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Domestication and inequality? Households, corporate groups and food processing tools at Neolithic Çatalhöyük ☆

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ABSTRACT

Questions about the early Near Eastern Neolithic include whether domestic groups were autonomous and self-sufficient; whether they had access to similar goods; whether households were competitive; whether specialization existed; and how domestic units articulated with corporate groups. Feasting models emphasize household competition and complexity, but wide-ranging ethnographic studies show that hoe-farming societies in areas of land abundance are usually egalitarian, with little material wealth, little inequality, and little wealth transmission (inheritance). This paper explores inequality at Çatalhöyük East (Turkey), via ground stone artefacts, which were central to food preparation and craft production. Analysis of 2429 artefacts from 20 buildings and 9 outdoor yards reveals a mix of egalitarian features and emerging social complexity. Households had private property and relatively equal access to cooking features and some ground stone tools, but ground stone toolkits do not indicate self-sufficiency. In particular, large millstones (querns) were expensive to procure and were possibly shared between households. Most were deliberately destroyed, suggesting taboos on transmission (inheritance). Lorenz curves for features and ground stone artefacts suggest that storage units, unbroken querns and unfinished quern roughouts were the most unequally distributed food preparation facilities. There are indications of subsistence intensification, craft specialization, and emerging factional competition.

Introduction

As early agrarian households evolved in the Neolithic of the Near East, how soon did differentials emerge between households in access to material "wealth"? Do we see precocious emergence of privileged households with unusual accumulations of prestige items, atypically large storage features, or exceptional capacities for feasting?

The Near East has a rich record of the evolution of agrarian societies, from the Late Epipalaeolithic (cf. Natufian) to the Pre-Pottery Neolithic A, B and C periods (=PPNA, PPNB, PPNC), corresponding to the Early Central Anatolian I–III (Özbasaran and Buitenheis, 2002) (Table 1). This time range witnessed the emergence of semisedentary foraging (Late Epipalaeolithic/Natufian); pre-domestication cultivation (PPNA); true plant domestication (Early-Middle PPNB) (Fuller et al., 2011); sheep-goat domestication (Middle PPNB) and hyper-growth of some villages to 15 hectares (Late PPNB–PPNC). Many have debated whether early Neolithic societies were egalitarian or not, and in what ways (Asouti, 2005, 2006; Banning, 1996, 2003, 2011; Banning and Chazan, 2006; Bienert, 2001; Bogaard et al., 2009; Byrd, 1994, 2000, 2005a,b; Düring, 2005, 2006, 2007; Flannery, 1972, 2002; Goring-Morris, 2000; 2005; Hodder and Cessford, 2004; Kuijt, 2000a,b, 2002, 2012; Kuijt and Goring-Morris, 2002; Kuijt et al., 2011; Pearson et al., 2013; Rollefson, 2000; Schmidt, 2006; Verhoeven, 2004, 2006; Watkins, 2008; Wright, 2000).

One of the largest Late PPNB–PPNC sites is Neolithic Çatalhöyük East (Turkey), where recent excavations revealed more than 50 buildings, along with outdoor yards and middens (Hodder, 2007, 2014) (Figs. 1 and 2) and detailed information on artefacts (e.g., Bains et al., 2013; Bogaard et al., 2013; Carter et al., 2005; Carter and Milic, 2013; Hodder, 2014; Nakamura and Meskell, 2013; Russell and Martin, 2005; Russell and Griffitts, 2013; Twiss et al., 2013; Wright et al., 2013; Yalman et al., 2013). The 1960s excavations (Mellaart, 1963, 1964, 1966, 1967) were confined to the South Area, a deep trench revealing diachronic change. There, Mellaart defined 13 'levels,' from 'Pre-XII' (at the base) to I and 0 (at surface), with some of the best preserved finds coming from Levels VIA and VIB, in the middle of the sequence. The recent excavations (Hodder, 2007, 2014) opened several areas (Figs. 2 and 3), each with area-specific level designations (Table 1). In the South Area, these begin with G (at the base); the latest are South T, Area TP and the Istanbul Area. Area 4040 (in the north) encompasses a narrower time range and is a wide exposure, revealing neighborhood

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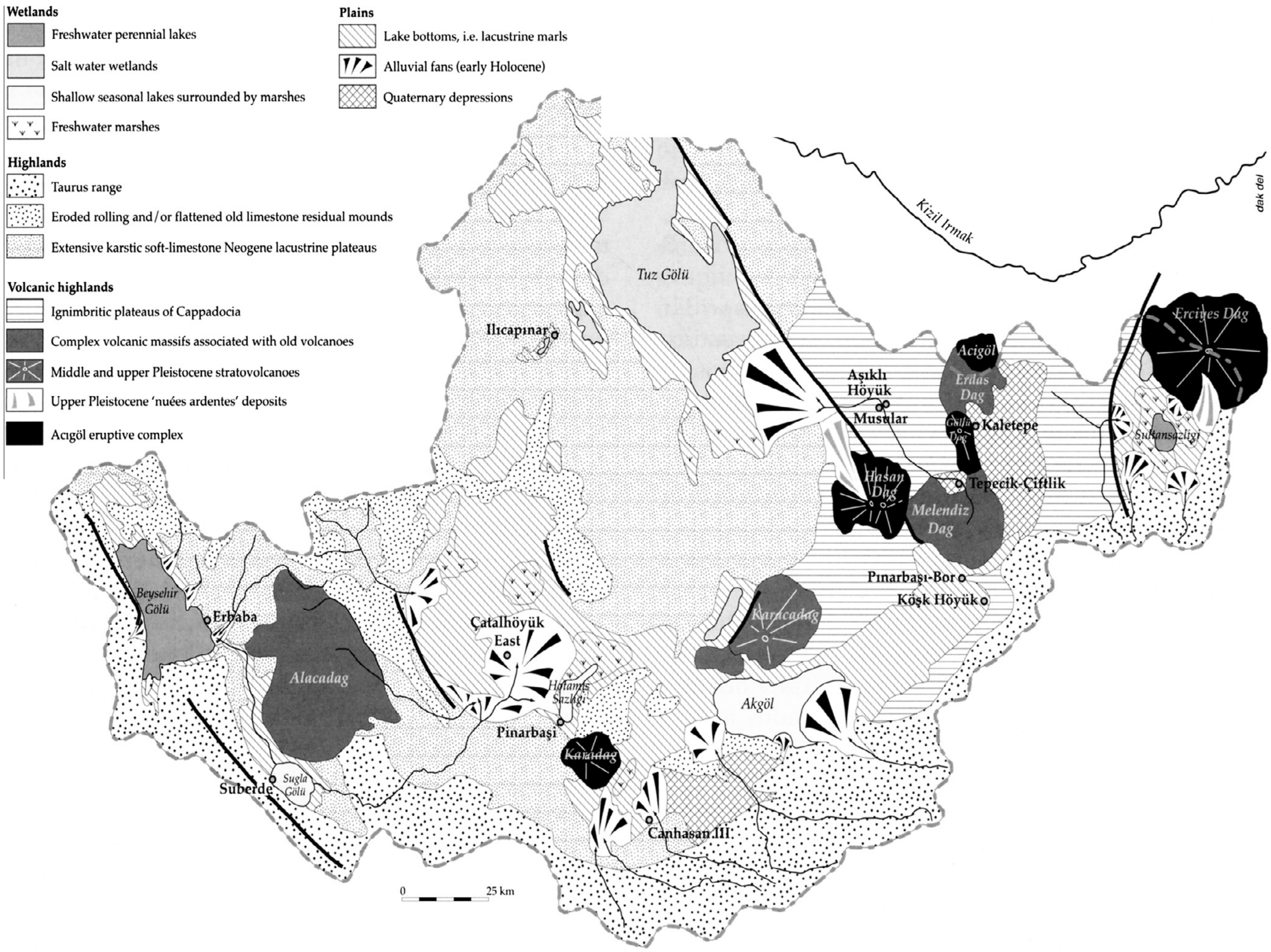

Fig. 1. Location of Çatalhöyük in relation to rock and mineral resources (Hodder, 2005a: Fig. 1.1; for further details of regional geology, see MTA, 2002).

relationships. Five levels (F–J) were defined for Area 4040, from Level F (earlier) to Level J (later), of which Levels G and H are best known at present. These probably correspond to South Area Levels N through Q (and to Mellaart's Levels VIB, VIA and V) (Table 1). In this paper, the term 'Area 4040' is used as a shorthand for all exposures in the north i.e. Area 4040 sensu stricto; the BACH area; and the North area (see Fig. 2).

Çatalhöyük East dates to between ca. 7400 cal BC (South Area, base of mound) and ca. 6000 cal BC at the surface (Cessford et al., 2005: table 4.1; Hodder, 2005b: fig. 1.6, 2013: 1, 10). In terms of schemes established for the Levant, it is coeval with the Late Pre-Pottery Neolithic B, the Pre-Pottery Neolithic C, and the beginnings of the Pottery Neolithic (or Late Neolithic) (Table 1) (see also Hodder, 2005b, fig. 1.5). In terms of schemes suggested for central Anatolia, it belongs to the later part of the Early Central Anatolian (ECA) II and the ECA III (Table 1) (Asouti, 2006; Özbasaran and Buitenheis, 2002). Its closest contemporaries are Can Hasan III, Suberde and Erbaba (central Anatolia); later levels at Çayönü (eastern Anatolia); Bouqras and Abu Hureyra II (north Euphrates); Ramad, Ain Ghazal and Basta (the Levant); and Ali Kosh, Guran and Jarmo (Zagros Mountains and adjacent valleys) (Hodder, 2013, fig. 1.1; Zeder, 2011).

Near Eastern Neolithic villages are very diverse, both within regions and between them. Çatalhöyük East is not typical of the PPNB, PPNC or early ceramic Neolithic and cannot be understood as representative. It is unusually large; it appears to be isolated within its region (Baird, 2005); and it has distinctive architecture, material culture and unusually well-preserved art works. Largely as a result of the site's size and the elaborate art, Çatalhöyük East has long been suspected of precocious social differentiation. While its buildings all appear to be domestic – there are no idiosyncratic, obviously corporate structures – the buildings vary. Hodder has identified four building types based on building form, contents or stratigraphy (Hodder, 2013): (1) elaborate/large houses, of unusual size and/or with paintings, reliefs or bukrania; (2) burial houses, with burial numbers exceeding those expected of one domestic group; (3) "history houses" built directly on top of other houses, with continuity in feature placement; and (4) relatively undistinguished houses.

Of these four types, Hodder defined types 1–3 (elaborate/decorated houses, multiple-burial houses, history houses) as "special buildings," which, although they have indications of domestic use (hearths, ovens, bins), nonetheless hint at either differential household status or special functions (Hodder, 2013). Variously, the elaborate or unusual structures have been interpreted as shrines (Mellaart, 1967); as foci for lineages and/or neighborhood-based corporate groups (Düring, 2005, 2006, 2007); as "dominant houses invested particularly in the construction and control of social memory" (Hodder and Cessford, 2004: 36); and as households engaged in competitive or cooperative feasting (Atalay and Hastorf, 2006; Bogaard et al., 2009; Russell and Martin, 2005). These interpretations, which are not necessarily mutually exclusive, are based on architecture, burials, art, faunal and botanical remains, storage and cooking facilities.

Ground stone artefacts are essential for understanding social organization, food sharing and craft production. They inform on

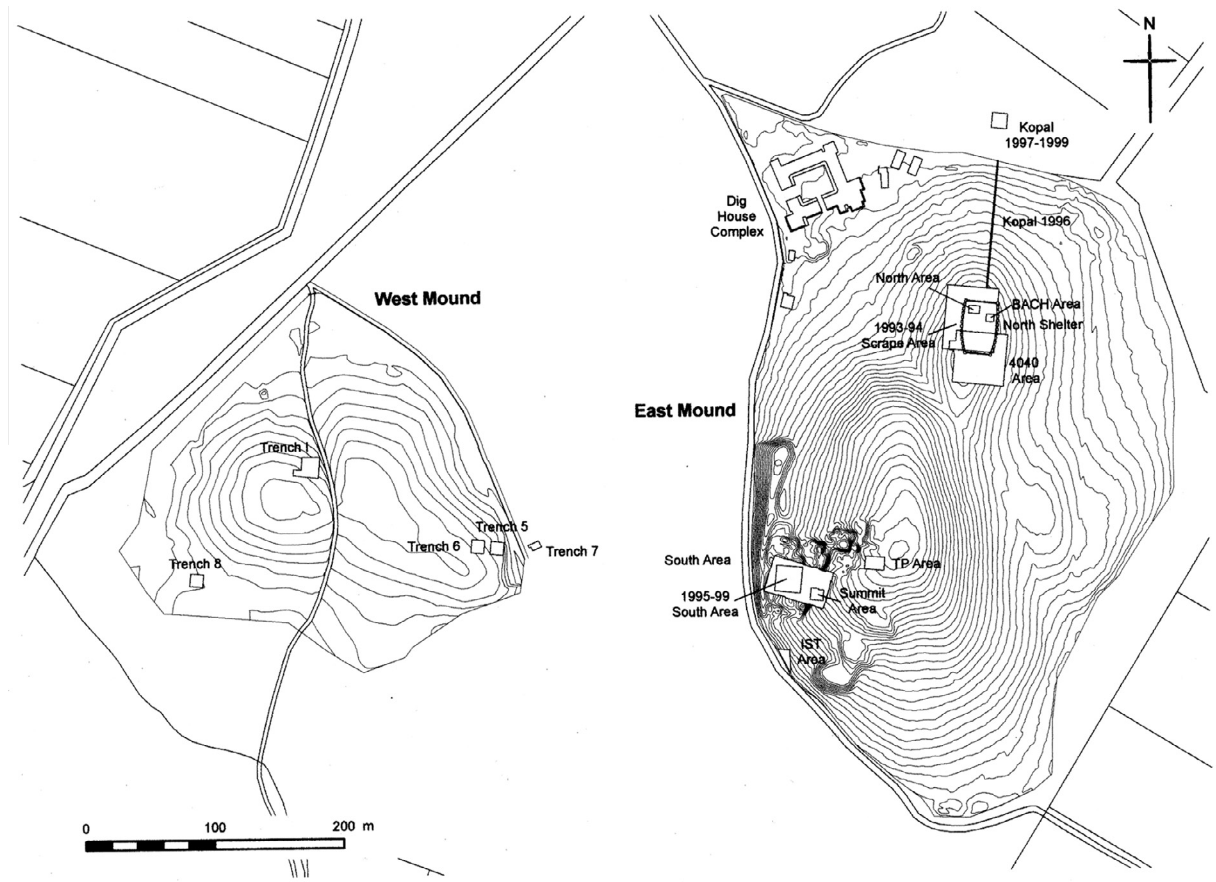

Fig. 2. Topographic site plan of Çatalhöyük showing areas excavated. *Note*: in this paper, the term 'Area 4040' is used as a shorthand for all exposures on the north side of the mound, i.e. Area 4040 (sensu stricto); the BACH area; and the North Area.

residential-group composition, social units of production–consumption, subsistence intensification, surplus production, access to resources and landscapes, material value, and craft specialization. Detailed data on ground stone artefacts from Çatalhöyük East were unavailable when the aforementioned interpretations were written. These data are now in hand (Tables 2 and 3) (Wright et al., 2013).

One aim here is to explore household equality/inequality, via spatial/contextual distributions of ground stone artefacts recovered from the East Mound. The focus is 2061 artefacts from 20 buildings and a further 368 from external yards (Tables 4–6) These derive from the South Area and Area 4040 (Figs. 2 and 3). Comprehensive recovery methods were used, to identify not only finished tools but also manufacturing debris (Table 2) (Wright et al., 2013; cf. Baysal and Wright, 2005).

A second aim is to address wider questions about food consumption, food production and the emergence of early inequality. Food preparation tools have much to tell us about these issues. It has been argued that feasting is central to the development of social hierarchies (Dietler and Hayden, 2001) and that the early Near Eastern Neolithic displays evidence for both. But wide-ranging ethnographic studies assert that many or most societies engaged in low-intensity agriculture involving simple technologies (eg hoe farming) are egalitarian (Goody, 1976; Gurven et al., 2010; cf. Shenk et al., 2010; Smith et al., 2010a). However, ethnographic studies also sugest that animal herding is associated with inegalitarian wealth distributions (Borgerhoff Mulder et al. 2010). Çatalhöyük East was an early hoe-farming society with domestic caprines (sheep-goat) and indications of feasting on wild cattle. It thus provides a test case.

Ground stone artefacts proliferated in the Neolithic. While they had ancient antecedents (Wright, 1994), the Neolithic expansion was of a different order of magnitude (Wright, 1993). These artefacts are examples *par excellence* of changes in the human use of material culture (Hodder, 2005a, 2012, 2013); they were critical not only to subsistence but to production of crafts, which also proliferated, e.g. stone beads (Bains, 2012; Wright and Garrard, 2003), stone vessels, axes, sculptures (Schmidt, 1997), plaster and painted plaster (Çamurcuoglu, 2013), and eventually pottery.

Ground stone artefacts are any in which abrasion plays a key role in manufacture They include millstones (=querns, grinding slabs, metates), handstones (=manos, grinders) but also many other types (Fig. 4; Table 2). The largest are usually millstones. These encompass grinding slabs (passive grinding tools involving linear motions) and querns (passive grinding tools involving oval motions). For brevity, I use here the term "quern" to discuss both. These tools are made of coarse-textured rocks (e.g., andesite, vesicular basalt) and differ from abrading and polishing tools made of finer materials (Table 2).

Archaeology and debates on Neolithic social inequality

Many questions about Neolithic social organization remain unanswered: the autonomy and self-sufficiency of residential groups; whether residential groups had similar access to similar materials; whether and how domestic groups shared resources (Byrd, 2005a); how domestic units articulated with corporate groups (lineages, sodalities, neighborhoods, networks) (Wright, 2000; cf. Byrd, 1994; Düring, 2007; Goring-Morris, 2000; Kuijt et al., 2011; Watkins, 2008); how much power and authority resided in corporate groups (Kuijt, 2002); and whether certain elaborate buildings were corporate (Schmidt, 2006) or a continuum with

Fig. 3. GIS plan of Çatalhöyük East, Area 4040, in (a) Level G and (b) Level H, showing major clusters of ground stone artefacts from floors and other use contexts. *Note*: materials were found on the floor of Building 3 but are not included on this plan (see Tringham and Stevanovic 2012; Wright and Baysal, 2012).

domestic structures (Banning, 2011). Some propose that social-economic inequality preceded plant domestication (Hayden, 2001b, 2003, 2004, 2009), although many disagree (Asouti and Fuller, 2013; Kuijt, 2009; Munro, 2004; Zeder and Smith, 2009). Some argue

Table 1
Chronology. Levantine periodization and calibrations based on Garrard and Edinborough (2013); Reimer et al. (2004) (= INTCAL, 2004); and Weninger et al. (2005) (= CALPAL, 2005). Central Anatolian periodization based on Özbasaran and Buitenheis (2002) (see also Hauptmann and Özdogan, 2007: 28; Gérard and Thissen, 2002). Chronology for Çatalhöyük is based on Cessford et al. (2005), Hodder (2005b: figs. 1.5–1.6), and Hodder (2011). Note, however, further discussions in Bayliss et al. (2014) and Hodder (2013). Abbreviations: TP = Team Poznan Area; IST = Istanbul Area.

