

Complex Societies: The Evolutionary Origins of a Crude Superorganism

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Biosketches

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Abstract

The complexity of human societies of the past few thousand years rivals that of social insect societies. We hypothesize that two sets of social “instincts” underpin and constrain the evolution of complex societies. One set is ancient and shared with other social primate species, and one is derived and unique to our lineage. The latter evolved by the late Pleistocene, and led to the evolution of institutions of intermediate complexity in acephalous societies. The institutions of complex societies often conflict with our social instincts. The complex societies of the last few thousand years can function only because cultural evolution has created effective “work-arounds” to manage such instincts. We describe a series of work-arounds and use the data on the relative effectiveness of WWII armies to test the work-around hypothesis.

Keywords: Gene-culture coevolution, complex societies, conflict, cooperation

The suffering which comes from [our relations to other men] is perhaps more painful to us than any other. We tend to regard it as a kind of gratuitous addition, although it cannot be any less fatefully inevitable than the suffering which comes from elsewhere.

Sigmund Freud, *Civilization and Its Discontents* 1930

Uh-oh!

God, upon dropping His collecting bottle full of humans on Earth and seeing them escape (according to cartoonist Gary Larson).

Introduction

Contemporary human societies are more complex than the societies of other animal species. Yet, for most of the 100,000 years since their first appearance, Anatomically Modern humans have lived in small-scale, egalitarian foraging societies (Klein 1989). Foraging societies are simple by comparison with modern societies, but even the simplest contemporary hunting and gathering peoples, like !Kung San and the peoples of Central Australia, link residential units of a few tens of people to create societies of a few hundred to a few thousand people. This multi-band “tribal”ⁱ level of organization is absent in other apes (Rodseth, et al. 1991; Boehm 1992). Especially in the simplest cases, tribes are held together by sentiments of common membership, expressed and reinforced by informal institutions of sharing, gift giving, ritual, and participation in dangerous collective exploits. Around 10,000 years ago, plant domestication began to raise the human carrying capacity in several regions of the world. Agricultural societies became larger, more densely populated, and rapidly more complex than those of the Pleistocene, to which human social “instincts” are presumably adapted. Institutions of formal coercive power arose. Around 5,000 years ago, innovations in social organization led to the first states, with

unprecedented levels of cooperation, coordination and division of labor. Some of these innovations, especially deep social hierarchies, generated enormous conflict. People's egalitarian impulses and love of autonomy rebel at the striking inequality and coercion present in complex societies. Nevertheless, larger, more complex societies are generally able to dominate smaller, simpler tribal societies, and a ragged but persistent trajectory of social evolution toward ever more complex social systems continues to the present.

The evolution of complex human societies is one of the oldest puzzles of the social sciences. Great debates, with roots in the political thought of Plato, Aristotle, Confucius and Marx, have raged over whether the evolution of such societies is voluntaristic or coercive, whether their operations are to be understood resulting from conflicts between individuals or as functioning wholes, and whether the right unit of analysis is the individual or the social institution (e.g., Service 1975, Carneiro 1970, Kirch 1984). Scholars have marshaled sophisticated arguments on both sides of these debates for a century without reaching any consensus.

Here we argue that the antagonists in these debates are all right. Complex societies are voluntaristic *and* coercive; we must understand them in terms of conflicts *and* functions, and at the level of the individual *and* the institution. Using the tools of evolutionary analysis, we construct a hypothesis that mixes the elements of classical positions. We do not have to choose between accounts built on individual advantage, conflicts between interest groups, or upon societal functions. Nor do evolutionary accounts have to choose genes or culture as the main engine behind social evolution in humans. Children come equipped to learn human culture, something that other apes cannot do. For all their intelligence and close relationship to humans, chimpanzees cannot learn to behave as even marginally successful members of human society (Whiten and Custance 1996, Tomasello 1996). Humans must have social "instincts"ⁱⁱ that distinguish us from the other apes. By social "instincts," we mean patterns of behavior which occur in all human societies and which therefore are highly likely to be rooted in genes. We certainly cannot understand human societies as solely the product of the evolved, genetically transmitted social instincts. Humans are much more adept social learners than any other animal. Our social

learning skills are the main cognitive adaptation that distinguishes us from our primate relatives (Tooby and DeVore 1987: 207-212). In terms we have used before (Boyd and Richerson, 1985), social instincts act as decision-making forces on cultural evolution. However, they are not the only forces. Other human innate propensities, for example the desire to eat well and sleep comfortably, no doubt affect cultural evolution. We may favor social arrangements that result in strong economies. Aside from our desires and decisions, natural selection may favor some social arrangements over others even when the differences are cultural rather than genetic (Soltis, et al. 1995).

Thus, to understand why human societies are more complex than those of other mammals we must answer the following questions: What are the instinctive rules that cause us different from our ape ancestors? How did they evolve? How could human populations of the last few millennia create much more complex societies than the small-scale ones, to which our social psychology is presumably adapted?

