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CHAPTER 4

Grandmothers, Politics, and Getting Back to Science

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Nineteenth-century anthropologists widely agreed that early human society was not based on the nuclear family. Instead, Lewis Henry Morgan argued for the priority of the matrilineal clan – a view that came to be shared by E. B. Tylor, Friedrich Engels, A. C. Haddon, W. H. R. Rivers, Emile Durkheim, and Sigmund Freud. For several decades, most scholars accepted a “stages” view of the evolution of kinship, in which descent through females universally preceded patrilineal inheritance.

Early in the twentieth century, Morgan’s evolutionist paradigm came under vehement attack. The modern schools of cultural anthropology in the United States and of social anthropology in Britain were formed out of this process. We can document the extent to which pro-family, anti-communist ideology overrode scholarship in determining the outcome of these debates. This political intervention was historically significant, since it lies at the root of the division between the social/cultural and evolutionary branches of anthropology. Throughout most of the twentieth century, evolutionary processes were disallowed as legitimate areas of study by social and cultural anthropologists. This has led to our present position of divorce in the discipline, with anthropologists on either side of the divide knowing lamentably little of one another’s work.

Recent work in evolutionary anthropology has produced two models of the evolution of human life history – the “grandmother” hypothesis (O’Connell, Hawkes, and Blurton Jones 1999) and the “diet, intelligence, and longevity” model (Kaplan et al. 2000). In the second part of our chapter, we evaluate these in historical and political perspective. The recent emergence of the grandmother hypothesis compels us to return to the issue of “matrilineal priority.” Critics of the grandmother model (for example, Kennedy 2003) routinely attack it on the basis that it presupposes female philopatry, in contrast to the male philopatry still dogmatically accepted as the prevailing situation throughout human evolution (for example, Foley and Lee 1989; Rodseth et al. 1991). Are these opponents merely revisiting old ideological battlegrounds, respectively debunking and defending the evolutionary centrality of the nuclear family? Or do they offer us the pros-

pect of reintegrating the split discipline of anthropology on a basis that owes more to science than to politics?

The Discovery of Matriliney: Bachofen, Morgan, and Mother-Right

Matrilineal exogamy was first accurately described in print by an early English adventurer, John Lederer, who published an account of his travels in eastern North America in 1672 (Lederer 1672, 4-5). Fifty-two years later, Father Lafitau (1724, 1: 71-72) described in glowing terms the honored status of women among the matrilineally organized Iroquois. Scottish historian Adam Ferguson (1819 [1767], 126) remarked of “savage nations” in general that the “children are considered as pertaining to the mother, with little regard to descent on the father’s side.”

The Swiss jurist and historian Johann Jakob Bachofen drew on ancient Greek sources to argue that “mother right is not confined to any particular people but marks a cultural stage” (1973 [1861], 71). The legal historian J. F. McLennan read Bachofen’s book in 1866, after publishing his *Primitive Marriage*, which independently proposed “kinship through females” as the “more archaic system” (1865, 123). Most prominent in supporting Bachofen, however, was American business lawyer Lewis Henry Morgan, who researched matriliney among the Iroquois and other Native Americans. Describing an Iroquois longhouse, Morgan wrote of the common stores and “the matron in each household, who made a division of the food from the kettle to each family according to their needs.” Here, he commented, “was communism in living carried out in practical life.” In such households, he concluded, “was laid the foundation for that ‘mother-power’ which was even more conspicuous in the tribes of the Old World, and which Professor Bachofen was the first to discuss under the name of gyneocracy and mother- right” (1881, 126-28).

Engels elaborated Morgan’s findings in *The Origin of the Family, Private Property, and the State* (1972 [1884]). “The rediscovery of the original mother-right gens,” he wrote, “...has the same significance for the history of primitive society as the theory of evolution has for biology, and Marx’s theory of surplus value for political economy.” He continues, “The mother right gens has become the pivot around which this entire science turns” (1972 [1884], 36). This was no hasty judgment. From their earliest days in revolutionary struggle, Marx and Engels had been wrestling with questions about sex as well as class. In 1844, Marx wrote that the “immediate, natural and necessary relationship of human being to human being is the relationship of man to woman,” adding that “from this relationship the whole cultural level of man can be judged” (2000 [1844], 96). Marx took Morgan’s

work on the matrilineal clan as confirmation that primitive communism preceded property-based class society and that its secret had been sexual equality. In *The German Ideology*, Marx and Engels contrasted this with the subsequent dominance of “property, the nucleus, the first form, of which lies in the family, where wife and children are the slaves of the husband” (2000 [1846], 185).

