PEOPLE AND SPACE IN HUNTER-GATHERER CAMPS: A GENERALISING APPROACH IN ETHNOARCHAEOLOGY

Todd Whitelaw

Introduction

Interest in the relationship between settlement population and settlement space has generated a sizeable volume of literature in archaeology (see Cook 1972; Hassan 1981; Schacht 1981). Nearly all of it builds on Naroll's study of population and floor area (1962), and nearly all of it follows the aim of that paper -- to establish a numerical relationship between settlement population and area which will enable the estimation of past population from archaeological site area.

In this paper, I shall focus on the relationship between people and space in hunter-gatherer camps. Rather than looking for a deterministic link between the two variables, I shall focus on variability in the people-space relationship and attempt to explain it. The first part of the study will investigate the relationship between people and space using a specific case study as a basis for identifying relevant variables and their interaction. The second part of the study pursues the same issues in the context of a wider, cross-cultural set of data.

Space in Hunter-Gatherer Camps: the Case of the !Kung

Initial discussion will focus on population, camp area, and the social use of space among the !Kung bushmen of the Kalahari desert. They provide one of the best data sets for such an investigation in the form of John Yellen's ethnoarchaeological study (1977a), in which he mapped a number of recent campsites and interviewed the inhabitants concerning the activities carried out during each occupation.

Yellen's data have served as the basis for four major studies of the relationship between population and settlement area in hunter-gatherer camps (Wiessner 1974; Yellen 1977a; Read 1978; Hassan 1981).

Yellen's solution (1977a:122-31) was to use a linear regression to relate population to camp area. However, no attempt was made to explain why the specific relationship obtained, or to specify under which conditions it would be expected to be relevant (cf. Binford 1978:358-60). Wiessner (1974) attempted to model the relationship between the two variables by reference to a more general discussion of allometric growth and city-size (Nordbeck 1971). By attempting to model the relationship in a manner relevant to all hunter-gatherer camps, she broke out of the purely descriptive role which limited Yellen's work. However, the mathematics of the general theory were not made relevant to the particular properties of hunter-gatherer camps, so the explanatory potential of the model was never demonstrated. Read (1978) managed to establish the mathematical relevance of Wiessner's equation to the geometry of possible camp growth, but his work indicated that the validity of the

model was predicated on two behavioural assumptions:

> that a certain structural arrangement -- a circular pattern -- characterizes residence locations in hunter and gatherer camps and that certain spatial relationships within that arrangement are constant, regardless of population size (1978:317).

Neither assumption is given justification in any of the studies, and for Yellen's !Kung data, let alone all hunter-gatherer camps, both are apparently wrong. Therefore, while mathematically elegant, Read's model remains behaviourally inappropriate. Hassan (1981:67-73) contributed three different equations to describe the same data, which simply modified previous models, without any contribution to explaining the posited relationship.

Developing a behaviourally relevant model entails the identification and incorporation of variables which are important in determining the nature of the people/space relationship in the !Kung case.

To put Yellen's data in context, it should be noted that the !Kung traditionally followed a pattern of seasonal aggregation and dispersion. The aggregate, dry season camps were established at permanent waterholes, and could be occupied for up to 6 months by a complete band, ranging from 35 to 60 individuals. The dispersed, rainy season camps were occupied for a period of days by a number of nuclear families, usually belonging to one extended family, or two linked by marriage. All of Yellen's mapped camps are rainy season camps, though he presents schematic information on the organisation of two dry season camps (1977a:70-1).

As a framework for analysing !Kung camp behaviour, Yellen created an abstraction, the RING MODEL (1977a:125-31). The part of the model relevant to the relationship between population and camp area specifies that !Kung campsites are formed of a circle of huts, each of which is a private social unit activity space, consisting of a shelter, hearth, and hearth-side activity area, oriented inwards around a central, open, community activity area. Analytically, a line drawn around the perimeter of the hut circle -- Yellen's Limit of Nuclear Area Total (LNAT) -- will reflect the population of the camp or number of social units.

In relating people to space, the primary element of the model is the circular arrangement of huts around an open communal area. However, inspection of Yellen's plans indicates that the centres of Yellen's camps are generally broken up with bushes, trees, and other huts. The communal activities for which he suggests such areas were used -- dancing and communal sharing of meat -- are activities only possible, or necessary, with the larger aggregations of population in dry season camps (see Marshall 1976:91; Yellen 1977b).

Yellen acknowledges that the fit of the model varies (1977a:89, 127), but ignores the variability that occurs. It is assumed that the same organisational principles apply to all camps, despite the fact that the small, temporary, rainy season, family camps and the large, almost permanent, dry season full band camps, represent very different types of social situations (cf. the discussions of camp size and stress in Lee 1979:370-400 and Johnson 1982) . The dry season camps do fit Yellen's Ring Model (Draper 1975; Hitchcock 1981), but Yellen has imposed this order on the smaller camps he mapped, without justification.

The Social Organisation of Camp Space

Starting afresh, two points are evident. First, camps are collections of social units arranged in space, not amorphous aggregations of individuals. Second, two different sets of dimensions determine camp area (from now on considered as LNAT, which usually includes about 90% of the archaeological debris): the areas occupied by the separate social units, or nuclear areas, and the spacing of those units on the ground. These two sets of dimensions have reference to different sets of variables.