The Social Instincts Hypothesis

Much evidence suggests that humans have two sets of social instincts. The first is a set of ancient instincts that we share with our primate ancestors. The ancient social instincts were shaped by the familiar evolutionary processes of inclusive fitness and reciprocity. Humans have a complex family life, and frequently form strong bonds with individual partners. Although human families and friendships have unique derived elements, in respect to such behaviors we do not depart drastically from other primates. The second set of instincts is that which allows us to interact cooperatively with a larger set of people, the tribe. Humans, unlike other primates, are normally able to make common cause with a rather large set of distantly related or unrelated individuals with culturally defined boundaries. We describe the reasoning and evidence leading to the social instincts hypothesis in considerable detail in Richerson and Boyd (in press); what follows in this section is a synopsis.

Darwinians interested in human behavior usually attempt to derive the institutions of human societies from the operation of kin selection and reciprocal altruism. We argue that

there is a critical flaw in these hypotheses that derives from the fact that bonds with kin and friends are indeed strong. Even in industrial societies, families and friends remain important. Suppose that, somehow, institutions establishing cooperation between distantly related kin or large groups of reciprocators have arisen. Given only kinship and reciprocity, we would expect that nepotistic cabals of closer relatives, and smaller, more tightly bonded groups of reciprocators, would arise to exploit any benefits of cooperation resulting from large-scale cooperation. Societies commonly suffer a considerable amount of crime, organized along just such lines. Since siblings are more closely related than are cousins and pair-wise reciprocity is easier to start than any larger group, these two mechanisms normally favor small societies. Theory suggests that neither kin selection nor reciprocity can easily be scaled up to account for large-scale social systems. This theoretical argument accords with the evidence. Kin selection results in large-scale social systems only when some mechanism exists to multiply the number of closely related individuals. The social insects, where a few reproductives produce a mass of sterile workers, are the classic case. There is no example of large-scale sociality having arisen by reciprocity. Humans are an outlier among the social animals in having small, outbred families at the core of considerably larger social systems.

In principle, moralistic punishment strategies could create cooperation in large groups. However, this mechanism will stabilize any norm that becomes common, whether adaptive or not (wearing ties to work is a humble example) (Boyd and Richerson 1992). Although coercion by dominants is a common phenomenon, no large-scale systems of cooperation seem to be based on the punishment principle except in conjunction with kinship and reciprocity, as in the social insects.

Why aren't human societies small in scale, like those of other primates? We argue that the most likely mechanism is group selection on cultural variation. Plausible mechanisms make cultural variation more easily subject to group selection than genetic variation. We have studied the effects of conformist transmission. With culture, it is possible to have more than two "parents" and hence to estimate the frequency of traits in the population. Under many circumstances, it makes adaptive sense to imitate the commoner type. Such a rule

has the byproduct of reducing variation within groups and preserving variation between groups. This is just the sort difference that in theory should make it possible for group selection to be a strong force (Boyd and Richerson 1985:ch. 7; Henrich and Boyd in press). Empirically, there is some direct evidence that cultural group selection is an important process (Soltis, et al. 1992).

We hypothesize that the long-continued effect of cultural group selection in the Pleistocene led to the evolution of the old, tribal, social instincts. As human genes coevolved with primitive prosocial cultural norms, the cultural environment selected in favor of dispositions adapted for life in cooperative groups. As the old social instincts became better adapted to life in culturally cooperative groups, cultural evolution could produce still more cooperation.

There is evidence that two instincts arose under the regime of cultural group selection. First, humans developed the capacity to operate systems of moralistic punishment. We are susceptible moral suasion by others and are inclined to punish fellow group members who violate social norms (Nuttin 1975; Milgram 1965). In simple societies, coercion by leaders is quite limited, and dominance has a quite different character than it animals (Eibl-Eibesfeldt 1989:279-314; Boehm, 1993). Coercion by elite leaders is important in complex societies, but is deeply resented unless others take it to be a legitimate enforcement of community norms (Insko, et al. 1983; Salter 1985). Second, we are ethnocentric, or more generally, innately prone to detect and act upon symbolically marked group memberships. Models show that symbolic marking of groups can evolve initially for ordinary adaptive reasons (Boyd and Richerson 1987), later to become part of the cultural group selection process. We tend to trust ingroup members, distrust outgroup members, discriminate in favor of ingroup members, and discriminate against outgroup members (LeVine and Campbell, 1972). Psychologists can elicit ingroup-outgroup behavior in the laboratory with quite minimal markers of group membership (Tajfel et al. 1971, Rabbie 1991). Ethnicity has proven to be a surprisingly durable institution in the face of modern, “rational” alternative principles of social organization (Glazer and Moynihan 1975).