Morgan recognized that the transition to patriliney rested on the isolation of women from one another in the husband’s home, reversing “the position of the wife and mother in the household” (1881, 128). Engels added political impact to this idea: “The overthrow of mother right was the *World historic defeat of the female sex*. The man seized the reins in the house also, the woman was degraded, enthralled, the slave of the man’s lust, a mere instrument for breeding children” (1972 [1884], 68; emphasis in original). He continued, “The first class antagonism which appears in history coincides with the development of the antagonism between man and woman in monogamian marriage, and the first class oppression with that of the female sex by the male” (1972 [1884], 75).

Revolution and Counterrevolution in Evolutionary Science

Around the turn of the century, virtually all those who had helped found the discipline of anthropology converged around the fundamentals of the Bachofen-Morgan theory. As G. P. Murdock subsequently observed, the “extremely plausible” arguments in its favor included inferences about paternity uncertainty, the biological inevitability of the mother-child bond, and, above all, numerous apparent survivals of matrilineal traditions in patrilineal societies. The logic of the hypothesis was so compelling, wrote Murdock, “that from its pioneer formulation by Bachofen in 1861 to nearly the end of the nineteenth century it was accepted by social scientists practically without exception” (1949, 185).

What, then, changed everyone’s mind? Once Engels’ inflammatory formulations in *The Origins of the Family* had become a manifesto of proletarian struggle, no one could write neutrally on these subjects any more. Today, social anthropologists assume that the matriliney hypothesis was falsified on scholarly grounds. The evidence is that politics played the decisive role. Morgan’s *Ancient Society* (1877), as Robert Lowie documents in his history of the period, “attracted the notice of Marx and Engels, who accepted and popularized its evolutionary doctrines as being in harmony with their own philosophy. As a result it was promptly translated into various European tongues, and German workingmen would sometimes reveal an uncanny familiarity with the Hawaiian and Iroquois mode of designating kin, matters not obviously connected with a proletarian revolution” (1937, 54-55).

Thanks to Engels' endorsement, Morgan's theory was destined to become a casualty of the central conflict of the age. Twentieth-century social and cultural anthropologists often imagine their discipline to have been shaped in its modern form quite independently of Marxism. It would be more accurate to describe it as shaped in reaction against Marxism. "With Morgan's scheme incorporated into Communist doctrine," observes Marvin Harris, "the struggling science of anthropology crossed the threshold of the twentieth century with a clear mandate for its own survival and well-being: expose Morgan's scheme and destroy the method on which it was based" (1969, 249).

A widespread consensus developed on both sides of the Atlantic that whether or not Morgan's paradigm was wrong, it was too dangerous to be allowed. An early 1930s radio broadcast by Bronislaw Malinowski revealed his state of mind:

A whole school of anthropologists, from Bachofen on, have maintained that the maternal clan was the primitive domestic institution In my opinion, as you know, this is entirely incorrect. But an idea like that, once it is taken seriously and applied to modern conditions, becomes positively dangerous. I believe that the most disruptive element in the modern revolutionary tendencies is the idea that parenthood can be made collective. If once we came to the point of doing away with the individual family as the pivotal element of our society, we should be faced with a social catastrophe compared with which the political upheaval of the French revolution and the economic changes of Bolshevism are insignificant. The question, therefore, as to whether group motherhood is an institution which ever existed, whether it is an arrangement which is compatible with human nature and social order, is of considerable practical interest. (1956, 76)

Malinowski declared, "I would rather discountenance any speculation about the 'origins' of marriage or anything else than contribute to them even indirectly" (1932: xxiii-xxiv). Despite this, Malinowski's mission statement was to "prove to the best of my ability that marriage and the family have been, are, and will remain the foundations of human society" (1956, 28). He argued that "marriage in single pairs – monogamy in the sense in which Westermarck and I are using it – is primeval" (1956, 42). Note Malinowski's tactic of denouncing origins research while specifying in advance its outcome.