Levant				Catalhoyuk			Anatolia	Comment
Levantine terminology	C14 YEARS BP	CAL BP	CAL BC	Catalhoyuk E South area Mellaart levels	Catalhoyuk E South Area Hodder levels	Catalhoyuk E Area 4040 Hodder levels	Early Central Anatolia (ECA) terminology – CAL BC	Trends (regionally variable)
Chronology								
Upper Palaeolithic	45,000–20,000	48,120–23,970	46,170–22,020					
Epipalaeolithic – Early	20,000–14,500	23,970–17,400	22,020–15,450					
Epipalaeolithic – Middle	14,500–12,500	17,400–14,730	15,450–12,780					
Epipalaeolithic – Late (Early Natufian)	12,500–11,250	14,730–13,130	12,780–11,180				ECA I: 12,000–9,000	Semisedentary foraging
Epipalaeolithic – Late (Late Natufian)	11,250–10,250	13,130–11,990	11,180–10,040					
Pre-pottery Neolithic A	10,250–9600	11,990–10,890	10,040–8940					Pre-domestication cultivation
Pre-pottery Neolithic B – Early	9600–9200	10890–10410	8940–8460				ECA II: 9000–7000	Plant domestication
Pre-pottery Neolithic B – Middle	9200–8500	10,410–9510	8460–7560					Sheep-goat domestication
Pre-pottery Neolithic B – Late	8500–8000	9510–8890	7560–6940	Pre-XII	G			Megasites
				XII–XI	H–I			
Pre-pottery Neolithic C (='Late/Final PPNB')	8000–7500	8890–8350	6940–6400	X–IX	J–K		ECA III: 7000–6000	Megasites
				VIII	L	F		
				VII	M	F		Ceramics in Anatolia, Syria
				VIB	N	G		
				VIA	O	G		
Late Neolithic	7500–6500	8350–7430	6400–5480	V	P	H		
					Q	H		Ceramics in south Levant
				IV	R	I		
					S	J		
				III	T	J		
			ca. 6000 cal BC	II-0	TP			
					IST		ECA IV: 6000–5500	
				Catalhoyuk West				
Chalcolithic	6500–5500	7430–6290	5480–4340	Catalhoyuk West	ECA V: 5500–4000			
Early Bronze Age	5500–4000	6290–4470	4340–2520					

Table 2
Çatalhöyük East: raw frequency of ground stone artefacts by type and raw material, total assemblage of all artefacts recovered since 1995. Includes surface and offsite materials. Key: a = igneous rocks; b = sedimentary rocks; c = metamorphic rocks; d = minerals. Note the dominance of volcanic rocks, especially andesite and basalt. Limestones shown (b2) are not local lake limestones. For details, see Wright et al. (2013). *Note*: * = quartzitic sandstone.

Material	a 1 Andesite	a 2 Basalt	a 3 Pumice	a 4 Gabbro	a 7 Diabase	b 1 Sandstone	b 10 Slate	b 11 Travertine	b 2 Limestone	b 3 Marl	b 4 Chalk	b 5 Chert	b 9 Sed. Quartzite	b 99 Other sedimentary	c 4 Marble	c 5 Schist	c 6 Serpentinite	c 7 Metaquartzite	c 8 Steatite	d 4 Pigment	Other or undifferentiated	Total	Percent
Ground stone artefacts by type and raw material, all contexts																							
Class and type																							
A – Percussion tools																							
A 1 Worktable/ Anvil	1	3																				4	<1
A 2 Hammerstone	10	125		1		2			5				4	2	1			1				151	4
A 3 Mortar	1																					1	<1
A 4 Pestle	9	4													2							15	<1
B – Coarse grinding tools																							
B 1 Quern	1920	107				5	1		2												2	2037	51
B 1.1 Quern roughout	23	2																				25	1
B 2 Handstone	99	31	1	3		2			2						2							140	4
C – Fine abrading tools																							
C 1 Abrading slab	3					10			1				1			2					3	20	1
C 1.3 Sanding slab	3					24										2						29	1
C 1.5 Palette	1					4			1							68						74	2
C 2 Abrader	12	1	4			35			5							42					3	102	3
C 2.2 Abrader-knife						4										58						62	2
C 2.3 Sander						17																17	<1
D – Polishing tools																							
D 1 Polishing slab						1			6						3							10	<1
D 2 Polisher		2		1					59				3	1	21			1			4	92	2
E – Grooved tools																							
E 1 Grooved abrader						2										3	1					6	<1
E 1.1 Shaft straightener	1					5										1						7	<1
E 2 Incised pebble																					1	1	<1
E 99 Grooved other		1				1			1													3	<1
F – Cutting tools																							
F 1 Axe/celt	2			10	102												4		3		3	124	3
F 1.1 Axe/celt preform		1		1	23																	25	1
F 2 Chopper						2									1							3	<1
F 3 Stone hoe						1*																1	<1
G – Perforated tools																							
G 1 Macehead															4						1	5	<1
G 2 Weight		1																				1	<1
G 99 Perforated other									1						1	1			1			4	<1
H – Vessels																							
H 1 Stone vessel (gen)	5								4						7				1		3	20	1
H 2 Stone bowl	1								1						1				1			4	<1
H 3 Stone tray	4																					4	<1
H 4 Stone platter									1													1	<1
X – miscellaneous																							
X 1 Stone ball	1								6						2	1		2			3	15	<1
X 3 Mineral																					109	109	3
X 4 Pigment									8											96		104	3
X 5 Figurine-related?									9						4						9	22	1
X99 Misc. worked	13	5	1		1	3			27	3	15			1	1	5	2		1		81	159	4
Y – Cores and debitage																							
Y 1 Core	2									1												3	<1
Y 2 Debitage	379	6		1	1	5			16			2			4	9	1	3			172	599	15
Tools + Debitage, N	**2490**	**289**	**6**	**17**	**127**	**123**	**1**	**0**	**155**	**4**	**15**	**2**	**8**	**4**	**54**	**192**	**8**	**7**	**7**	**96**	394	**3999**	100
Tools + Debitage,%	62	7	<1	<1	3	3	<1	<1	4	<1	<1	<1	<1	<1	1	5	<1	<1	<1	2	10	100	
Z – Unworked, N	1042	206	19	17	36	184	5	64	2749	93	69	41	2	20	189	128	4	5	0	0	23084	27957	

Note: * = quartzitic sandstone

that embryonic social complexity existed in the early Neolithic (Barzilai, 2010; Bienert, 2001; Pearson et al., 2013; Rollefson, 2000). Others see PPNB–PPNC societies as egalitarian, on the basis of architecture and burials; some argue that social constraints prevented household inequality (Kuijt, 1996, 2000a, 2009; cf. Byrd, 2005a; Düring, 2007; Hodder and Cessford, 2004; Verhoeven, 2006).

Of many nuances in the data, one concerns private property. I argue (Wright, 2000) that increasingly private storage and food preparation can be documented in Levantine Neolithic houses, from open easy-access patterns of the PPNA; to visible kitchen-porches bridging house and neighborhood, in the mid-PPNB; to a retreat of cooking and storage facilities to more sheltered, private spaces in larger, more enclosed households, in the Late PPNB (see now also Kadowaki, 2006; Kuijt, 2012). These trends are illustrated at multi-phase sites (Byrd, 2005a: Figs. 143, 154, 258, 302, 347, 372). In central Anatolia, storage rooms at Late PPNB–PPNC Çatalhöyük were extremely secluded (Bogaard et al., 2009: 653), while earlier sites may have had more visible storage and food preparation (Asouti and Fuller, 2013; Esin, 1991; Esin and Harmankaya, 1999; Özbasaran, 1998). In northern Mesopotamia, too, PPNA food preparation patterns were perhaps visible (Asouti and Fuller, 2013; cf. Stordeur, 2000; Willcox and Stordeur, 2012; Yartah, 2005), while storage spaces in later PPNB houses are notably private (Banning, 1996; cf. Akkermans et al., 1981; Moore, 2000b).

Other nuances concern corporate groups and how to interpret nondomestic buildings, e.g. those of Göbeklitepe, seen as temples (Schmidt, 2000, 2002, 2005, 2006) or as houses (Banning, 2011). Non-domestic buildings do not automatically signify inequality, but raise questions about corporate authority. Some have specific burial types, possibly of people with special food consumption patterns (Özdogan and Özdogan, 1989; Pearson et al., 2013). Corporate buildings occur in sites which also have domestic architecture (Byrd, 2005a; Düring, 2005; Esin, 1991; Esin and Harmankaya, 1999; Hauptmann, 1988, 1993, 1999; Özbasaran, 1998; Rollefson, 2000; Schmidt, 2000, 2002, 2005, 2006). There are also sites suggesting regional rituals (Bar-Yosef and Alon, 1988; Goren et al., 1993, Goring-Morris, 2000, 2005). Finally, "megasites," including Çatalhöyük, raise questions about integration of large populations. Though models of proto-urbanism or ranking (Bienert, 2001; Mellaart, 1967; Wason, 1994) have been dismissed (Düring, 2007), village hyper-growth requires explanation and it is intriguing that Çatalhöyük East had few/no contemporaries nearby (Baird, 2005).

Food processing and ground stone tools are key to identifying the domestic from the non-domestic – or determining whether this distinction is applicable. Ground stone tools from idiosyncratic corporate buildings may display very distinctive patterns (Wright, 2013; cf. Byrd, 2005a: e.g., figs. 302, 317). Also, artworks are sometimes seen as indicators of the nondomestic. But ground stone tools were used for making art in domestic contexts (Wright, 2008; Wright et al., 2013; cf. Bains et al., 2013; Çamurcuoglu, 2013; Wright and Garrard, 2003; Wright et al., 2008) and "ordinary" ground stone tools can be iconic (e.g., Edwards and Webb, 2013; Garrard et al., 1994; Gopher, 1997; Mithen et al., 2005; Perrot, 1966; Rosenberg and Gopher, 2010; Rosenberg and Redding, 2000; Wright, 1993).

Thus, the evidence for equality vs. hierarchy remains ambiguous. Also unclear is the degree to which domestic groups were constrained by community social controls, or conversely, the extent of domestic group agency. One approach is to explore whether Çatalhöyük East fits expectations of models relating inequality to food production and consumption; and how processing tools inform on these.

Food consumption and social inequality

Feasting models posit that ambitious aggrandizing households intensify food production to hold feasts and place other households in debt, leading to spiralling competitive surplus production and economic inequality (Dietler and Hayden, 2001; Jones, 2007). This draws on ethnographies of Melanesia (Sahlins, 1974) and other societies (Hayden, 2001a,b, 2003, 2004, 2009). Feasting has been identified in the Neolithic, on the basis of large-mammal remains; large quantities of plant foods said to imply group processing or special consumption events; and suggestions of production of alcoholic drinks (beer). Views vary on whether such data indicate hierarchies (Asouti and Fuller, 2013: 299; Bogaard et al., 2009: 664–665; Dietrich et al., 2012: 674; Goring-Morris and Horwitz, 2007: 902; Russell and Martin, 2005: 97). Some argue that stable isotope data from burials indicate differential food consumption patterns and may indicate PPNB social complexity (Pearson et al., 2013).

Feasting interpretations sometimes assume that clusters of milling tools indicate mass food preparation (Asouti and Fuller, 2013: 320–321; Hayden, 2009: 597; Willcox and Stordeur, 2012: 99). This may sometimes be so, but such clusters can result from household toolkits with several grades of millstones (e.g., Bartlett, 1933); sharing of spaces by task groups in routine food preparation; storage habits; or secondary deposition (Wright, 2013; cf. Byrd, 2005a: fig. 290). Tool distributions are affected by household life cycles, e.g. fissioning of domestic groups and life-stages of individuals (e.g., Goody, 1971: 80–81, figs. 1–2; cf. Banning and Byrd, 1987; Folorunso, 2007; Kadowaki, 2006). Also, culturally-driven processing practices deeply affect preservation of archaeobotanical remains (Wright, 2000; cf. Hillman, 1984a, 1984b; Hillman et al., 1989), so inferences from archaeobotanical remains need scrutiny in light of details of hearths and processing tools.

We can concede that feasting played a role in the development of hierarchy (Schmandt-Besserat, 2001) and that true feasting events may be detectable. But Neolithic feasting has to be placed in a wider background of day-to-day "politics of gastronomy" (Appadurai, 1981), otherwise we risk misinterpreting relevant data or entering a problematic realm of "too many feasts and not enough habitus" that encourages interpretations that emphasize competition and hierarchy, to the detriment of other possibilities. In any case, feasting alone is a narrow frame of reference for exploring social inequality. Some discussions avoid these traps, e.g. analysis of storage, archaeobotany and fauna at Çatalhöyük indicated that feasting may have been cooperative, subverting household inequality (Bogaard et al., 2009; see also Atalay and Hastorf, 2006).

Food production systems and social inequality

Recent ethnographic studies explored correlations between subsistence and wealth inequalities (Borgerhoff Mulder et al., 2009, 2010; Bowles et al., 2010; Gurven et al., 2010; Shenk et al., 2010; Smith et al., 2010a,b). The studies expanded and reinforced Goody's earlier work, which linked the intensity of agricultural systems to inheritance regimes and wealth inequality, drawing contrasts between (1) societies practicing low-intensity, simple-technology agriculture (e.g., extensive agriculture; shifting cultivation; cultivation with hand tools and digging sticks) and (2) societies practicing intensive agriculture (e.g., plough or irrigation farming, involving more complex technologies) (Goody, 1976, 1990; Goody and Tambiah, 1973). Goody's analysis drew, in turn, on that of Boserup (1966), who pointed out the effects, on social and economic equality, of shifts from lower-intensity systems to labor- or capital-intensive agricultural regimes (agricultural intensification). Goody concluded that low-intensity systems, common in Africa, tended to be egalitarian, with little material wealth, and tended to be associated with exogamy, polygamy, bridewealth, corporate land tenure, and little emphasis on inheritance of land or personal property. By contrast, intensive agricultural regimes, common in Eurasia, encouraged wide economic differentiations,

Table 3
Chronological distribution of Çatalhöyük ground stone artefact types: raw frequency, by Area and Level. Surface and offsite materials are excluded. Data include a sample from Çatalhöyük West. For temporal relationships between the levels of the South and 4040 areas, see Table 1. Note that andesite trays and maceheads appear only in the middle of the sequence (4040 G–H) and later (South TP, Istanbul, West). Mellaart's discoveries of additional maceheads appear to have derived from his levels VI to III (Mellaart, 1963, 1964, 1966, 1967). For further data on Çatalhöyük West see Brady (Brady, 2012).d

Type	South G	South H	South I	South J	South K	South L	South M	South N	South O	South P	South Q	South R	South S	South T	South TP	South IST	4040 F	4040 G	4040 ?G	4040 H	4040 I	West	Total
Chronological distribution of ground stone artefacts by type, area, level																							
A 1 Worktable/Anvil																		4					4
A 2 Hammerstone	1			1	1	1	2			4	12	2	7	1	1			71	4	6	1	3	118
A 3 Mortar																				1		1	2
A 4 Pestle						1	3								3			4	1	3		4	19
B 1 Gr. slab/quern	63	4		4	32	51	35			73	185	47	69	6	68	1		323	29	63	6	70	1129
B 1.1 Gr. slab/q roughout	1								1		2		6					14		2			26
B 2 Handstone	3			1	9	7	5			7	14	2	16	3	5		3	37	12	5	3	36	168
C 1 Abrading Slab						2				1		2	3		2			7		2		2	21
C 1.3 Sanding Slab	2	1			2	1	1						2					13	1	3	1		27
C 1.5 Palette	1	1	1		1	1	2				12	4	6	4	4		1	14	3	9	7	2	73
C 2 Abrader	5			1	1	1	3			12	10	7	19	1	4			18	1	3	6	9	101
C 2.2 Abrader-Knife					1	1	1			6	8	2	11	3	9			9	3	2	2	3	61
C 2.3 Sander	1						1				2							12			1	2	19
D 1 Polishing Slab	5					1	1												2	1			10
D 2 Polisher	1				2	1	5			7	8	1	8	2	8	2		23	10	8	3	9	98
E 1 Grooved abrader											1							3			2		6
E 1.1 Shaft straightener						1												2	2	2		2	9
E 2 Incised Pebble					1																		1
E 99 Grooved Other											1		1							1			3
F 1 Axe/Celt	1				7	7	4	1		14	12	3	10	1	12		1	25	2	15	7	20	142
F 1.1 Axe/Celt preform					1					1	2	3	2		1			11	1	1	2	2	27
F 2 Chopper					1													1		1			3
F 3 Stone Hoe																		1					1
G 1 Macehead																2			1	2			5
G 2 Weight																		1					1
G 3 Disc																						1	1
G 99 Perforated other					1		1								2								4
H 1 Stone vessel (general)	1									1	4		1		10			2	1			6	26
H 2 Stone bowl													1					1	1		1	6	10
H 3 Stone tray															3						1	3	7
H 4 Stone platter																		1					1
X 1 Stone ball							1			1	1		1		3			5		2	1		15
X 3 Mineral					1		4			2	13	3	14	1	1			4		5		2	50
X 4 Pigment	6	1		1	4	2	1			3	6		1		2			13		3	4	8	55
X 5 Figurine-related?				1	1	1			1		1	2	1		3			2	2	4	3	6	28
X99 Misc. worked							1			3	4	1	4	2	78			31	2	8	1	7	142
Y 1 Core																		3				1	4
Y 2 Debitage	31	3		7	13	26	5			14	21	7	13	1	7		3	87	17	3	7	23	288
Total	122	10	1	16	79	105	76	1	2	149	319	86	196	25	226	5	8	742	95	155	59	228	2705

which were perpetuated via endogamy or close marriage (e.g. cousin marriage); monogamy; dowry; familial land tenure; and elaborate rules of devolution / transmission of property through time (including diverging devolution, the endowment of both male and female heirs). Thus, "these differences are related to the high productivity of the plough, the specialization that this permits, the scarcity of land which it creates or aggravates, and the differential holdings of land and capital which then become important" (Goody 1976:97). In the more recent studies, low-intensity, simple-technology farming systems were collectively labelled as 'horticulture' and the findings were that most such societies are egalitarian, with little or no material wealth or inheritance thereof, and that "domestication alone does not lead to inequality" (Gurven et al., 2010: 49, 61). Gurven et al. noted that some of these societies do display greater complexity. They relate this to scarce resources (e.g. circumscribed land) requiring defense, leading to labor intensification, competitive feasting and circulation of prestige goods, e.g. the Melanesian big-man societies (Gurven et al., 2010: 52–53) that are emphasized in feasting models (Hayden, 2001b). On the other hand, these studies concluded that pastoralism is associated with "substantial levels of intergenerational transmission and marked inequality" (Borgerhoff Mulder et al. 2010:35), while "the combination of intensive agricultural technologies [defined as plough or irrigation farming] with heritable wealth is a precondition [for] social complexity." (Shenk et al., 2010: 70, 80), an echo of Goody's (1976) results. In contrast to models that invoke selective ethnographic analogies (see critique by Spriggs, 2008), Goody's study was based on 592 societies (Goody, 1976: Table 1, p. 12); the work by Gurven et al. was based on 83 societies.

Ethnographic data cannot address origins; anthropologists acknowledge it (e.g., Bowles et al., 2010: 8; Fortunato et al., 2006; Goody, 1990). Modern small-scale societies may be affected by contact with industrialized complex societies (Calderaro, 2011: 265; Smith et al., 2011: 579); Neolithic data have no such problem. Goody himself, following Mellaart (1967), guessed that Çatalhöyük had "craft specialization…internal stratification…and intensive agriculture" (Goody, 1976: 24). Intensive agriculture (in Goody's sense) does not apply to Çatalhöyük – Bogaard et al. (2009) describe the Çatalhöyük regime as 'horticulture,' modest in scale – but questions of differentiation and specialization are still open.

Table 4

Exterior yard inventories: raw frequency of ground stone artefacts, broken and complete, from exterior yards in the South Area. Spaces are shown in chronological order from earlier (Level South P) to later (South T). For definitions of terms (broken, complete, ubiquity, diversity, number of types), see caption to Table 5. Number of spaces refers to the number of spaces containing a type.