Firstly, nuclear areas are remarkably stable, though there is some variation according to the number of individuals in a household (ranging from 1 to 6) and the duration of occupation (Yellen 1977a:108-20). However, the variation is small and for modelling purposes it will be sufficient to consider these as constant areas with a mean radius of 2.24 metres. On the other hand, the spacing between households is quite variable. The area occupied by all the nuclear areas within a camp accounts for between 36% and 91% of the LNAT in Yellen's 16 camps. The remaining variability is ascribable to the effect of the variation in spacing between the individual households.

If variability in household spacing is not random, it should relate to patterning in the arrangement of huts within a camp. This would be expected on the basis of observations made by Yellen (1977a:89) and Marshall (1976:85,168,171), e.g.:

> The fires of the nuclear families which compose an extended family are always near each other, not scattered about in the werf [encampment]. (Marshall 1960:343)

This suggests that if there is patterned variability in the spacing of huts within a camp, it may bear some relation to kinship distance between hut residents.

To explore this possibility, account was taken of the simple bilateral kinship system of the !Kung and the way it is used for band integration, and an index of kin distance was established by counting the minimum number of primary genealogical linkages (parent/child, sibling, husband/wife) existing between any member of one household and any member of another. A strong pattern emerged between such kinship dis-

tance and inter-hut spatial distance. While particular personal relationships between individuals will modify this basic pattern, its general validity is indicated by plotting the average distance values for each pair of households (Figure 1).

On the camp level, one effect of this relationship is that as the number of social units in a camp increases, the average kin distance also increases -- expectable as more peripheral kin join the group. At the same time, mean inter-hut distance (between nearest-neighbours) also increases.

But how far is the proposition that kinship distance and spatial distance are fairly directly related (i.e. that kinship relations are used to organise space in !Kung campsites) compatible with the formal circular arrangement of huts in the large dry season camps? An initial exploration was made using the two schematic plans Yellen provides of dry season camps at Dobe (1977a:70-1). In Figure 2, the average kinship distance for each hut position is plotted, indicating that in general, the same relationship applies in the dry season camps.

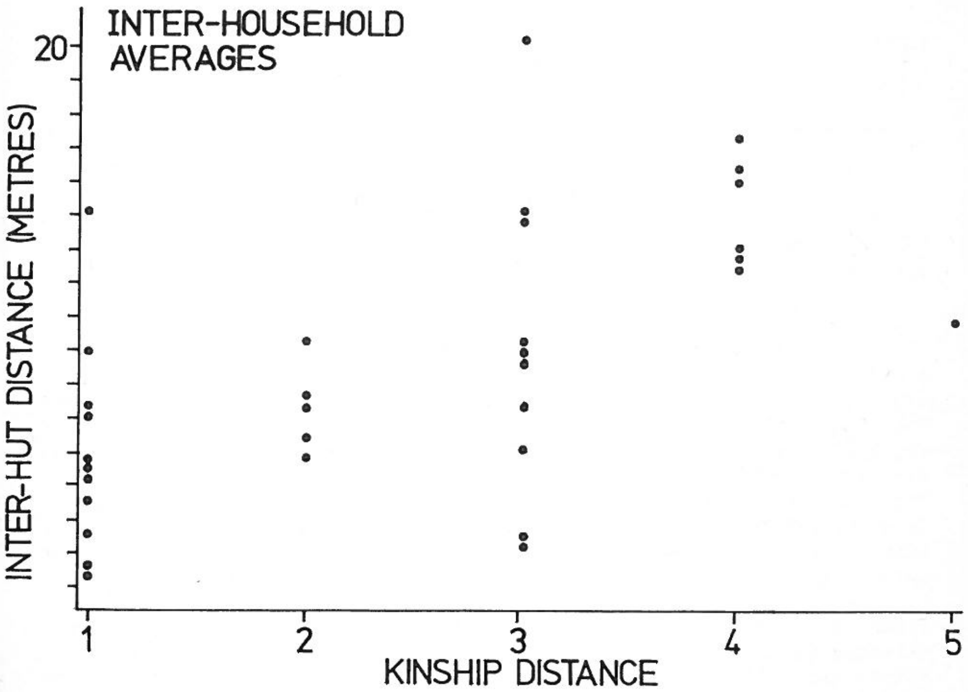


Figure 1: Inter-household kinship distance and spatial distance.