In the United States, Franz Boas and his students were worried by Social Darwinism as much as by Bolshevism, launching a trend in American liberal circles in which these threats were deliberately linked. According to Lowie (1960 [1946], 418), Boas had initially supported matrilineal priority. This was understandable since, as Murdock later explained, there was a "complete lack of historically attested, or even inferentially probable, cases of a direct transition from patrilineal to matrilineal descent" (1949, 190). In

Murdock's opinion, this was the most difficult obstacle to destroying the matrilineal priority theory. A single exception was needed to undermine Morgan's scheme.

Boas came up with the Kwakiutl. This group had once been patrilineal, he claimed, but had adopted matrilineality from coastal neighbors, disproving Morgan's understanding of the necessary directionality (Boas 1897, 334 -35). Subsequently, Boas's student Robert Lowie admitted that although "the Kwakiutl facts are very interesting, it is highly doubtful whether they have the theoretical significance ascribed to them" (1960 [1914], 28). The Kwakiutl *numaym* discussed by Boas were neither exogamous nor matrilineal. However, Lowie's admission did not prevent Boas and his students from disseminating the myth. As Marvin Harris summed up the episode: "On the basis of this one drastically deficient case, there gradually diffused out of Schermerhorn Hall at Columbia, through lecture, word of mouth, article and text, the unquestioned dogma that Boas had proved that it was just as likely that patrilineality succeeded matrilineality as the reverse" (1969, 305).

Lowie's seminal books *Primitive Society* (1920) and *The Origin of the State* (1927) were written with the express purpose of discrediting the notion of "primitive communism," claiming private property and the state to be universals of all human societies. Another student of Boas, John Swanton (1905) actually inverted Morgan's stages, arguing that bilateral (nuclear family) and patrilineal forms of social organization were more primitive than matrilineal ones. This became established dogma within American anthropology (Murdock 1949, 189).

Across the Atlantic, a parallel assault on Morgan was launched when A. R. Radcliffe-Brown (1924) published his celebrated article on the "mother's brother." His target was a comprehensive monograph on the Thonga of Mozambique (Junod 1912). Details of the avunculate in this culture had led Junod to conclude that the Thonga were neither simply matrilineal nor patrilineal – they were in a transitional stage. Radcliffe-Brown proposed an alternative explanation. Brother-sister unity, he argued, has no necessary connection with matrilineality. It is just a universal sociological principle. This led him to his punch line: given emotional solidarity between brother and sister, it is psychologically inevitable that any "sentiments" felt by a child toward its mother will be "extended" to her brother as well.

Radcliffe-Brown's sleight of hand was to invoke brother-sister solidarity as if this could be dissociated from matrilineality. Schneider (1961) reiterated the central logical insight that Radcliffe-Brown's circumlocutions were designed to obfuscate. Feelings of mutual solidarity may indeed characterize the brother-sister relationship. But that does not make the unit of brother and sister central to social structure. Sibling solidarity of an intensity sufficient to survive the rival pressure of marital obligation is by no means a "univer-

sal sociological principle.” On the contrary, these are variables – choices between alternative strategies. When a woman marries, any new loyalty to her husband can only be at the expense of her former loyalty to natal kin. Where the husband wins out, a wife must in effect surrender her reproductive future to him and his kin – her children will belong to them. Let us suppose, however, that after marriage, a woman continues to prioritize her brother and other kin at her husband’s expense. To follow that principle consistently would be to assert the primacy of matrilineal as opposed to patrilineal descent.

