
Matriliny in Evolutionary Priority

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ABSTRACT

While dismissing the nineteenth century theory of matrilineal priority as an evolutionary scenario, George Murdock (1937) finds that the theory would seem to have validity, provided that one assumes (and he does not) evolutionary stages in prehistory. However, his rejection of the theory appears to arise from a study of social formations across the ethnographic landscape, from hunter-gatherers to agriculturalists and pastoralists; whereas, the issue of matrilineal priority should be addressed entirely in the context of variations among the social formations of hunter-gatherers, since only hunter-gatherers existed during the period for which the question has relevance.

Matriliny is not an abstract system of descent; it exists as a real social form only when it functions as a system of inheritance. And there are at most two social resources among hunter-gatherers which are available for intergenerational distribution; birthrights to territorial resources and birthrights to human fertility. The consequences of these resources for social organization have not been recognized in cultural anthropology. However, I shall show that these two dynamically interpenetrating resources are fundamental to socio-economic processes among hunter-gatherers and are definitive in the choice of matriliney versus patriliney versus alineality.

Alternative social formations among hunter-gatherers derive from four conditions: (a) If territory and fertility are both positively valued at the margin, then the society must be matrilineal (in the absence of cattle). (b) If territory and fertility are positively valued at the margin and cattle are available, then the system must be patrilineal. (c) In the exceptional case of demographic expansion into new territories, the marginal value of new territory would be nearly

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zero and the marginal valuation of fertility would be high, so that the system would be matrilineal. And finally (d) if the marginal social valuation of territory were positive or zero and the marginal social valuation of fertility is zero, due to social or ecological circumstance, then the society would be either matrilineal, patrilineal or alineal, as a function of its particular history and context.

As the earliest modern humans struggled to emerge and survive as a new species in the challenging, competitive, environments of the Late Pleistocene, they would have required dynamically expanding social formations, featuring positive valuations of fertility and territory. This category of societies was central to the peopling of the world; and they would have been matrilineal. Other social formations would also emerge, but they would tend to suffer demographic decline or stagnation and become lost to social history in the wake of the more dynamic. It is in this sense that matrilinearity had priority.

INTRODUCTION

While I regret the hasty and often baseless rejection of Henry Morgan's ideas, the theoretical foundations of this paper bear no relationship to the comparative philology of Morgan (1871). Morgan sought to infer the social structures of early societies by examining residual images gleaned from the terms which Ego used in referring to consanguineal and collateral relatives, together with the (potentially validating) direct observations by various itinerant missionaries. Morgan's methodology had the advantage of looking beyond the currently observable social structures and *imputing from sets of kin terms* the characteristics of unseen structures of the past. Twentieth century anthropologists, however, have been satisfied with direct observation of contemporary societies; and it has been assumed that social arrangements which have not been observed must never have existed. Since hardly anyone continues the methodology of Morgan, there is no point in disputing it here. However, the twentieth-century methodology still reigns and is shown here to be naïve.

The view of the matter which captures contemporary opinion has two components. First, it has been assumed that the earliest societies had very simple social structures and, correspondingly, were lacking in lineage formation and other elements of social structure. In this case, the earliest must have been alineal. This view is well expressed by Murdock (1937: 446):

Although some of the early evolutionists, notably Morgan, believed the matrilineal clan to be the first form of human social organization, preceding even the individual family, this view is now recognized as erroneous by the leading representatives of every school of anthropological thought, who are in agreement that *a loose form of organization*, often superficially patriarchal in character, preceded the development of any unilateral system of kinship affiliation. We shall consequently regard this point as settled... (emphasis mine)

While it may be impolite to question a consensus of nearly a century in duration, one should note that it does not rest on an examination of prehistory, the period during which unilateral systems must have developed, in spite of the implicit temporal elements in Murdock's proposition. Indeed, I have found that my effort to interrogate the matter in relation to circumstances of prehistory is met with complete puzzlement. Instead, it is presumed that the simplest social structures among *contemporary* hunter-gatherers represent convenient images of the past, obviating the need for any examinations of prehistory. Yet, we know that a wide array of social structures among hunter-gatherers of the nineteenth and twentieth centuries have been of only very recent development. For example, Athabascan peoples who *migrated in matrilineal formation* from the Polar region over the last 2000 years developed a patrilineal society on the Pacific coast and devolved into alineal structures among some groups which moved eastward into more arid locations (Perry 1991). Hence, it is important to understand the circumstances which would induce people to abandon matriliney and adopt alineal structures, before positing a theory of alineal priority.

