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*THE HUMAN MOTIVATIONAL COMPLEX :
EVOLUTIONARY THEORY AND THE CAUSES OF
HUNTER-GATHERER FIGHTING*

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Part I: Primary Somatic and Reproductive Causes

At the centre of this study is the age-old philosophical and psychological inquiry into the nature of the basic human system of motivation. Numerous lists of basic needs and desires have been put together over the centuries, more or less casually or convincingly. The most recent ones show little if any marked progress over the older, back to Thomas Hobbes's *Leviathan*, 6 (e.g. Maslow 1970 [1954]; Burton 1990). In the absence of an evolutionary perspective, these lists have always had something arbitrary and trivial about them. They lacked a unifying regulatory rationale that would suggest why the various needs and desires came to be, or how they related to one another.

Arguing that the human motivational system as a whole should be approached from the evolutionary perspective, this study focuses on the causes of fighting. It examines what can be meaningfully referred to as the 'human state of nature', the 99.5 percent of the genus *Homo*'s evolutionary history in which humans lived as hunter-gatherers. In this 'state of nature' people's behaviour patterns are generally to be considered as evolutionarily adaptive. They form the evolutionary inheritance that we have carried with us throughout later history, when this inheritance has constantly interacted and been interwoven with the human staggering cultural development. In the anthropological literature, the concept of 'primitive war', which makes no distinction between hunter-gatherers and pre-state agriculturalists, is commonly used to describe 'original', pre-state, warfare. While this category has some value, in evolutionary terms it lumps together the aboriginal condition of all humans with a quite recent cultural innovation. Thus, this study will give priority to the evidence from hunter-gatherers' warfare, which reflects the vast time-span of the evolution-shaped 'human state of nature'. Evidence from primitive agriculturalists will only be cited in support, where there is good reason to believe that they show little significant change from hunter-gatherers.

The causes of 'primitive warfare' remain a puzzle in anthropology, with explanations ranging from the materialist to cultural and psychological ('sheer pugnacity').¹ In recent years, the discussion has been largely dominated by what has been presented as a controversy between the evolutionist and cultural-materialist theories. That the debate has taken this form is due to historical developments within anthropology. Being one of the principal theoretical approaches in anthropology, cultural materialism stresses people's desire to improve their material lot as the basis of human motivation. Since there is a very substantial grain of truth in this idea, cultural materialism has had an obvious explanatory appeal. However, its limitations should have been equally clear, and they were revealed,

for example, in the anthropological study of war during the 1970s. It was horticulturalists, the Yanomamo of the Orinoco basin and the Highlanders of New Guinea, that stood at the centre of the debate. It was not clear why these horticulturalists fought among themselves, for there was no real sign that either the Yanomamo or some of the New Guinea Highlanders experienced agricultural land shortage. The proponents of the materialist school thus suggested that they fought over highly valued animal protein. With the Yanomamo, this supposedly took the form of competition over hunting resources in the forests around their villages. In New Guinea, the competition was allegedly over grazing grounds in the forests for domesticated pigs. While this interpretation had some plausibility, it did not sit quite comfortably with all the evidence.² Indeed, the cultural materialists themselves began to look for complementary explanations.

At a more fundamental level, the cultural materialists never seriously explained, never felt that there was a need to explain, their central argument: why was it that the quest for material gains was the overriding motive of human action. This was simply postulated by them as a fact of life, the way things were, in the same way that anthropology as a discipline never asked itself what was the reason for kin solidarity (or for the incest taboo) which anthropologists everywhere observed as fundamental features of the societies they studied. Furthermore, the predominance of the materialist argument necessitated that all other possible motives would be somehow explained away as secondary, derivative, or as disguises for the material motive. As with the Marxist perception of a materialistic 'infrastructure' versus ideological 'superstructure', there was, again, some truth in that as well. Still, the materialist argument often called for elaborate intellectual acrobatics, which in extreme cases made cultural materialism famous for the most contrived explanatory stories.

>From the mid-1970, modern evolutionary theory slowly began to win attention among anthropologists. One of the first anthropologists influenced by it was Napoleon A. Chagnon, who had already been the best-known student of the Yanomamo. Chagnon argued (1979a, 1979b, 1988) that Yanomamo warfare, as well as their internal conflicts, were predominantly about reproductive opportunities. In inter-village warfare, women were regularly raped or kidnapped for marriage, or both. Village headmen and distinguished warriors had many wives and children, many times more than ordinary people did. Violent feuds within the village were chiefly caused by adultery.

As we shall see, most of these ideas were true. Unfortunately, however, Chagnon - who in the 'protein controversy' wholly opposed the idea that Yanomamo warfare involved competition over hunting territories - gave the impression that evolutionary theory was about reproduction in the narrow rather than the broadest sense. His arguments have thus opened themselves to all sorts of criticisms; anthropologists have anyhow exhibited considerable resistance to the intrusion of evolutionary theory, which called for a thorough re-evaluation of accepted anthropological interpretative traditions. Many of the criticisms levelled against Chagnon's position have been poorly informed about the fundamentals of evolutionary theory. For instance, one critic (McCauley 1990: 3) queried why, if fighting was beneficial for inclusive fitness, was it not continuous and ubiquitous. He failed to realize that fighting, like any other behaviour, could be only one possible tactic for inclusive fitness, depending for its success, and activation, on the presence of specific conditions. Another cluster of often-voiced criticisms was that it was not true that people were motivated by the desire to maximize the number of their offspring; that the

widespread occurrence of infanticide among primitive people was one example that belied this idea; and that women were sought for economic as well as sexual purposes, as a labour force (McCauley 1990; Ferguson 1995: 358-9).

The flaws in these criticisms can be pointed out only briefly here. It is not that people consciously 'want' to maximize the number of their children; although there is also some human desire for children *per se* and a great attachment to them once they exist, it is mainly the desire for sex - Thomas Malthus's 'passion' - which functions in nature as the powerful biological proximate mechanism for maximizing reproduction; as humans, and other living creatures, normally engage in sex throughout their fertile lives, they have a vast reproductive potential, which, before effective contraception, mainly depended for its realization on environmental conditions. Infanticide typically takes place when a new-born in conditions of resource scarcity threatens the survival chances of his elder siblings, as, for example, of an elder nursing infant; for inclusive fitness is not about maximizing offspring number but about maximizing the number of *surviving* offspring. The fact that women may sometime also be valued for economic, as well as reasons is strictly in line with evolutionary theory; people must feed, find shelter, and protect themselves (somatic activities) in order to reproduce successfully.