	Level											
	South P	South P	South P	South Q	South Q	South Q	South R	South S	South S	Total	No. spaces	Ubiquity (%)
External yard inventories, south area: all contexts												
Space no.	329	333	371	299	314	427	339	129	319			
Broken (B)												
B 1 Quern fragment	21	10	19	17	28	18	11	67	6	197	9	100
Y 2 Debitage		11	3	1	3	1	2	23	5	49	8	89
B 2 Handstone		4	1	2	1	1		3		12	6	67
C 2 Abrader		5			1	1	1	20		28	5	56
C 2.2 Abrader-Knife	1	5			2		1	4		13	5	56
F 1 Axe/Celt			1	1		2		1	1	6	5	56
A 2 Hammerstone			2		2	3				7	3	33
C 1.5 Palette						2	3	3		8	3	33
X 4 Pigment		1		1		1				3	3	33
D 2 Polisher		1						1		2	2	22
F 1.1 Axe/Celt preform							1		1	2	2	22
X99 Misc. worked				1	2					3	2	22
E 99 Grooved Other								1		1	1	11
H 1 Stone vessel (gen)									1	1	1	11
Total broken	22	37	26	23	39	29	19	123	14	332	9	100
No. types (B)	*2*	*7*	*5*	*6*	*7*	*8*	*6*	*9*	*5*	*14*		
Diversity (%) (B)	***14***	***50***	***36***	***43***	***50***	***57***	***43***	***64***	***36***	***100***		
Complete (C)												
C 2.2 Abrader-Knife	1	1		2				3	2	9	5	56
B 2 Handstone	1			2			1			4	3	33
C 2 Abrader		2					3	2		7	3	33
D 2 Polisher	1	4					1			6	3	33
F 1 Axe/Celt	1								2	3	2	22
X 5 Figurine-related?				1				1		2	2	22
C 1.5 Palette					1					1	1	11
E 99 Grooved Other				1						1	1	11
F 1.1 Axe/Celt preform		1								1	1	11
H 2 Stone bowl								1		1	1	11
X 1 Stone ball			1							1	1	11
Total complete	4	8	1	6	1		5	7	4	36	8	89
No. types (C)	*4*	*4*	*1*	*4*	*1*	*0*	*3*	*4*	*2*	*11*		
Diversity (%) (C)	***36***	***36***	***9***	***36***	***9***	***0***	***27***	***36***	***18***	***100***		
Total B + C	26	45	27	29	40	29	24	130	18	368	9	100

Table 5
Building interiors, total house inventories: raw frequency of all ground stone artefacts, broken (B) and unbroken/complete (C), from all contexts within 20 buildings at Çatalhöyük East. Within each area (South and 4040), houses are mostly shown in chronological order by level, from earlier (e.g., South J) to later (e.g., South Q). (see Table 1). However, some history houses are grouped according to direct stratigraphic relationships from earlier to later, e.g. 18–16 and 65–56–44. The raw data shown combine broken and complete artefacts together, except in the case of querns, but diversity data show both combined and separate calculations for broken and complete tools. "Broken" means a fragment only; "complete" artefacts include artefacts where re-fits resulted in reconstruction of the whole tool. "No. houses" refers to the number of houses containing a type. Ubiquity (%) is the percentage of buildings containing a type. "No. types" is the number of different types found within a building. Diversity (%) is the number of artifact types present in a building, as a percentage of the total number of artifact types from the 20 buildings. Contexts include room fills, construction contexts, middens, layers, floors, feature fills. Note: data for Buildings 58 and 59 are mainly floor data and not all fill material was available. Key to building types: h = history house; b = burial house; e = elaborate/large house; u = undistinguished house.

	Consolidated broken + complete Level																						
	South J	South K	South J	South K	South L	South Q	South R	South S	South K	South P	South Q	4040 F	4040 G	4040 G	4040 G	4040 G	4040 G	4040 G	4040 H	4040 H	Total	No. Houses	Ubiquity (%)
Total house inventories: ground stone artefacts from all contexts																							
Building NO.	18	16	23	17	6	65	56	44	2	75	68	5	1	49	59	52	77	3	54	58			
Building Type	h	h	h	h	h	h	h	hb	u	u	u	he	hb	b	e	e	e	u	u	u			
B 1 Quern fragment (B)	1	1	2	9	7	85	53	166	15	51	168		44	73	25	36	287	81	17	27	1148	19	95
Y 2 Debitage	3		4	168	1	12	9	6	9	1	3	3	15	6	17	2	22	34	1	1	317	19	95
B 2 Handstone			1	3	1	5		13	2	1	1	2	4	4		6	10	7	1	3	64	16	80
C 1.5 Palette				1	1	4	1	4			2	1	1	2	1	3	2	3	2	7	35	15	75
F 1 Axe/Celt				1	1	5	2	6	2	3			4	2		1	11	2	1	4	45	14	70
A 2 Hammerstone						2	2	10	1	1	17			21	1	5	41	11	1	2	115	13	65
C 2 Abrader				1	1	4		6		3	2		1	5	1	4	3	2		3	36	13	65
X 4 Pigment	1			16	2	3		1	1	5			4	2	1		2	2	4		44	13	65
D 2 Polisher						5		7	2	1	1			1	1	3	10	7	2	5	45	12	60
F 1.1 Axe/Celt preform						1	2	1	1		1		1	2		3	1	1			14	10	50
X99 Misc. Worked						1	1	4		1				6		9	9	11	2	6	50	10	50
C 1 Abrading Slab					1		1	4						1		1	1	1		2	12	8	40
C 2.2 Abrader-Knife				1		2	1	2			1			5				4			16	7	35
C 2.3 Sander						1					1		2		4	3	1	2			14	7	35
B 1 Quern (complete)						2		1			1					1	12			1	18	6	30
B 1.1 Quern roughout						2		6					1	1			11			2	23	6	30
C 1.3 Sanding Slab				3				2					2			6	5		2		20	6	30
X 5 Figurine-related?	1			1										1			1		1	1	6	6	30
X 1 Stone ball								1						1		2	2		1		7	5	25
A 4 Pestle					1									2			2			1	6	4	20
E 1 Grooved abrader						1								2			1				4	3	15
E 1.1 Shaft straightener					1												1			1	3	3	15
F 2 Chopper				1												1			1		3	3	15
Y 1 Core														1			1	1			3	3	15
A 1 Worktable/Anvil																1	3				4	2	10
H 1 Stone vessel (gen)						1												1			2	2	10
D 1 Polishing Slab																				1	1	1	5
F 3 Stone Hoe																	1				1	1	5
G 1 Macehead																				1	1	1	5
G 2 Weight																	1				1	1	5
G 99 Perforated other				1																	1	1	5
H 2 Stone bowl																1					1	1	5
H 4 Stone platter													1								1	1	5
Total artefacts, N	6	1	7	206	17	136	72	240	33	67	198	6	80	138	51	88	441	170	36	68	2061	20	100
No. Types	*4*	*1*	*3*	*12*	*10*	*17*	*9*	*17*	*8*	*9*	*11*	*3*	*12*	*19*	*8*	*18*	*25*	*16*	*13*	*17*	*33*		
Diversity (%)	***12***	***3***	***9***	***36***	***30***	***52***	***27***	***52***	***24***	***27***	***33***	***9***	***36***	***58***	***24***	***55***	***76***	***48***	***39***	***52***	***100***		
Total broken tools	5	1	6	203	16	121	62	214	29	63	192	6	71	110	49	64	336	140	31	44	1763	20	100
No. types (B)	*3*	*1*	*2*	*9*	*9*	*13*	*2*	*15*	*6*	*8*	*6*	*3*	*9*	*14*	*6*	*11*	*12*	*13*	*9*	*11*	*25*		
Diversity (%) (B)	***12***	***4***	***8***	***36***	***36***	***52***	***8***	***60***	***24***	***32***	***24***	***12***	***36***	***56***	***24***	***44***	***48***	***52***	***36***	***44***	***100***		
Total complete	1		1	3	1	15	10	26	4	4	6		9	28	2	24	105	30	5	24	298	18	90
No. types (C)	*1*	*0*	*1*	*3*	*1*	*9*	*7*	*10*	*3*	*3*	*6*	*0*	*6*	*13*	*2*	*12*	*20*	*10*	*5*	*12*	*26*		
Diversity (%) (C)	***4***	***0***	***4***	***12***	***4***	***35***	***27***	***38***	***12***	***12***	***23***	***0***	***23***	***50***	***8***	***46***	***77***	***38***	***19***	***46***	***100***		

Table 6

Building interiors, floor inventories: raw frequency of all ground stone artefacts, broken (B) and unbroken/complete (C), strictly from floors, features, placements, and other use and abandonment contexts, within 20 buildings at Çatalhöyük East. In this case, broken and complete tools are considered separately and as separate artefact types. Within each area (South and 4040), houses are mostly shown in chronological order by level, from earlier (e.g., South J) to later (e.g., South Q) (see Table 1). However, some history houses are grouped according to direct stratigraphic relationships from earlier to later, e.g. 18–16 and 65–56–44. See caption to Table 5 for other explanations and abbreviations.

Level	South J	South K	South J	South K	South L	South Q	South R	South S	South K	South P	South Q	4040 F	4040 G	4040 G	4040 G	4040 G	4040 G	4040 G	4040 H	4040 H	Total	No. houses	Ubiquity (%)
'Floor' inventories: artefacts from floors, features and other use contexts																							
Building no.	18	16	23	17	6	65	56	44	2	75	68	5	1	49	59	52	77	3	54	58			
Building type	h	h	h	h	h	h	h	hb	u	u	u	he	hb	b	e	e	e	u	u	u			
B B 1 Quern fragment (B)	1	1		3	4	61	15	4	1	15	68		15	36	15	11	219	2		6	477	17	85
B Y 2 Debitage (B)	3		1	1		3	1			1	1		5	1	12		17				46	11	55
B B 2 Handstone (B)				2	1	4		1		1	1		1			1	7			1	20	10	50
B F 1 Axe/Celt (B)				1	1	2				1				1			2				8	6	30
B C 1.5 Palette (B)						1		1				1				1				2	6	5	25
B A 2 Hammerstone (B)						2					6			2			5				15	4	20
B C 2 Abrader (B)										1				1	1	4					7	4	20
B X 4 Pigment (B)						1							4	1	1						7	4	20
B X99 Misc. worked (B)						1				1						7	3				12	4	20
B C 1 Abrading slab (B)					1									1						1	3	3	15
B C 2.3 Sander (B)						1									4	1					6	3	15
B B 1.1 Quern roughout (B)														1			1				2	2	10
B C 1.3 Sanding slab (B)													1			2					3	2	10
B C 2.2 Abrader-knife (B)				1																	1	1	5
B D 1 Polishing slab (B)																				1	1	1	5
B D 2 Polisher (B)						3															3	1	5
B G 2 Weight (B)																	1				1	1	5
B H 1 Stone vessel (gen) (B)						1															1	1	5
C A 2 Hammerstone (C)							1							4	1	2	17	1			26	6	30
C C 1.5 Palette (C)				1		1									1		1	1		3	8	6	30
C B 2 Handstone (C)								2								1	1			1	5	4	20
C C 2 Abrader (C)					1	1				1							1				4	4	20
C F 1 Axe/Celt (C)						1	2			1							8				12	4	20
C B 1 Quern (C)						2										1	6				9	3	15
C B 1.1 Quern roughout (C)						2		2									7				11	3	15
C C 1.3 Sanding Slab (C)													1			3	2				6	3	15
C D 2 Polisher (C)																	9	1		1	11	3	15
C F 1.1 Axe/Celt pre-form (C)							2							1		1					4	3	15
C C 2.2 Abrader-Knife (C)							1							1							2	2	10
C C 2.3 Sander (C)													2			1					3	2	10
C X 1 Stone ball (C)																1	1				2	2	10
C X 5 Figurine-related? (C)	1																1				2	2	10
C A 1 Worktable/anvil (C)																	1				1	1	5
C A 4 Pestle (C)																	2				2	1	5
C C 1 Abrading slab (C)																	1				1	1	5
C E 1 Grooved abrader (C)																	1				1	1	5
C E 1.1 Shaft straightener (C)																	1				1	1	5
C F 2 Chopper (C)																			1		1	1	5
C F 3 Stone hoe (C)																	1				1	1	5
C H 2 Stone bowl (C)																1					1	1	5
C X99 Misc. worked (C)							1														1	1	5
Total B + C	5	1	1	9	8	87	23	10	1	22	76	1	29	50	35	38	316	5	1	16	734	20	100

(*continued on next page*)

Table 6 (*continued*)

	Level South J	South K	South J	South K	South L	South Q	South R	South S	South K	South P	South Q	4040 F	4040 G	4040 G	4040 G	4040 G	4040 G	4040 G	4040 H	4040 H	Total	No. houses	Ubiquity (%)
No. types	3	1	1	6	5	16	7	5	1	8	4	1	7	11	7	15	25	4	1	8	41		
Diversity (%)	7	2	2	15	12	39	17	12	2	20	10	2	17	27	17	37	61	10	2	20	100		
Total broken	4	1	1	8	7	80	16	6	1	20	76	1	26	44	33	27	255	2		11	619	19	95
No. types (B)	2	1	1	5	4	11	2	3	1	6	4	1	5	8	5	7	8	1	0	5	18		
Diversity (%) (B)	11	6	6	28	22	61	11	17	6	33	22	6	28	44	28	39	44	6	0	28	100		
Total complete	1			1	1	7	7	4		2			3	6	2	11	61	3	1	5	115	15	75
No. types (C)	1	0	0	1	1	5	5	2	0	2	0	0	2	3	2	8	17	3	1	3	23		
Diversity (%) (C)	4	0	0	4	4	22	22	9	0	9	0	0	9	13	9	35	74	13	4	13	100		

Sherratt, noting that irrigation and plough farming appeared much later, pointed out the importance of early animal herding (sheep-goat) and, later, domestication of draft animals, but suggested that early Neolithic groups had egalitarian characteristics (Sherratt, 1981: 297), while some suggest that rebuilt houses could indicate wealth transmission (Shennan, 2011). At Çatalhöyük, we have house variations and feasting, but we don't know whether they mean competitive aggrandizement (Hayden, 2001a,b, 2003, 2004, 2009), or cooperation (Bogaard et al., 2009; Kuijt, 2000a). If some hoe-farming societies are more complex because of land scarcity (Gurven et al., 2010: 52–53), at Çatalhöyük land scarcity was not a problem; the site was almost alone in the Konya Plain (Baird, 2005). Thus, uncertainties persist about social complexity at Çatalhöyük.

We can explore these issues via house-by-house artefact inventories. If Çatalhöyük conforms to the patterns found by Gurven et al. (2010), we would expect little or no surplus production or craft specialization; low levels of material wealth; little evidence for material inequality; and few or no indications of material wealth transmission. We would expect property rights (especially in land) to be vested in corporate groups (e.g. lineages), not households, and to be based on shared use-rights of access (usufruct). Gurven et al. (2010) also argued that attitudes to material goods in horticultural or hoe-farming societies are similar to those of hunter–gatherers (Smith et al., 2010b). On the other hand, Çatalhöyük was practicing herding of some animals (sheep-goat are domesticated) but not others (cattle appear to be wild) (Russell and Martin 2005). Pastoralism in general is associated with inegalitarian characteristics and material wealth transmission, in the study by Borgerhoff Mulder et al. (2010). How, then, does Çatalhöyük fit into these models, if at all? Unlike the ethnographies on which the models are based, the data from Çatalhöyük are unambiguously free from the problem of contact with modern complex societies and thus permit a test of these models.

"Material wealth" and the problem of value at Çatalhöyük

If ground stone tools were critical to Neolithic food preparation and craft production, did some have special value? Assessing value is difficult (Appadurai, 1986: 20–21; Bevan, 2007), but an artefact type may have had special value (1) if it is made of material imported from a considerable distance; (2) if there were difficulties associated with importing; and (3) if manufacture was unusually labor intensive.

Çatalhöyük lies in a Quaternary alluvial setting (Doherty, 2008; MTA, 2002; Rosen et al., 2005) of lake limestones, chalks, marls, gypsum and travertines – all useless for tools requiring hardness, impact strength, or abrasive texture (Schumann, 1992). These materials were rarely used for ground stone objects. Most artefacts were made of volcanic rocks, chiefly andesites and basalts, of which the nearest sources were 35 km away (Fig. 1, Table 2) (MTA, 2002; Türkmenoglu et al., 2005). Andesites and basalts were particularly used for querns and handstones, which were highly fragmented (Table 2, Fig. 5). Other materials were available closer by, e.g. sandstone (4.5 km distant), but andesites and basalts are better for food processing because rock particles are not easily detached. This is why andesite and basalt were (and are) so widely used, worldwide, for millstones (Williams-Thorpe and Thorpe, 1993). Boulders for the largest tools – the querns – would have required long-distance transport. Since some querns were very large; transport would have demanded cooperative effort and strength (Fig. 14). Thus, querns probably had special value.

Another possibility might be diabase axes/celts, the only tools made of this green material, perhaps chosen partly for symbolic reasons (cf. Boivin and Owoc, 2004). Other possible prestige items, which are rare and appear in the site's later levels, were fine andes-

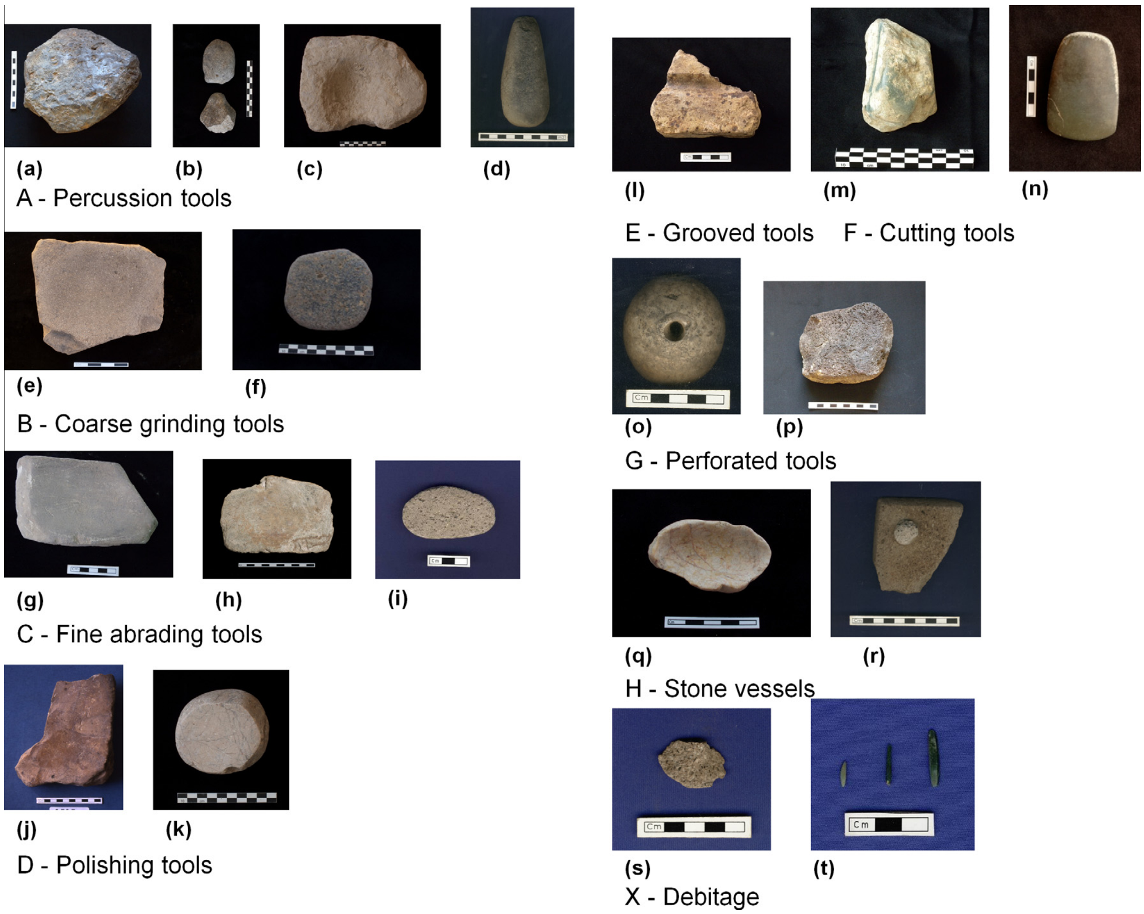

Fig. 4. Overview of ground stone artifact classes and types. For technotypology, see Wright et al. (2013). (a–d) Class A, percussion tools: (a) anvil, vesicular basalt; (b) hammers, massive basalt; (c) mortar, andesite; (d) pestle, massive basalt. (e and f) Class B, coarse grinding tools: (e) large quern, andesite; (f) handstone, vesicular basalt. (g–i) Class C, fine abrading tools. (g) abrading slab, fine sandstone; (h) palette, schist; (i) abrader, fine pumice. (j and k) Class D, polishing tools. (j) polishing slab, hard limestone; (k) polisher, hard limestone. (l) Class E, grooved tools: grooved abrader (shaft straightener), fine andesite. (m and n) Class F, cutting tools: (m) axe-celt pre-form, diabase; (n) axe/celt, diabase. (o and p) Class G, perforated tools. (o) macehead, hard limestone; (p) perforated weight fragment, vesicular basalt. (q and r) Class H, stone vessels. (q) miniature bowl, hard limestone; (g) fragment of footed rectangular tray, view of base, fine andesite. (s and t) Class Y, cores and debitage: (s) andesite flake; (t) diabase bladelets.

ite trays (the only complex vessels) and maceheads. Apart from these four types, most ground stone tools were made by simple lithic reduction techniques (Wright et al., 2013). Investment in decoration of ground stone tools as special material wealth items is not clearly indicated in most artefacts. Notably, very different patterns can be seen in other early Neolithic sites (e.g., Özkaya and Cosku, 2009). Other forms of wealth (e.g. health, or ‘embodied wealth’) (Bowles et al., 2010) may have been generally more important at Çatalhöyük East.

