

CHAPTER 3

Human Origins

“I can see no reason why it should not have been advantageous to the progenitors of man to have become more and more erect or bipedal. They would thus have been better able to have defended themselves with stones or clubs, or to have attacked their prey or otherwise obtained food. The best constructed individuals would in the long run have succeeded best, and have survived in larger numbers.”

[Darwin, 1871, p. 142]

What caused our lineage to branch off from the apes? About seven million years ago, some individuals from a community of arboreal apes began behaving in an unusual manner, marking the onset of a new lineage — the hominin lineage — which diverged from the ancestral ape ancestry. There is no accepted explanation for how and why this happened. It remains “the enduring mystery of human origins” [Berger, 2000].

There has long been widespread agreement that the first hominins were distinguished by their practice of a bipedal behavior of some kind, commonly presumed to be bipedal walking. Nevertheless, how bipedal walking itself could have provided reproductive benefits is a mystery.

This obstacle is surmounted if the innovative behavior was not bipedal walking, but bipedal use of hand-held weapons [Young, 2003, 2009, 2010, Chapter 14]. In the present chapter I will show how this activity, performed in a bipedal stance, would have provided immediate and continuing reproductive benefits to our earliest ancestors that promoted natural selection to improve this behavior for millions of years. In later chapters I will describe how this turned an arboreal ape into a hominin with modern body proportions who walked bipedally.

Fighting and reproductive success in chimpanzees. Although we are not descended from chimpanzees, we share with them a common ancestor (Chapter 2). As our nearest living relative, and one which retains its arboreal adaptation, the common chimpanzee (*Pan troglodytes*) provides a model for understanding how use of weapons could have arisen, and why it would have yielded reproductive benefits.

Chimpanzee males are larger, more aggressive, and fight more often than females, using physical aggression to establish and maintain a dominance

hierarchy. High rank is frequently gained by direct confrontation, although more disputes are settled by display and threat than by fighting [Goodall, 1986, 1990a]. Displays may include dragging or flailing branches, throwing rocks or other material in random directions and slapping the ground or a tree. When attacks occur, they do not involve weapons, but may include hitting, kicking, stamping, dragging, scratching, grabbing and biting [Goodall, 1986, 1992]. High rank yields reproductive benefits. The future genetic composition of a chimpanzee community is strongly influenced by the breeding privileges of the alpha male. Although females also copulate with lower-ranking males, this may be thwarted by the alpha male, who is especially possessive of mature females during the ovulation period [Goodall, 1986, 1988, 1990a; deWaal, 1989; Nishida, 1990]. The male hierarchy also regulates access to food [Boesch and Boesch-Acherman, 2000]. Chimpanzee behavior is strikingly different toward familiar and unrecognized conspecifics. Wild chimpanzee males display a hostile and aggressive attitude towards strangers (except females in estrus). Outgroup members may be attacked, killed and even eaten [Goodall, 1986, 1990a, 1992; Nishida, 1990]. Territories are patrolled and defended by groups of males [Manson and Wrangham, 1991; Wrangham, 1999]. When patrol groups encounter trespassers, the group with the fewest males withdraws. Consequently, the more males, the more easily a neighbor's territory can be invaded and occupied, yielding more food and females for raising more offspring [Goodall, 1986; Boesch and Boesch, 1989; Wrangham and Peterson, 1996].

The chimpanzee diet is predominantly vegetarian, but small mammals acquired by hunting (usually a male group activity) are also eaten. Prey animals such as Colobus monkeys, are taken by grabbing, then killed by biting, battering or eating [Teleki, 1973; van Lawick-Goodall, 1975; Goodall, 1986; Boesch and Boesch, 1989; Stanford, et al., 1994]. A male who eats the meat he has procured increases his intake of a nutritionally valuable food. When a hunt is successful, however, the carcass is commonly shared, especially with females in estrus, members of the hunt and dominant males [Teleki, 1973; Goodall, 1986; Boesch and Boesch, 1989; Boesch and Boesch-Acherman, 2000]. Females copulate more frequently with males who have shared meat with them. Thus, males increase their mating success by sharing meat with females and females increase their caloric intake by mating more frequently with males who share meat with them [Gomes and Boesch, 2009]. (Gilby, et al. [2010] are not convinced that chimpanzee males gain more copulations by sharing meat with sexually receptive females).

Chimpanzee throwing and striking. Throwing objects and flailing with sticks and branches commonly occurs on the ground from a bipedal stance and involves only the arm (or arms). Throwing may be overarm, sidearm, underarm or back-handed [Goodall, 1964, 1986; van Lawick-Goodall, 1968, 1975; Kortlandt, 1972; Brewer, 1978; deWaal, 1989; Marzke and Wullstein, 1996]. When it seems to be aimed, throwing is highly inaccurate [Goodall, 1964, 1986, 1988]. If the throw is underarm, the object sometimes lands behind the thrower [van Lawick-Goodall, 1968]. In their natural habitat they throw sticks, stones, leaves, twigs, nuts and branches. During conflicts, they also may throw grass, leaves, or sand,

suggesting that throwing is a threat display, rather than an intentional use of weapons to cause injury. They also grasp sticks or tree branches and swing them like clubs [Köhler, 1927; Kortlandt, 1972, 1986; Goodall, 1964, 1986]. Flailing with sticks from close enough to hit a target is seldom successful [Goodall, 1986]. Throwing and striking appear to be unaimed in most instances. Both are almost entirely male behaviors [Goodall, 1986], although with large individual differences. About half the males do not throw at all [van Lawick-Goodall, 1968; Goodall, 1986, 1990a]. Chim-panzees have never been observed to use weapons for predation [Kortlandt, 1986; McGrew, 1992]. They seem to lack the “concept” of weaponry [Köhler, 1927; Wrangham and Peterson, 1996].

Hominin throwing, striking, and reproductive benefits. Darwin [1871] was the first to suggest that throwing and clubbing would have yielded advantages to early hominins. He thought it would have enabled them to defend themselves with stones or clubs, attack their prey, obtain food, and fight with their enemies. Those best constructed for this behavior, in his view, would have proliferated. Since then, many authors have expressed the opinion that ancient hominins used weapons, such as “stones thrown as missiles, or stones, bones, or wood used as clubs” [Schick and Toth, 1993, p. 183].