This brings us to the crux of the current controversy. Having initially emphasized only the reproductive implications of warfare, thus giving rise to the misguided notion among his critics that this was all that evolutionary theory was about, Chagnon has correctly begun to stress the complementary nature of the somatic and reproductive efforts within this theory.³ Curiously, however, he has largely undermined his own position, and thus left the whole debate on the wrong track, by suggesting that in doing that he has been 'synthesizing' the insights of evolutionary theory with those of cultural materialism. There seemed to be a similar need for a synthesis from the other side. Chagnon's main protagonist in recent years, R. Brian Ferguson, has advanced a highly elaborate and increasingly one-dimensional materialistic interpretation of the causes of primitive warfare. However, after exhausting all options for explaining away and playing down any non-material motive, he has had to admit that some such motives did in fact exist (Ferguson 1984a: 38-41; 1984b: 269-71, 308-10; 1990; 1995: xii, 8-13). Offering, as he did, an increasingly narrow interpretation, he, too, has called for a broadening of approach to the study of the causes of war (Ferguson 1990: 54-55; 1995: 8).

However, the real meaning of Chagnon's argument was that evolutionary theory in fact *encompassed* the materialist interpretation, let alone its ecological counterpart; indeed, that it offered the broad explanatory rationale for principal materialist/ecological insights. What required a synthesis were the somatic and reproductive elements in explaining war rather than the materialist and evolutionary theories, for evolutionary theory had *always* consisted of both elements. The false dichotomy of the reproductive versus materialist debate is demonstrated by some of the debate's strange twists and turns: as we shall see, in looking for a complement to their game shortage hypothesis, materialists like Marvin Harris came up with a reproductive interpretation; on the other side, even though Chagnon has acknowledged both the somatic and reproductive elements of evolutionary theory, he has continued to claim (1990) that with primitive people - in general, not only with the Yanomamo - it was the reproductive rather than somatic reasons that were chiefly responsible for warfare.

In fact, the 'human state of nature' was not that different from the general state of nature. Both somatic and reproductive struggles were an integral part of it. Cultural diversity in human societies is stressed by social scientists and historians for excellent reasons, but all too often to the point of losing sight of our easily observed large core of species specificity.⁴ It has long been assumed by many in these disciplines that people may be moved to action – including fighting – for practically *any* reason. However, as this study will claim, hunter-gatherers, and other primitive societies, manifested a remarkably similar set of reasons for fighting, regularly observed by anthropologists everywhere they went. As Sumner put it (1965 [1911]: 212; 1906: para 22; Davie, 1929: 65; also Goldschmidt 1988): the great motives that move people to social activity - including fighting - are hunger, love, vanity, and fear of superior powers. It is the intricate interactions and manifold refraction of these reasons in humans, exponentially multiplied by cultural development, that are responsible for the staggering wealth and complexity of our species' behaviour patterns, including that of fighting. Although I shall now go through the reasons for warfare among hunter-gatherers (as observed by anthropologists) seemingly one by one, it is not the intention here to provide yet another 'list' of separate elements. Instead, I shall seek to show how the various 'reasons' come together in an integrated motivational complex. This complex has been shaped by the logic of evolution and natural selection for billions of years, including the millions-year history of our genus *Homo*, and the tens of thousands of years of our species, *Homo sapiens sapiens*.

Subsistence resources:

hunting territories, water, shelter, raw materials

Resource competition is a prime cause of aggression, violence, and deadly violence in nature. The reason for this is that food, water, and, to a lesser degree, shelter against the elements are tremendous selection forces. As Darwin ([1871] 428-30), following Malthus, explained, living organisms, including humans, tended to propagate rapidly. Their numbers are constrained and checked only by the limited resources of their particular ecological habitats and by all sort of competitors, such as conspecifics, animals of other species which have similar consumption patterns, predators, parasites, and pathogens.

Some anthropologists have disputed that this rationale applied to humans, pointing out that hunter-gatherers, both recent and during the Pleistocene, exhibited on average little if any demographic growth over long periods of time and constantly regulated their numbers through infanticide. However, as we have already seen, infanticide is generally used to maximize the number of surviving offspring precisely when people push against the resource walls of their particular environment. When these environments suddenly expand, an unusual event in nature, demographic growth is dramatic. One of the best known examples of this is the rapid proliferation of Old World wildlife into new territories in the wake of the European age of discovery. Humans propagated equally dramatically in similar circumstances. More than a million years ago, *Homo erectus* broke out of his original habitat in Africa and filled up large parts of the Old World. From about one hundred thousand years ago *Homo sapiens sapiens* repeated that process on an even wider scale. As recently as the last tens of thousands of years, the small groups that crossed from Asia into North America propagated into hundreds of thousands and millions of people, even prior to the introduction of agriculture, filling up the Americas. Similarly, the small

'founder groups' that arrived in the Pacific islands during the last two millennia, in most cases probably no more than a few tens of people on each island, rapidly filled up their new habitats, increasing in numbers to thousands and tens of thousands.

These dramatic cases only demonstrate that as a rule, and contrary to the Rousseauite belief, our Palaeolithic ancestors had no empty spaces to move to. Normally, species quickly fill up their particular habitat and soon push against its boundaries. As some scholars have pointed out, even low population densities and relative mobility over low-yield terrain do not necessarily mean lack of competition and territoriality. Low-yield environment simply requires larger territories for subsistence. Many animal species that also require very large territories for subsistence and are therefore widely spaced out - such as, for example, lion prides - hotly defend their territories against intruders who try to improve their lot. The same applies to humans. Hunter-gatherers' mobility and nomadism were practised *within* a circumscribed territory. Contrary to a lingering popular impression from the 1960s, evidence of territoriality exists for most hunter-gatherer societies examined. Indeed, some territories are better, have richer wildlife, than other, and are, therefore, much coveted (Bigelow 1975: 247-8; Eibl-Eibesfeldt 1979: 129; E. Wilson 1978: 107-9; Anders 1994: 230-2). Anthropological thinking on hunter-gatherers was dominated for some time by the study of the Kalahari Bushmen in the 1950s and '60s (Wilmsen and Denbow 1990). But during the Pleistocene, hunter-gatherers inhabited not only isolated arid areas but also, indeed mainly, the world's most fertile environmental niches, which had much denser populations. This resulted in much greater contact and much more competition with other groups.