Humans are thus adapted, we argue, to live in morally structured communities on a scale much larger than the family or group of reciprocators, though these institutions remain very important. The old social instincts underpin tribal social institutions. The ancient and old social instincts are a little like the principles in the Chomskian principles-and-parameters model of grammar (Pinker 1994: 111-112). When cultural parameters are set, the combination of instincts and institutions produces an operational social system. Genes constrain human societies in important ways, but social structure is also very flexible. The small-scale foraging societies in which we evolved were quite diverse in social organization, no doubt for adaptive reasons, at least in part (Steward 1955: chs. 6-8).

The tension between the small-scale loyalties dictated by self-interest, kin selection, and reciprocity, and the larger scale loyalties generated by tribal institutions, is unresolved in humans. We lack any analog of worker sterility that would more effectively reduce the tendency of higher and lower level loyalties to conflict. Thus, humans are adapted to tolerate a system in which there is conflict among the cooperators, as evidenced by such behavior as the patient search for consensus in forager communities (and university committees). Institutions that minimize the conflict inherent in the gene-culture system will be favored by the processes of cultural evolution, but these institutions cannot, in the nature of the situation be perfect. For example, sometimes, simple societies happen on an adaptation that lends itself to private appropriation, such as salmon fishing or horse hunting. The lucky or skillful individuals who become rich exploiting such resources exert dominance on a scale not seen in typical foraging societies (Johnson and Earle 1987: ch.7). Followers struggle to limit the power of leaders to reduce their autonomy and command their resources, with considerable, but not complete, success.

Thus, the vagaries of cultural evolution, even in the late Pleistocene, might sometimes result in social organization being dominated by either the old or the ancient social instincts to a pathological degree. In some well-attested cases, tribal institutions become so weak or badly organized that something akin to the Hobbesian war of all against all takes place. In such cases, the solidarity among a few closely related males may be the dominant bonds (Otterbein and Otterbein 1965, Otterbein 1968, Edgerton 1992, Gambetta

1995), leading to pervasive distrust among people in the same residential community. Such communities are vulnerable to extinction at the hands of better-organized neighbors. Knauff (1985) observed a highly egalitarian society, the Gebusi of New Guinea, beset by unresolved failures of marriage exchanges and racked by the resulting witchcraft accusations and executions. At the time of European contact, the Gebusi were a small and shrinking society due to raiding and demographic absorption by their neighbors, whose marriage exchange institutions resolved conflicts and who were able to cooperate to mount the raids. On the other side, military institutions are liable to lead to in-principle preventable escalations of violence that put excessive demands on male manpower and expose women, children, and the subsistence economy to terrible losses. The destructive escalation of violence among Native American groups caused by the advent of European guns, horses, and trade opportunities is notorious. The admirably heroic, but uniformly futile, armed resistance of Native Americans to the European holocaust is ample testimony of the power of tribal warriors' love of their tribes, and their way of life, to overcome interests in personal or familial success. Because of the conflict between larger and smaller scales, a certain frequency of pathological cases is an inevitable consequence of the coevolutionary process involved.

The Spectrum of Small Scale Societies

The original result of the coevolution of social instincts and cultural institutions was the spectrum of foraging societies we know from the archaeological, ethnographic, and historical records. The first test of our social instincts hypothesis is whether it can account for the range of societies that likely characterized the late Pleistocene. This test is largely *post hoc*, since the theoretical work reviewed in the previous section inspired in large part by our reading of these same records. Nevertheless, the complexity of the record and especially the scanty evidence from the late Pleistocene itself admit of many readings. Future discoveries may well falsify our hypothesis. Most important, it may be that either the ancient or old instincts are absent, and that cultural norms, working jointly with more domain-general psychological mechanisms, determine social organization.ⁱⁱⁱ Campbell (1982) suggested that the cultural group selection process central to our hypothetical

tribal instincts actually began to operate only with the emergence of complex societies rather recently. After the evolution of plant and animal production schemes (beginning 10,000 years ago) increased population densities, greater food storage, and greater mobility caused the size of societies to increase. Perhaps it was only at this stage that kinship and reciprocity became inadequate bases for social institutions. More radically, perhaps culture suppressed even the ancient social instincts, as cultural anthropologists sometimes argue. At the other extreme, perhaps new social instincts adapt us to live in hierarchical social systems.

The data on pre-domestication societies suggests that late Pleistocene foragers lived in a range of social systems. At the latest, the final steps of the evolution of the social instincts took place in the events leading up to the Upper Paleolithic Transition. The social instincts should be adapted to the central tendency of such societies, assuming that culture carries the main burden of explaining the variation. Admittedly, the division of evolutionary labor between genes and culture could be more complex, but it should hold as a rough approximation. Thus, we will take it without further argument here that the ubiquity of ties to kin and friends implies that the ancient social instincts persist down to the present in humans.^{iv} In Europe, the abrupt displacement of Neanderthals by anatomically modern people about 35,000 years ago is some measure of the importance of the evolution of the old, tribal instincts. There is evidence that Neanderthals had little symbolic culture, and they drew their raw materials for artifact production from a relatively small region (Klein 1989: ch. 6; Stringer and Gamble 1993: ch.7). Anatomical Moderns with elaborate symbolic culture, and larger social spheres (on the evidence of raw materials from distant regions), replaced them. Neanderthals perhaps lacked the tribal social instincts, at least ones as strong as Moderns have. Population densities of Moderns seem to have been about 10 times higher than for Neanderthals. Thus, the perfection of the tribal instincts may have unleashed the economic and demographic revolution that allowed Moderns to replace all people of the Archaic anatomical grade.