Murdock’s (1959, 378) research on the Thonga confirmed they were indeed in the throes of transition from matriliney to patriliney – as Junod had originally claimed. In essential conformity with Morgan’s scheme, the rise of alienable property may be the crucial factor cementing marital bonds at the expense of brother-sister solidarity throughout much of sub-Saharan Africa. As David Aberle (1961, 680) put it, “the cow is the enemy of matriliney.” Following in the footsteps of Murdock’s cross-cultural comparative work, Mace and Holden’s (1999) phylogenetically controlled analysis confirmed a negative correlation between African matriliney and cattle owning. In their most recent analysis of matriliney as daughter-biased investment, Holden, Sear, and Mace comment, “the two factors Morgan identified, heritable wealth and paternity uncertainty, remain central to our understanding of variation in matriliney and patriliney in human social organisation” (2003, 110).

The Effect on Paleoanthropology in the Twentieth Century

Subsequent to the fraudulent claims of the leaders of American cultural and British social anthropology, theories based on evolutionary stages were held to be “dead as mutton” (Evans-Pritchard 1965, 100). Except in the Soviet Union (where it became incorporated into state dogma), matrilineal priority was effectively suppressed. By the mid-1930s, it had become institutionally impossible to reopen the debate.

So where did this leave palaeoanthropology and evolutionary theory? Morgan’s work on the matrilineal clan had led such influential thinkers as Engels, Freud, and Durkheim to argue for fundamental discontinuity between primate and human social organization. Classificatory kinship, exogamy, totemic avoidances – these things needed explanation in any account of human origins. The main effect of the suppression of Morgan’s work was to sideline social anthropology’s distinctive scholarly contribution to evolutionary science. From this point on, the two branches of anthropology were hardly on speaking terms. As a result, Darwinians were handicapped with profound ignorance of variability in kinship systems around the world and their historic development.

By default, as a gradualist theory, Darwinism assumes continuity between primate and human life. Drawing on the primatology of his day, Darwin himself had pictured primeval man as a sexual tyrant jealously guarding his hard-won harem of females to the exclusion of local male rivals (1871, 2: 362). After World War II, populist writers on human evolution felt licensed to weave narratives free of all ethnographic constraint. “Naked ape” theory (Morris 1967) connected extant primates directly to the pair-bonding preoccupations of contemporary Western culture. Eurocentrism was the inevitable result, as middle-class English family values became scientifically naturalized and projected into the evolutionary past. This trend continues today as U.S. college campus lifestyles are reflected in the literature produced by evolutionary psychology (for example, Ellis and Symons 1990; Kenrick et al. 1990). Even where surveys of sexual preferences have aimed to collect cross-cultural data (for example, Buss 1989), propertied societies have been overwhelmingly represented to the virtual exclusion of hunter-gatherers.

From the 1930s, Leslie A. White and his students had attempted to salvage much of Morgan’s evolutionist program, with the major difference that the bilateral-patrilineal-matrilineal sequence of Boas’s disciples was now taken for granted. Against this background, Sherwood Washburn and associates launched palaeoanthropology in its modern form. Central to their preoccupations was what they termed “the human family,” attributed to the hunting way of life, deep in the evolutionary past. This “human family” was simply assumed to be a male-female pair sharing a complementary division of labor to raise offspring (Washburn and Lancaster 1968, 301). Despite abundant primate evidence for the significance of matrilineal bonds (for example, Kummer 1971), female strategies had no place in this paradigm. Although the “patrilocal band” model (Service 1962) was heavily criticized by social anthropologists (Lee and DeVore 1968; Woodburn 1968), subsequent origins narratives countenanced male but not female bonding. Patrilocality but not matrilocality, paternity certainty but not the alternative of paternity confusion -- no one seemed to notice how their choice of narrative WAS being systematically constrained.

New Models for Old Arguments

When evolutionary psychology came onto the scene in the 1980s, it inherited this default set of assumptions. The major challenge to this legacy has arisen with the development of the “grandmother” hypothesis (O’Connell, Hawkes, and Blurton Jones 1999), deriving from work on the Hadzabe of Tanzania. This group of big-game hunter-gatherers lives in the East African savanna environment that produced modern humans. Kristen Hawkes

(1991; 1993) observed that, contrary to the assumptions of the nuclear family model, Hadza men did not provide meat to their own families, but instead hunted large game that was distributed throughout the entire camp (Hawkes, O'Connell, and Blurton Jones 1991). If men are not trading provisioning for pair bonds and paternity certainty, we need different models for the emergence of a social division of labor and may even ask Why pair bonds at all? (Hawkes, O'Connell, and Blurton Jones 2001).