Ausis our largest, continent-size, 'pure' laboratory of simple hunter-gatherers, which before Western arrival was totally unaffected by contact with farmers or herders. The focus on the Kalahari Bushmen has resulted in a relative neglect of this methodologically and empirically far superior 'laboratory' in recent anthropological literature. In Australia, even in the desert areas of the central regions, where population densities were often as low as one person per 20 square miles, or less, let alone in the resource-rich and more densely populated areas, group territories existed and their boundaries were well defined and kept on penalty of death. These boundaries criss-crossed the continent and by and large were apparently very old. There was no 'vast common land'. Rather than free-rangers, the Aborigines (like the Greenland Eskimo, another good, isolated 'laboratory' of simple hunter-gatherers) were in fact 'restricted nomads', or 'centrally based wanderers', confined for life to their ancestral home territories.⁵

The human - like animal - tendency for maximizing reproduction was constantly checked by resource scarcity and competition, largely by conspecifics. This competition was partly about nourishment, the basic and most critical somatic activity of all living creatures, which often causes dramatic fluctuations in their numbers. Resource competition, and conflict, is not, however, a given quantity but a highly modulated variable. They change over time and place in relation to the varying nature of the resources available and of human population patterns in diverse ecological habitats (Durham 1976; Dyson-Hudson and Smith 1978; Dawson 1996: 25). The basic question, then, is what the factors that act as the main brakes on human populations in any particular habitat are; what

the main scarcities, stresses, and hence objects of human competition, are. Again, the answer to this question is not fixed but varies considerably in relation to the conditions.

In extreme cases like the mid-Canadian arctic, where resources are highly diffused and human population density is very low, resource competition and resource conflict may barely exist. In arid and semi-arid environments, like those of Central Australia, where human population density was also very low, water holes were often the main cause of resource competition and conflict. They were obviously critical in times of drought, when whole groups of Aborigines are recorded to have perished. For this reason, however, there was a tendency to control them even when stress was less pressing. For example, as Meggitt recorded (1962: 42), between the Walbiri and Waringari hunter-gatherers of the mid-Australian Desert, whose population density was as low as one person per 35 square mile, relatively large-scale fighting, to the order of 'pitched battles' with a 'score or more dead', took place, among other reasons, in order to 'occupy' and monopolize wells.

In well-watered environments, food often became the chief cause of resource competition and conflict, especially at times of stress, but also in expectation of and preparation for stress.⁶ As Lourandos, for example, has written with respect to the Australian Aborigines (1997: 33): 'In southwestern Victoria, competition between groups involved a wide range of natural resources, including territory.... competition between groups is expressed in the elaborate material culture of weaponry (shields, clubs and the like) used for display and combat.' Resources meant mainly food. The nature of the food in question obviously varied with the environment. Still, it seems safe to conclude that it was predominantly meat of all sorts that was hotly contested among hunter-gatherers. This fact, which is simply a consequence of nutritional value, is discernible throughout nature. Herbivores rarely fight over food, for the nutritious value of grass is too low for effective monopolization. To put it in terms of the model (Dyson-Hudson and Smith 1978) that relates defended territoriality and violent competition to resource density: grass' nutrition is simply too 'defused' to make the effort to monopolize it cost-effective. Fruit, roots, seeds, and some plants are considerably more nutritious than grass and are often the object of competition and fighting, both among animals and humans. Meat, however, represents the most concentrated nutritional value in nature and is the object of the most intense competition. Animals may defend territories to monopolize mates or food, or both. The higher the nutritional value of their food, the more the food element of territorial behaviour would be present in addition to the reproductive element. At the top of the food chain, meat eaters would not only defend their hunting territories against conspecifics; whenever they had the opportunity, they would act against predators from other species to weed out competitors. Lions, for example, would kill leopard and hyena cubs whenever they can find them. Game resources are the principal factor determining predators' spacing out in nature.

Indeed, before and during the 'protein controversy', game resources have been consistently shown in a series of studies to play a similar role across a whole range of primitive human societies examined. Chagnon was right that there were other, and perhaps even more important, (reproductive) reasons for Yanomamo warfare, but he was wrong in claiming that game competition was not a reason at all. As his protagonists reminded him, he himself had noted that 'game animals are not abundant, and an area is rapidly hunted out'. His protagonists accepted that the Yanomamo suffered from no 'protein deficiency'. But they pointed out that the minimum levels of consumption achieved were only secured

by a static population level, kept static *inter alia* by the high mortality rates in fighting recorded among the Yanomamo, as well as among other primitive peoples. A rise in human population level would easily be translated into game depletion.⁷ Hence an inherent state of competition and conflict between the human hunters. Alien hunters would naturally be regarded as competitors and encounter animosity. Indeed, in environments where game is highly concentrated and unevenly spread, food competition and conflict would be the most intense. In resource rich areas such as northern and southern Australia or the American Northwest, prime concentrations of fish, birds, and other wildlife, such as river mouths, were far superior to ordinary stretches of beach or river shore, let alone inland territories (e.g. D. Harris 1987; Kimber 1990). Violent clashes, brought about by hunting forays and population movements were commonplace, undoubtedly becoming more intense when hunger and starvation loomed during seasonal and other natural food supply shortages and stresses.