The evidence about the scale of tribal institutions hypothetically supported by the old social instincts is far from clear-cut. Our ethnographic sample of foraging societies is

biased in favor of groups living in poor environments that agricultural and pastoral peoples did not want badly enough to evict them. Thus, the Kalahari San and Central Australian peoples furnish a disproportionate share of the ethnography on foragers. We know from historical accounts and salvage ethnology, particularly from Western North America, that foragers in more provident environments had considerably more complex social organization than those characterizing the ethnographic sample (Jorgensen, 1980). However, there is room to doubt most of the claims made about these groups, which were considerably influenced by modern societies by the time professional anthropologists began to study them. It is clear that foraging societies were quite diverse, and that no one society can serve to represent them all (Kelly, 1995; Arnold, 1996). It is also difficult to know how to project the ethnographic and historical samples back into the Pleistocene. The last-glacial-period environment from about 60,000 to 10,000 years ago was colder, drier, and lower in atmospheric CO₂ concentration than the Holocene. Perhaps because of lower plant productivity, hunting of large mammals was a more widespread specialty in the Pleistocene than the Holocene. Latest Pleistocene foragers had very modern looking artifact assemblages from perhaps the early or middle part of the last Interglacial, but the archaeological record to date is good only for Europe. Artifact assemblages for the first time include artistic productions, such as items of personal adornment and elegant carved statuettes. Social organization does not become so direct a part of the record, so archaeologists must draw tenuous inferences.

At the minimum, social complexity in the average late Pleistocene societies presumably at least equaled that of the simpler societies of the ethnographic record. We know from the excellent ethnoarchaeological studies of Wiessner (1983, 1984) that the !Kung San of southern Africa have a system of gift exchange, involving just the kind of artistic productions known from the late Pleistocene archaeology. These gift exchanges weld the small residential bands (fewer than ten families per band) into a tribe composed of a much larger number of people. Much like tiny model a modern nation, the whole tribe never gathers in one place, but there is normally a clear sense of who belongs to the group and who does not. People actively maintain contacts with members of other bands because in times of subsistence emergencies, one can call upon fellow tribespeople in other bands for

permission to forage on their territories or receive emergency aid. There is a suspicion that people living in poorer environments have more elaborate institutions to maintain solidarity with other bands just because population density is low (Yengoyan 1968). Very much unlike a modern nation, tribal institutions are modest in scale, and are completely informal in cases like the !Kung. In such simple cases, there is no discernable superstructure of government at all, not even an informal council of band headmen. In any case, “band headman” is a very difficult role to discern in highly egalitarian groups like the !Kung (Boehm 1993). Surrounded by powerful neighbors, the !Kung are not warlike, though within-group rates of violence are quite high since self-help coercion is the only mechanism of punishing transgressors in the politically simplest human societies (Knauff 1987). The most egalitarian and least politically sophisticated foragers and horticulturalists have problems maintaining internal peace and rallying responses to external threats, despite vigorous efforts to maintain friendly ties with as many people as possible (Otterbein 1968; Knauff 1985). More broadly however, the great majority of ethnographically known foraging societies know war, and cooperation for defense (and offense) was likely an important function of tribal institutions by the latest Pleistocene (Keeley 1996: 28). It is by no means clear that the !Kung and similar societies are the most representative foraging societies, even though they are the subjects of the most sophisticated ethnography.

Other ethnographically well-attested foragers did have considerably more complex societies. Some societies in the Northwest Coast culture area of North America had ranked and even stratified societies. Some of this sophistication may have arisen in response to early trade stimulated by the coming of Europeans. On the other hand, some archaeologists argue that such societies were common in the latest Pleistocene (Price and Brown 1985; Arnold 1996). Much as the rich marine resources of the Northwest Coast supported locally dense populations that created the population base for complexity, so might the harvest of migratory big game at favorable sites have supported large populations. Dried or frozen meat would at least allow a prolonged rendezvous season.^v

In between these extremes, any of a variety of ethnographically or historically known foraging societies might be proposed as approximating the central tendency of the latest Pleistocene. Good candidates might be the North American Plains groups that specialized in big game hunting. These environments resemble the cold, semi-arid environments that were more common in the last glacial than today, and the focus of the economy on large mammals is perhaps more representative than the more plant focused subsistence strategies of groups like the !Kung. A little historical information is available for Plains groups before the introduction of the horse in the 18th Century. Much more is available from the first two or three generations post-horse as fur traders established regular contact with the groups. For example, a trader first visited Blackfeet of the northwestern Plains in 1787 (the second generation of the horse era). A few elderly people with experience with pedestrian hunting were still alive to describe to him that way of life (Ewers, 1958). The Blackfeet came from a purely foraging ancestry, unlike many Plains tribes of the horse era, who were formerly farmer-hunters. The core of their subsistence was apparently hunting bison by means of pounds and drives. Several families cooperated to construct traps for the herds and to drive the animals into them. The production from successful drives was considerable, but failures were common. Likely, unsuccessful groups often had to depend upon the generosity of successful ones, motivating bands to maintain tribal scale affinities for insurance purposes, as in the !Kung and Central Australians. Dried meat may have supported regular rendezvous with other bands on some scale.