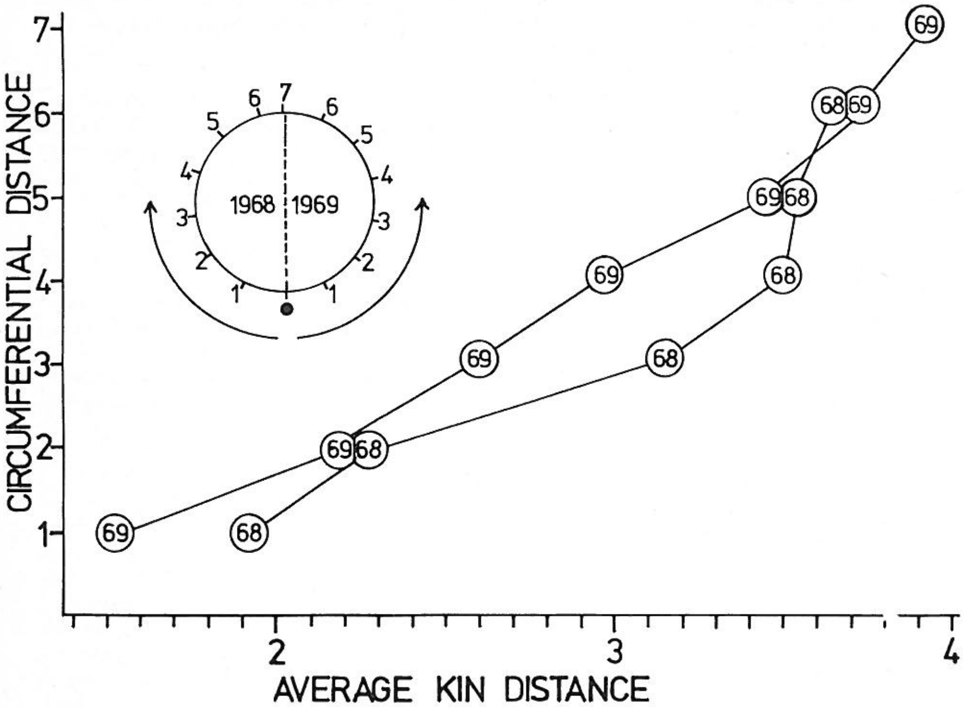
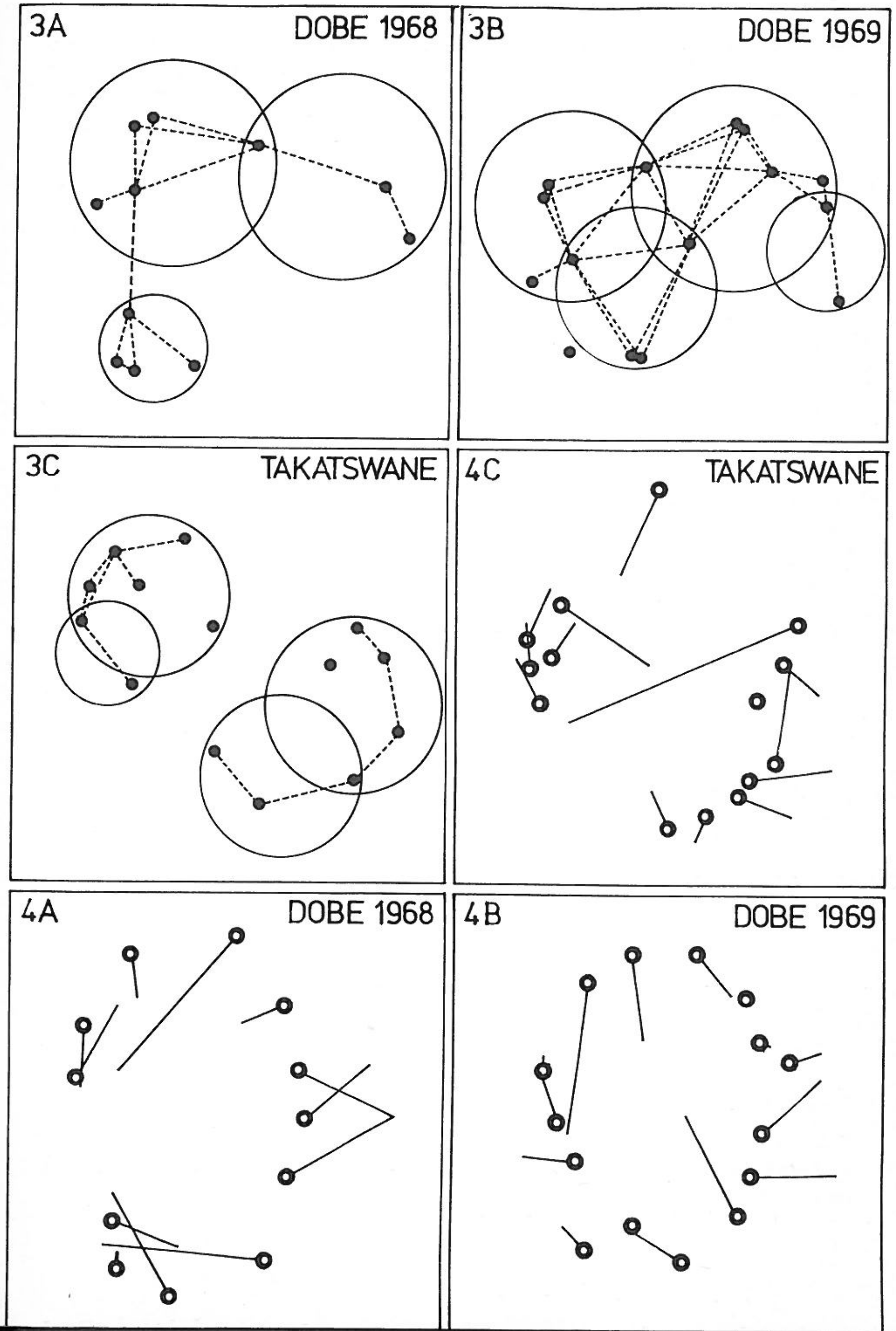


Figure 2: Dobe dry season camps, average kinship distance for each hut position.

Is the circular camp formation actually determined by the much more basic kinship/spatial distance relationship? To explore this, the minimum kin distances between all huts in each of four large camps (the two Dobe !Kung dry season camps, and two !Ko and G/wi camps for which plans and kin information were available (Eibl-Eibesfeldt 1972:32, 1978:113)), were input into a Non-Metric Multi Dimensional Scaling (MDSCAL) routine. The intention was to generate a model camp plan in two dimensions, relating, as far as possible, the physical distance between each pair of huts to the relative minimum kin distance between the occupants. Some possibility of success was anticipated due to the 'horseshoe' effect of

Figure 3: MDSCAL modelling of San dry season camps. Circles indicate extended families, dotted lines represent primary kinship linkages.
Figure 4: Comparison of MDSCAL modelled camps with actual hut positions. Circles indicate actual hut positions; lines run to modelled positions.



multi-dimensional scaling when used for seriation (Kendall 1971). The nature of San band formation, with a tendency for extended families to chain together (each extended family linked to another by a single marriage), suggested a similar outcome.