The second element of the established view is also expressed by Murdock (1937: 468):

We are thus led to our third conclusion, namely, that the patrilineate and matrilineate represent adjustments to special elaborations respectively in the male and female realms of economic activity – a conclusion essentially in accord with the findings of Lippert and other sociologically oriented anthropologists.

This is a masterfully ambiguous statement, since the 'adjustment to special elaborations respectively in the male and female realms of economic activity' encourages many interpretations. But in its simplest form, it means that patriliney will be more prominent in societies where men have primary responsibility for domestic subsistence – a proposition which is strongly contradicted by data on

hunter-gatherers. However, were we to compare hunter-gatherers with pastoralists or (female dominated) horticulture with plow agriculture, we would see how Murdock's argument can be made; and it appears that statistical analyses in relation to these major social formations provide limited support, as Murdock demonstrates.

However, among hunter-gatherers, neither horticulture nor herding are relevant, yet one finds considerable variation in social structure among them. Among the 117 hunter-gathers-fishers in the *Ethnographic Atlas* (Murdock 1981), most are listed as alinear, while 17 are patrilineal and 18 are matrilineal. But patriliney is not to be explained by male contributions to subsistence. Indeed, societies which are largely dependent on hunting are often matrilineal.

AN ALTERNATIVE ANALYSIS

I shall show that inheritance is definitive in the social selection of matriliney/patriliney. Variations in social organization among hunter-gatherers derive from social valuations of two foundational heritable resources: rights to the benefits of territory and rights to the benefits of fertility, as defined herein. These are *resources of long duration*, because under proper management they can be preserved in usefulness and transmitted over the course of many generations, an essential attribute of heritable resources. One must admit, however, that territory may be subject to ecological amelioration or degradation beyond the reasonable management of human inhabitants. Certainly, this is the case if millennium is the relevant time scale. Fertility is an even more uncertain resource, being subject to disease, starvation, warfare and any number of calamities; and its intergenerational management requires much effort and skill. But this complexity of inheritable resource transmission is not unique to hunter-gatherers. (In defining heritable resources, one must be careful to avoid the Western, Christian, confounding of inheritance with bequest. Inheritance is defined by birth and by a surrogate thereof, not by choice.)

In order for individuals to thrive and for their progeny to have high probabilities of survival, some archaeologists have suggested that the minimum size of human group in a new environment must be 150–175 persons (Roebroeks 2003). This group must be able to persist in the face of diseases, accidents, ecological crises and violence. Consequently, the actual minimal size of group will depend on the general ecology and a large number of cultural factors.

In any case, *such groups are the products of human fertility*, a resource from which members of a group enjoy privileged benefits. Fertility, viewed as a single dynamic which radiates with increasing breadth over time, is a resource of the group to which its progeny belongs and on which its survival depends. It is not the kind of resource which Murdock had in mind, and its significance is generally absent from social science, but it is foundational to every aspect of life for hunter-gatherers. As the group increases in size it enjoys an increased ability to prevail in territorial disputes, thereby providing a basis for further advances in the expression of fertility.

TERRITORIALITY

Those foragers who survived the periodic crises of the recent past and prehistory were those who managed to maintain access to essential resources, while others perished. ‘Since the emergence of *Homo sapiens* 150–200 thousand years ago (kya), the species is thought to have lived in small, scattered populations and been at risk of extinction for much of its existence’ (Soares, Alshamali, and Pereira *et al.* 2011). When many were dying from lack of resources, powerful groups would maintain privileged access to the more desirable geographical domains; and in the face of declining resources for the preservation of life, efforts to secure exclusive use of resource domains would be inevitable (Read and LeBlanc 2003; Bell 2015), and by definition it would be the *demographically* powerful who were successful. If not before, at least during periods of ecological crisis, those successful groups would have been *territorial* and efforts to rebuild their populations would stress the positive valuation of fertility.

Ecological crises of the Pleistocene are absent from the prevailing presentations of hunter-gatherer lifeways. Instead, it is presumed that individual family groups were always free to roam among an abundance of unclaimed foods and prey in a world largely lacking human populations. Yet, even in the relatively blissful conditions of the Holocene, territorial struggles were common, with the exception of some arid regions lacking resources worthy of struggle.