The American Northwest, for example, another vast 'laboratory' of 'pure' hunter-gatherers, was a land of plenty, possessing rich marine and land game resources. However, plenty is partly a misleading notion, for it is relative, first, to the number of mouths that have to be fed. The more resource rich a region is, the more people it attracts from outside, and the more will internal population growth take place. As Thomas Malthus pointed out, a new equilibrium between resource volume and population numbers would eventually be reached, recreating the same tenuous ratio of subsistence which has been the fate of most pre-industrial societies throughout history. As in the richest environments in northern Australia, population densities in some southern regions of the Northwest Coast were as high as eight (and, in places, even twenty) people per mile of coastline, or three to five people per square mile.⁸ Monopolization of prime resource territories took place both within and between the regional groups, resulting in developed social ranking within the groups and constituting one of the major reasons for the endemic warfare that took place among them. Territorial boundaries were well known and, at the peril of death, were normally not crossed. As a rule, people did not feel safe to go where they did not have rela.⁹ Even R. Brian Ferguson, who stresses Western impact on a so-called 'tribal zone' during 'proto-contact', fully recognizes the struggle for subsistence resources as a prime cause for the native warfare in the region. Warfare is archaeologically recorded there for no less than four thousand years.¹⁰

According to one comparative study (Keeley 1996: 109-10), territory changed hands among hunter-gatherers up to a rate of 5 to 10 percent per generation. Things were further complicated in instances where the vital concentrations of game were geographically mobile rather than more or less static. Buffalo herds' migration routes on the North American Great Plains were changing and difficult to predict. Hunting in other tribes' territories thus became necessary from time to time, often resulting in warfare (Newcomb 1950: 325; Biolsi 1984: 148-50). Upper Palaeolithic hunters of large game in Europe, from France to the Ukraine, may have exhibited similar patterns as the Buffalo hunters.

The main point of all this is that resource competition and conflict existed in most hunter-gatherer societies; but how significant they were, how they ranked in comparison to other possible reasons for conflict, and what resource specifically was mostly in conflict - depended on the particular conditions of the human and natural environment in question. Scarcities and stresses, and hence the causes and occurrence of conflict, varied. The concept of 'territoriality', which was brought to the fore in the 1960s by Ardrey (1966),

Lorenz (1966), and Tinbergen (1968), has been more subtly defined in this light. Like aggression, territoriality is not a blind instinct. It is subservient to the evolutionary calculus, especially in humans, whose habitats are so diverse. Among hunter-gatherers, territories vary dramatically in size - territorial behaviour itself can gain or lose in significance - in direct relation to the resources and resource competition. The same applies to population density, another popular explanation in the 1960s for violence. In other than the most extreme cases, it is mainly in relation to resource scarcity and hence as a factor in resource competition that population density would function as a trigger for fighting. Otherwise, Tokyo and the Netherlands would have been among the most violent places on earth.¹¹

In conclusion, let us understand more closely the evolutionary calculus that can make the highly dangerous activity of fighting over resources worthwhile. In our societies of plenty, it might be difficult to comprehend how precarious people's subsistence in pre-modern societies was (and still is). The spectre of hunger and starvation always loomed over their heads. Effecting both mortality and reproduction (the latter through human sexual appetite and women's fertility), it constantly, in varying degrees, trimmed down their numbers, acting in combination with disease. Thus, struggle over resources was very often evolutionarily cost-effective. The benefits of fighting must also be matched against possible alternatives (other than starvation). One of them was to break contact and move elsewhere. This, of course, often happened, especially if one's enemy was much stronger, but this strategy had clear limitations. As we have already noted, by and large, there were no 'empty spaces' for people to move to. **In the first place, space is not even, and the best, most productive habitats were normally already taken. One could be forced out to less hospitable environments, which may also had been earlier populated by other less fortunate people.** Indeed, finding empty niches required exploration, which again might involve violent encounters with other human groups. Furthermore, a move meant leaving the group's own habitat, with whose resources and dangers the group's members were intimately familiar, and travelling into uncharted environments. Such a change could involve heavy penalties. Moreover, giving in to pressure from outside might establish a pattern of victimization. Encouraged by their success, the alien group might repeat and even increase its pressure. A strategy of conflict, therefore, concerns not only the object presently in dispute but also the whole pattern of future relations. Standing for one's own might in fact mean *lessening* the occurrence of conflict in the future. No less so, and perhaps more, than actual fighting, conflict is about deterrence.

Having discussed fighting's possible benefits and alternatives, deterrence brings us to its costs side. Conflict would become an evolutionarily more attractive strategy for those who resort to it the lower their risk of serious bodily harm and death. Consequently, demonstrations of strength and threats of aggressive behaviour are the most widely used weapons in conflict, both among animals and humans. It is the state of mutual apprehension and armed surveillance - more than the spates of active fighting which, of course, establish this pattern of relations - that is the norm among human groups. Furthermore, when humans, and animals, do resort to deadly violence, they mostly do so under conditions in which the odds are greatly tilted in their favour. As students of 'primitive warfare' have shown, it is not the open pitched battle but the raid and ambush that constitutes the principal and by far the most lethal form of warfare among hunter-gatherer and other pre-state societies.

Animals are important not only for their meat but also as a source of hides and furs for clothing in cool climates, and of bone, horn, and other materials for tools. Other vital raw materials for tool-making include flint and obsidian. There are also luxury, prestige, and exotic goods like pigments (ochre), ivory, and feathers, whose evolutionary value will be discussed later on. In most cases, these raw materials may not in themselves be in scarcity among hunter-gatherers, in the sense that there may be enough of them in the environment for all. However, since **at least some of these items might be unevenly spread, the nearby inhabitants often tried to monopolize them for trade purposes. Furthermore, crossing group boundaries to obtain raw materials might also carry the risk of violent confrontation because of the state of conflict and mutual apprehension over *other things* which might prevail among human groups.** As Kimber (1990: 163) writes with respect to Aboriginal Australia:

The red ochre gathering expeditions... were normally all-males parties, and although cordial relationships between groups were sought, fighting appears to have been a common hazard faced by travelling parties. One entire party, with the exception of one man, is recorded as having been ambushed and killed in about 1870, whilst in about 1874 all but one of a group of 30 men were 'entombed in the excavations'.

Things were not very different in the American Northwest and Alaska. Attempts at monopolization and mutual apprehension over other reasons often made trade journeys hazardous and necessitated strictly followed customs and practices to regulate them. In the evolution-shaped motivational complex that may lead to conflict, the elements were mixed, intertwined, and mutually affected.