Having observed the relative rarity of success for each individual Hadza hunter (amounting to one big kill each month), Hawkes and colleagues went on to document the more reliable daily gains of women's labor (Hawkes, O'Connell, and Blurton Jones 1997). This research focused on the economics of female foraging strategies, especially foraging for roots and tubers (most commonly *//ekwa*), which provide the staple of the Hadza bush diet. To this day, Hadza women tend to live with their mothers and sisters. The work of older women, particularly matriline relatives (Hawkes, O'Connell, and Blurton Jones 1997, 554), proves important in subsidizing weaning mothers. Viewing these findings in the light of general mammalian life-history theory (Charnov 1993), the Hawkes team offered an account of the evolution of human life-history characteristics, dubbed the grandmother hypothesis, which was discussed in the context of the palaeoclimate, fossil, and archaeological records.

The grandmother hypothesis provides an elegant account of the evolution of those life-history characters distinguishing humans from chimpanzees – menopause, increased fertility rates, delay in sexual maturity, and reduced weanling and overall mortality rates. It does not address encephalization, a critical issue discussed further below. O'Connell, Hawkes, and Blurton Jones (1999) specify an evolutionary context of change in climate and foraging strategies that triggered new social strategies. With the increasing aridity of the Lower Pleistocene, it became harder for weanlings to find accessible resources. Roots and tubers became widely available in this climate but could only be processed by adults. They argue that the mother's mother was the most reliable candidate for doing work to feed weanling children. A female with a long-lived, vigorous mother would be able to shorten her interbirth intervals and increase reproductive output relative to other females. This sets up selection directly for longer life span and greater allocation of somatic effort to maintaining the body after reproduction. The consequent reduction of mortality rates allows delay in sexual maturity.

Aside from empirical observation, this challenge to the “Man the hunter” paradigm arises as a matter of principle from modern Darwinian theory. Because the sexes get genes into the next generation by different means, they have different calculations about fitness. For females, high levels of parental investment are inevitable; for males, investment in an offspring

may come at a high opportunity cost if there are chances of mating elsewhere (Trivers 1985). While it is likely that some form of male care or paternal solicitude is ancient in primates as a guard against infanticide, this differs from male parental investment (MPI) involving provision of energy to mother or offspring. The latter is not seen among nonhuman primates, and we have to explain its evolution in terms of fitness benefits and costs to males.

The old “Man the hunter” stories may have dissolved away in the acid of selfish genes, but the camp aligned with nuclear family orthodoxy has now responded to the grandmother hypothesis with an updated version of Washburn’s earlier model (Kaplan et al. 2000). Similarly sophisticated in its use of life-history theory, the “diet, intelligence, and longevity” model is grounded in fine-grained evolutionary ecological comparative work on chimpanzee and human hunter-gatherer foraging strategies, broken down by age and sex. The model takes encephalization into account – a strong point – but is notably weak in contextualizing the argument in terms of archaeological and paleontological data. The authors demonstrate that among contemporary hunter-gatherers, the energy produced by males between the ages of twenty and fifty effectively subsidizes female reproduction. Yet the energy production of hunters with modern weapons is a different story from that of males in a Pleistocene scavenging economy, lacking spears or bows and arrows. Blithely ignoring two decades of archaeological debate about whether hominins of the Plio-Pleistocene were hunting or scavenging (cf. O’Connell et al. 2002, 838), Kaplan et al. (2000) argue that a dietary shift towards high-quality, difficult-to-acquire foods required increasing skill and knowledge. Because individuals became more productive at later ages, and needed longer periods to learn the skills needed for acquiring these foods, this led to coevolution of intelligence with longer life span. Kaplan et al. (2000, 173-74) hitch their model to MPI, with skillful, older males fuelling the process by providing difficult-to-acquire resources to juvenile dependents (their offspring). The authors have been vague about a specific time period for the initial stages of the model, linking it indifferently to the first phase of encephalization (over 2 mya, associated with early *Homo* culminating in *H. ergaster*) or the second phase (from c. 600,000 BP, associated with *H. heidelbergensis*, culminating in modern humans and Neanderthals).