Blackfoot warfare was a tribal scale institution. The Blackfeet fought a chronic guerrilla war against the Shoshoni-Comanche who emerged from the Rockies to contest the bison hunting grounds east of the mountains. Owing to the limited mobility of pedestrian hunters, most fights were band-scale raids. Nevertheless, informants who lived as young adults in the pre-horse days told an early visitor that fights ranging up to 200 warriors on a side sometimes occurred. Such a scale involved a fair fraction of the tribe's total force of warriors.

At least as important as the scale on which war occurred is the scale on which it did not. Relative internal peace prevailed over a rather large area. Three sub-tribes of Blackfeet

(Piegans, Bloods, and Blackfeet proper), each composed of several bands, were at peace. At least in horse times, the Blackfeet were in turn allied with two other tribes, the Gros Ventres and the Sarsis, so maintaining internal peace on a considerable scale.

Commentators on primitive warfare do not always carefully describe the realm over which peace is maintained in acephalous tribal societies and the mechanisms by which internal conflict is controlled so as to permit external war (Otterbein 1968). Yet, the scope and quality of internal peace is, perhaps, a more important index of the strength of tribal institutions than the size and frequency of wars themselves. Logistics considerations limit the size of war parties among foragers, but the realm of peace can include more people than could ever be assembled in one place and commonly does. Without formal leadership and law, the “policing” of informal analogs of civil and criminal law is by self-help violence by aggrieved parties in acephalous societies like the Blackfeet. It is testimony to the strength of tribal instincts and their associated cultural institutions that even acephalous societies do not normally suffer a Hobbesian collapse of social peace (Service 1966: 54-61). Boehm (1983, 1984) dissects the role of cultural rules in preventing feud among historical agricultural Montenegrins and other tribal societies from disrupting the ability of the tribe to mount defenses against their enemies.

Cross-cultural analyses show that many tribal societies reduce the violence of internal conflict by means of institutions that break up or crosscut patrilineal extended families. Patrilineal extended families keep closely related males in a compact group, tending to align cultural affinity with biological relatedness, thus lessening the conflict between cooperative impulses regulated by kinship, friendship and ingroup-outgroup. Otterbein and Otterbein’s (1965) “fraternal interest group” finding fits the principles-and-parameters part of the social instincts hypothesis. When cultural and genetic transmission patterns are highly correlated, the parameter setting of the tribal instincts will, in the limit, reduce the sense of ingroup and outgroup to the small set of close genetic kin. Still, as with the Montenegrins, most groups with internal war (feuding) can also unite to face external enemies because tribal institutions prevent feud from reaching the Hobbesian extreme.

The Blackfeet remind us even more than simpler societies of a miniature model of a modern nation-state. However, even in the horse days, Blackfoot tribal governance was very informal and lacked command and control institutions, aside from the general pressures exerted by public recognition of the prestige of successful war and peace leaders. Boehm (1993) argues that the weak leadership of classic egalitarian societies amounts to a reverse dominance hierarchy. Collectively, followers control the behavior of leaders. Even in the horse days, this was still largely true of the Blackfeet. Band “leaders”, “peace chiefs” in the historical literature, but more like bigmen in the technical terminology of anthropology, were typically older men rich in horses. In pedestrian days, significant differences in wealth probably did not arise, limiting even further the ability of informal leaders to influence others except reasonable argument. In the horse period, generous rich men who lent horses and food to the poor could earn great respect. Only men whose decisions were sound could maintain it. Even at that, chiefs could only use the respect accorded them to guide the emergence of a consensus, and could not successfully dictate to followers. Errant chiefs could be “replaced” simply by popular sentiment coming to favor the opinions of another man. Individual families were also free to move to other bands if they were dissatisfied with life in their current band. Groups of families could split off to form a new band. “War chiefs” were usually younger men than peace chiefs, and were essentially entrepreneurs who organized raids on an ad hoc basis in quest of horses, captives, and glory. War chiefs were not subordinate to peace chiefs or vice versa.

The horse lent mobility and a wealth of food to the Blackfeet but there was little time for the horse era to affect basic institutions. Thus, horse era Blackfeet must have been little more than modestly scaled up, richer versions of pedestrian big game hunters, with a little more dominance successfully exercised by richer horse owners. It is quite plausible that the range of latest Pleistocene foraging societies encompassed societies of the complexity of the Blackfeet. It is, of course, much more difficult to say how close to the late Pleistocene central tendency they might have been.