Household conventions of ground stone tool use: Building 77 and other houses

Were ground stone artefacts private household property, or under household control?

This demanded investigation of whether artefacts came mainly from within buildings or equally from external yards or roofs (shared neighborhood space) and middens (discard).

Most artefacts came from building interiors (Fig. 6). Of course, the site is mostly buildings, but even so, exterior yards with firepits revealed only low-density “background noise” of broken items (Table 4) and a few unbroken hand tools, indicating that communal use of ground stone tools in these yards was not significant. We found no clear indication of the use of ground stone on rooftops

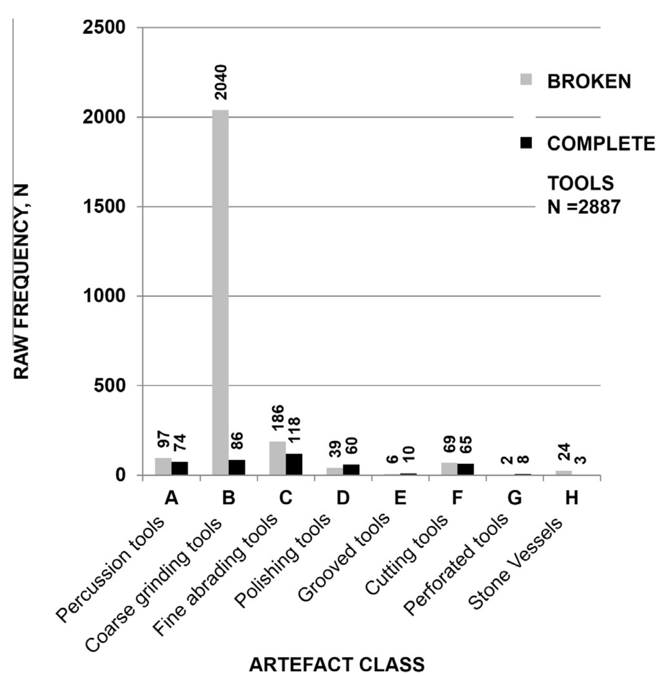

Fig. 5. Numbers of broken and complete tools, by artifact class, Çatalhöyük East, stratified contexts. Quern fragments greatly dominate the assemblage.

(Wright et al., 2013). Middens revealed far fewer artefacts than expected, despite housecleaning (Hardy-Smith and Edwards, 2004).

Most evidence for ground stone manufacture also came from buildings. Debitage – chiefly andesite flakes – was mostly found in houses, as were most quern roughouts and axe/celt pre-forms (Tables 4–6; Figs. 6 and 19). The evidence also includes a quern-making area in Building 77. This area is shown in Figs. 8 and 9a, with its hammers and unfinished roughouts shown in Fig. 13. This does not require us to infer that *all* procedures in ground stone artefact production were always conducted within buildings. Large items in particular (e.g., querns) may well have been reduced to roughout stage at quarries or in external areas, as seen ethnoarchaeologically (Hayden, 1987) and archaeologically (Shimelmitz et al., 2005). It is simply that (at this writing) we have no evidence for quern production in exterior areas, while we do have extensive evidence for ground stone tool production (or modification) in interior spaces.

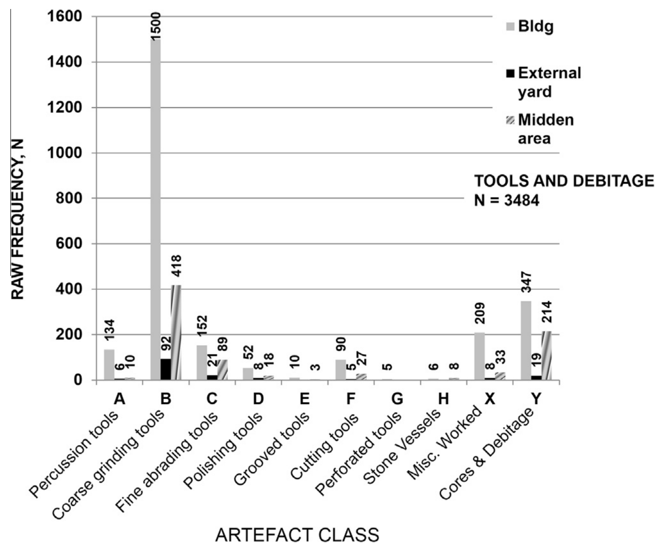

Fig. 6. Provenance of ground stone artefacts: building interiors, external yards, middens, Çatalhöyük East, stratified contexts. Bldg = building interiors. Most artefacts come from within buildings.

Turning to artefact use, burnt buildings tell us about spatial and social conventions. We begin with an elaborate building (77) and then ask whether it is typical. In Building 77 (Fig. 8), floors revealed artefact manufacture, storage and use of tools in daily routines, and abandonment practices. In the storage room, tools from floor were fragmentary, although plant remains occurred (Bogaard et al., 2013). Unbroken tools were stored in private bins or basins, one with "hardware: " pestles, anvils, abraders, polishers, one well-worn stone hoe and a broken digging stick weight (Fig. 10) (for other hoes, see Hole et al., 1969; Lloyd and Safar, 1945; Milner et al., 2010). These suggest routine craft production and agricultural tools; the hoe and digging stick weight imply tools of one farmer. Another bin revealed a small, complete, portable plano-convex quern, a handstone, and botanical remains (Fig. 11b). These were probably food processing tools. The quern could have been used in the bin, but was readily removable.

Larger tools were found in the reception room, e.g. a large, fixed, heavy, essentially immovable andesite quern, probably used for food processing, at the doorway to the bin room (Fig. 8). Other immovable tools included a massive sandstone abrading slab with grooves (Fig. 12c), probably a whetstone/sharpening tool; four diabase axes/celts were arranged around it. Six other axes/celts were found, an unusually high number, raising questions about group activities involving axes.

The north platform revealed another large quern and evidence for quern manufacture: hammers, roughouts, debitage (Fig. 8, 9a, 13). This cluster is unique on the site, so far. The material is consistent with tools and debris of basalt manufacturing sites, both ethnographic and archaeological (Hayden, 1987; Shimelmitz et al., 2005; Wright et al., 2013).

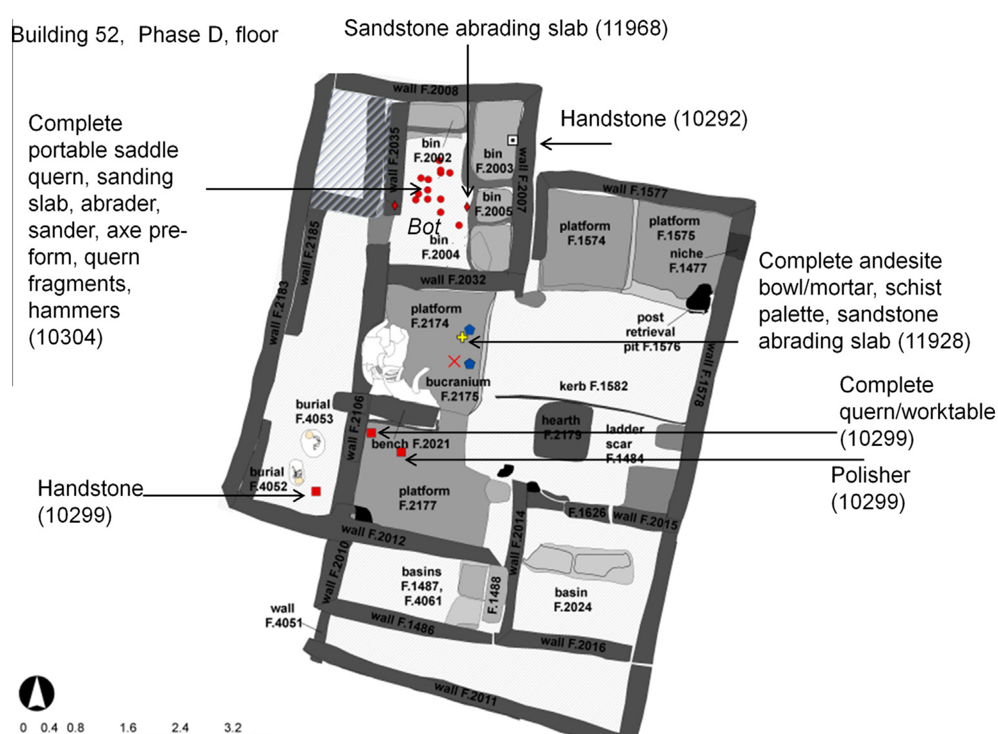

Fig. 7. Plan of Building 52 (Area 4040) showing materials from floors and features. The worktable is shown in Fig. 12b. Bot = botanical remains. See also Twiss et al. (2008). The pattern of portable querns stored in bins or side rooms, with a larger, heavy, fixed quern in the living room, is also seen elsewhere, e.g. Building 77. See Figs. 8, 11, 12.

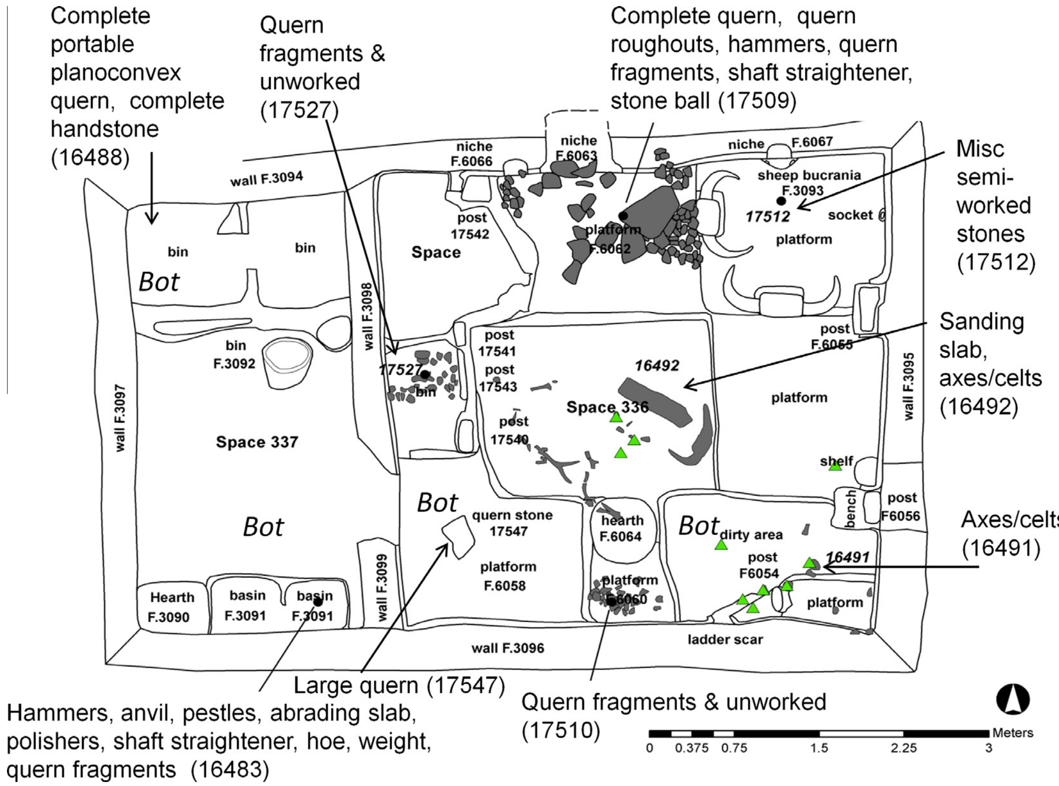

Fig. 8. Plan of Building 77 (Area 4040) showing materials from floors and features. Bot = botanical remains. Small triangles are axes/celts. Note the portable quern and handstone in bin (16488); the hardware cabinet (16483); the heavy, fixed living-room quern (17547); and the stoneworking area (17509).

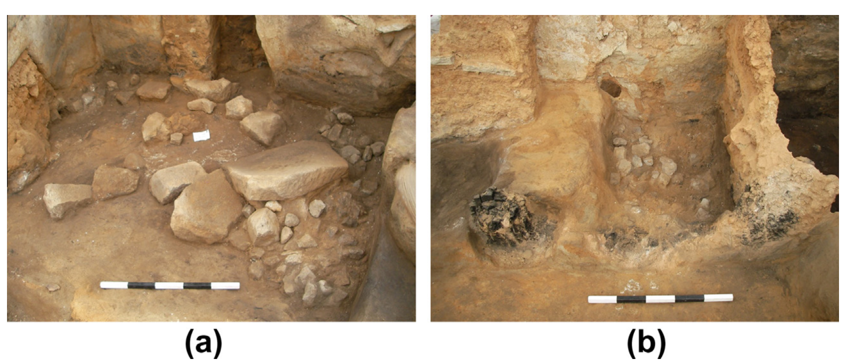

Fig. 9. Building 77: (a) the stoneworking area, unit 17509; (b) bin, unit 17527, with quern fragments of different andesites.

However, the cluster also reveals deliberate breaking of querns. Small hand-sized fragments were seemingly being detached from querns (Fig. 13b and c). Was this simply part of the manufacturing process? Not entirely, nor is it mere fire damage. Some large roughouts were broken exactly in half (Fig. 13d–e) and halves were found on opposite sides of the room (Fig. 13d). Breaking of querns would have required effort; andesite has high impact strength (Schumann, 1992). Many small quern fragments were found in bins (Fig. 9b). Most were about the size of a human hand. Fragments did not refit, and were made of different andesites, so this is not in situ decay of whole objects. Additional evidence of deliberate breaking of querns was found in other buildings (below and 15).

Private property vs. shared equipment: portable vs. immovable querns

How typical is Building 77? Some conventions find parallels in other buildings. Unbroken querns occur in the same two sizes: small planoconvex querns and large, heavy querns (Fig. 18). Small, planoconvex querns are fairly common. They appear in bins or cubicles and occur in isolation, not in clusters, e.g. Buildings 52, 68, 58, 65, 44, and Space 88 (Figs. 7, 11, 15c–d). Small abrading slabs (Fig. 4g) also occur in bins (Building 1) (Baysal and Wright, 2005: Fig. 13.1, No. 7). These are all highly portable items, easily removed from bins for use anywhere. They constitute a small-scale, mobile processing system, under household control, involving carefully-stored private property.

By contrast, large querns are rare and could not have been easily moved (Figs. 12 and 18; Tables 5 and 6). Thus, in addition to a portable processing system, there was a fixed one: people had to move to these querns to use them. The rarity of these objects raises two possibilities: that most households had them and that they were destroyed; or that large querns were shared by multiple households. The latter seems more likely, since (1) small querns survive in higher numbers; (2) most quern fragments from houses are small and suggest fragmentation of smaller querns, not very large ones.

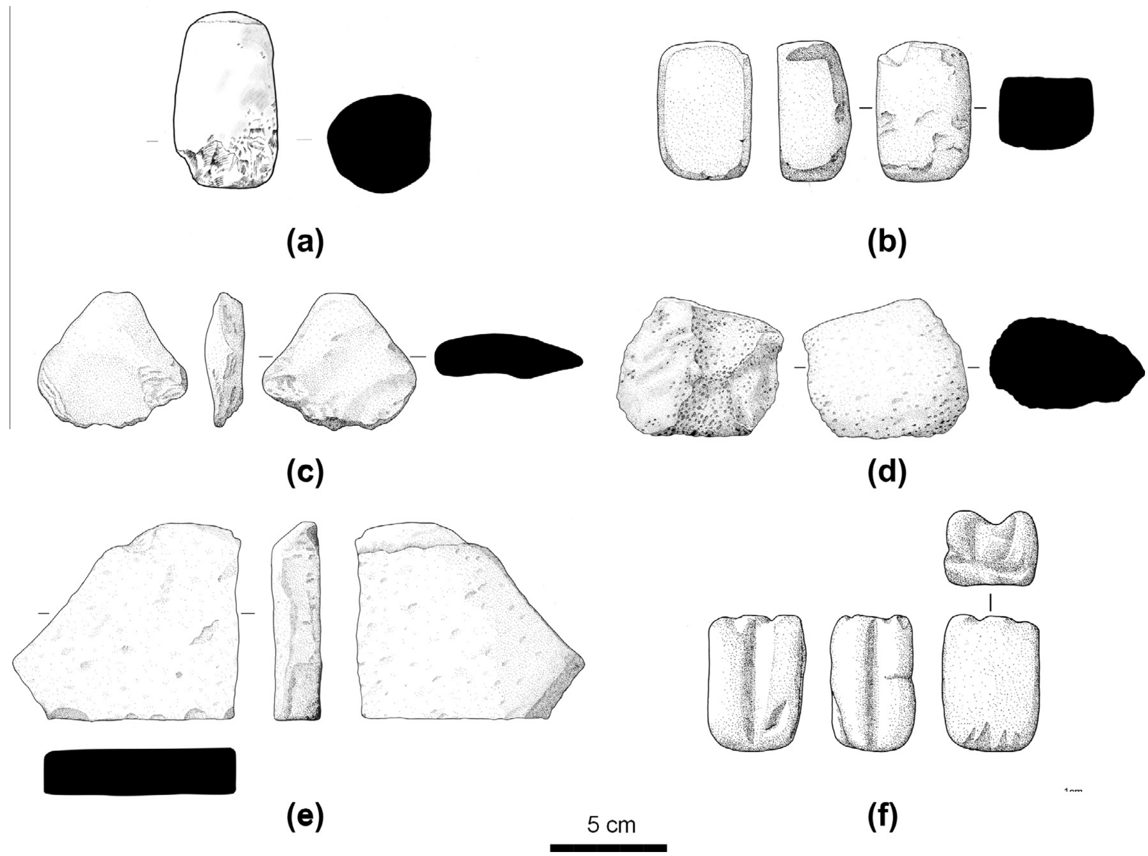

Fig. 10. Building 77: selected artefacts from the 'hardware cupboard,' unit 16483. (a) cylindrical pestle, andesitic basalt; (b) polisher, hard limestone; (c) stone hoe, quartzitic sandstone; (d) digging stick weight, vesicular basalt; (e) tabular quern fragment or abrading slab, medium texture andesite; (f) shaft straightener/grooved whetstone, fine textured sandstone. Illustrations by Kathryn Killackey.