When Did Humanlike Life Histories Start?

These two life-history models stand as the modern sparring partners in the old matriliney vs. nuclear family controversy. Kaplan et al. (2000, 181) avoid specifying dates, places, or even species in outlining their model. But does

the fossil record constrain the time period of major changes in hominin life history? If it does, we can propose a timetable for the onset of life-history changes in *Homo*, and then ask how well the two models fit this timetable.

What can evolutionary anthropology say about the evolution of human forms of kinship? We need to investigate the main pathways of natural selection that would produce early forms of social cooperation, including divisions of labor. Critical here are the energetic costs of reproduction for each sex. These have altered during the course of human evolution particularly because of increases in brain size and body size, which require extra energy for maintenance (Key 2000). Across species, brain and body size are closely related to life-history variables such as age at first reproduction and life span. Fossil remains can therefore provide important evidence about the life history of fossil taxa.

Among earlier hominins – australopiths prior to 2 mya who retained significant climbing abilities – brains and bodies were relatively small, with high size dimorphism between the sexes. From about 2.5 mya, some of these species began to encephalize while bodies remained quite small and apparently still highly dimorphic (McHenry 1996; Wood and Collard 1999). These species led after 2 mya to the emergence of *Homo ergaster*, the first hominin with body proportions like ours – bodies that were bigger and designed for walking not climbing (Wood and Collard 1999). Their brains were twice the size of chimpanzee/australopithecine brains. Sex size dimorphism had reduced, largely because *H. ergaster* females increased body size proportionately more than males (McHenry 1996). Why the strong selection pressure on females? According to the expensive tissue hypothesis (Aiello and Wheeler 1995), it is possible for an organism to run a larger brain without increasing basal metabolic rate if expensive tissue from another part of the body is reduced. The gut is the part that can be most readily reduced, but only if the animal finds a higher-quality diet. To find such a diet requires larger foraging areas. To travel further, *H. ergaster* females needed larger bodies of the right shape to give them more efficient bipedality and thermoregulation in increasingly arid environments. In addition, larger body size aided females who had to carry offspring that were helpless for longer. A further benefit is that the bigger the mother in relation to her offspring, the more efficient lactation per unit body weight (Lee and Bowman 1995).

Cathy Key (2000) models the effects of body size on reproductive costs for hominin species. For females, energetic costs of producing a single offspring are calculated by breaking down a single interbirth interval (IBI) in terms of costs of gestation, costs of lactation, and costs while cycling after weaning (Key 2000, 337). Among anthropoid primates, daily energy expenditure is closely related to body mass. During gestation, this may be increased by some 25 percent; during lactation by 50 percent. Key (2000, 338-

39) applies chimpanzee life-history parameters, with relatively long lactation/IBI, and human parameters, with shorter lactation/IBI, to a range of hominin species, drawing body mass estimates from McHenry (1992). If the same parameters, whether chimp or human, are applied across all species, there is a 50 percent increase in energy expenditure for females across the australopith-Homo transition due to the increase in body size. Alternatively, if costs are calculated for the australopiths using long chimp-style IBI, and for *Homo* with shorter human-style IBI, then costs level off across the transition (Key 2000, 340). Fossil evidence of pattern and rate of dental development in australopithecines strongly supports ape-like life-histories in these species (Smith 1991). While one recent study of dental development in *H. ergaster* (Dean et al. 2001) points to australopith growth rates, a number of other studies place this species closer to the modern human range of variation (for example, Clegg and Aiello 1999; Smith 1993).