Reproduction

The struggle for reproduction, in the stricter sense of the concept, is about access to sexual partners of reproductive potential. There is a fundamental asymmetry here between males and females, which runs throughout most of nature. Females invest a great deal more in carrying and rearing the fertilized eggs, and often also the offspring that come out of them. Their reproductive potential is limited by this heavy logistic burden, for they can only carry and rear a limited number of fertilized eggs or offspring at one time and, hence, in a lifetime. Thus, while sufficient sexual activity is necessary for maximizing female conception, increasing the number of sex partners is not. At any time, a female can be fertilized only once. Consequently, evolutionarily speaking, she must take care to make the best of it. It is quality rather than quantity that she seeks. What she requires is that the male who fertilizes her would be the best scan find. Hence, she must be choosy. She must select the male who looks the best equipped for survival and reproduction, so that he would impart his genes, and his qualities, to the offspring. In those species, like the human, where the male also contributes to the raising of the offspring, his skills as a provider and his loyalty are other crucial considerations.

In contrast to the female, a male has theoretically almost no limit to the number of offspring he can have. He can fertilize an indefinite number of females, thus multiplying his own genes in the next generations. The male's reproductive capacity increases in direct relation to the number of his sex partners, while the female's does not. In real life, the

sexually most successful human males, for example, can have, indeed often had, scores and even more children. The main brake on male sexual success is competition from other males.

All this, of course, is only an abstract. Around this rationale, sexual strategies in nature are highly diverse and most nuanced (Symons 1979; Daly and Wilson 1983; Ridley 1994). Some species are highly polygynous. In many social animals, the leading male monopolizes all the females in the group. Fighting among the males for control over the harem is most intense because the evolutionary stakes are the highest. In many species, especially among herbivores, access to females is practically the *only* reason for intraspecific fighting. Males of many non-social species also fight among themselves for any sexually receptive female they encounter. Not all species, however, are highly polygynous. Access to females can be more evenly spread, all the way down to pair monogamy. However, while monogamy reduces, it by no means terminates, male competition. In monogamous systems, the quality of the female partner also gains significance. If the male is restricted to one partner, it becomes highly important for him as well to choose the partner with the best reproductive qualities he can get: young, healthy, and optimally built for bearing offspring; that is, in sexual parlance, the most attractive female.

Where do humans stand on this scale? The need to take care of very slowly maturing offspring, which required sustained investment by both parents, turned humans in the monogamous direction, to pair bonding. This in itself significantly reduces male competition and violence, because reproductive opportunities are more equally spread. Competition over the best female partners remains, however. Furthermore, humans, and men in particular, are not strictly monogamous. In the first place, males would tend to have more than one wife when they can. Only a minority can, however. Although in most known human societies, including those of hunter-gatherers, polygyny was legitimate, only a select few well-to-do men in these societies were able to support, and thus have, the extra wives and children. Secondly, in addition to official or unofficial wives, men would tend to search for extra-marital sexual liaisons with other women, married or unmarried. On the man's part, this infidelity is - evolutionarily speaking - a strategy intended to increase his reproductive success by gaining a chance to fertilize more women. On the 'other woman's' part, if she is unmarried, an affair might be her only chance of a sexual relationship, or an opportunity for a relationship with a successful man (well-endowed and supporting). For a married woman as well, an affair might be an opportunity for a relationship with a better-quality man than the one she has, promise extra care and support, or provide insurance against marriage failure.

Again, this is only an abstract, for the 'battle of the sexes' and sexual infidelity is not our subject. But, indeed, how does all this affect human violent conflict and fighting? The evidence across the range of hunter-gatherer peoples (and that of primitive agriculturalists) tells the same story. Within the regional group (tribe), women-related quarrels, violence, so-called blood feuds, and homicide were rife, often as the principal category of violence. Some incidents were caused by suitors' competition; some by women's abduction and forced sex; some by broken promises of marriage; most, perhaps, by jealous husbands over suspicion of wives' infidelity. Between groups, the picture is not very different, and is equally uniform. Warfare regularly involved stealing of women, who were then subjected to multiple rape, or taken for marriage, or both. According to Meggitt (1962: 38), if the

Walbiri 'were able to surprise the enemy camps and kill or drive off the men, they carried away any women they found.' Wheeler (1910: 118, 139) specified the following motives for the frequent inter- and intra-group Aboriginal fighting: 'women, murder (most often supposed to be done by magic), and territorial trespass.' Warner wrote in his classical study, conducted in Arnhem Land in the 1920s (1937: 155): 'Warfare is one of the most important social activities of the Murngin people and surrounding tribes.' His list of causes for fighting, including 'the stealing of women', was not very different from Wheeler's. The natives of the American Northwest Coast and arctic are our other vast microcosm of hunter-gatherer peoples. According to Franz Boas (1966: 108-10), successful Indian raids in the Northwest Coast typically ended as follows: 'When the men were killed, their heads were cut off with their war axes. They burned the village. Women who pleased the warriors, and children, were taken as slaves.' Eskimo warfare on the Alaskan coast followed a similar pattern: 'Not only the men but also the women and children might be killed, although young girls sometimes were spared and carried off.' (Oswalt 1967: 185-8)

So hunter-gatherer fighting commonly *involved* the stealing and raping of women; but was it *about* women? Was the stealing and raping of women the cause or a side effect of hunter-gatherer fighting? This question has recently been posed by Ferguson (1995: 355-8) in respect to Yanomamo warfare. Ferguson, who holds that warfare is caused by material reasons, has disputed Napoleon Chagnon's claim that the Yanomamo fought primarily for women. Chagnon, for his part, dismissed the materialist position, enlisting the testimony of Yanomamo men who had told him amused: 'Even though we like meat, we like women a whole lot more!' However, even Chagnon appears to waver on occasions on whether Yanomamo warfare was really *about* women (Chagnon 1977: 123, 146; McCauley 1990: 5).

The Yanomamo are hunter and horticulturalists rather than pure hunter-gatherers. However, the fundamental question in dispute is relevant to hunter-gatherers as well. As I have already indicated, I think this question is in fact pointless and has repeatedly bemused scholars and led them to a dead end. It artificially takes out and isolates one element from the wholeness of the human motivational complex that may lead to warfare, losing sight of the overall rationale that underpins these elements. In the evolution-shaped 'human state of nature', this complex consists of varying mixes of the particular scarcities for which people in any given society may resort to violent competition. Both somatic and reproductive elements may be present with humans; moreover, both these elements are interconnected; and they give rise, in turn, to other elements, which we shall later discuss. Among hunter-gatherers, women are often a strong motive for warfare, frequently the main motive, but rarely the only one. Again, women are such a prominent motive because reproductive opportunities are a very strong selective force indeed.