Querns through time and transmission: use-lives, deliberate breakage, storage and ritual placements of fragments

Unbroken querns have flat or shallow use surfaces; some look "new" (Fig. 11a and b). Even the most heavily worn quern in the assemblage (Fig. 12d) was not deeply concave. Thus, complete querns were not used for long periods.

Most houses revealed many small (hand-sized) quern fragments in bins and in many other contexts. These small fragments are the most common artefact type (Table 2) and the most ubiquitous tools in all houses (Tables 5 and 6). The extensive fragmentation cannot be explained by natural decay, since whole querns survive well on many Neolithic sites. Querns were special targets for destruction. Of all artefact classes, querns and handstones were the least likely to survive complete (Fig. 5). Some fragments were found in special deposits suggesting abandonment rituals, e.g. Buildings 65 and 44 with edge fragments set up on hearths and halved querns deposited face down in pits or on edge (Fig. 15b–d).

Because small quern fragments are so numerous and ubiquitous, and because they were found clustered in bins, we believed initially that they simply reflected conservation and curation of andesite and the recycling of old tools for use in other ways (Baysal and Wright, 2005). Such fragments could have been used as heating stones, as casual grinding tools, and in construction. We found some evidence of these practices, but not enough to explain the overwhelming numbers of small fragments or the rarity of complete querns and handstones. Furthermore, querns were broken even though they were not worn out; even fragments had flat or shallow use surfaces (Figs. 13c and 15c). Destruction was seemingly driven by other motivations. Thus, querns had short use-lives, while quern breakage was deliberate. The intentional breakage of querns in particular is evident in (1) an activity area showing this (Building 77) (Figs. 8, 9a, 13); (2) consistent small sizes of many fragments, which were collected from different querns and stored in bins (Fig. 9b); (3) abandonment of broken querns in ritual placements (Fig. 15); and (4) the extremely high breakage rate, and uniquely low survival, of complete examples of querns, relative to all other artefact classes (Fig. 5).

Short use-lives and deliberate breakage show that querns were not transmitted, i.e. handed down to later generations. We found support for this in rebuilt houses, e.g. Buildings 65-56-44. A complete quern roughout was abandoned in the earliest building (65); the inhabitants of the later building (56) did not retrieve and use it (Figs. 14d, 16–17; Tables 5 and 6). Querns appear to have been used in connection with the life of a house and then abandoned or broken at abandonment. They were not transmitted or cycled upward as houses were rebuilt. This is discussed further below.

Household self-sufficiency? Ubiquity of standard house toolkits, or not

Did houses originally have comparable, comprehensive toolkits? If so, this would suggest house autonomy and self sufficiency. If not, it would indicate cooperation and sharing, or inequality of access.

Tables 5 and 6 show distribution data for broken and unbroken artefacts from 20 buildings, organized by area and house type. Both tables reveal wide variations in absolute numbers of artefacts, a subject to which we will return. Meanwhile, can we tease out a common suite of artefacts in a majority of houses? To do this, we explore ubiquity of artefact types, i.e. the percentage of houses containing a particular type.

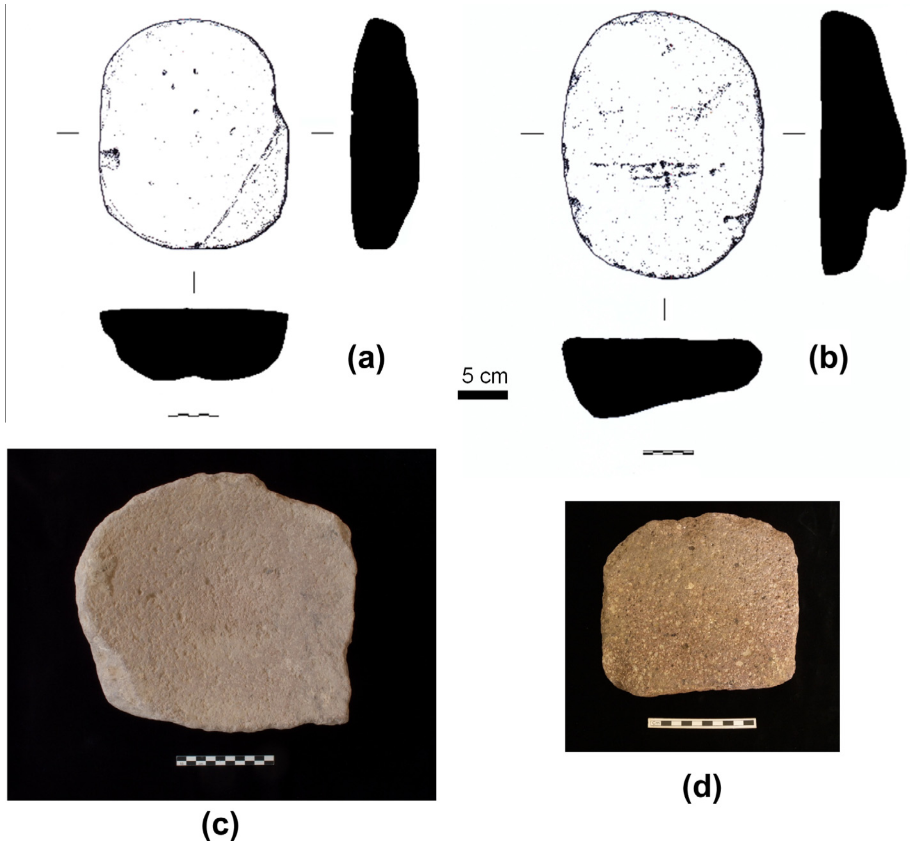

Fig. 11. Small, portable planoconvex querns: (a) andesite quern from Space 88, a small cubicle attached to Building 3; (b) fine textured andesite quern found with a handstone and botanical remains, in a bin in Building 77, unit 16488. (c) quern from Building 68, unit 14072, medium texture andesite; (d) quern from Building 58, unit 11955, coarse porphyritic andesite. Illustrations by (a) K. Wright and (b) Lyla Pinch-Brock and Elisabet Diaz-Pila.

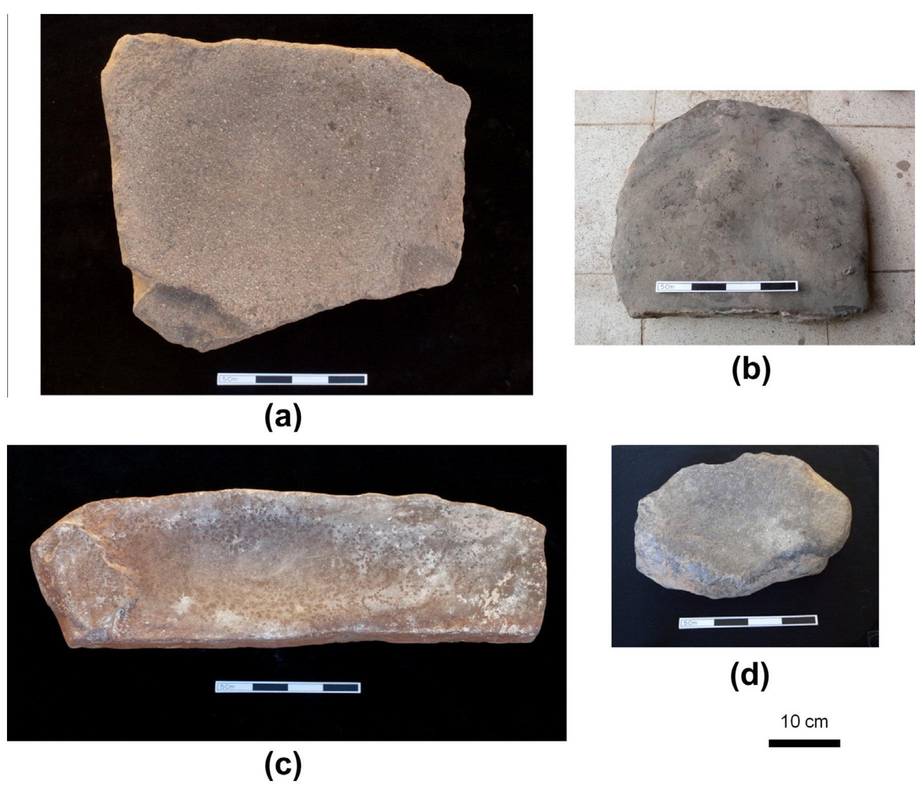

Fig. 12. Large, heavy querns and slabs from house interiors. (a) Large andesite quern from the stoneworking area of Building 77, unit 17509; (b) quern/worktable from Building 52 floor, unit 10299; (c) sandstone abrading slab from the center of the large room in Building 77, unit 16492; (d) quern, dense vesicular basalt, from Building 77 room fill.

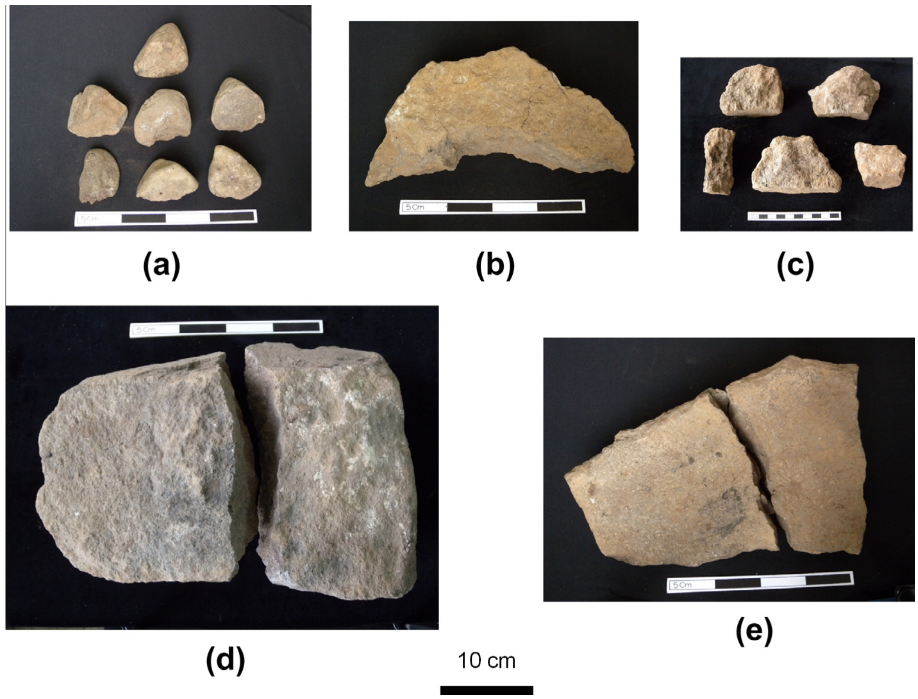

Fig. 13. Artefacts from the stoneworking area, Building 77, unit 17509: (a) edged hammers, dense andesitic basalt (cf. 'pics' described in Hayden, 1987). (b) quern from which fragments were detached, medium texture andesite; (c) edge view of quern fragments; note flat use surfaces on bottom, medium texture andesite; (d) broken quern roughout, fine andesite, with working of sides but unfinished use surface; the two halves were found on opposite sides of the large room; (e) halved quern roughout, coarse andesite.

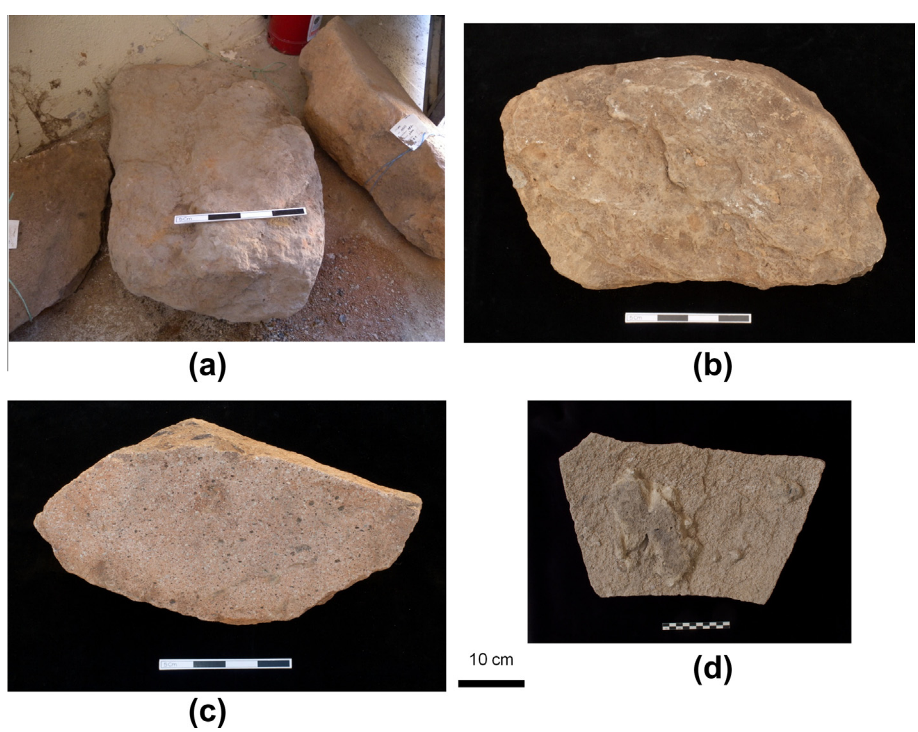

Fig. 14. Large quern roughouts. (a–c) are from Building 77: (a) large boulder, minimally modified, coarse dacitic andesite; (b) quern roughout with flaking, coarse andesite; (c) quern roughout, coarse dacitic andesite, with finished but 'new' use surface and flaked V-shaped base; (d) unfinished quern roughout, fine-textured andesite, found in 'cleanup cluster' of Building 65 (see Fig. 15a); sides are finished but use surface is incompletely pecked

Table 5 presents total house inventories of all artefacts from all interior contexts (including construction, room fills etc.). It shows artefacts in descending order of ubiquity. Since breakage of querns was deliberate, broken and complete querns are treated as separate types.

The table shows that a "core group" of basic equipment was found in 50% or more of the houses. Most universal are quern fragments and andesite flakes, followed by a range of small hand tools, many relating to craft production. Noteworthy in this group are

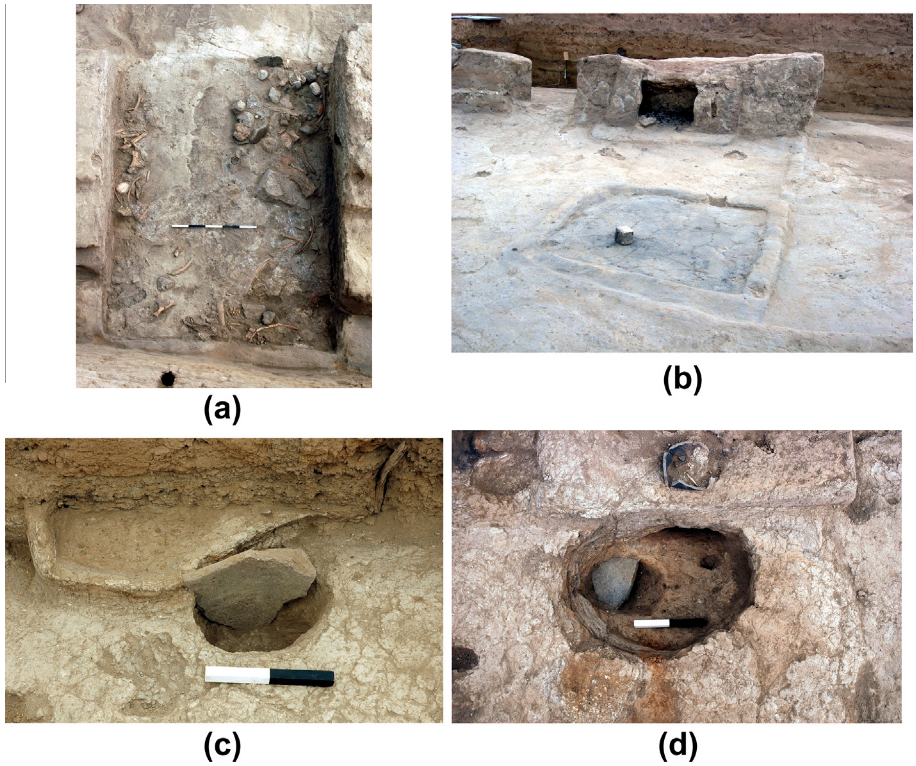

Fig. 15. South Area: (a) Building 65, cleanup cluster in niche, unit 14019; (b) Building 65, quern edge fragment placed on hearth, unit 13358; (c) Building 44, quern fragment on edge in pit; (d) Building 44, halved quern fragment in pit next to hearth, use surface facing down touching the bottom of the pit.