By Charnov's life-history model (1993), large body size in *Homo ergaster* implies reduction in mortality and delay in maturity. Key's simple model shows that female *H. ergaster* could not have evolved her larger body unless she had considerably reduced IBI relative to chimps. Shortening lactation greatly reduces reproductive costs. But this is only possible if the weanling can fend for itself, or if someone other than the mother can support it. According to Key's model, human-like life histories must begin to emerge from 2 mya, associated with the increase in body size following the initial phase of encephalization. Yet that first phase of encephalization involved incipient development of secondary altriciality (Shipman and Walker 1989). This refers to the extreme helplessness of a human infant, owing to the rapidity of brain development in the first year and corresponding retardation of motor skills or digestive function. This retardation makes sense for the mother because she has significantly more energy to find than a chimp mother and so slows the whole process down. But the key contradiction of human evolution is this: how, given the pressures of encephalization, did human mothers end up with shorter, rather than longer IBIs? If *H. ergaster* mothers reduced their IBIs, their weanlings, as a result of encephalization, would have been relatively immature. They would have needed other individuals to help find food, leading to the onset of another novelty of human life history—childhood. Unlike primate juveniles, human children, once weaned, are still dependent on adult help.

Who Could Have Helped?

We have outlined two competing accounts of the evolution of human life history. Do they work in the time frame outlined by energetics modeling? The grandmother hypothesis fits well. It directly associates the onset of hu-

manlike life history with the emergence of *H. ergaster/erectus*. It allows for the necessary reduction of IBI in conjunction with the increase of female body size through female social cooperation. It points to the evidence of palaeoclimate change that drove novel female foraging strategies, enabling provisioning of children. The one thing left out of the argument is encephalization (see Blurton Jones, Hawkes, and O'Connell 1999, 157-58). Yet stress of encephalization on top of climate change can promote grandmother strategies. *Homo* mothers experienced the heaviest costs of growing brains in the first two years of infancy (Foley and Lee 1991); it is for this reason that weaning of underdeveloped juveniles required a novel social solution. Without allocarers, *Homo* females would have had to extend their IBIs, resulting in prohibitive reproductive costs; with grandmothers, they could raise birth rates.

The “diet, longevity, and intelligence” argument compares chimpanzee patterns of energy production and consumption with those of modern hunter-gatherers. Yet the comparison critical for this life-history argument is between chimps and hominins of the Plio-Pleistocene boundary. Two key questions arise. Firstly, could males in a Lower Pleistocene scavenging economy be productive enough on a regular basis to underwrite life-history changes (see O'Connell et al. 2002, 853 -59)? Secondly, if males could be so productive, why would they channel hard-won resources into MPI rather than into attracting extra fertile females? We are asked to believe that, over 2 million years ago, when *Homo* mothers critically required allocare for newly weaned children, they turned first to mates, who were liable to rove, instead of to female kin. Partly because Hadza scavenging returns were highly variable and intermittent, O'Connell, Hawkes, and Blurton Jones (1988) were prompted to investigate “grandmothering” as an alternative, since returns would be far more reliable on a day-to-day basis. Because females share similar trade-offs while males must engage in mating competition, there is little doubt which sex is going to provide the most dependable energy income.

If we remove the insistence on MPI at this early stage, we could salvage aspects of Kaplan and colleagues' argument. It is not clear why, apart from ideological considerations, MPI is necessary to coevolution of complex foraging skills, intelligence, and longer life span. For *Homo* females coming under increasing stress from encephalization and climate change, senior female kin offer the most reliable option for daily allocare, setting up incipient selection for longer postreproductive life span, shorter IBIs, reduced mortality rates and delayed onset of reproduction. In modeling the effects of body size on reproductive costs, Key and Aiello (2000) investigated how the relative reproductive costs of the sexes affected their likelihood of co-

operation, both within each sex and between the sexes. Where males had similarly high costs to females, because they needed much bigger bodies to succeed in reproductive competition, they were unlikely to be cooperative. Wherever female costs of reproduction were high – as would be the case in *H. ergaster* with increased brain and body size – female-female cooperation was strongly selected. When female costs rise relative to males, males become much more likely to cooperate with females. With the evolution of *H. ergaster*, female costs did rise relative to males because of the reduction in sexual size dimorphism. Already in Lower Pleistocene scavenging economies, males may have been giving females significant benefits – but such male-female cooperation emerged on a basis of prior interfemale cooperation. The reduction of sexual size dimorphism is driven originally by females meeting their own costs – becoming larger bodied – not by changes in behavior between the sexes. By Key’s model, increasing male-female cooperation is an outcome of change in body size, not a cause.