Our main point is that late Pleistocene societies were almost certainly segmentary tribal formations in the sense that small residential bands were commonly a part of a larger

society composed of a few to many bands. At least at the complex end of the range that likely existed, there were probably three or four levels of segmentation---band, sub-tribe, tribe, tribal alliance. The last is not a strictly segmental category, not being part of a nested system defined by blood descent, real or more or less fictionalized, that is so extensively elaborated in some pastoral tribes like the contemporary Nuer (Evans-Pritchard 1940, Kelly 1985). The diverse ways in which extended, segmentary, and fictionalized kinship is used to organize societies on a scale larger than the family is one of the classic subjects of anthropology. Institutions of various kinds and degrees of formality that cross-cut and supplement kinship are fairly common in the ethnographic record of foragers and include social club like sodalities (religious and secular), tribes, triplets, moieties, feud arbitration, councils, and, sometimes, leadership with formal authority (see Jorgensen 1980: ch. 8 and 9 for Western North America). The North American Great Basin societies are a minimal case (R.L. Bettinger, personal communication). Basin societies were composed of highly autonomous family bands with virtually no discernable tribal institutions, not even the analog of the gift exchange system of the !Kung. Yet, there remained a generalized propensity to cooperate with and trust more speakers of one's own and closely related languages. Bands often aggregated for communal enterprises such as rabbit and antelope drives or for socializing. When all the cultural parameters except linguistic markers are set to zero, the tribal instincts alone drive a modest but significant amount of cooperation. Kinship and friendship may have been sufficient to account for social organization at the band level, but at the tribal level, principles of social organization unique to humans were widespread, consistent with the presence of tribal instincts. At the other end of the continuum, tribal societies with sufficient resources—rich fishing or hunting grounds, or domestic animals and plants—can grow to several thousand people with the aid sufficiently sophisticated cultural institutions. Nuer tribes ranged from less than 10 to more than 40 thousand, and they maintained a modicum of unity on this scale by a segmentary ideology and other modest institutions (Kelly 1985: ch. 4; Evans-Pritchard, 1940). Most likely, no Pleistocene societies reached this size. Tribal social instincts, coupled with appropriate cultural institutions, permitted societies perhaps 10 to 20 times larger than

typical in the Pleistocene. Beyond this scale, the more formal and more coercive institutions of complex societies have historically been necessary.

Complex Societies as a Natural Experiment

The last 10,000 years has seen a race, supported by agricultural and industrial production, toward ever more complex societies. The ability of large-scale complex social organization to produce public goods like defense, and economic security, and intangibles like an interesting life-style, powers the race, along with the drive of elites to secure special privileges (Freud 1930, Campbell 1975, Maryanski and Turner 1992). According to our hypothesis, this breathtaking increase in social scale and complexity has occurred so rapidly that it has not been accompanied by any significant changes in the human social instincts. In the face of a psychology adapted to life in small, egalitarian societies, cultural evolution has led to beliefs and institutions that allow deep hierarchy, strong leadership, inegalitarian social relations, and an extensive division of labor. These institutions are built on top of a social “grammar” adapted to a simpler world.

The evolution of complex societies is a grand series of experiments at the expense of the social instincts. It has resulted in unsubtle “treatments” that human subjects committees would never approve, to say the least. In complex societies, we are expected to live in social systems whose size, degree of division of labor, requirements for subordination, frequency of interaction with strangers, degree of status differences, and so on, are far outside the range of even the most complex foraging societies. Unsubtle experiments are useful to study complex systems because the effects of subtle ones tend to get lost in the noise inherent in any complex natural system. Ecologist experimenting with complex ecosystems have learned that it is necessary to apply sledgehammer treatments (e.g. remove the entire upper trophic level of a lake, Carpenter 1993). In the abstract, several responses to these experiments may be expected.

First, selection might have been strong enough to produce new social instincts. It may seem that a few thousand years is too short a time for new instincts to evolve. However, when strong selection is exerted on a trait for which there is heritable variation, responses

can be quite marked in just a few generations. Lumsden and Wilson (1981: 298-300) and Darlington (1969) have argued that such changes are important in the evolution of complex societies. We dismiss this hypothesis without further argument because genetically closely related peoples have commonly, when cultural diffusion furnished the means, participated in societies of a very broad range of complexity. Thus, New World peoples speaking Uto-Aztecan languages included Great Basin foragers with some of the simplest societies known, as well as the Aztecs. In the Old World, the various German societies of the late Classical period ranged from simple horticultural tribes to military elites that furnished several Roman Emperors (Musset 1965). As Darwin (1874: 237) observed “The American aborigines, Negroes, and Europeans are as different from each other in mind as any three races that can be named; yet I was incessantly struck, while living with the Fuegians on the ‘Beagle,’ with the many little traits of character showing how similar their minds were to ours; and so it was with a full-blooded negro with whom I happened once to be intimate.” We are not aware of any reliable evidence for new social instincts.