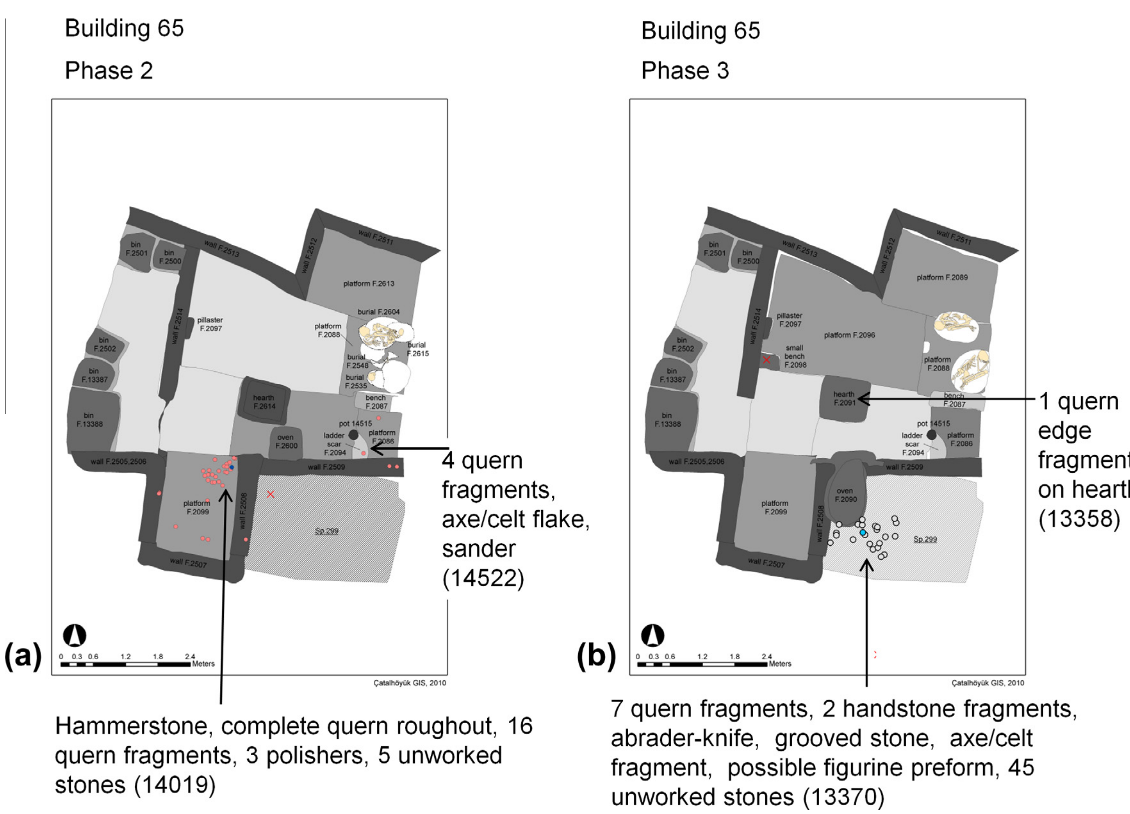

Fig. 16. Building 65, South Area: (a) Phase 2; (b) Phase 3. In (a), the unfinished quern roughout abandoned in Phase 2 indicates failure to transmit a viable quern to residents of later houses above this phase, e.g. Phase 4, shown in (b); see also the later buildings above Building 65, in Fig. Fig. 17a-b.

handstones (portable food processing tools), axe/celt pre-forms, axes/celts, and pigment. Collectively, the core group tools indicate relatively equal access to simple tools and materials. Notably, a majority of households seem to have (1) quern fragments (mostly

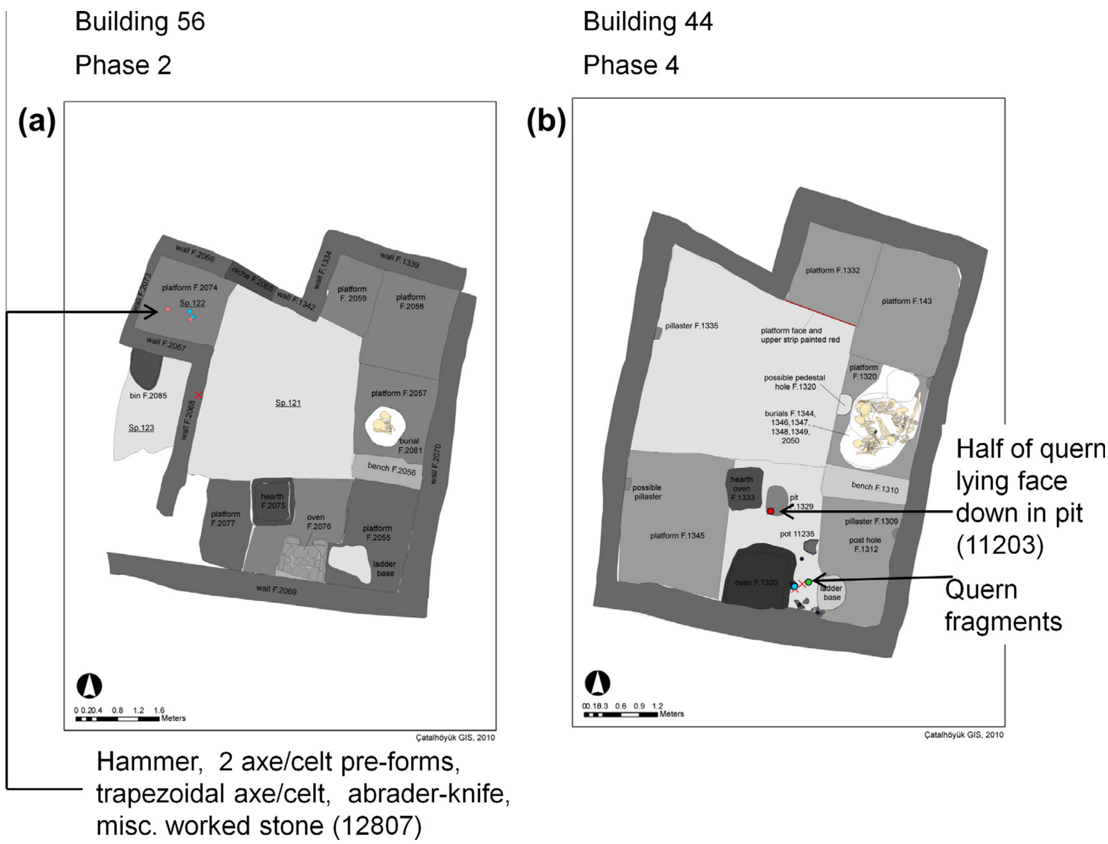

Fig. 17. Houses built above Building 65 (see Fig. 16). (a) Building 56, Phase 2, floor artifacts; (b) Building 44, Phase 4. In (b), note the deliberate destruction and ritual abandonment of the half quern (see Fig. 15d).

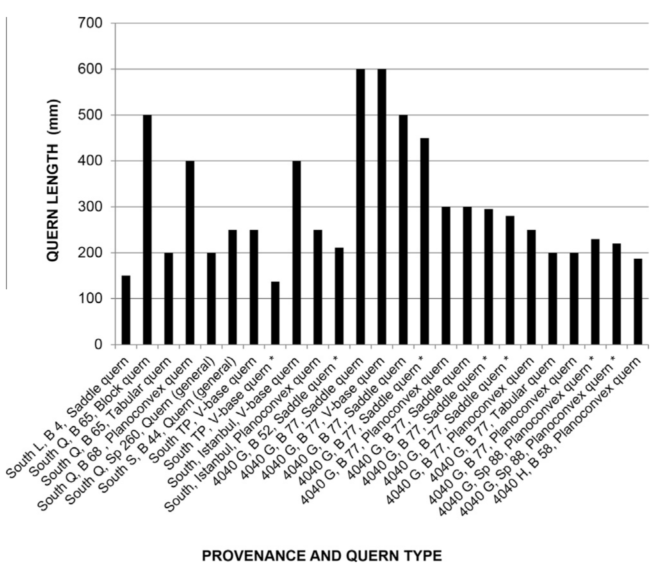

Fig. 18. Size categories, by quern length, of complete querns from Çatalhöyük East, ordered by area and level. Querns were classed in size categories according to maximum length (e.g., <500 mm, <450 mm), hence figures do not always reflect precise measured lengths of each quern, except where marked by an asterisk*. Samples are small, but the largest querns seem to come from Level South Q and later; and from Area 4040 G (probably contemporary with South N) and later.

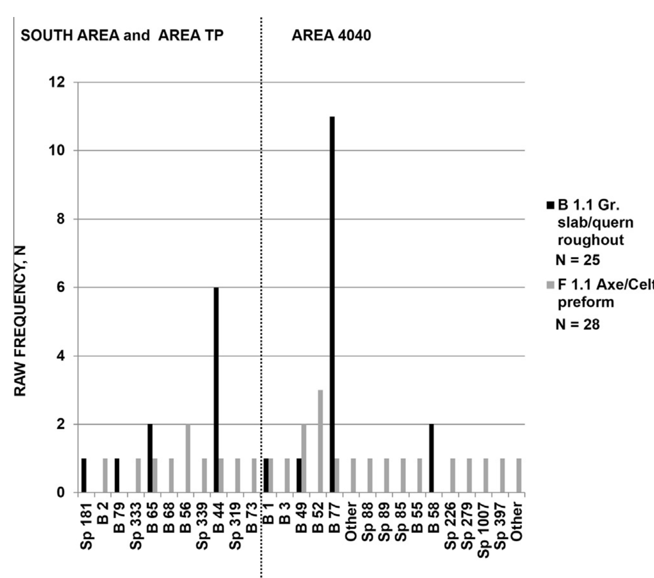

Fig. 19. Distribution of all quern roughouts and axe/celt pre-forms in the Çatalhöyük East database as of 2012. Both suggest in-house manufacture, but axe-celt pre-forms are widely distributed while quern roughouts display more clustering, particularly in Buildings 77 and 44.

small); (2) involvement in andesite working/tool modification; (3) control of axe/celt production, and (4) access to pigment.

A second "middle range" of types was found in 20–40% of the houses. These expand the scope to abrading tools and include larger tools, notably complete querns and unfinished quern roughouts. Finally, a third group of tools are rarities, occurring in only 5–15% of houses. These include possible prestige items (vessels, maceheads); agricultural tools (stone hoes, weights); and shaft straighteners.

Table 6 shows only floor inventories, i.e. artefacts from floors, clusters, and fills of features (bins, pits, niches, basins). These encompass primary refuse, stored items, sweep-ups and special placements. In this case, broken and complete tools are viewed separately. Looking at broken tools (Table 6, top), we see patterns similar to those of the total house inventories (Table 5), except in this case the "core group" tools appear in fewer houses overall – a result of housecleaning. The hierarchy of ubiquity is about the same. Turning to complete tools (Table 6, bottom), overall ubiquity levels for all tools are even lower, but the most ubiquitous tools are in the "core group" established from the total house inventories. Complete tools from floors are rare, occurring in 30% or fewer of the 20 houses.

To summarize, ground stone artefacts were made, used, destroyed and abandoned largely inside houses. Kits of complete tools, stored in secluded bins, tell us that small artefacts were, at some level, private property. Despite much housecleaning, we can identify a relatively common "core toolkit" of simple tools in a reasonably wide range of houses.

However, many tool types occur in less than 50% of the houses, often in only a tiny minority of houses. In particular, complete querns and quern roughouts occur in only 30% of houses. Agricultural tools are rare, as are vessels, maceheads, and shaft straighteners. The extent of tool destruction is also variable; complete tools from floors are also rare. Thus, while there is a core and somewhat common toolkit of simple tools, toolkits are not standardized and these houses do not seem entirely self-sufficient.

Inequality vs. sharing: artefact numbers, diversity, querns, storage

Are these variations a result of cooperative sharing or competitive, unequal access to ground stone tools? Sharing vs. unequal access can be approached by looking at (1) overall variations in artefact numbers; (2) diversity, i.e. how many different artefact types are present in a given house, as a percentage of the total number of types found in all houses; (3) complete tools from floors; (4) distributions of unbroken, complete querns, especially large querns; (5) occurrences of quern roughouts; and (6) relationships between ground stone and storage features.

Artefact numbers

Tables 5 and 6 show wide variations in artefact numbers. Caution is required, because of burning, housecleaning and abandonment. However, burned buildings themselves show wide differences. First, the sheer quantities of material from Building 77 are remarkable. Its 441 artefacts comprise 22% of all artefacts in the total house inventories from all 20 buildings (Table 5). If we consider only floor data from Area 4040 Level G (Table 6) – Building 77's roughly contemporary neighborhood – the data are even more striking. Buildings 1, 49, 59, 52, 77 and 3 collectively revealed 473 artefacts from floors and features. Of those, 316 artefacts derived from Building 77 – a full 67% of all artefacts from this sample of the neighborhood floors. It might be argued that Building 77 is a simple case of burning that resulted in abrupt abandonment and therefore high numbers and a high diversity of artefacts. However, this does not seem to explain fully the concentration of material in Building 77. Other buildings in 4040G were badly burned and presumably abandoned rapidly (e.g., Buildings 49, 52), but they revealed nothing like the unusual quantities of ground stone artefacts seen in Building 77, which suggests at least the possibility of unequal access.

Artefact diversity

The degree of artefact diversity can be affected by sample size, but Tables 5 and 6 show that type diversity in buildings is not purely a function of overall sample sizes from one house to another. Beginning with total house inventories, (Table 5), which buildings have 50% or more of all artefact types? Building 77 has the highest diversity: 76% of all artefact types from all 20 houses were present in it. The others are Buildings 52, 49, 52, 65, 44 and 58. Of these, all are special buildings, except for Building 58. High diversity thus tends to be associated with special buildings, but not strictly so.

Turning to floor data (Table 6), diversity is lower overall. However, the highest diversity figures for all artefacts appear in Buildings 77, 52, 65 and 49. For broken artefacts, the same buildings stand out. For complete artefacts, diversity is highest in Buildings 77, 52, 65 and 56. All are special buildings. Of other buildings, none come close to the diversity levels of these buildings, with one exception – Building 75 has a reasonably high diversity of broken tools from floors (33%). Interestingly, in this house, Bains found unique evidence of stone bead-making (Bains, 2012; Bains et al., 2013; see also comments in Hodder, 2013). In sum, high artefact diversity has a tendency to be associated with special buildings.

Complete tools from floors

Very few houses retained complete tools on floors (Table 6, bottom). Buildings 77, 52, 65–56–44 revealed the most; all are special buildings. This is not a simple matter of preservation by burning. Other buildings in Area 4040 G were burnt but do not reveal as many complete items on the floors. However, Building 77 stands out, with far more objects (61) than any other house.

Unbroken querns

In total house inventories (Table 5), 18 unbroken querns were found altogether in the 20 houses. Houses with complete querns included Buildings 77, 65, 44, and 52 – special buildings – but also the undistinguished Buildings 68 and 58, while a cubicle attached to undistinguished Building 3 (not part of it) produced one complete quern (not shown in the table) (Wright and Baysal, 2012). However, of all 18 unbroken querns from these 20 houses, Building 77 produced 12 of them (67%). Turning to the floor data (Table 6), only 9 complete querns were found on house floors. They appeared in Buildings 65 (2 querns); 52 (1) and Building 77 (6). All are special buildings. The 6 querns from Building 77 constitute 67% of all complete querns from the floors of the 20 houses.

Since querns come in two sizes (large and small), we would like to know about large and small querns on the site as a whole. Available data on quern lengths are shown in Fig. 18. We see that large querns are less common than small planoconvex types. The querns from Building 77 include some of the largest examples.

Quern roughouts

Looking at total house inventories (Table 5), we see that while andesite flakes are ubiquitous, quern roughouts were found in 30% of the 20 houses ("middle range" ubiquity). Which houses were they? A total of 23 quern roughouts were found in these 20 buildings (Table 5). They derived from Buildings 65, 44, 1, 49, 77 and 58. All are special buildings, except for Building 58. Building 77 produced 11 of the 23 roughouts – or 48% of the total. Turning to the floor data (Table 6), we find two broken roughouts from floors, in Buildings 77 and 49, both special buildings. Of unbroken quern roughouts (including reconstructed ones) from house floors, 11 in total were recovered from the 20 houses. Buildings 65 and 44 had two each. Building 77 revealed 7 quern roughouts, that is, 64% of all complete quern roughouts from 20 house floors.

This is striking given that (1) andesite flakes are ubiquitous; and (2) axe/celt pre-forms occur in 50% of houses – with no patterning regarding special buildings (Table 5). Caution is required here, but it seems possible that there was some specialization in quern manufacture associated with special buildings, while modification of andesite tools was normal in most buildings. Alternatively, Building 77 acted as a hosting place for a cooperative task group involved in quern manufacture.

The unequal distribution of unbroken querns and quern roughouts can be appreciated in Fig. 22. These graphs represent a variant of a standard measure of household income or wealth inequality used in economics, a measure known as a Lorenz curve. Lorenz curves are usually applied to industrial societies (Atkinson, 1980; Cowell, 2000: 105; Gottschalk and Smeeding, 2000; Kerbo, 2000; Lorenz, 1905; Nygard and Sandstrom, 1981). In such curves, the *x*-axis shows social units (e.g., households). The *y*-axis shows the percentage of total income or wealth held by the social units. Social units are ordered according to income/wealth, from lowest to highest and the data are presented cumulatively. Where households have perfectly equal access to a resource (or wealth or income), the distribution will be a straight line ($y = x$), also called the line of complete (or perfect) equality. Inequality is indicated by a concave distribution; the more concave the distribution is, the more inequality is indicated, since fewer households account for most of the income or wealth (Atkinson, 1980: 40–41).

Fig. 22 shows Lorenz curves for four artefact types. Schist palettes and handstones (Fig. 22a and b) display concave distributions, but the concavity is relatively shallow. By contrast, the distributions for unbroken querns and quern roughouts are extremely concave; only 30% of houses (6 of 20) account for 100% of these artefact types in each case. Most of these are special buildings, although not exclusively so (Buildings 58 and 68 are not 'special' on other grounds). The dominance of Building 77 is noteworthy.

Fig. 23 places these findings in a wider context of cooking and storage features, to which we now turn.

Ground stone tools, cooking features and storage features

From the foregoing, several patterns emerge. Household tools, including small querns, were common and were stored in bins, implying privately controlled household tools that could be moved around for small scale processing. Households were engaged in their own axe/celt production and in modification of andesite tools. Possibly, large querns for larger scale processing were set up in some houses but not others. Special buildings tend to have concentrations of numerous, diverse and complete ground stone artefacts, especially large querns and quern roughouts, and more complete tools were found on their floors. The data point to either (1) unequal access to large querns; (2) sharing of tools by multiple houses; or (3) very large differences in practice concerning the breaking of querns. They also suggest either specialization in quern making, or some buildings serving as cooperative arenas for task groups involved in quern manufacture.

Multi-household sharing, or differential wealth accumulation? A wealth accumulation model requires a closer look at storage and surplus. Bogaard et al. (2009: Table 5 and p. 663) analyzed numbers and volumes of storage bins for a selection of buildings and concluded that while bins mainly indicated production for domestic consumption, modest levels of risk-buffering "normal surplus" (Halstead, 1989) could be housed in side rooms. They also found variations between houses in storage capacity. Do ground stone tools correlate with this?

For the moment, the answer seems to be no, or at least not in a straightforward way. Drawing on Bogaard et al.'s storage data (2009, Table 5 and p. 663), and looking at floor assemblages (Table 6), we find that houses with unusually high storage capacities (e.g. Building 59, with 10 bins and an estimated capacity of 3360 l) do not necessarily display large ground stone toolkits. Building 65 has only 5 bins with a total capacity of about 1703 l, somewhat above the average (1233 l) – but it has a substantial ground stone assemblage. Building 52 revealed a modest 4 bins with capacity of 1531 l – and a large ground stone assemblage. At the low end of the storage scale, in Building 1, storage capacity was below average (1032 l); ground stone tools were also few; but this building revealed one of the highest concentrations of burials (Andrews et al., 2005; Boz and Hager, 2013; Cessford, 2007; Hillson et al., 2013; Hodder, 2007). As for Building 77, only 5 bins were found (including basins), while the ground stone assemblage is uniquely large and diverse, and hints at specialization. Thus, there are variations in storage capacities and also in ground stone assemblages, but assemblage size does not correlate directly with storage capacity. However, ground stone assemblage diversity, complete querns and quern roughouts do tend to be linked with special buildings (though not strictly so).

Since overall household surpluses were small (Bogaard et al., 2009: 664), it is difficult to argue for competitive household aggrandizement on these data – but we also cannot exclude it completely. We would be on more secure ground with a differential wealth model if querns had been found grouped in storage bins or in close groups of similar tools on floors in obvious use contexts. Instead, querns from Building 77 come from different context types (floors, bins, production areas, fills). So the data do not necessarily indicate differential accumulation or the use of querns in feasting. Even if we had such clusters, they could represent sharing networks linking a range of houses – i.e., the hosting of neighborhood task groups, in line with suggestions made by Düring (Düring, 2007). Such clusters of querns occur in other PPNB sites and may indicate such sharing (Byrd, 2005a; Wright, 2013).

However, the data are subtle. To place these observations in wider context of food preparation, Fig. 23a–b shows Lorenz curves for (a) number of cooking and storage features in 44 individual house phases, i.e., specific floors (see Table 7) and (b) number of five ground stone artifact types (here including quern fragments) from 20 whole buildings (all phases of a building; see Table 5). Grouping of ground stone assemblages by contents of whole buildings (as opposed to individual house phases) was necessary because numbers of artefacts for an individual phase are usually very small; and because artefacts may have cycled upward through buildings. Post-abandonment infilling may have affected these data to some degree, so the measure is imperfect, but it is assumed that such practices did not skew the patterning excessively (note the similarity of the curves for palettes, handstones and quern fragments in Fig. 23a).

Remembering that greater concavity implies greater inequality, in Fig. 23a we see that ovens, siderooms and hearths most closely approach the line of equality. Bins and basins display the most 'unequal' distribution among the features. In Fig. 23b, we find that the curves for palettes, handstones and quern fragments are comparable, with relatively shallow distributions (similar to that for bins and basins). Again, quern roughouts and unbroken querns display the greatest concavity, with 30% of buildings (6 of 20) accounting for 100% of these artifact types. Collectively, the data in Fig. 23 suggest that basic cooking facilities were standard features for most households, while storage features, ground stone tools, and especially quern roughouts and complete querns are much less equally distributed. There is a possibility, then, that some houses were accumulating larger surpluses; had unusual capacities for larger-scale food preparation; and specialized in quern production.

Table 7
Features in 44 individual house occupation phases at Çatalhöyük East: raw frequency and percentage frequency. Data from excavation reports. Key to building types: see Table 5.