Furthermore, the early definitions of territoriality were anchored to studies of birds and other species, where it implied the complete and forceful exclusion of outsiders. But ‘[b]y human territoriality I mean the attempt to affect, influence, or control actions and interactions (of people, things, and relationship) by asserting

and attempting to enforce control over a geographic area' (Sack 1983: 85). This is a definition which is useful for the discussion of territoriality among lineages, tribes and nation-states, where the entrance of outsiders is provisionally permitted.

Units of territorial possession are highly variable among societies. Among the Bedouin, for example, who have possessed a highly segmented kinship system, struggles for territorial rights arise at lineage, clan and tribal levels: lineages against lineages, clans against clans and tribes against tribes, as different situations arise (Musil 1928; Lancaster 1981). On the other hand, the tribe, itself, is often the more effective form, obviating entirely the need for lineage and clan organization. In reference to the alineal Tenino of the American northwest, Murdock (1980: 130) indicates that: 'Its territory had belonged originally to the Molala, who were expelled from it by the Dalles Tenino in a war estimated to have occurred shortly prior to 1830.' As pointed out by Read and LeBlanc (2003: 69), as a tribe increases the size of territory and population, a process of decomposition into lineages can be expected, which increases the efficiency of general resource management. In other words, we can expect that the social organization of successfully expansive tribes will feature a decomposition into territorial lineages or clans, providing the basis for *unilineal kinship organization*.

Indeed, during periods of widespread ecological crisis, as experienced in Africa, Europe and Asia, during the late Pleistocene, it would clearly be only the stronger groups, groups able to secure precious, yet slowly disappearing, essential resources, which would support progeny of the next millennium. And if we look even further back into prehistory, into the period 180–110 thousand years ago, it is clear that the humans who emerged from this unparalleled devastation, when most of the world's humans died (!), would not have been members of individual isolated family groups.

FERTILITY

The *intrinsic rate* of human reproduction corresponds to the case where pubescent women enjoy adequate nutrition and where they are encouraged to accept the entry of every new offspring into the human group (Read and LeBlanc 2003). Then, given an active career of reproduction from the age of 14 to the age of 40, with offspring emerging every 2.5 to 3 years, we may expect a group to increase rapidly in size during periods of resource adequacy. If, however, the group's claim on resources is limited and if no suc-

cessful efforts are made to increase the size of its territory, the size of the group will be limited by the carrying capacity of its fixed territorial domain (Winterhalder 1986). Population levels which challenge this carrying capacity would lead to reduced nutritional standards for women and their rates of reproduction would decline. In the best of cases, populations will stabilize at or near carrying capacity by means of some forms of fertility restraint. On the other hand, population may momentarily exceed that level and then crash amidst violence and disease (Turchin 2003). Read and LeBlanc (2003) appear to believe that culturally evolved practices, such as postpartum sex taboos, can provide a reasonable degree of demographic stability. And, certainly, in an imaginary world of annually or decennially stable resource availabilities, demographic stability might be achievable in this way. However, even well-developed, culturally embedded, methods of fertility restraint are unlikely to be successful in the face of ecological variation; and infanticide would become a significant factor in fertility restraint. And, given the relatively low population densities which have been feasible with hunter-gatherer technology, the carrying capacity of a region would be reached rather quickly and population cycles would evince high frequency, with the result is that the average level of population could measure much below carrying capacity.

In her survey of this issue, Scrimshaw (1984: 453) points out that

In fact, regulation of either familial or societal fertility is one of the most common reasons cited for overt infanticide (Abernathy 1979; Dickeman 1975; Carr-Saunders 1922). This is often expressed in terms of limiting the population in order to avoid food shortages. Firth (1961: 202) wrote that the Tikopia practiced infanticide in proportion to available food.

Unchallenged cycles of life and death are unlikely. Things change dramatically when even a single group recognizes the feasibility of seizing the territory of another in order to enable its population to continue rising at the natural rate (Read and LeBlanc 2003). Concepts of rightful territoriality, even when recognized, would not have prevented a group from overwhelming another in order to maintain the viability of its offspring. *And once a group makes claim on the territory of another in the face of resource deficits, the rate of fertility is removed from the domain of biology and enters the domain of social organization.* It does so because the ability of a group to overwhelm another will be strongly if not to-

tally a function of group-size and because size of group is a function of (socially managed) fertility. It would be increasing group size which prompts the need to overwhelm others and fertility which provides the ability to do so (Manson, Wrangham, Boone *et al.* 1991). The synergy of fertility, increasing size of group, territorial limitations and intergroup violence places fertility at the foundation of social action.