Second, if social organization is entirely culturally determined, we should expect that the evolution of complex societies could result in the more or less direct optimization of social organization for large scale. This hypothesis is explicitly or implicitly held by the many social scientists who treat culture as a superorganic system with little interesting interaction with biology. In Richerson and Boyd (1998), we review at more length the psychological evidence that the social instincts exist.

Third, cultural evolution may be constrained by the social instincts. The third alternative breaks naturally into two subcases. Many social scientists who have applied evolutionary theory to human behavior have supposed that what we call the ancient social instincts play a strong role in human behavior. The evidence that this hypothesis is correct is quite compelling, as we have said. Excellent examples include Daly and Wilson’s (1988) study of the effects of inclusive fitness on homicide in modern societies and Silk’s (1980) devastating critique of Sahlin’s (1976) claim that Polynesian adoption practices exemplified cultural free play with concepts of kinship. We will add a few observations to

the growing corpus of such examples below. The idea that there are also old, tribal instincts, themselves the product of coevolution with culture, is newer and more controversial. We are especially interested if there is evidence for the existence of these instincts. If our hypothesis is correct, some of the most telling evidence should be the adaptations cultural institutions make to accommodate a psychology that evolved to support tribal societies. We expect that modern complex societies should betray their old and ancient roots in the form they take. The modifications that permit complex societies would have to be recently evolved, cultural “work-arounds” that leave the slowly evolving, genetically encoded, social instincts largely intact.

The fourth possibility is that social institutions, even in modern societies, derive from the direct operation of the social instincts without any cultural mediation at all. Some ancient social instincts arguably have this character, such as incest avoidance. Darwinian psychologists sometimes seem to argue that cultural mediation of social institutions is unimportant (Thornhill, et al., 1997). The argument goes that cultural variation could be more apparent than real; perhaps modern social institutions we observe is the result of the expression of the Pleistocene instincts in radically changed Holocene environments. We dismiss this hypothesis from serious consideration here on the grounds that the last 10,000 years of relatively very stable Holocene environment has resulted in a slow, halting, trajectory of increases in scale of social organization. Direct interactions between environment and instincts should reach equilibria quickly. Actual rates of increase in social complexity are far slower, strongly implicating cultural evolution. Note that in the test below that cultural variation and cultural microevolution play a major role.

The Work-Around Hypothesis

Institutional work-arounds are crucial for development of societies completely outside the range encountered in Pleistocene times if either type of social instinct is important. By work-arounds we mean those features of the institutions of complex societies that specifically adapt institutions to use as personnel people whose social instincts adapt them to function in small-scale, egalitarian societies with little coercion and much autonomy. On the face of it, our social instincts are ill suited for life in complex societies. Nevertheless,

the evolution of complex institutions has taken place despite the unpromising raw material. To function in such societies, humans must live at the intimate scale in a social world that is not too different from those to which our social instincts are adapted. Against this, for a large-scale society to function, it must cause people to behave in ways that are quite different than in small-scale tribal societies. Labor must be finely divided. Discipline is important, and leaders have formal power to command obedience. Large scale makes routine, peaceful interactions with outgroup members routine. By their nature, complex societies seeming must conflict with the family centered institutions buttressed by the ancient social instincts and the tribal ones supported by the old instincts. Social demands that conflict with our instincts will generate painful conflicts at the individual level and resistance or rebellion at the social scale. For example, the conflicts we academics experience between the demands of career and family are often quite acute. Cultural conservatives, less committed to secular rationalism, are in open rebellion against the anti-familial tenor of Modernism. Innovations that, at the margin, simultaneously make larger scale society possible while preserving (or recreating) the sense of living in a small-scale society will tend to spread, thus working around the constraints otherwise imposed by the instincts. People will prefer such arrangements and will adopt them given a choice. They may take collective political action to secure better work-arounds, as in the drive for social and political liberties in modern societies. Societies that possess such institutions will suffer less conflict between larger and smaller scale units and will tend to be more effective competitors. To put the idea a little differently, to the extent possible, institutions buttressed by the ancient and old social instincts will be used as building blocks in the evolution of complex societies. These building blocks are inherently rather awkward for the purpose. Complex institutions that make the most creative use of our instinct constrained raw material will function best.

At least up to the scales so far achieved, greater scale has translated into greater military and economic power, and an arms race dynamic has driven increases in scale. The devil has taken the hindmost in the rush to increase the scale of societies, and the fine tuning of work-arounds has not kept up. Given a vast gulf between life in simple societies and life in complex societies, we expect most of the institutional work-arounds will be clumsy and

imperfect, and that such imperfections give rise to the inevitable conflicts of which Freud spoke. The conflicts in turn should betray what social instincts are causing the conflict. There is good reason to expect variation in quality of work-arounds between different societies. Even if average quality is equal between evenly matched societies, we would expect variation institution by institution. Thus, if our hypothesis is correct, the techniques that complex societies use to organize institutions like armies should reflect compromises with and exploitation of social instincts. Variations in effectiveness of institutions in different societies of the same general level should often reflect better and worse work-arounds. When conflicts are relatively low in a given society's institution, there is a potential increment in efficiency, unless there is a countervailing loss function at the higher level. The Holy Grail of innovation in complex societies is change that increase both individual happiness and social function.