The results for the two Dobe camps are reproduced in Figure 3. Using the kinship information for the camps, these plots were produced as the least-stress configurations resulting from ten runs with different random starts for each camp. Primary kin linkages (parent/child, sibling) are indicated by dotted lines, while extended families are circled.

To assess the fit of the MDSCAL models to the actual camp layouts, both sets of data (actual and MDSCAL hut locations) have been input into the standard GENSTAT rotation routine, to rotate and scale the two configurations to the best fit. Figure 4, where the actual hut positions are indicated by circles and lines run to the modelled position, makes clear the generally good fit.

As can be seen from the comparison of modelled against actual camp layout, the circular form is consonant with, but is also a regularisation of, the tendency for !Kung to map their social relations in space. At what point and why does this formalisation take place? I suggest that this is a function of scale and increasing social distance, along with the nature of !Kung band recruitment strategies -- essentially the result of the increasing social distance between the ends of a chain of families (Marshall 1976:182). In San kin classification systems, few individuals are recognised as falling within specific close categories, while many individuals are simply 'close' or 'distant' kin (Marshall 1976:201-23; Silberbauer 1981:140-85). I suggest that the tendency toward formalisation begins when camps are composed of more than two extended families, as the two groups at the ends of the chain form blocks of individuals who are simply kin-of-close-kin to each other, not actual close kin (Figure 5).

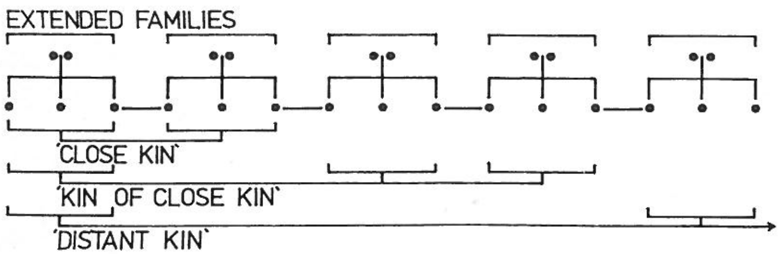


Figure 5: Model of extended family 'chaining' within a band.

The difference between small and large camps seems documented in a sharp 'elbow' in the size/density curve for San camps at about 24 individuals (Figure 6). An additional factor is the essential permanence of the large dry-season camps, which does not allow the reshuffling of residence arrangements that is possible with short-term camps and constitutes a major mechanism for alleviating social stress (Lee 1979:361,397; Silberbauer 1981:142,299-303; Turnbull 1968).

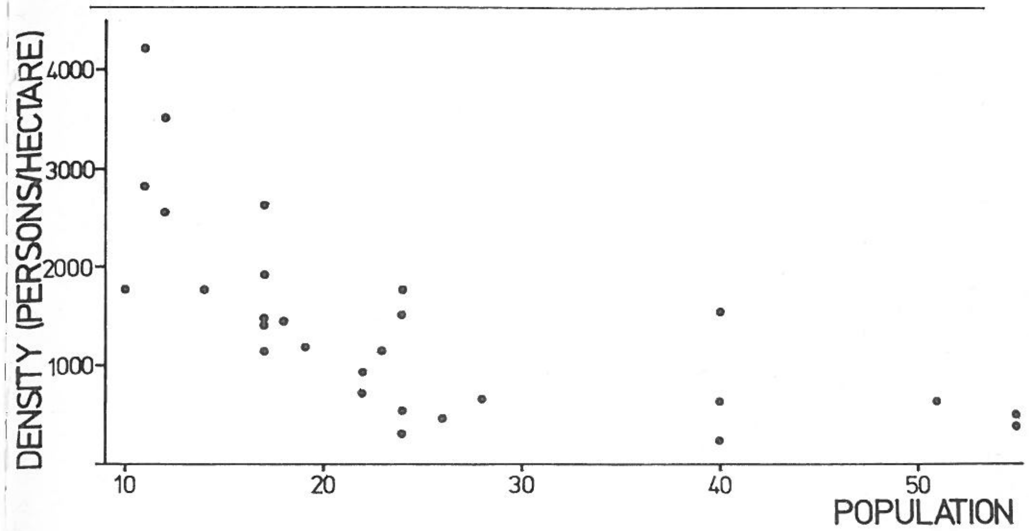


Figure 6: San camp population and density.

The same principle may also help to regulate band size less than around 60 members, since five or more extended families create a chain where the end blocks of individuals are only recognised as 'distant kin' (Figure 5). Johnson (1982) has explored the idea of scale and social stress in !Kung social groups. I believe the recognition that an increase in scale brings a rapid increase in social distance is important for pinpointing the reasons for increasing social stress. As residential density studies show, stress is not related to crowding _per se_, but to crowding by strangers (Draper 1973; Fletcher 1981).

Two major points have been established, relevant to modelling !Kung camp growth:

1) The Ring Model is not particularly valid for small camps, though it is an adequate abstraction of large, dry season camp layout.

2) Read's assumption of constant nuclear area spacing is unjustified, and variation in spacing is highly responsive to differences in social distance between occupants.

Incorporating these two elements, two extreme models may be proposed, each with inter-hut distance increasing with the number of social units in a camp:

1) An accretion model, in which spacing alone is important. This produces linear growth in camp area, subject to a scale-dependent spacing factor.