Instructive examples of territorial warfare are presented by Strathern (1971) for people around Mount Hagen in New Guinea and by Reay (1959) for the Kuma. Phiri (1983: 257) points out that 'In the pre-colonial period, polities and families in central Africa were in a state of flux on account of constant migration and warfare...' And later Phiri (p. 266) cited Hodgson (1923) in reference to the struggles of the Chewa with the Ngoni:

Using the policy of assimilation which they evolved during their migration from the south, and the strength of their military organization, they gathered many of the defeated Chewa inhabitants around them. In the Ngoni polities, the Chewa became a subject people (abafo) who were compelled to fight and work for their Ngoni masters.

So, rather than remaining the private resource of a woman, the size of the group, and hence fertility, becomes an essential resource of a tribe or lineage. Hence, every new offspring, male or female, becomes a critical element in the continued viability of the society and its continued growth. Regardless of the number of offspring which a woman has produced, an additional child (a *marginally increased* population for the society) is valued by the society for which it is potentially instrumental. Under these conditions, human fertility can be said to possess *positive marginal social valuation*, and each pubescent woman becomes a resource producer whose social value reaches far beyond that of any man and any group of men.

At a rather abstract level, this process is captured in the models of Joel Cohen (1995) who considers the process by which increases in the carrying capacity of the Earth proved to be a function of increased population:

$$\frac{dK(t)}{dt} = \frac{L}{P(t)} \frac{dP(t)}{dt}$$

Cohen's equation (Cohen 1995: 344) captures well the dynamics which we assign to fertility among hunter-gatherers. Suppose that $K(t)$ is territory at time t , L is an arbitrary constant and P is the

size of the group. Then, the equation indicates that the increased size of the group (that is, fertility net of mortality) enables the group to increase the size and carrying capacity of its territory; but as the size of the group increases over time, the effectiveness of fertility as a factor in territorial acquisition eventually declines toward zero and the *marginal social value of fertility* (MSVF) falls to zero. In the implied scenario, women were initially encouraged to contribute offspring to the group (tribe or lineage), but eventually fertility loses social valuation at the margin and fertility restraints are imposed as the *marginal social value of territorial resources* (MSVT) increases exponentially.

In discussing the value of territory and fertility I shall employ the notion of *marginal valuation*, such that if territory (or fertility) were in surplus, its marginal valuation would be zero. However, the values of these two resources often move in opposite directions. When fertility is surplus, having a marginal value of zero, $MSVF = 0$, there is a need to increase the size and resources of territory, $MSVT > 0$. In order for the $MSVF > 0$, adequate territory must be available and may even be in surplus with a zero marginal valuation, $MSVT \geq 0$. So, in equilibrium both may have positive marginal valuations, the need for more territory being readily accommodated by the forces of demographic growth (that is, by the larger number of warriors generated by fertility). Consequently, *when society is dynamically expansionary, $MSVF > 0$, $MSVT \geq 0$* . However, in the more common cases in ethnographic literature, the societies suffer social and ecological circumscription, $MSVF \leq 0$, $MSVT > 0$.

MARGINAL VALUE OF FERTILITY = 0

In the event that a group (lineage or tribe) suffers *unalterable* resource constraints, MSVT will tend of increase without limit and the MSVF may fall to zero, as indicated by infanticide and other fertility reducing methods. By definition, $MSVF = 0$ means that the fertility of daughters is no longer a source of social power for those who have rights to it. Indeed, its full expression would be a source of social distress, reducing the wellbeing and viability of the group. Since there are usually significant cultural entailments associated with matrilineal affiliation, a retention of a woman's fertility by natal kin is common, even when $MSVF = 0$; and in most cases, matrilineal societies are also matrilocal, such that married women remain in the household of their mothers and sisters. This arrange-

ment places men under the control of fathers-in-law and may provide elements of social power of wives over husbands.