Which females precisely will males be inclined to help? Males will choose those who are most frequently fertile, that is, those with reduced IBIs. In other words, females with older female kin who take the weaned children off their hands will attract more male help. Micronutrients in meat are especially valuable for children (Milton 1999). Females who get meat gifts from males will be able to reduce their IBIs even further and/or their children will survive better. So “Grandmother” and “Man the cooperative scavenger” become mutually reinforcing. Males will actively choose females who have senior female kin support. We can dispense with MPI since male investment can start and proceed on the basis of mating effort with fertile females.

The combination of “Grandmother” with “Man the Lower Pleistocene scavenger” yields a more complete argument for the emergence of specifically human life histories. Complex scavenging strategies could then set up selection pressures for investment in intelligence and longer life span in males, as argued by Kaplan et al. (2000). As it stands at present, without the grandmother model as necessary precursor, the diet, intelligence, and longevity model is silent on menopause.

In the final phase of encephalization, from 600,000 BP among *H. heidelbergensis*, (the ancestor of moderns and Neanderthals), female costs again rose steeply (Aiello 1996). In line with Hawkes, we argue that female coalitions adopted strategies to promote male competition in big-game “showoff” hunting. Males became more productive from the Middle to Upper Pleistocene, attaining the levels seen among modern hunter-gatherers, and effectively subsidizing female reproduction of larger-brained offspring (cf. Kaplan et al. 2000). None of this requires assumptions about MPI; it can

all be driven by males seeking matings with fertile females. We have argued elsewhere that such female coalitionary strategies led to the emergence of ritual and symbolism (Knight 1991; Knight, Power, and Watts 1995; Power and Aiello 1997). Because female-female cooperation remained central, there is little reason to suppose that prior structures of female kin-bonding would have been altered at this stage. We conclude that our ancestors, from *H. ergaster* through *H. heidelbergensis* up to early modern humans, were biased to matrilocality – tipping the scales towards matriliney as and when unilineal descent groups evolved.

Conclusion

Seeking to explain variation in marriage and family systems, Morgan and Engels anticipated the discipline of evolutionary ecology. Modern Darwinians may well object that the grandmother hypothesis is not an argument about matrilineal clans or “group motherhood” – it implies female kinbonded coalitions and a strong (but variable) tendency to female philopatry. We do not imagine *Homo ergaster* coalitions were unilineal descent groups with classificatory kinship. But, as Murdock (1949) established long ago, the pragmatics of residence, affiliation, and mating on the ground must precede and constrain the emergence of formal systems of kinship and descent. If the evolution of menopause is evidence for ancestral female philopatry in genus *Homo*, this necessarily constrains the ways in which kinship arose with the beginnings of symbolic culture in modern humans. Our picture of the world history of kinship then reverts to Morgan’s perspective of matrilineal priority with classificatory kinship.

In exposing the politically motivated grounds for discarding Morgan’s legacy, we are not trying to reinstate the Morgan/Engels scheme of universal stages of cultural evolution. Nevertheless, Morgan successfully identified key factors underlying variation in residence and descent. Bird (1999) has argued that we can understand the sexual division of labor as the product of variable outcomes to strategic conflict between the sexes in differing environments. Instead of assuming cooperation between the sexes, kinship systems can likewise be viewed as variable outcomes to sexual strategic conflict, with factors such as paternity uncertainty and heritable wealth altering trade-offs (Holden, Sear, and Mace 2003). Understanding variability is preferable to any view of fixity in species patterns. Some do not accept that menopause is an adaptation. Even they will surely acknowledge that a century’s unhealthy preoccupation with paternity certainty and the nuclear family has blinkered our vision of the full range of strategies available to our ancestors (cf. Beckermann and Valentine 2002; Marlowe 2004; Hrdy, this volume).

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