The continent-size Australian laboratory of simple hunter-gatherers is, once more, an unmatched source of data, already cited in this connection by Darwin ([1871]: 871). Polygyny was legitimate among all the Aborigines tribes and highly desired by the men. However, comparative studies among the tribes show that men with only one wife comprised the largest category among married men, often the majority. Men with two wives comprised the second largest category. The percentage of men with three or more wives fell sharply, to around ten to fifteen percent of all married men, with the figures declining with every extra wife.¹² To how many wives could the most successful men aspire? There was a significant environmental variation here. In the arid Central Desert,

four, five, or six wives were the top. However, in the more rich and productive parts of Arnhem Land and nearby islands in the north, a few men could have as many as ten to twelve wives, and in some places, in the most extreme cases, even double that number. There was a direct correlation between resource density, resource accumulation and monopolization, social ranking, and polygyny.¹³ Naturally, the increase in the number of a man's wives generally correlated with his reproduction rate (number of children). Statistics for the Aborigines are scarce (Meggitt 1962:80-1). **However, among the Xavante horticulturalists of Brazil, for example, 16 of the 37 adult males in one village (74 out of 184 according to a larger survey) had more than one wife. The chief had 5, more than any other man. He fathered 23 surviving offspring who constituted 25 percent of the surviving offspring in that generation.** Shinbone, a most successful Yanomamo man, had 43 children. His brothers were also highly successful, so Shinbone's father had 14 children, 143 grandchildren, 335 great grandchildren, and 401 great-great grandchildren, at the time of the research (Daly and Wilson, 88-9, 332-3; Symons 1979: 143; Chagnon 1979b: 380).

The same applied to hunter-gatherers. The leaders of the Aka Pygmies were found to be more than twice as polygynous as ordinary people, and to father more children (Betzig 1991). As we saw, resource scarcity reduced social differentiation, including in marriage, but did not eliminate it. Among the !Kung of the arid Kalahari Desert, polygyny was much more limited, but 5 percent of married men still had two wives (Daly and Wilson 285). Women related feuds were the main cause of homicide among them. The natives of the American Northwest Coast and arctic, our other great microcosm of hunter-gatherer peoples, demonstrate the same trend. In the extremely harsh conditions of the mid-Canadian arctic, where resources were scarce and diffused, fighting over resources barely existed. Because of the resource scarcity, marriages among the native Eskimo were also predominantly monogamous. One study registered only 3 polygynies out of 61 marriages. Still, wife-stealing was a widespread, probably the main, cause of homicide and 'blood feuds' among the Eskimo (Dickemann 1979: 363; Symons 1979: 152; Irwin 1990: 201-2).¹⁴ Among the Eskimo of the more densely populated Alaskan Coast, abduction of women was a principal cause of warfare. Polygyny, too, was more common among them, although restricted to the few (Nelson 1983 [1899]: 292, 327-9; Oswalt 1967: 178, 180, 182, 185, 187, 204; Burch and Correll 1972: 33). **Strong *Ingalik* (big men) often had a second wife, and 'there was a fellow who had five wives at one time and seven at another. This man was a great fighter and had obtained his women by raiding.'** (Betzig 1991) The resource-rich environment of the Northwest Coast accentuated resource competition and social ranking. Conflict over resources was therefore intense. However, resource competition was not disassociated from reproduction, but constituted, in fact, an integral whole with it. Typically, women are not even mentioned in Ferguson's elaborate materialist study of Northwest Coast Indian Warfare (1984b). Nonetheless, as we have already seen in Boas' account, they were there. Most natives of the Northwest Coast were monogamous. However, the rich, strong, and powerful were mostly polygynous. The number of wives varied from tribe to tribe, but 'a number' or 'several' is normally quoted, and up to twenty wives are mentioned in one case. The household of such successful men is repeatedly described as having been very substantial and impressive indeed (Rosman and Rubel 1971: 16-17, 32, 110; Drucker 1951: 301; 1965: 54; Krause 1970 (1885): 154).

After all, what was it for that more resources and more prestigious goods were desired and accumulated by the natives, most successfully by the chiefs and 'big men'? For somatic reasons, to be sure, that is, above all, in order to feed, clothe, and dwell as well as they could; but, indeed, to feed, clothe, and house larger families with more wives and more children; and to demonstrate their ability to do so in advance, in order to rank as worthy of the extra wives. Competition over women can lead to warfare *indirectly* as well as directly. Conflict over resources was at least partly conflict over the ability to acquire and support women and children. According to Hayden's model (1994), simple resources in resource-rich societies are accumulated and converted to luxury items in an intensified competition for status, prestige, and power. He could add women to the list of converted goods. Resources, reproduction, and, as we shall see, status, are interconnected and interchangeable in the evolution-shaped complex that motivates people. Resources are convertible to more and 'better' women. In some fortunate cases - as with mass and energy in Einstein's equations - the opposite is also true, and women generate resources which are greater than those which they and the children require from the husband; with the Indians of the Great Plains, for instance, the many women of the chiefs and 'big men' produced decorated robes for the White Man's trade.¹⁵ Finally, both resources and women contributed to status, which in turn was likely to increase one's access to resources and matrimonial opportunities.

The explanation for their wars that Meggitt (1977: 182-3) recorded from the Mae Enga horticulturalists of Highlands New Guinea wonderfully ties all these elements together: 'A clan that lacks sufficient land cannot produce enough of the crops and the pigs needed to obtain the wives who are to bear future warriors to guard its domains and daughters whose brideprice will secure mates for their "brothers".' Polygyny among the Enga was 'the ideal', practised, according to one sample by 17.2 percent of the men (Meggitt 1977:111). Among another Highlands tribe, the Goilala, it amounted to 12 percent of the men (16 percent of the married men), with some men having as many as 4 wives. With them as well, marriages were an interrelated complex comprising sexual, economic, and alliance aspects (Hallpike 1977: 122-6, 129, 135-6).