The consequences of matrilineal-matrilocal marriage arrangement is well illustrated by Shostak (1981). In this case a man spent many years working for a girl's parent's household, far from the territory of his own kin, awaiting her coming into marriageable age, only to be dismissed by her after menses. One should be impressed by the power that this young woman had, as she functioned within the social framework provided by her parents; and we can understand how such circumstances offer an incentive for young men to prefer patrilineal-patrilocal marriage.

When $MSVF = 0$, patrilineal affiliation of offspring may arise and a 'marriage payment' will be required. However, among hunter-gatherers *the form of this payment will reflect the fact that fertility lacks marginal social valuation*. It will consist of ordinary consumption goods, the output of male productivity, offered as a token for the transfer a woman's *conjugal* (Divale 1972). As I shall show, momentarily, a payment for the transfer of *positively* valued fertility must take a form which has not been available to hunter-gatherers.

While $MSVF = 0$ is consistent with both matrilineal and patrilineal societies, the majority of hunter-gatherers in Murdock's sample appear to be alineal. In the most extreme case, $MSVT = 0$, in which case resources per square mile might be so scarce that claims on territory are dysfunctional. This could happen in very arid domains, but the best documented example of this case is the reindeer hunting Inuit of the North Polar Region, as described by Hoebel (1954) and Ingold (1980). The traditional technique of these hunters was to intercept reindeer in the course of their seasonal migrations, but since these migrations followed unpredictable pathways, specific territorial claims were dysfunctional, $MSVT = 0$. Moreover, adequacy of food was never assured and extensive female infanticide was practiced, indicating that $MSVF = 0$. Consequently, with both territory and fertility absent as heritable resources, there was no basis for tribal or kinship organizations. This does not imply that people roamed around in 'loose associations'. Quite the contrary. The Inuit village was an intense domain of cooperation and sharing, groups of men being dependent on each other in an ecology where death by accidents and starvation was common. However, households were free to move among villages as circumstances indicated.

The more common case of $MSVF = 0$ would be where $MSVT > 0$, but where the size of territory is too small to allow efficient decomposition into lineage formation. The tribe as a whole would be the unit of optimization. Certainly, the impact of European migration into the New World caused major disruptions and may have been responsible for the fragmentation of larger societies into smaller units for which the tribe, itself, became the unit of territorial possession. However, other than the Athabascan matrilineal migration, we have little information about the social forms of Native American societies as they migrated southward from the Polar region.

MARGINAL VALUE OF FERTILITY > 0

If the $MSVF$ is positive, fertility becomes a source of social power in an expanding demographic. And in this case, a woman's natal household will refuse to transfer her fertility to another group without adequate compensation; and *the only well-established form of this compensation is cattle, delivered as 'bridewealth'*. My information on this case comes from a series of computer simulations which I developed in collaboration with Shunfeng Song during the early 1990s (Bell and Song 1990, 1994). These simulations were inspired by the neoclassical 'Golden Rule' growth models of Edmund Phelps (1966) and by an obscure book from a couple of Swedish investigators, Dahl and Hjort (1976), which examined growth scenarios of cattle and other domesticates, using computer simulations which we reproduced to the fourth decimal.

What do we learn? Using the 'standard model' of herd growth and our specification of a set of demographic variables, such as age specific survival rates, ages of marriage, and fertility rates, we derived quite a number of relationships between those variables and the rate of population growth. In the 'normal' case, there was a nine percent increase in the number of wives per man as a result of judicious exploitation of the herd for bridewealth (the extra wives being taken from other lineages or tribes) and a consequential significant increase in population growth. *This higher growth rate illustrates the demographic advantage of cattle-based patriliney over matriliney.* An increase of nine per cent in wives/man translates into a massive increase in population growth and demographic power.

In Bell and Song (1994) we show that the exchange of cattle for brides is a good deal for bride givers as well, given female total

fertility in a realistic range; and people will be induced by this ‘good deal’ to offer their daughters in exchange for cattle – potentially promoting the shift from matriliney to patriliney. Bride givers gain in the exchange, regardless of the level of bridewealth because the fertility rates of cattle exceed those of the human group, making cattle a better long run investment. That is, the number of daughters'-daughters'-daughters which a given woman may generate over time is no match for the number of brides obtainable from the herd growth generated by her bridewealth. However, bride givers suffer a temporary reduction in demographic growth, while bride takers gain. In a well-managed system of cattle-based patriliney, only a fraction of fertile cattle is used at a given time, allowing the herd to grow in concert with the growth of the group. In this way, bridewealth reduces the rate of growth of the herd while increasing the rate of growth of the lineage. And for this reason, cattle-based patriliney dominates matriliney in an evolutionary sense, that is, it is a more powerful institution for demographic expansion.