2) A ring model, in which units are arranged around the perimeter of a circle. This produces exponential growth in camp area, subject to the same scale-dependent spacing factor.

From our critical examination of Yellen's Ring Model, we would expect the first model to be particularly relevant to the small, rainy season camps, and the second to the large, dry season camps.

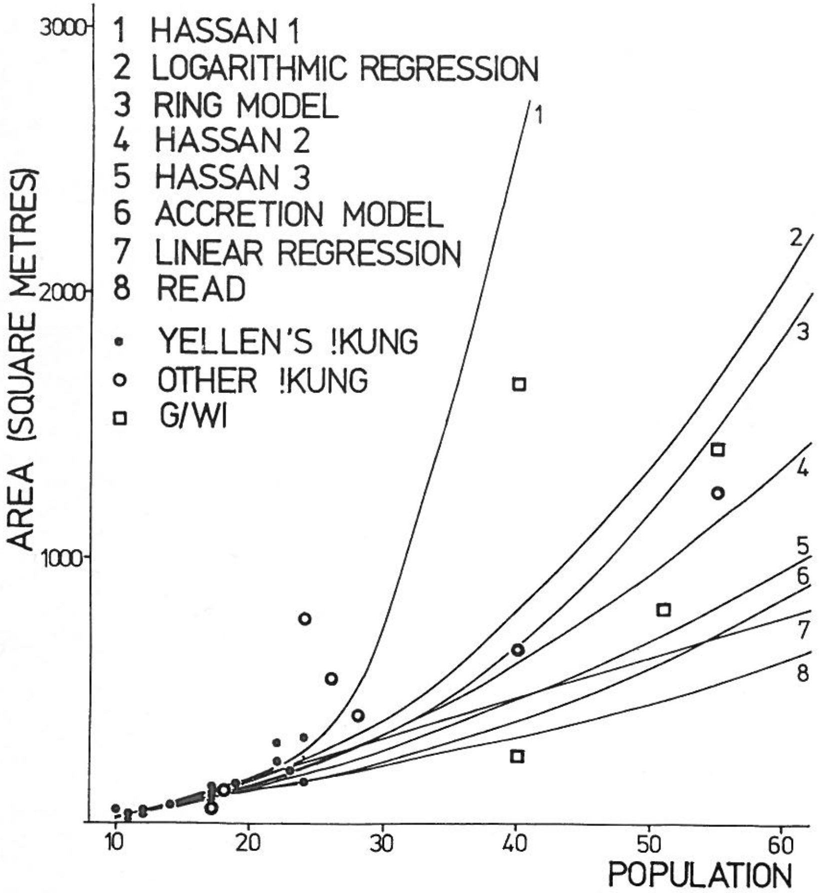


Figure 7: San camp population and area; proposed models and observed cases.

These two models, along with the others which have been proposed, may be compared with Yellen's data (Figure 7). In addition, information on a number of large !Kung and G/wi camps is also included to assess the fit of the models when used to extrapolate beyond Yellen's data (additional data on the !Kung from Draper 1973, Brooks et al. in press; on the G/wi from Silberbauer 1981, Eibl-Eibesfeldt 1978).

In actuality, a correlation of observed and expected values for the different models yields effectively the same result (Table 1). In other words, at this scale, the data do not help us to assess the models, though on substantive grounds, as presented above, we would expect the actual relationship to shift between the accretion and ring models as we shift from small to large camps. It should be remembered that the linear and logarithmic regressions, and Hassan's three models are all descriptive models, designed to produce an equation giving the best fit to the data. Their fit should therefore be good, but they are not explanatory models per se. An interesting point here is that each investigator who has modelled !Kung camp population and camp area has enlisted the high correlation associated with their model as an assessment of its validity. As this analysis indicates, good fit alone is not sufficient to judge the explanatory value of any model. The model suggested here does account for the documented variation in spacing between nuclear areas and for the circular form of the dry season camps -- the two key elements structuring the relationship between population size and camp area.

	Linear	log/log	Read	Hassan 1	Hassan 2	Hassan 3	Accretion	Ring
Yellen's 16 camps	.8865	.8874	.7620	.8705	.8891	.8897	.7688	.7414
Sample of 28 camps	.8444	.8275	.8332	.7409	.8353	.8401	.8280	.8147

Table 1: Correlations of model predictions with observed camp areas.

A similar basic relationship between kinship and spatial distance has been noted in other hunter-gatherer studies (Binford 1983:140). For instance, among the Alyawara, O'Connell notes (1979:107):

> Household camps are neither randomly nor regularly distributed through the settlement, but are grouped in discrete clusters, consisting of 2-12 households... Members of these households are linked by close kin ties, such as parent-child or sibling relationships.
>
> The spatial distribution of households in a cluster may appear to be random or haphazard, but in fact represents a sensitive measure of inter-household economic and social relationships.

However, the Alyawara and many other hunter-gatherer groups do not pursue this principle to the point of doing mental MDSCAL to arrive at a circle. Clearly, while the basic principle may generate the form, it is not, in itself, sufficient to do so.

Wiessner (1982a) and Draper (1973, 1975) have both suggested that !Kung camp density and the open, circular plan result from the fundamental role of sharing in !Kung subsistence. The camp in many respects serves as a common subsistence unit, and the density and intervisibility allows constant monitoring of what others have, acting as a powerful deterrent against hoarding. That this is relevant is suggested by the changes in camp plan that accompanied the process of sedentisation during the 70's, particularly the increasing distance between huts, the construction of fences around some households, and indeed the breakdown of the circular camp structure (Draper 1975; Hitchcock 1980; Brooks et al. in press).

