גישות שונות לסחר חליפין באנתרופולוגיה ומציג את המסגרת התיאורטית של עבודה זו. הפרק כולל תקציר על גישות תיאורטיות לסחר החליפין

בפרהיסטוריה (סעיף 1) ואת גישתו המתודולוגית של מחבר עבודה זו לתורת הערך ולסחר במוצרים (סעיף 2). גישה זו פותחה מתוך ההשקפה הדיאלקטית המטריאליסטית של קארל מרקס ובמסגרת הארכיאולוגית הכללית שפותחה על-ידי גורדון צ'יילד(Gordon Childe) . עבודה זו אימצה גם אלמנטים ממודלים של סחר חליפין ארכיאולוגי שפותחו על-ידי קולין רנפרו (Colin Renfrew) ופרד פלוג (Fred Plog). סעיף 3 של הפרק מתאר בקווים כלליים מקורות אתנו-ארכיאולוגיים והיסטוריים להסברת נתונים ארכיאולוגיים, בעוד שסעיף 4 מסביר את הקשרים בין מודלים של סחר חליפין בתוך הפרמטרים המרחביים שלהם, בדרך-כלל במונחים אזוריים ובין-אזוריים.

חלק ב' מציג את המוצרים על-פי הדפוסים הארכיאולוגיים המסורתיים, לדוגמה קרמיקה (פרק 3), כלי-צור (פרק 4), כלי- שחיקה (פרק 5), מתכות (פרק 6), נתונים ארכיאו-בוטניים (פרק 7), עצמות בעלי-חיים (פרק 8) ומינרלים (פרק 9). כל אחד מהפרקים מציג ניתוח ראשוני של המוצרים שנסחרו, ייצורם ומחקרים אתנו-ארכיאולוגיים קודמים על הפצתם. כאשר מקורם נקבע, קבוצות אלה הוגדרו טיפולוגית, כרונולוגית ואזורית. שלב מאוחר יותר של המחקר בחן את דפוסי ההתפלגות של כל מוצר על-מנת לזהות התפלגות בזמן ובמרחב, על-פי סוגי המוצרים והתקופות.

בחלק ג' נחקרים סוחרים, אמצעי תעבורה ורשתות של סחר חליפין. פרק 10 עוסק בחמור כבהמת משא להעברת סחורות. בחלק זה גם נבחן את הקשר בין צלמיות של סוסיים לפעילויות פולחניות ולקבוצות חברתיות העוסקות בסחר חליפין. פרק 11 מתאר רשתות באזור על פי הנתונים על ההתפלגות של סוגים שונים של מוצרים, כאשר התוצאות מסוכמות במפות 21-28.

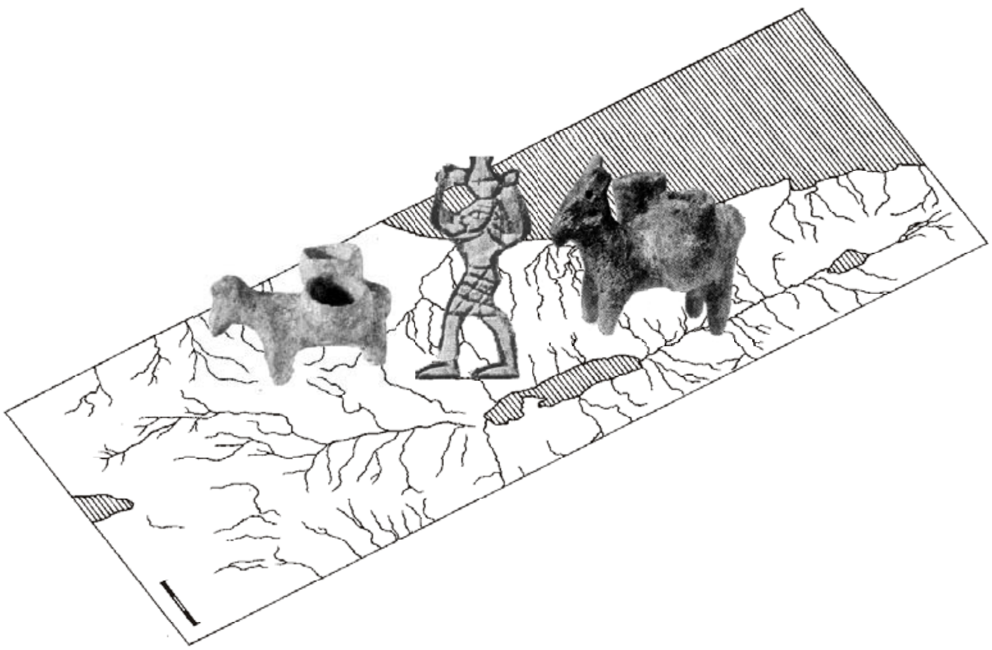
בחלק ד', פרק 12 מציג מסקנות לגבי מאפיינים של רשתות סחר חליפין ולגבי הכלכלה והחברה בתקופת הברונזה הקדומה לאור המחקר הנוכחי. פרק זה מציע גם גישות חדשות שיתרמו למחקר עתידי בנוגע לסחר חליפין בתקופת הברונזה הקדומה ושניתן לישמן לתקופות אחרות בדרום הלוונט.