The importance of the higher fertility rates of cattle is made plain when we consider the use of camels as bridewealth. In this case a transfer of brides to outsiders is seriously damaging for the bride giver, because camels have lower fertility rates than women, making camels a bad investment. I have devoted a paper on this issue (Bell 2004), but stated very briefly, we note that camel-based Bedouin groups of the Sahara avoid the exchange of brides for camels by strongly favoring marriage *within the lineage*, such as marriage to the father's brother's daughter. In this case, the transfer of camels and brides is entirely nominal, especially if brothers maintain a camel camp in common. The Tuareg solve this problem by reducing the transfer of camels to the level of *dower* and the fertility of brides remains within the natal group in a matrilineal system in spite of a ‘marriage payment’ in the form of camels: the transfer of camels is sufficient to induce patrilocal residence, but not patriliney.

Now, consider ‘female dominated horticulture’: why is it likely to be associated with matriliney? Is the matrilineal inheritance of productive land the answer? No, at least, not completely. In contrast with hunter-gatherers who require extensive territories in order to support a relatively modest population, horticulture has the advantage of enabling a considerable increase in population density, making it possible for the society to be expansive within modest territorial domains. With horticulture, $MSVF > 0$ and quite possi-

bly $MSVT = 0$. This is a situation which we already know is associated with matriliney; and, indeed, if men have no cattle, they have no way of inducing the transfer of fertility, in competition with matriliney, when $MSVF > 0$.

Murdock (1949) presumes the impossibility of voluntary transition from patriliney to matriliney. However, it is *technically* feasible, but only when the $MSVF$ has fallen to zero, that is, when lineage and herd expansions are no longer possible due to territorial limitations. Korotayev and Kazankov (2000: 686) challenge Murdock with a single example, the Rejung of southern Sumatra. They suggest that 'this case shows how the Austronesian matricentric pattern could have proliferated.' However, the adoption of matriliney is not an idea which is feasible in the absence of material conditions. There is the case of the Ngoni who adopted the matrilineal culture of the Chewa in the nineteenth century (Phiri 1983), even though the Ngoni had been pastoralists. One may infer from this case that available territory was not sufficient to encourage expansion of herds, *reducing the marginal valuation of cattle fertility to zero*, while being sufficient for continued expansion of horticulture, preserving $MSVF > 0$. Yet, one can imagine an entirely different scenario, where aggressive cattle people attack agriculturalists and cease lands in order to continue growth of herds in patrilineal formation.

MATRILINITY IN PRIORITY

We have considered the case where the $MSVF$ is non-positive and concluded that the associated social system may be matrilineal or patrilineal or alineal; and we have considered the case of positively valued fertility where men have access to cattle as a form of bride-wealth, making possible the development of strong patrilineal institutions. Indeed, we see that patriliney is the dynamically superior form when cattle are available, because the fertility rates of cattle are greater than the fertility rates of women.

Now we consider positive $MSVF$ in the absence of cattle, as would be the case among hunter-gatherers. But we have a serious problem here. Ethnography has not identified a demographically expansive society of hunter-gatherers. Although the Athabascan groups were expansive, featuring positive $MSVF$ during the recent past, their progress had been blocked by the time ethnographers arrived. Consequently, the ecological conditions which might have prompted the priority of matriliney as a social formation have dis-

appeared, leaving largely a scatter of alineal residues for which evolutionary priority has been falsely assigned. Yet, our examination of the circumstances of prehistory indicate periods of expansion and decline for which matriliney would have been the necessary form, that is, when $MSVF > 0$; and men had no potential for extracting fertility from its source, leaving matriliney as default. So, while alineal and patrilineal societies may have been common at various points in time and in various domains, they would have been the weaker, environmentally circumscribed, societies whose continued long term persistence would be questionable. The dominating, expansive, societies, on the other hand, had to be matrilineal.