Level	House phase (house type)	Hearths N	Hearths %	Ovens N	Ovens %	Bins + Basins N	Bins + Basins %	Siderooms N	Siderooms %	Reference
Features in 44 house occupation phases at catalhoyuk east: raw frequency and percentage frequency										
South J	18.2.2 (h)	0	0.0	2	4.9	4	3.8	1	2.2	Farid, 2007c ('Level X...') fig. 5.17 p 131
South J	23.2A (h)	2	4.3	0	0.0	0	0.0	1	2.2	Farid, 2007c ('Level X...') fig. 5.7 p 109
South J	23.2B (h)	1	2.2	1	2.4	0	0.0	1	2.2	Farid, 2007c ('Level X...') fig. 5.10, p. 115
South J	23.2C (h)	3	6.5	1	2.4	0	0.0	1	2.2	Farid, 2007c ('Level X...') fig. 5.12, p. 118
South J	23.2D (h)	5	10.9	1	2.4	1	1.0	1	2.2	Farid, 2007c ('Level X...') fig. 5.14, p. 122
South K	16 (h)	0	0.0	1	2.4	0	0.0	0	0.0	Farid, 2007a ('Level IX. . .'), pp. 183–184; 1 oven, remodeled 4 times
South K	17B (h)	1	2.2	1	2.4	2	1.9	1	2.2	Farid, 2007a ('Level IX. . .'), fig. 6.52
South K	17D (h)	1	2.2	2	4.9	3	2.9	1	2.2	Farid, 2007a ('Level IX. . .'), fig. 6.41, pp. 185–221; 2 ovens, 1 remodeled
South K	2.2A (u)	1	2.2	1	2.4	0	0.0	1	2.2	Farid, 2007a ('Level IX. . .'), fig. 6.4 p. 142 and pp. 154–155
South K	2.2B (u)	2	4.3	1	2.4	0	0.0	1	2.2	Farid, 2007a ('Level IX. . .'), fig. 6.4 p. 142 and pp. 154–155
South K	2.2C (u)	1	2.2	1	2.4	0	0.0	1	2.2	Farid, 2007a ('Level IX. . .'), fig. 6.13 and pp. 153–157
South K	2.4 (u)	0	0.0	1	2.4	0	0.0	1	2.2	Farid, 2007a ('Level IX...'), fig. 6.16 and pp. 158–160
South K	2.5 (u)	0	0.0	1	2.4	2	1.9	1	2.2	Farid, 2007a ('Level IX. . .'), fig. 6.18 and pp. 161–167
South L	6.2 (h)	2	4.3	1	2.4	5	4.8	1	2.2	Farid, 2007b ('Level VIII. . .'), fig. 7.16. One oven, two components
South L	6.3 (h)	1	2.2	1	2.4	3	2.9	1	2.2	Farid, 2007b ('Level VIII. . .'), fig. 7.25
South P	75 (u)	1	2.2	1	2.4	1	1.0	1	2.2	Regan, 2014a, in press
South Q	68 (u)	0	0.0	0	0.0	1	1.0	1	2.2	Regan, 2014b, in press
South Q	65.2 (h)	1	2.2	1	2.4	5	4.8	1	2.2	Regan, 2014a, in press
South Q	65.3 (h)	1	2.2	1	2.4	5	4.8	1	2.2	Regan, 2014a, in press
South R	56.2 (h)	1	2.2	1	2.4	1	1.0	1	2.2	Regan, 2014a, in press
South R	56.3 (h)	1	2.2	1	2.4	1	1.0	1	2.2	Regan, 2014a, in press
South S	44.2 (hb)	1	2.2	1	2.4	0	0.0	0	0.0	Regan, 2014a, in press
South S	44.3–4 (hb)	1	2.2	1	2.4	0	0.0	0	0.0	Regan, 2014a, in press
South S	44.5 (hb)	1	2.2	1	2.4	2	1.9	0	0.0	Regan, 2014a, in press
4040 F	5.B (he)	0	0.0	1	2.4	8	7.7	2	4.4	Cessford, 2007b ('Building 5'): fig. 11.1
4040 G	1.2A (hb)	2	4.3	0	0.0	2	1.9	2	4.4	Cessford, 2007a ('Building 1'): fig. 12.8
4040 G	1.2B (hb)	0	0.0	2	4.9	1	1.0	2	4.4	Cessford, 2007a ('Building 1'): fig. 12.19
4040 G	1.2C (hb)	0	0.0	1	2.4	4	3.8	2	4.4	Cessford, 2007a ('Building 1'): fig. 12.38
4040 G	1.3 (hb)	1	2.2	1	2.4	2	1.9	2	4.4	Cessford, 2007a ('Building 1'): fig. 12.52
4040 G	1.4 (hb)	2	4.3	1	2.4	1	1.0	3	6.7	Cessford, 2007a ('Building 1'): fig. 12.63
4040 G	59.2 (e)	0	0.0	1	2.4	3	2.9	2	4.4	House, 2014a, in press
4040 G	52.D (e)	1	2.2	0	0.0	8	7.7	2	4.4	Farid, 2014, in press
4040 G	52.E1 (e)	1	2.2	0	0.0	9	8.7	2	4.4	Farid, 2014, in press
4040 G	3.1B (u)	1	2.2	1	2.4	2	1.9	0	0.0	Tringham and Stenavovic, 2012: 98
4040 G	3.1C (u)	1	2.2	1	2.4	3	2.9	0	0.0	Tringham and Stenavovic, 2012: 104
4040 G	3.1D (u)	1	2.2	1	2.4	4	3.8	0	0.0	Tringham and Stenavovic, 2012: 107–108
4040 G	3.2 (u)	1	2.2	1	2.4	3	2.9	0	0.0	Tringham and Stenavovic, 2012: 112
4040 G	3.3 (u)	1	2.2	1	2.4	2	1.9	0	0.0	Tringham and Stenavovic, 2012: 118–119
4040 G	3.4A (u)	1	2.2	1	2.4	3	2.9	1	2.2	Tringham and Stenavovic, 2012: 122–123
4040 G	3.4B (u)	1	2.2	2	4.9	1	1.0	1	2.2	Tringham and Stenavovic, 2012: 131–132
4040 G	49.3–5G (b)	1	2.2	1	2.4	0	0.0	1	2.2	Eddisford, 2014, in press
4040 G	77 (e)	2	4.3	0	0.0	7	6.7	1	2.2	House, 2014b, in press
4040 H	58 (u)	1	2.2	1	2.4	0	0.0	1	2.2	Sadarangani, 2014b, in press; Farid and Zoroglu, 2005, fig. 20
4040 H	54 (u)	0	0.0	0	0.0	5	4.8	1	2.2	Sadarangani, 2014a, in press; Bogdan, 2005
Total		46	100.0	41	100.0	104	100.0	45	100.0	

Further exploration of these possibilities is amenable to statistical testing (e.g., Kolmorogov–Smirnov D-test; Gini coefficient) (Blalock, 1972: 262–265; Cowell, 2000: 111–112), but since the data are complex, this will be presented elsewhere.

Discussion

Specialization

If the foregoing data raise the possibility of household specialization in quern manufacture, this could have taken the form of cooperative hosting of quern-making activities in certain buildings. Other hints of specialization are unique stone bead-making evidence from Building 75 (Bains et al., 2013) and possibly stone figurine-making (see discussion in Baysal and Wright, 2005) although this needs more investigation (Nakamura and Meskell, 2013). Hence, stoneworking was a possible arena of house differentiation. If so, this did not apply to every category. The distribution of axe/celt pre-forms suggests that this was unspecialized and the ubiquity of andesite flakes means that modification of andesite objects was going on in most houses (Tables 5 and 6). Nonetheless, the roughout distributions are clustered. This can be appreciated by looking at the distribution of *all* quern roughouts in the Çatalhöyük East ground stone database (as of 2012), against all axe/celt pre-forms (Fig. 19).

If quern-making was specialized, it meant differential access to a key resource, not trivial to acquire or produce, that was fundamental to food preparation and consumption and to Neolithic technology generally. Specialization might imply special access to key resources (large andesite boulders) not easy to transport across a 35 km distance Similar questions have been raised about transport of large stones for production of stelae at Göbeklitepe (Banning, 2011; Schmidt, 2006). Other indications of household specialization have been documented in this time range, e.g. in beadmaking in PPNC seasonal camps (Wright and Garrard, 2003; Wright et al., 2008); in PPNB villages (e.g., Byrd, 2005a, Building 14; see also Barzilai, 2010) and there are other hints at Çatalhöyük East itself, such as the bead-making data (Bains et al., 2013) (see also Asouti, 2005: 87–88).

Ethnoarchaeology sheds light on milling in agricultural societies and on how millstone distributions are affected when grain is processed by specialists. In the absence of specialized milling, hand milling is commonly carried out by each household for its own consumption. In the archaeological record this finds expression in a correlation between the number of querns and the number of production–consumption units (Hayden and Cannon, 1984: 68f.). For example, in Hopi villages, each household tended to contain consistent sets of two or three metates (querns) (Bartlett, 1933: 14). However, when specialized milling is involved, consistent associations of millstones with household units are not close. Ethnoarchaeological accounts of Iranian villages documented private household storage of querns in bins; but also sharing of querns between households, in situations when a village is making use of specialist industrial milling. When specialists are used, querns are considered precious and sharing takes place (Hansen, 1961: 32, 56; Horne, 1980: 23, 1990; Kramer, 1982: 33f.; Watson, 1979: 168–169). Both patterns seem to occur at Çatalhöyük East: private household bin-storage (small querns) and sharing (larger querns). Thus, I suggest that (1) some households specialized in, or perhaps hosted, quern manufacture; and (2) large milling tools were shared. Ethnoarchaeological data cited by Hansen, Horne, Kramer and Watson (see references above) indicate that these two patterns go together.

Intensification

According to Shenk et al., the seeds of truly complex social inequalities lie in (1) agricultural intensification and (2) inheritance, especially of land (Shenk et al., 2010). Intensification resulting in higher food yields figures in many models of the origins of social inequality. Agricultural intensification is usually thought of in terms of field activities (e.g. plough/irrigation farming; larger groups of farmers) that raise yields at harvest level (Boserup, 1966; Goody, 1976; Shenk et al., 2010). However, prehistorians often use "intensification" to mean increased investment of effort in subsistence practices generally, or diversification of practices,

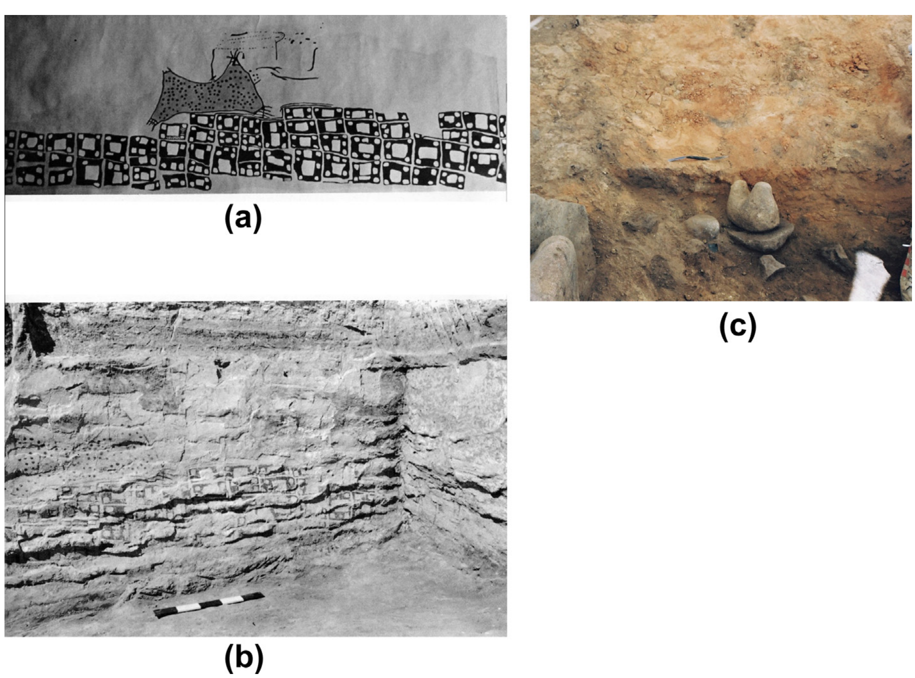

Fig. 20. (a) Reconstruction of painting from Mellaart excavations, probably a portrait of the village under a twin volcano (Mellaart 1967, plate 59); (b) photograph of the painting (Mellaart 1967, plate 60); (ibid.); (c) from a house in the Istanbul Area, Çatalhöyük East: planoconvex andesite quern found with clay figurine on top.

to extract higher food returns from restricted areas (e.g., with rising sedentism) (Hayden, 2009; Munro, 2004; Stiner et al., 2000).

In a broad sense, the late Epipalaeolithic and early Neolithic periods indicate intensification of labor in food preparation (and also craft production), probably a consequence of sedentism, rising populations and restriction of foraging territories. There was a quantum leap in ground stone assemblages (Wright, 1994; cf. Colledge and Conolly, 2010). In the Neolithic, rising emphasis on cereals as staples resulted in expansion of optional milling techniques (e.g., grinding of groats) as an addition to dehusking (not optional; cereals cannot be consumed without this). Dehusking can be achieved with stone mortars but requires wooden pestles (and, ethnographically, most often involves wooden mortars as well) (Hillman, 1984b; Meurers-Balke and Luning, 1992; Nesbitt and Samuel, 1995). The addition of milling to dehusking clearly entailed significant labor intensification, as shown by experiments, ethnographic data and possibly (though this is controversial) skeletal remains (Wright, 1994; cf. Meurers-Balke and Luning, 1992; Molleson, 2000; Peterson, 2002).

Though there are variations, a range of Late Epipalaeolithic base camps have assemblages dominated by mortars and pestles (e.g., Edwards and Webb, 2013; Edwards, 2013; Perrot, 1966; Rosenberg et al., 2012; Wright, 1991; also Rosenberg and Redding, 2000; Smith, 1972; , but the pattern is not universal; see Moore, 2000a). The Late Natufian saw rising frequencies of grinding tools (Wright, 1991, 1993; cf. DuBreuil, 2004; Valla et al., 2001). This continues in the PPNA, with nuances (Gopher, 1997; Mazurowski, 1997; Nierlé, 1983; Rosenberg and Gopher, 2010; Shaffrey, 2007; Solecki, 1980; Willcox and Stordeur, 2012; Wright, 1993). By the PPNB, grinding slabs and querns dominate village assemblages (e.g., Dorrell, 1983; Gopher and Orrelle, 1995; Wright, 1993, 2013).

Milling of foods into finer particles exposes more surface area of a food and makes nutrients more available to digestion (Stahl, 1984, 1989). It thus increases yields of food supplies without ploughs, irrigation or other field methods usually used to define 'intensive agriculture.' Thus, the early Neolithic in general represents a form of intensification in food production, albeit not in terms of field activities, but in terms of post-harvest activities (Wollstonecroft, 2011). This intensification took place in houses – at consumption level. At production level, at Çatalhöyük East there are suggestions of intensive garden agriculture (Bogaard, 2005). The scale was seemingly small, though: In Building 77's "hardware cabinet," we see one hoe and one digging stick weight (Fig. 10c and d), despite multiple bukrania, multiple querns and quern-making.

In this light, it is of interest that – on present evidence – the largest querns at Çatalhöyük East seem to appear in the middle of the sequence, as the site began to grow (Fig. 18). If this pattern (which is still tentative) is confirmed, it would indicate rising levels of post-harvest intensification as the site grew. So far, it appears that there are concentrations of large querns in a few houses. If this pattern is confirmed, it would suggest something along the lines of household differentiation, economic inequality and competition, as the village evolved.

Inheritance?

If intensification combined with inheritance is critical to complex societies (Shenk et al., 2010), do we see inheritance at Çatal-

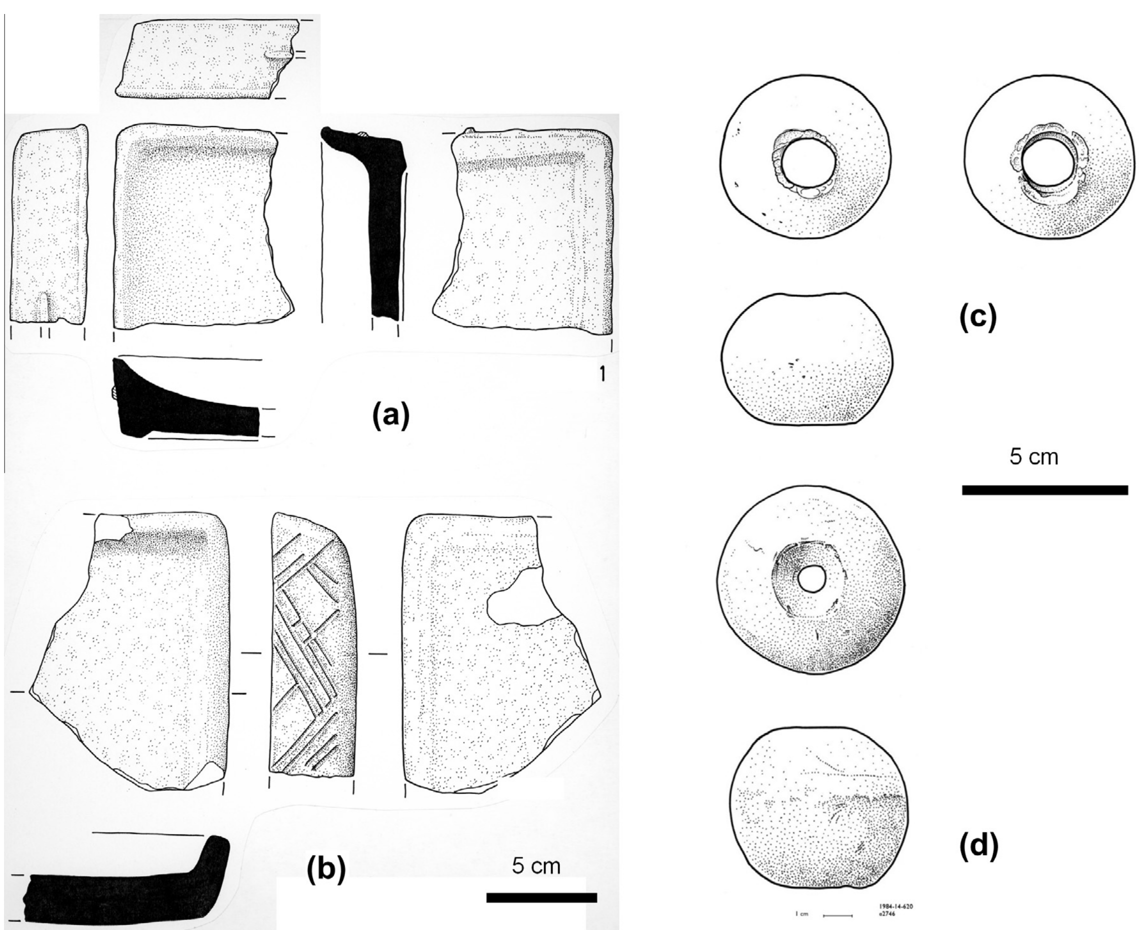

Fig. 21. (a-b) Andesite trays, Çatalhöyük West (Chalcolithic); (c-d) Maceheads, Çatalhöyük East.

höyük East? As noted, some see house rebuildings as a hint of this (Shennan, 2011). Others note building continuity but place less emphasis on inheritance as such (Düring, 2005). Hodder and Cessford discussed diachronic change at Çatalhöyük East in terms of social memory (Hodder and Cessford, 2004). Joyce argues that social memory, as preserved in heirlooms, is characteristic of house societies (Joyce, 2000). In light of approaches that stress inheritance and social memory, we would like to know what diachronic change in artefacts, as houses are rebuilt, might tell us. Can we track transmission of artefacts through time from artefact life cycles as houses were rebuilt?