סעיף 1 מצביע על גורמים ראשוניים של רשתות הפצה, למשל ריכוזיות, כיווניות וסימטריה. הוא מסכם עבור הקורא את מאפייני רשתות הסחר של מוצרים שונים, אשר נמצא שהן הותירו דפוסים שהן לפעמים דומים, לפעמים חופפים חלקית, ולפעמים שונים מאד זה מזה. באופן כללי, נמצא שרשתות נפרדות אלו אינן משולבות. עוד היבט של רשתות אלו הוא שלפחות במסגרת הנתונים הארכיאולוגיים שנשתמרו, רובן מצביעות על דפוסים א-סימטריים של הפצת סחורות בין אזורים שונים.

סעיף 2 מנתח את ההבדלים והשינויים לאורך הזמן בתוך תקופת הברונזה הקדומה והגורמים הכלכליים וכנראה הפוליטיים לשינוים אלו. הם מצביעים על כך שדפוסי ההפצה בתקופת הברונזה הקדומה א' הן אינן מרוכזות, בעוד שהן נעשות ממורכזות יותר בתקופת הברונזה הקדומה ב'. ןלעומת זאת בתקופת הברונזה הקדומה ג' ריכוזיות זו פוחתת ויש חזרה מסוימת לרשתות בלתי-ממורכזות. סעיף 3 דן בהבדלים בין מוצרים לבין חפצים בעלי-ערך כפי שמראים הנתונים הארכיאולוגיים המוצגים בחלק ב'. סעיף 4 מסכם את מה שניראה כקיומו של מעמד סוחרים ואת מעמדה החברתי. סעיף 5 מציג את מסקנות המחבר, תוך מתן הסבר לבסיס הכלכלי לסחר חליפין במוצרים בתקופת הברונזה הקדומה. ראוי לציון שאין עדויות לפעולתו של "שוק" יחיד והומוגני; בניגוד לזאת יש רשתות אזוריות רבות ומגוונות במהלך כל התקופה. סעיף זה מנסה להסביר את השלכות הכלכליות וההיסטוריות ואת דפוסי החליפין, לאור היעדרם של אמצעי חליפין מסוימים והיעדר כל עדות למסמכים העוסקים במסחר. לבסוף, עבודה זו (סעיף 6) מציעה כיוונים עתידיים למחקר ומציגה שאלות פתוחות שהמחבר סבור שראוי שיזכו להתייחסות של החוקרים.

אוניברסיטת תל-אביב
הפקולטה למדעי הרוח ע"ש לסטר וסאלי אנטין
בית הספר למדעי היהדות ע"ש חיים רוזנברג
החוג לארכיאולוגיה ותרבויות המזרח הקדום

סחר חליפין בתקופת הברונזה הקדומה בכנען



מאת

יניר יצחק מילבסקי

הוגש לסנט אוניברסיטת תל אביב
לשם קבלת תואר "דוקטור לפילוסופיה"

אוגוסט 2005