During the period prior to the volcanic eruption of Mt Toba, Sumatra, 73.4 kya, conditions for modern humans were deteriorating on the eastern coast of Africa. But the Toba eruption wiped out most of these people, forcing a residual population, from the L2/L3 macrohaplogroups, to move into the southern tip of Africa, displacing the L1 macrohaplogroup, ancestors of the contemporary *Ju/'hoansi* (Rampino and Self 1992). *Only organized kin groups could have ousted the L1 lineage from their homeland.* It was these new people whose subsequent demographic expansion, as matrilineal institutions, preserved the human race, as we know it today (Ambrose 2003; Soares, Alshamali, and Pereira *et al.* 2011). But even among the survivors of Toba, crises persisted with nearly complete desiccation of the southern coast of Africa, forcing a small surviving group to exist Africa toward South Asia around 63 kya (Bell 2015). This was a spectacular process of demographic expansion. Briefly stated, the demographic story of the turbulent Late Pleistocene was one of demographic crises which would eliminate much of the human population, followed by periods of ecological amelioration during which people could experience demographic recovery. In Europe, this process was repeated with the near bottleneck produced by the Last Glacial Maximum, 22–15 kya (Banks *et al.* 2008). The reoccupation of northern Europe involved the movement into ‘new’ territories ($MSVT = 0$; $MSVF > 0$) and subsequent consolidation of populations with continued expansion ($MSVT > 0$; $MSVF > 0$). Without question, these demographically expanding hunting societies were matrilineal; men possessed no assets which would suffice for the extraction of fertility from its source.

As we mentioned earlier, a society may initially expand on a non-segmented tribal basis, but pressures toward decomposition

into lineages and clans may become overwhelming as expansion proceeds. Since most contemporary hunter-gatherers have been forced into deserts and/or circumscribed territories by stronger societies, the kind of intergroup or inter-societal dynamic associated with hypothesized demographically expansive societies of hunter-gatherers has not been observed ethnographically. Consequently, those who have sought to characterize prehistoric hunter-gatherers have relied on studies of geographically and/or socially circumscribed societies. Quite likely, circumscribed societies were common during even the earliest periods of human development, arising as debitage in the wake of the expansive. And in the face of extreme social disadvantage, these societies might have devolved pitifully into 'loose forms of organization, often superficially patriarchal' as posited by 'the leading representatives of every school of anthropological thought.' On the other hand, matriliney can be said to be the earliest form of social formation, if prehistory (and history) is a story to be told by the powerful, by the victors, by the expansive societies of prehistory as they progressively made claim upon the Earth.

REFERENCES

- Abernathy, V. 1979. *Population Pressure and Cultural Adjustment*. New York: Human Sciences Press.
- Ambrose S. H. 2003. Did the Super-Eruption of Toba Cause a Human Population Bottleneck? Reply to Gathorne-Hardy and Harcourt-Smith. *Journal of Human Evolution* 45: 231–237.
- Bell, D. 1990. Growth and Process in a Lineage-based Social Technology (with Shunfeng Song). *Journal of Quantitative Anthropology* 2 (1): 17–45.
- Bell, D. 1994. Explaining the Level of Bridewealth (with Shunfeng Song). *Current Anthropology* 35 (3): 311–316.
- Bell, D. 2004. Evolution of Middle Eastern Social Structures: A New Model. *Journal of Social Evolution and History* 5 (2): 1–24.
- Bell, D. 2015. *The Last 73.4 Thousand Years: Social Relations in Prehistory*. Outskirts Press.
- Banks, W. E., d'Errico, F., Peterson, A. T. *et al.* 2008. Human Ecological Niches and Territories during the LGM in Europe Derived from an Application of Eco-cultural Niche Modeling. *Journal of Archaeological Science* 35: 481–491.
- Carr-Saunders, A. M. 1922. *The Population Problem: A Study in Human Evolution*. London: Clarendon Press.