Yet, cooperation and sharing are fundamental to other hunter-gatherer groups. The arguments suggested here to account for !Kung camp density and layout, if valid, should be more widely applicable. To assess these propositions requires a comparative perspective. In the second part of this paper, these propositions will be examined for their relevance to a wider sample of hunter-gatherer societies.

Cooperation and Crowding in Hunter-Gatherer Camps

A number of recent studies of hunter-gatherer societies have emphasised that sharing of some forms of subsistence items beyond the individual household serves as a means of buffering against variation in subsistence intake at the household level (Gould 1980:74-5,85-6; Graburn 1969:66-71; Lee 1979:118,243,335-6; Marshall 1976:288,295; Woodburn 1968; Smith 1981). Sharing is a particularly valuable strategy when obtaining a resource will yield high returns, but each attempt has a low chance of success. This accounts for the often observed situation that gathered plant foods and small body-size animals, such as reptiles, rodents, birds and fish, are shared only within the individual household, but larger body-size animals are shared widely within the local residential group. Sharing meat widely within a camp serves to ensure optimal utilisation of the resource and to even out variations over time in any individual's access to meat, particularly in hot environments where meat can only be stored for very limited periods of time. Wiessner has recently put this into perspective as one of a number of mechanisms whereby hunter-gatherer populations can cope with subsistence risk (1977, 1982a, 1982b).

A different form of subsistence buffering behaviour is represented by reliance on storage strategies. These can operate at two levels. At one level, extensively explored by Binford (1978, 1980), storage strategies can be used to even out periodic differences in the availability of certain resources. This is particularly crucial in higher latitudes with a limited growing season, where many species have adjusted to

extreme seasonal environmental fluctuations through, for instance, migratory behaviour. In these situations, resources may only be accessible for exploitation for limited periods of time, and storage serves to extend the availability of a resource beyond its natural range.

At another level, storage can perform the same role as sharing, in the sense of permitting the full use of a resource within the domestic unit, rather than encouraging the investment of that which exceeds a household's immediate needs in future reciprocity through 'social storage' (O'Shea 1981). However, the degree to which these two strategies may be considered alternatives has wider systemic implications, since storage strategies link crucially to mobility (Binford 1980), and both storage and sharing may be employed by the same culture in different contexts.

These two risk-reducing strategies can be seen to be responses conditioned by particular ecological situations. They can also be viewed as having particular social corollaries which should influence settlement patterns, as was suggested above for the specific case of the !Kung.

The line of reasoning put forward here suggests two complementary general propositions:

1. In hunter-gatherer societies where subsistence sharing is minimal, whether because of primary reliance on ubiquitous, small package size inputs (gathered resources or small, individually captured game), or because of buffering through storage, spacing between domestic units within a camp will be large, expressing the independence of the individual production and consumption units.
2. In hunter-gatherer societies where sharing is extensive, either through reliance on cooperative hunting, or because of buffering through 'social storage', spacing between domestic units within a camp will be small, allowing constant monitoring of what others have, and emphasising the inter-dependence of the camp as a productive unit.

Table 2 presents observations on six well-known hunter-gatherer societies. The relevance of the above propositions for these adaptations can be assessed on the basis of the data in columns 6, 7 and 8.

The arguments presented so far are meant to relate within-camp population densities to social behaviour in particular ecological contexts. However, if these propositions are meant to have cross-cultural validity, they should be viewed in the context of a wider sample. Such a sample is presented in Figure 8, where culturally-specific mean camp densities are plotted for a world-wide sample of 61 hunter-gatherer societies.

For analysis, I have used estimated net primary productivity of a society's ecosystem as the main index variable for environmental variability. This has been calculated on the basis of rainfall and temperature (Whittaker 1975; Lieth 1975), and the estimate determined by the

Adaptation	Example	References	Subsistence inputs[1]	Procurement strategy	Storage	Sharing	Residential density
Arctic hunting	Nunamiut	Binford 1978b Gubser 1965	large 82% small 18% minimal reliance on plant foods	individual hunting, limited co-operation	long-term	household	4.9 persons/ha
Northern Forest hunting, trapping & fishing	Mistassini Cree	Rogers 1963 Tanner 1979	large 2.6% medium 8.4% small 89.3% low reliance on plant foods	hunting, trapping & fishing by individuals or partners	short-term	household	152.7 persons/ha
Northwest coast fishing & hunting	Coastal Tlingit	Oberg 1973 de Laguna 1972	large <10% small >90% ca. 10% reliance on plant foods[2]	cooperative fishing, hunting & gathering by house-group	long-term	housegroup limited re-distribution in village	327.1 persons/ha
Tropical Forest hunters	Mbuti	Turnbull 1965 Tanno 1976 Harako 1976 Abruzzi 1980	medium 70% small 30% exchange for vegetal food with agri-culturalists	cooperative hunting with drives or nets	none	between par-ticipants in hunt	ca. 820 persons/ha
Desert-savanna hunting & gathering	!Kung	Lee 1979 Yellen 1977a Marshall 1976	large 10.5% medium 49.5% small 40.0% estimated 70% of diet vegetal	individual hunting & gathering	minimal	large and medium sized game - camp; small game - household	803.9 persons/ha
Australian desert hunting & gathering	Pitjandjara	Gould 1967; 1969; 1980	medium 8.2% small 91.8%[3] estimated 80% of diet vegetal	individual hunting & gathering	minimal	larger medium sized game - camp; smaller game - house-hold	27.9 persons/ha

Notes: 1. Meat categories by body meat weight: large=>20 kg; medium=2-20 kg; small=<2 kg.
2. Estimated from Oberg 1973:65-78.
3. Not including 'many' mice (Gould 1980:65-6)

Table 2: Major hunter-gatherer adaptations, data on subsistence, storage and residential density.

limiting factor. To give a clearer display (in Figure 8) of the position of each culture in terms of ecologically relevant and intuitively interpretable variables, each culture is also plotted against its latitude, a variable shown by Binford (1978:91-4, 1980) to be relevant to storage strategies theoretically and empirically.