As mentioned earlier, wealth, status, matrimonial success, and power were similarly inter-connected among the 'big men' of northern Australia (Hart and Pilling 1964: 18, 50). The same pattern applied to the 'big men' (*umialik*) of the Eskimo hunter-gatherers of the Alaskan coast (Oswalt 1967: 178; Burch 1974: 6). A positive feedback loop mechanism was in operation. Chagnon (1979b) has shown one way this mechanism worked with the Yanomamo, and Ian Keen (1988: 290) has independently detected the same pattern among the Australian hunter-gatherers. Clan growth depended on reproductive success. Now, the largest clans in a tribe, those comprising more siblings and cousins, acted, as always, on the principle of kin solidarity *vis a` vis* the rest of the tribe. They moved on to increase their advantage by controlling leadership positions, resources, and marriage opportunities at the expense of the others. As a result, large clans tended to dominate a tribe, politically and demographically, over time. The Yanomamo Shinbone family, mentioned above, grew into several villages within a few generations. The notion that there is a self- and mutually-reinforcing tendency which works in favour of the rich, mighty, and successful, facilitating their access to the 'good things of life', goes back a long way. The idea that 'the rich get richer' is valid in a much wider sense.

Polygyny greatly exacerbated women's scarcity and direct and indirect male competition and conflict over them. Indeed, a cross-cultural study (Otterbein 1994: 103) has found polygyny to be one of the most distinctive correlates there is of feuding and internal warfare. Female infanticide was another factor contributing to women's scarcity and male competition. Although the number of male and female babies should be nearly equal at birth (105:100 in favour of the boys), a survey of hundreds of different communities from over a hundred different cultures (of which about one fifth were hunter-gatherers) has shown that juvenile sex ratios averaged 127:100 in favour of the boys, with an even higher rate in some societies (Divale and Harris 1976). The Eskimos are known to have been one of the most extreme cases. They registered childhood sex ratios of 150:100 and even 200:100 in favour of the boys. No wonder then that the Eskimo experienced such a high homicide rate over women, even though polygyny barely existed among them. Among Australian Aboriginal tribes childhood ratios of 125:100 and even 138:100 in favour of the boys were recorded (Fison and Holt 1967 [1880]: 173, 176). Among the Orinoco and Amazonian basin hunters and horticulturalists childhood boy ratio to every 100 girls was recorded to be: Yanomamo 129 (140 for the first two years of life), Xavante 124, Peruvian Cashinahua 148 (Dickemann 1979: 363-4). In Fiji the figure was 133. **In tribal Montenegro it was estimated at 160 (Boehm 1984: 177).** Although the evidence is naturally weaker, similar ratios in favour of the males have been found among the skeletons of adult Middle and Upper Palaeolithic hunter-gatherers, indicating a similar practice of female infanticide that may go back hundreds of thousands of years (Divale 1972).

Polygyny and female infanticide thus created women scarcity and increased men's competition for them. How was this competition resolved? Partly by peaceful, albeit still oppressive means. Although a study of the Walbiri Aborigines (Meggitt 1965: 149-50) shows that no men were excluded from marriage altogether, things may have been different for a small minority of marginalized men in more ranked hunter-gatherer societies. Furthermore, in primitive societies females were married at puberty, whereas most males married in their late twenties or even thirties. This helped a great deal to offset the sex imbalance. In addition, males were victims of hunting accidents (and boys have always been and continue to be more prone to accidental death in risky games than girls), though this may have been offset by female death in birth-giving. Finally, however, there was also open conflict: male death in feuding and warfare. The correlation of male violent death and women's scarcity has been first pointed out by Warner in his study of the north Australian Murngin (1930-1, 1937), and later independently re-discovered and greatly elaborated by Divale and Harris (1976). During a period of 20 years, Warner (1937: 157-8) estimated death rate for the Murngin was 200 men out of a total population of 3000 of both sexes, of whom approximately 700 were adult males. This amounts to a range of 30 percent of the adult males. Violent mortality among the women and children is not mentioned. Pilling's estimate of at least 10 percent killed among the Tiwi adult males in *one decade* comes within the same range (1968: 158). The Plains Indians showed a deficit of 50 percent for the adult males in the Blackfoot tribe in 1805 and 33 percent deficit in 1858, while during the reservation period the sex ratio rapidly approached 50-50 (Livingstone 1967: 9). Among the Eskimo of the central Canadian arctic, who lacked group warfare, violent death, in so-called 'blood feuds' and 'homicide', was estimated by one authority at one person per thousand per year, 10 times the 1990 USA rate (Symons 1979: 145; Knauft 1987: 458; Briggs 1994: 156). The !Kung of the Kalahari Desert are

popularly known as the 'harmless people'. Richard Lee who contributed to the creation of this impression, nevertheless reports (1979: 398; 1982: 44) that in his study area in the period 1963-1969, there were 22 cases of homicide; 19 of the victims were males, as were all of the 25 killers. This amounts to a rate of 0.29 person per thousand per year, and had been 0.42 before the coming of firm state authority.

The somewhat better data which exist for primitive agriculturalists basically tell the same story as those for the hunter-gatherers. Among the Yanomamo about 15 percent of the adults died as a result of inter- and intra-group violence: 24 percent of the males and 7 percent of the females (Dickemann 1979: 364). The Waorani (Auca) of the Ecuadorian Amazon hold the registered world record: more than 60% percent of adult deaths over five generations were caused by feuding and warfare (Yost 1981; Robarchek and Robarchek 1992). In Highland New Guinea independent estimates are again very similar: among the Dani, 28.5 percent of the men and 2.4 percent of the women have been reckoned to have died violently (Heider 1970: 128); among the Enga, 34.8 percent of the adult males have been estimated to have met the same fate (Meggitt 1977: 13-14, 110); among the Goilala, whose total population was barely over 150, there were 29 (predominantly men) killed during a period of 35 years (Hallpike 1977: 54, 202); among the Lowland Gebusi, 35.2 percent of the adult males and 29.3 of the adult females fell victim to homicide; the high rate for the females may be explained by the fact that killing was mainly related to failure to reciprocate in sister exchange marriage (Knauff 1987: 462-3, 470, 477-8). **In tribal Montenegro it was estimated at 160 (Boehm 1984: 177).** Archaeology unearths similar finds. In the Neolithic site of Madisonville, Ohio, 22 percent of the adult male skulls had wounds and 8 percent were fractured (Livingstone 1967: 9).