Querns can have very long use lives, 100 years or more; such cases include millstones passed down from one generation to the next. Millstones wear down after long use. For a given rock type, long-used millstones are deeply concave while those with short use-lives have shallow use surfaces. Many studies document recycling of worn-out tools (Aschmann, 1949: 685; David, 1998: 58; Hayden and Cannon, 1984: 123; Horne, 1983: 18, 1990; Schott, 1989).

Mesopotamian Bronze Age texts mention millstones in connection with property inheritance. A list of dowry items includes a handstone (CAD, 1956, s.v. narkabu). In a legal text (early second millennium BC), a man accused of theft states: "I swear, I did not take any property of my sister, neither her millstone…nor anything else" (Salonen, 1965: 51).

Millstones were received by women as gifts from their husbands in Old Babylonian Sippar; it was specified that these were their property to dispose of freely and children were specifically denied any claim to them. Other women received millstones from their fathers and as bridal gifts (Harris, 1975: 319, 330, 369). Thus, Mesopotamian texts link millstones with female inheritance, which is arresting in light of discussions by Goody (1976) and Shenk et al. (2010) on inheritance. Inheritance of food processing tools (frequently from mother to daughter) is also documented in hoe-farming societies (Goody, 1971: 72–73). Do we see anything like this in the Neolithic? If millstones were "expensive" objects and possibly an arena for specialization and intensification, were they transmitted through time?

At Çatalhöyük East, clearly not. Querns at Catalhoyuk East had short use lives, displaying flat or shallow use surfaces, even when broken (Figs. 11-13). In addition to quern fragmentation, we explored whether complete querns were cycling upward as houses were rebuilt, e.g. in Buildings 65–56–44 (Figs. 16 and 17). In a situation of transmission of querns through time within this domestic group (assuming that those who built houses atop Building 65 were related), we would expect long-used, concave querns abandoned only in the upper house (Building 44), with an absence of querns abandoned in Building 65. But Tables 5 and 6 show that complete querns were abandoned in Building 65; in fact, an

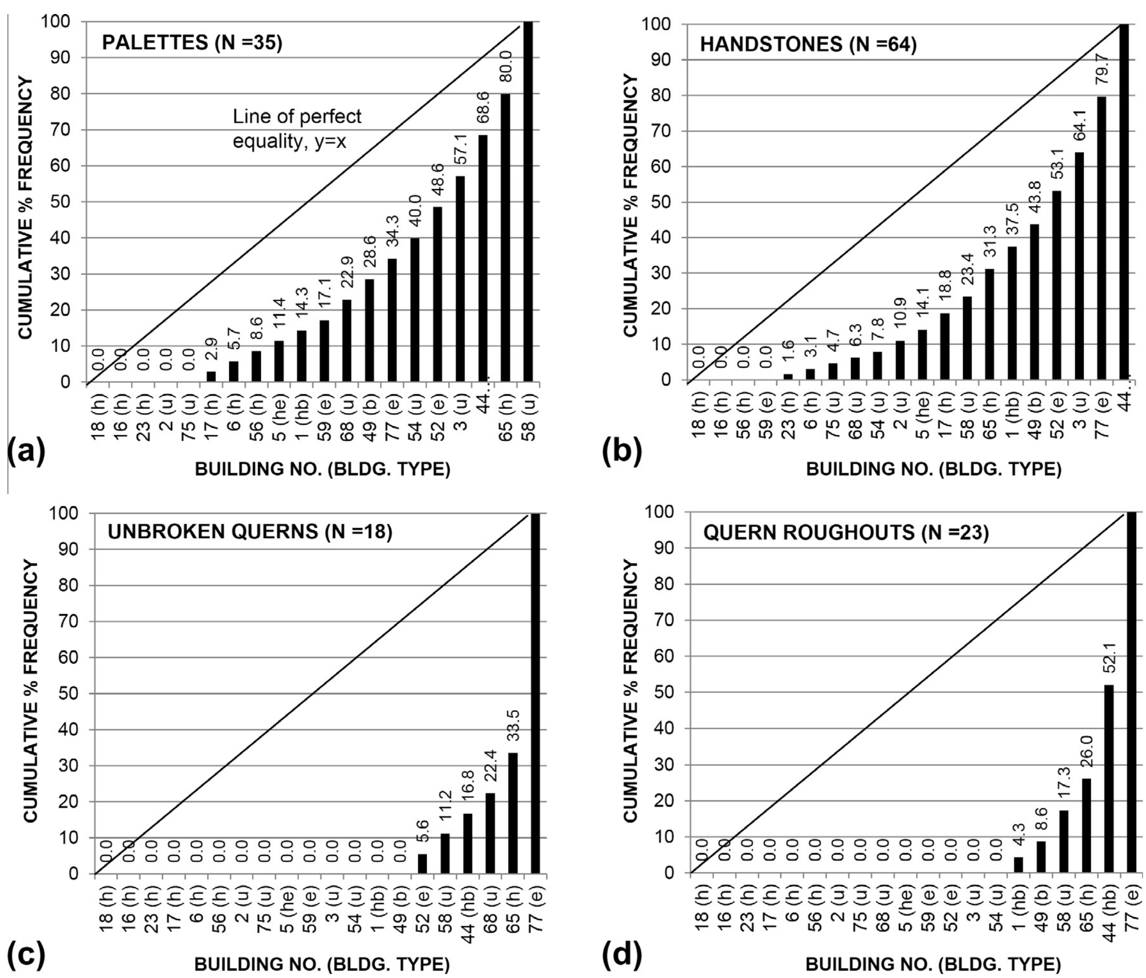

Fig. 22. Cumulative percentage frequency of four artifact types in 20 houses at Çatalhöyük East, based on data in Table 5 (Lorenz curves). The solid line shows the distribution that would result if all houses had equal numbers of the artifacts (line of perfect equality of access). A concave distribution indicates unequal access; the more concavity there is, the more inequality. Schist palettes and handstones are unequally distributed; however, the unequal distribution of unbroken querns and quern roughouts is much greater (i.e., there is greater concavity). For each of these artifact categories (unbroken querns and unfinished quern roughouts), 100% of the artifacts were found in only 30% of houses (6 houses of 20). Note the distribution for Building 77. (For Lorenz curves, see Atkinson, 1980; Cowell, 2000: 105; Gottschalk and Smeeding, 2000; Kerbo, 2000; Lorenz, 1905; Nygard and Sandstrom, 1981.)

unfinished quern roughout was abandoned in it, instead of being retrieved and completed by those who built Building 56 (Fig. 14d). Hence, the pattern is closer to what happens with formation of new domestic groups in a cycle of domestic fission, wherein new units establish their own grinding equipment and other facilities (Goody, 1971: figs. 1 and 2; cf. Banning and Byrd, 1987; Kadowaki, 2006).

Thus, millstones were deliberately destroyed at house abandonments, before they showed heavy wear. Where found complete, in rebuilt houses, they are not found in patterns we would expect of cross-generational transmission. They were special targets for destruction which would have required substantial effort. The driving force appears to have been social, not practical. If there were forms of inheritance and material wealth transmission, millstones were not part of this. Breakage patterns seem an emphatic "statement" against transmission of these artefacts across generations. The pattern is reminiscent of the destruction of personal wealth at death (or in this case at house abandonment) – or the reversion of property to lineage or corporate group control – as described by Gurven, Goody and others for hoe-farming societies (Goody, 1971: 69–73, 1976; Gurven et al., 2010: 52–53).

Thus a widespread ban on some forms of personal-property transmission (i.e., inheritance) within domestic groups was part of this picture. Some of this might fit with a house society model (Levi-Strauss, 1982) and one might be tempted to invoke a potlatch analogy to explain the destruction of querns. Potlatch is associated with highly competitive societies and overt displays of wealth (Codere, 1950). Practices relating to ground stone tools at Çatalhöyük East (e.g., the rarity of decoration of such tools) could be seen as attempts to play down such displays, but perhaps we must leave this question open. Gurven et al. (2010) state that attitudes to material wealth in hoe-farming societies are similar to those of hunter–gatherers. It is of interest that some pre-PPNB sites have a dominance of broken tools not readily explained by natural site formation processes (Edwards and Webb, 2013: 213; Özkaya and Cosku, 2009; Rosenberg et al., 2012: 93).

However, since some houses at Çatalhöyük East reveal complete tools – and these are usually special buildings – clearly there is differentiation in this regard. This fits partially with Hodder and Cessford's "dominant houses preserving social memory" model (Hodder and Cessford, 2004), although the complete artefacts do not cycle upward and therefore are not heirlooms (Joyce, 2000). However, other early Neolithic sites show complete querns surviving but used unto exhaustion, indicating long use lives (Byrd, 2005a; Wright, 1992a,b, 2013), more in line with heirlooms (Joyce, 2000) and transmission across generations. Interestingly, some of these sites (e.g. Beidha, Jordan) have public buildings but were very small villages. These observations suggest that there were (1) substantial cultural variations in management, distribution and inheritance of material property, and (2) regional and temporal differences in the development of social organization, in the early agricultural societies of the Near Eastern Neolithic. Such variations constitute a warning against application of simple models based on ethnographic analogies (e.g., 'house societies'), or broad-brush

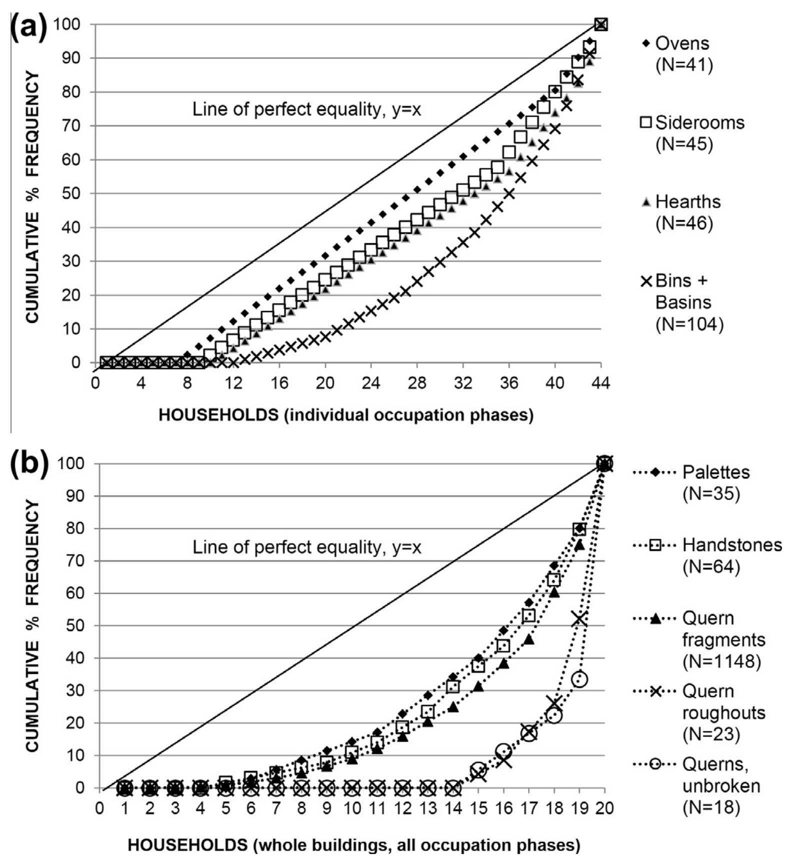

Fig. 23. Lorenz curves for (a) features in 44 house occupation phases (see Table 7) and (b) selected ground stone artifact types in 20 households (based on whole buildings, see Table 5). (*Note*: *x*-axis numbers are sequential and do not refer to building numbers.). The solid line shows the distribution that would result if all houses had equal numbers of features and artifacts (line of perfect equality or access). A concave distribution indicates unequal access; the more concavity there is, the more inequality. In (a), ovens, siderooms and hearths are the features most closely approximating equal distribution; storage features (bins and basins) have the most unequal distribution. In (b), complete querns and quern roughouts display a more unequal distribution than the other artifact categories. Comparison of (a) and (b) suggests that whilst cooking and heating facilities are more evenly distributed among houses, storage features and ground stone artefacts are less so, particularly the manufacture and survival of complete querns. (For Lorenz curves, see Atkinson, 1980; Cowell, 2000: 105; Gottschalk and Smeeding, 2000; Kerbo, 2000; Lorenz, 1905; Nygard and Sandstrom, 1981.)

evolutionary scenarios of how inequality and social complexity emerged (e.g., 'the hoe vs. the plough;' also animal domestication, early pastoralism, and secondary products). Likewise, 'material entanglement' (Hodder, 2012) may be too broad and general a concept to explain these variations.

Household competition or cooperative "host houses"?

Thus, it is not clear whether a competitive-households model applies at Çatalhöyük, but we cannot rule it out. From such a model, we would expect large storage features, ground stone accumulations and multiple bukrania in the same houses. The data are not quite as clear as that, although special houses do appear to be special in ground stone terms. Some of these data could also be explained by a cooperative model. Early villages may have had something like "guest houses" – with some of the functions of reception buildings of latter-day village headmen, as seen in many ethnographic accounts (Aswad, 1971: 42–43; Fernea, 1969: 20–21, 24; Kramer, 1982; Salim, 2013). Such institutions are used for information exchange, receiving visitors, and group events (not only feasts). Yoffee points out that archaeologists fail to consider institutions such as assemblies (Yoffee, 1995). At Çatalhöyük, if special buildings were "host houses," they were also domestic (cf. houses of lineage heads). This would explain intermittent distributions of bukrania, burials, quern-making evidence, or unusually high numbers of (for example) axes/celts near a whetstone (e.g. Building 77, Fig. 8).

A host-house model would fit with interpretations offered by others. Kuijt (Kuijt, 2000a) proposed that Neolithic rituals were about maintaining equality. Bogaard et al. (2009) argued that cooperation via cattle feasting balanced out private food storage. Düring proposes that special houses were foci for lineages or neighborhood integration (Düring, 2007). Byrd has commented on integrative corporate institutions and the possibility of shared resources (Byrd, 1994, 2005a). Banning commented on hospitality (Banning, 1996) and this is important. A concept of hospitality – "mi casa es su casa" – could account for the mix of evidence for household equality with indications of difference. But the differences may not be wealth accumulation/competition so much as sharing and "neighbourliness," a point also highlighted by Banning and Düring.

However, Kuijt and Bogaard et al. are correct, I think, to highlight tensions between household and corporate group, because these houses were very sheltered, and the privacy of the side-room storage features is extreme (more extreme than what we see in the LPPNB Levant) (Wright, 2000). Hospitality and host houses would act to assert equality – while also insisting on the primacy of the house itself as the basic unit. This might explain the absence of obvious corporate buildings at Çatalhöyük East. Through time, that absence could have encouraged inter-household (or, more likely, inter-lineage) competition.

Corporate groups and use-rights: can artefacts symbolise landscapes?

Thus, domestic groups seem to have had constraints on them and special houses may have been arenas for corporate group activity and identity. Other evidence for corporate groups includes wall paintings (the "bull hunt") (Mellaart, 1967) probably showing male hunting sodalities (fraternal cooperative organizations that cross-cut households and lineages) (Service, 1971). Such organizations in the PPNB are suggested by non-habitation sites linking men, wild animals and hunting, e.g. Nahal Hemar (Israel) (Bar-Yosef and Alon, 1988; Davis, 1988; Goren et al., 1993; Goren et al., 2008) and Göbeklitepe (Schmidt, 2006). These hint at dominance of hunting territories by corporate groups. Bukrania may be emblems of corporate group solidarity, as much as inter-household competition. Host houses would have been another, bridging domestic groups, lineages, sodalities and the village.

Other wall paintings may illustrate this, e.g. the probable portrait of the village under the twin volcanos (Fig. 20a). The painting raises questions about landscapes. As we have seen, most ground stone artefacts are made of volcanic materials coming from at least 35 km away. The most difficult to acquire would have been large andesite boulders for querns, requiring cooperative effort. Querns were special targets for deliberate destruction. This destruction is ubiquitous, ritualized, and part of house abandonment in rebuilt houses; and therefore a statement of non-transmission of property through time within residential groups. Quern manufacture may have involved specialization, while uneven distributions of unbroken querns may suggest multi-household sharing networks.

Are these phenomena an expression of corporate use-rights to materials from volcanic lands? A discovery in the Istanbul Area is intriguing. A portable plano-convex quern was found with a clay figurine on top (Fig. 20b). The figurine recalls the twin peaks of the painting and may testify to a special role of volcanoes and mountains in Çatalhöyük cosmology and community identity (cf. later Anatolian cultures: Beckman, 1989; Canby, 1989). If so, it is possible that breakages of andesite querns add up to performances designed to emphasize corporate control of certain resources, e.g. from volcanic regions, and corporate constraints on household ambitions.

If so, such constraints did not last forever. It has been asked whether competition between households might have increased through time (Asouti, 2005: 90). Some artefacts do speak to this. Two rare types appear only in middle to late levels and are more common at Çatalhöyük West: andesite serving trays and maceheads (Fig. 21; Table 3). Details of the appearance of trays and maceheads only in middle to late levels are presented in depth elsewhere (Wright et al., 2013; cf. Brady, 2012). The trays represent the most elaborate stone vessels in the site, implying more formal dining practices; the maceheads represent hand-to-hand combat weaponry more commonly seen in the Chalcolithic and later (Levy, 1995; Rosenberg, 2010; Rowan and Levy, 2011). They imply rising social tensions and factional competition (Brumfiel and Fox, 1994: 4). Later on, maceheads were not only weapons, they were symbols of political authority (cf. Bar-Adon, 1980; Frangipane and Palmieri, 1983; Rowan and Levy, 2011; Yadin, 1955). But they had Neolithic roots (Rosenberg, 2010; Wright, 1992b). The Çatalhöyük maceheads thus hint at the scenario outlined by Sahlins (1974: 146–148).

Conclusions

The ground stone assemblages and other data from Çatalhöyük East suggest a society in transition from egalitarian organization to something more complex. Analysis of 2429 ground stone artefacts from 20 buildings and 9 yards reveals private household property and a broad equality of access to cooking features and some ground stone tools, but ground stone toolkits do not indicate self-sufficiency. Lorenz curves for features and ground stone artefacts suggest that storage units, unbroken querns and unfinished quern roughouts were the most unequally distributed food preparation facilities. Elaborate buildings have more diverse artefacts and concentrations of unbroken, large querns and quern roughouts, which may mean unusual status, specialization or hosting of task groups. From food processing tools we detect hints of a form of agricultural intensification (post-harvest) but also constraints on wealth transmission within domestic groups. It is suggested that corporate groups held substantial power and that decorated buildings were "host houses" for cooperative, multi-household activities, comparable to the Near Eastern *mudhif*. At Çatalhöyük, these were also residences.

Models emphasizing inter-household competition may need some modification. Generally, there are questions about the definition and evolution of the household as a social unit. Households are production–consumption units not necessarily linked to architectural units in obvious ways (Netting et al., 1984; Netting, 1993). Ground stone artefacts from Çatalhöyük accord with that.

However, some artefact types (e.g. maceheads, special trays) suggest rising tensions and factional competition through time. Hints are also accumulating for PPNB–PPNC craft specialization, perhaps an arena for residential-group agency. If so, did early craft specialization carry seeds of differential access to material wealth? It is not necessarily a long leap from "differential access of specialists to needed raw materials" to "differential access to the means of craft production." Çatalhöyük East's artisans seem to have approached that point without quite reaching it. Transmission of material wealth through time would have also been a key threshold in the entrenchment of inequality. Çatalhöyük East seems not to have reached that threshold. In sum, the data from Çatalhöyük East hint at a society trying to maintain egalitarian principles even as it was slowly changing into something else. Mechanisms for maintaining egalitarianism may have encountered problems as the site grew large, leading to abandonment and a different social order at Chalcolithic Çatalhöyük West.

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