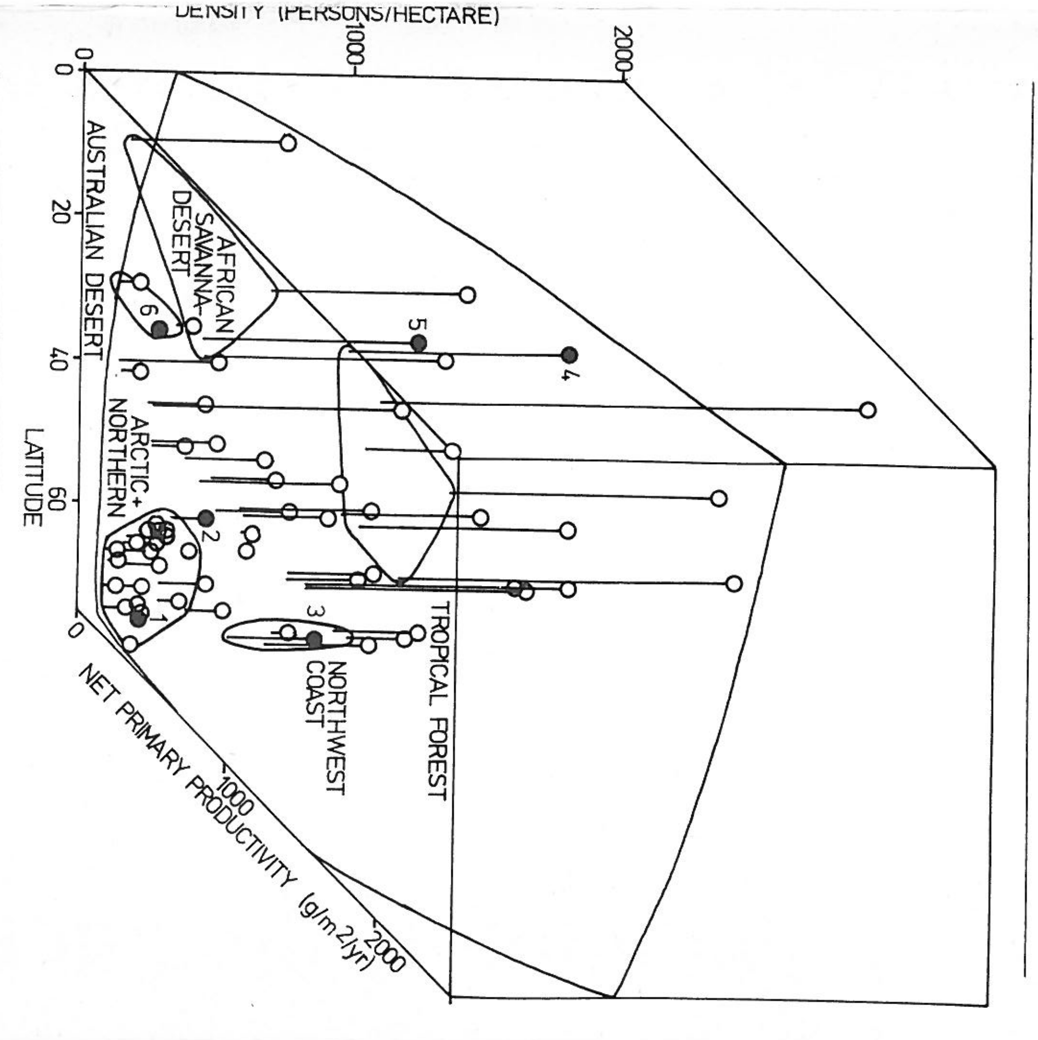


Figure 8: Camp density and ecological diversity for world-wide hunter-gatherer sample. (1. Nunamiut; 2. Mistassini Cree; 3. Coastal Tlingit; 4. Mbuti; 5. !Kung; 6. Pitjandjara.)

The adequacy of the general propositions outlined above, linking within-camp densities to ecological conditions in a predictable manner, can be judged against Figure 8. The circles represent each culture's position with respect to net primary productivity, latitude and population density, identified on the appropriate axes. For convenience, several major subsistence adaptations have been indicated, and the six test cases of Table 2 labelled. Camp population density, indicated along the vertical axis, can be seen to drop consistently and dramatically from the upper left to the lower right corners of the graph (indicated by a third-order polynomial trend surface fitted to the points).

Australia -- always anomalous?