- Cohen, J. E. 1995. Population Growth and Earth's Human Carrying Capacity. *Science* 269 (5222): 341–346.
- Dahl, G., and Hjort, A. 1976. *Having Herds: Pastoral Herd Growth and Household Economy*. Stockholm: Department of Social Anthropology, Stockholm Studies in Social Anthropology.
- Dickermann, M. 1979. Female Infanticide, Reproductive Strategies, and Social Stratification: A Preliminary Model. In Chagnon, N., and Irons, W. (eds.), *Evolutionary Biology and Human Social Behavior: An Anthropological Perspective* (pp. 321–367). North Scituate, MA: Duxbury Press.
- Firth, R. 1961. *Elements of Social Organization*. Boston: Beacon Press.
- Hodgson, A. G. O. 1923. Notes on the Achewa and Angoni of the Dowa District of the Nyasaland Protectorate. *Journal of the Royal African Institute* 63.
- Hoebel, E. A. 1954. *The Law of Primitive Man: A Study in Comparative Legal Dynamics*. Harvard, MA: Atheneum.
- Ingold T. 1980. *Hunters, Pastoralists and Ranchers: Reindeer Economies and Their Transformations*. Cambridge: Cambridge University Press.
- Korotayev, A., and Kazankov, A. 2000. Regions Based on Social Structure: A Reconsideration (or Apologia for Diffusionism). *Current Anthropology* 41 (4): 668–690.
- Lancaster, W. 1981. *The Rwala Bedouin Today*. Cambridge: Cambridge University Press.
- Manson, J., H., Wrangham, R. W., Boone, J. L. *et al.* 1991. Intergroup Aggression in Chimpanzees. *Current Anthropology* 32 (4): 369–390.
- Morgan L. H. 1871. *Systems of Consanguinity and Affinity of the Human Family*. Washington DC: The Smithsonian Institution.
- Murdock, G. P. 1937. Correlations of Matrilineal and Patrilineal Institutions. In Murdock, G. P. (ed.), *Studies in the Science of Society* (pp. 445–470). New Haven: Yale.
- Murdock, G. P. 1949. *Social Structure*. London: Macmillan.
- Murdock, G. P. 1980. The Tenino Indians. *Ethnology* 19 (2): 129–149.
- Murdock, G. P. 1981. *Atlas of World Cultures*. Pittsburgh: University of Pittsburgh Press.
- Musil, A. 1928. *The Manners and Customs of the Rwala Bedouins*. New York: AMS Press.
- Perry, R. J. 1991. *Western Apache Heritage: People of the Mountain Corridor*. Austin: University of Texas Press.
- Phelps, E. S. 1966. *Golden Rules of Economic Growth: Studies of Efficient and Optimal Investment*. New York: W. W. Norton.

- Phiri, K. M. 1983. Some Changes in the Matrilineal Family System among the Chewa of Malawi since the Nineteenth Century. *The Journal of African History* 24 (2): 257–274.
- Rampino, M. R., and Self, S. 1992. Volcanic Winter and Accelerated Glaciation Following the Toba Super-Eruption. *Nature* 359: 50–52.
- Read, D., and LeBlanc, S. A. 2003. Population Growth, Carrying Capacity, and Conflict. *Current Anthropology* 44 (1): 59–85.
- Reay, M. 1959. *The Kuma: Freedom and Conformity in the New Guinea Highlands*. Melbourne: Melbourne University Press of the Australian National University.
- Roebroeks, W. 2003. Landscape Learning and the Earliest Peopling of Europe. In Rockan, M., and Steele, J. (eds.), *Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation* (pp. 99–115). London: Routledge.
- Sack, R. D. 1983. Human Territoriality: A Theory. *Annals of the Association of American Geographers* 73 (1): 55–74.
- Scrimshaw, S. C. M. 1984. Infanticide in Human Populations: Societal and Individual Concerns. In Irenaus Hausfater, G., and Hrdy, S. B. (eds.), *Infanticide: Comparative and Evolutionary Perspectives* (pp. 439–462). New York: Aldine.
- Shostak, M. 1981. *Nisa, the Life and Words of a !Kung Woman*. Cambridge, MA: Harvard University Press.
- Soares, P., Alshamali, F., Pereira, J. B. *et al.* 2011. The Expansion of mtDNA Haplogroup L3 within and out of Africa. *MBE Advance Access* 29 (3): 915–927.
- Strathern, A. J. 1971. Cargo and Inflation in Mount Hagen. *Oceania* 41 (4): 255–265.
- Turchin, P. 2003. *Historical Dynamics: Why States Rise and Fall*. Princeton, NJ: Princeton University Press.
- Winterhalder, B. 1986. Diet Choice, Risk, and Food Sharing in a Stochastic Environment. *Journal of Anthropological Archaeology* 5 (4): 369–392.