In this way, male and female numbers in primitive societies - highly tilted in favour of the males in childhood - tend to level out in adulthood. Violent conflict is thus one of the principal means through which competition over women is both expressed and resolved. Furthermore, as Divale and Harris have shown, there is a vicious circle here: in societies that lived under the constant threat and eventuality of violence, families' preference for males who would protect them increased. Families' choices thus further reinforced the scarcity of women and male competition and violence connected with them, even though, from the social perspective, more females would have reduced both. Thus, conflict and violence fed partly on themselves. As is often the case, the rational choice of each family when left to its own conflicted with the common good. The only solution to such 'Prisoner's Dilemmas' is from above. Indeed, it has been shown that in those primitive societies on which modern states enforced internal and external peace, female infanticide, as measured by juvenile sex ratios, declined substantially (Divale and Harris 1976: 537-30). However, in caution, there is another factor, which was not noted by Divale and Harris: in all probability, state's sanction itself may have deterred and decreased infanticide.

As mentioned earlier, among the victims of male competition over women are the young adult males, who are obliged to postpone marriage for quite a long time. This universal and probably very old trend among primitive human communities has some interesting evolutionary consequences. Men reach sexual maturity at an older age than women, which is quite the opposite from what we would expect in view of the fact that man's reproductive role and reproductive organs involve a much lighter physical burden than the woman's. The main reason for this later male maturing seems to be male

competition. Men are given a few more years to grow up and gain strength before being exposed to potential violent conflict (Alexander et. al. 1979: 414-6; Daly and Wilson **189-95**). Another consequence of young adult males' sexual deprivation is their marked restlessness, risk-taking behaviour, and belligerency. This has been a highly observable feature in all societies. Young adult males are simply 'programmed' to greater risk-taking, for their matrimonial status-quo is evolutionarily highly unsatisfactory. They still have to conquer their place in life. They have thus always been the most natural recruits for violent action awar. Male murder rates peak in both London and Detroit (although forty times higher in the latter) at the age of twenty-five (Jones 1993: 92; Daly and Wilson **92-7, 297-301**).

To be followed by Part II

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- ¹ Overviews of interpretations can be found in Ferguson 1984a; Dennen 1990.
2. For a survey and bibliography of the protracted 'protein controversy' see Harris 1984. On the frustrations of the ecological/materialist approach see Vayda 1976: 1-7.
3. This point was brought home to Chagnon by Alexander 1987. Chagnon 1988, 1990.
4. Perhaps the best discussion of this point is Tooby and Cosmides 1992.
- ⁵ Wheeler 1910: esp. 19-20, 29-30, 40, 62-3, 71, 118, 139, and *passim*, incorporating the earliest anthropological works on the subject; Tindale 1974: esp. 10, 55-88; Meggitt 1962: 44-46 and *passim*; Maddock, 1973: 26; Peterson 1976: esp. 20; also Hamilton 1982: 85-108.
6. For the expectation of stress as a strong promoter of war and anticipating action see Ember and Ember 1992; also Hamilton 1975: 146.
7. Again see a survey and bibliography in Harris 1984; Chagnon 1977: 33. Chagnon himself admits (1990: 87-9) that humans, like other animals, fill up new ecological niches, rapidly approaching these niches' carrying capacity of life-sustaining material resources; in stark contradiction to his general argument, he concedes that somatic conflict is then the norm.
- ⁸ The literature on the Northwest Coast is extensive. A meticulous survey, concentrating on the evidence on war, is Ferguson 1984b; for the population densities: 273, 298. For the northern part: Oswalt 1967: 2-10, 113-15; Burch and Correll 1972; Burch 1974. See also Andrews 1994; Hayden 1994.
- ⁹ Ferguson 1984b: 273-4, 278, 282, 285, 298, 312. Examples of large-scale forceful territorial occupations are provided by Drucker 1951: 332-65; Drucker 1965: 75-6; Oswalt 1967: 179-190; Burch and Correll 1972: 21, 24-5, 33-4; Andrews 1994: 82-93.
- ¹⁰ Ferguson 1984b: 271, 272-4, 278, 285, 298, 312; relying on MacDonald 1979, and other unpublished research by the latter. The thousands year old antiquity of warfare in southern Alaska and other areas of the Northwest Coast is similarly pointed out by Yesner 1994: 161-2; Hayden 1994: 237; Burch and Correll 1972: 24; Burch 1974: 1.
11. Durham 1976; Dyson-Hudson and Smith 1978; Dawson 1996: 25; Huntingford and Turner 1987: 229-30 233-7; Mueller 1983: 63-66; Keeley 1996: 118-9; de Waal 1996: 194-6.
12. These figures need some adjustment for age, because a few of the younger men who still had only one wife would acquire a second one or more in time. This adjustment, however, affects the overall picture only slightly. Extensive statistics can be found in Meggitt 1962: 146-159; Long 1970: 293.

13. Hart and Pilling 1964: 17, 18, 50; Meggitt 1962: 78; Berndt and Berndt 1964: 172; Keen 1982; Lournados 1988: 151-2.

14. This is ignored by Knauff (1991), whose account of simple hunter-gatherers is exclusively based on the Eskimo and particularly the Kalahari Bushmen (but see the comments on his article by L. Betzig, R. K. Denton, and L. Rodseth). As we shall see (in Part II), Knauff exaggerates the egalitarian nature of simple hunter-gatherers to the point of naivety. Turning the differences of degree between simple and complex hunter-gatherers into a schism, he ties himself in strange knots: he in effect rules out any somatic or reproductive competition among simple hunter-gatherers; consequently, since he fully recognizing that they also have very high violent mortality rates, he attribute them in their case to wholly expressive 'sexual frustration'. In fact, not only is polygyny practised by the few in most of these societies, there is strong competition over the '*quality*' of the wife that one can get, and constant conflict over wife stealing, adultery, and broken promises of marriage.

15. Biolsi 1984: 159-60; for northern Australia see n. 13.