A marked inconsistency between predictions and observations appears to exist in the density contrasts between the desert adaptations of the !Kung and G/wi of the Kalahari desert, and the Pitjantjara, Alyawara and Pintupi of the central and western deserts of Australia. Yet ecologically the two deserts are very different, a point well brought out by Jochim (1981:93-5). In particular, the Australian desert has markedly less rainfall, and is not characterised by predictable seasonality in the spatial and temporal distribution of rainfall. In this context, camps form and disperse in response to purely local conditions -- camps as such are not coherent subsistence units. This is consistent with the nature of Australian Aboriginal territorial organisation, since individuals have access to the resources of an area through territorial birthright (Peterson 1979), while groups that form as the result of temporary co-residence have no corporate structure. In addition, little cohesion is given to camps through sharing, since while there are elaborate rules for the sharing of large game (10-20kg edible body weight), animals in this size range constitute less than 3% of the animals consumed (calculated from Gould 1980:65-6), in a diet where meat forms less than 15% of the total food consumed. Other animals and gathered plants constitute small package size foods, ubiquitously available, which are only shared within the family. The subsistence system is therefore aimed at individual family productive units, not camps as risk-sharing units, and this lack of cooperation and social cohesion is expressed in the large spacing between families in a camp.

On the other hand, as presented in the first half of this paper, sharing of large game is a frequent and integral part of !Kung subsistence behaviour. (In comparison with the Pitjantjara, 60% of the game captured is in the large and medium body size range, and is shared beyond the household.) In addition, !Kung camps exist as corporate groups with short and long term continuity in membership (Wiessner 1977, 1982b; Barnard 1979). It is membership in the band, as a social entity, that confers access to the resources of a band's territory (Cashdan 1983). I would argue that this emphasis on cooperation and cohesion is expressed in both the density, and the layout of !Kung camps.

Considered this way, the spacing behaviour of Australian desert Aborigines is fully consistent with the propositions put forward earlier. In addition, the case of the !Kung, pursued in some detail, can be seen to fall into a larger pattern of ecologically dependent density relationships, documented for a world-wide sample of hunter-gatherer societies.

Concluding Remarks

If we return to the original point, the estimation of hunter-gatherer group population from camp area, it should be clear that the key variable determining camp size is not simply the number of individuals in a camp, but, at least as important, the spacing between individual domestic units. I have suggested that this distance will vary with social distance among hunter-gatherer groups, though there are clear differences in the degree to which social relations are mapped in space. Therefore, in terms of actual metrics, inter-cultural variability rules out the type of cross-cultural formulation envisaged by Yellen (1977a:99-100) and applied in the interpretation of archaeological sites (e.g. Wilmsen 1973; Price 1978; Jacobi 1978; Odell 1980; Hassan 1981).

While getting to grips with some aspects of variability in the relationship between people and space in hunter-gatherer camps will put us in a better position to estimate population from certain types of archaeological sites, I hope I have shown that we can ask more interesting questions of the archaeological record than simply 'how many'. When we start to ask why relationships such as those documented here obtain, we are asking about the basis for aspects of human behaviour, and we address a set of questions and concepts that can usefully be approached on the level of cross-cultural generalisation and explanation.

Acknowledgements

I would like to thank Polly Fahnestock, Clive Gamble, Paul Halstead, Glynis Jones, Steve Shennan and Robin Torrence for reading and commenting on an earlier draft of this paper. Polly Wiessner kindly discussed the work on the !Kung data at an early stage. Responsibility for the remaining confusions must rest with me.

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Address: Department of Archaeology,
Downing St.,
Cambridge CB2 3DZ.

ON THE JUBE LINE: CAMPSITE STUDIES IN KURDISTAN

Christopher Evans

As a part of an ethnographic research programme which was conducted in conjunction with the Royal Ontario Museum's archaeological investigations at Qal'Eh-i Yazdigird, Iran, in October 1978, a survey of recently abandoned campsites of the local transhumant population was undertaken. These campsites were recognised and recorded by what were essentially archaeological criteria. However, this study was not primarily conducted as an ethnoarchaeological experiment in site recovery, but rather as an attempt to examine the spatial organisation of a transhumant community's seasonal campsites and tent dwellings.

This work was undertaken as part of a general research programme to study the contemporary population of the Zardeh basin, which, during the final years of the late Shah's reign, was rapidly changing due to an influx of cash into the area brought about by the Shah's economic policies and the inflated prices paid for animal produce. This programme of ethnographic research was approached as an extension of the overall archaeological project in the basin, in which the present Zardeh communities are the most recent or final phase in its settlement sequence. In this context, information that could be obtained concerning the contemporary settlement patterns and economy in the basin could prove to be relevant for our understanding of its archaeological settlement, through analogy based on the apparent continuity of land-use patterns in the area. Therefore, as an ethnoarchaeological study, this work is more closely related to human ecology studies and historical geography than to current material culture studies.

As a study of the campsites of a transhumant group, this work has a specific relevance for much of the archaeological work which has been undertaken in the Zagros uplands during the last two decades. Pastoral transhumance, unlike specialised nomadism -- which is thought to be a frontier response to the political stability and economic prosperity of sedentary societies (Adams 1965:52, 109; Barth 1961:118) -- is a cultural and economic adaptation to ecological conditions. As such, transhumant communities in given highland areas of Western Asia have shown "exceptional historic stability based on permanence of an economic function" (Planthol 1966:295). In this regard, pastoral transhumance, which has not been so extensively studied as specialised nomadism, may well have a direct relevance for the study of early animal domestication and prehistoric communities in Western Asia.

The valley of Qal'Eh-i Yazdigird is located in the Kermanshah province of western central Iran and lies on the westernmost flanks of the Zagros Mountains, overlooking the Mesopotamian plains (Figure 1). The valley is situated at the northwestern end of a geological syncline which extends as a trough for 20km southeast to Rijab. The valley of Qal'Eh-i Yazdigird proper corresponds to the area of the Zardeh basin and covers an area of some $24km^2$. This basin is, in fact, an elevated