Creating Complex Societies: Hierarchy and Stratification

The most important cultural innovations required to support complex societies are command and control institutions that can systematically organize cooperation, coordination and a division of labor in societies consisting of hundreds of thousands to hundreds of millions of people. Command and control institutions lead to more productive economies, more internal security, and better resistance to external aggression. Complex systems also universally develop social stratification in which objective material well being and culturally defined prestige varies greatly by social role. Those in high positions in the command and control system, seemingly inevitably, acquire a more or less disproportionate share of society's rewards. There is every evidence, as we have seen in the last two sections, that humans' Pleistocene evolutionary experience did not prepare us to tolerate more than the most minimal command and control institutions. Nor were we prepared to tolerate much inequality. In this section we describe what seem to us to be the main work-around mechanisms, and the conflicts, compromises, and modes of failure that each entails.

Coercive dominance

The cynics' favorite mechanism for creating complex societies is command backed up by force. The conflict model of state formation has this character (Carneiro 1970). A society successful in war upon a neighboring group can impose itself as a ruling class on the defeated if the defeated cannot flee, as farmers often cannot.

Elements of coercive dominance are no doubt necessary to make complex societies a going concern. Tribally legitimated self-help violence is a limited and expensive means prosocial coercion. Complex human societies have to supplement the moralistic solidarity of tribal societies with formal police institutions. Otherwise, the large-scale benefits of cooperation, coordination and division of labor would cease to exist in the face of selfish temptations to expropriate them by individuals, nepotists, cabals of reciprocators, organized predatory bands, and classes or castes with special access to means of coercion. At the same time, the need for organized coercion as an ultimate sanction creates roles, classes, and subcultures with the power to turn coercion to narrow advantage. Social institutions of some sort must police the police so that they will act in the larger interest to a measurable degree. Such policing is never perfect and, in the worst cases, is very poor. The fact that elites always generate economic inequality shows that narrow interests, rooted in individual selfishness, kinship, and, often, the tribal solidarity of the elite, always exert an influence. The use of coercion in complex societies offers excellent examples of the imperfections in social arrangements traceable to the ultimately irresolvable tension of selfish and prosocial instincts.

While coercive, exploitative elites are common enough, there are two reasons to suspect that no complex society can be based purely on the coercion. The first problem is that coercion of any great mass of subordinates requires that the elite class or caste be itself a complex, cooperative venture. The second problem with pure coercion is that defeated and exploited peoples seldom accept subjugation as a permanent state of affairs without costly protest. Deep feelings of injustice generated by manifestly inequitable social arrangements move people to desperate acts, driving the cost of dominance to levels that cripple societies in the short run and often cannot be sustained in the long run (Kennedy

1987). Durable conquests, such as those leading to the modern European national states, Han China, or the Roman Empire leaven raw coercion with more pro-social institutions. The Confucian system in China, and Roman legal system in the West, were far more sophisticated and durable institutions than the highly coercive systems sometimes set up by predatory conquerors and even domestic elites.

Segmentary Hierarchy

As we have remarked, late Pleistocene societies were undoubtedly segmentary in the sense that supra-band ethno-linguistic units served social functions, although they presumably lacked much formal political organization. The segmentary principle can serve the need for more command and control by hardening up lines of authority without disrupting the face-to-face nature of proximal leadership present in egalitarian societies. The Polynesian ranked lineage system illustrates how making political offices formally hereditary according to a kinship formula can help deepen and strengthen a command and control hierarchy (Kirch 1984; Sahlins 1963). A common method of deepening and strengthening the hierarchy of command and control in complex societies is to construct a formal nested hierarchy of offices, using various mixtures of ascription and achievement principles to staff the offices. Each level of the hierarchy replicates the structure of a hunting and gathering band. A leader at any level interacts mainly with a few near-equals at the next level down in the system. New leaders are usually recruited from the ranks of sub-leaders, often tapping informal leaders at that level. As Eibl-Eibesfeldt (1989: 314) remarks, even high-ranking leaders in modern hierarchies adopt much of the humble headman's deferential approach to leadership.

The hierarchical nesting of social units in complex societies gives rise to appreciable inefficiencies. In practice brutal sergeants, incompetent colonels, vainglorious generals, and their ilk in other bureaucracies, degrade the effectiveness of social organizations in complex societies. Leaders in complex societies must convey orders downward, not just seek consensus among their comrades. Only very careful attention to detail can make subordinates responsive to the hierarchy's leaders without destroying their sense that these

same leaders would have arisen by natural consensus without imposition from above. The chain of command is necessarily long in large complex societies, and remote leaders will not normally be able to exercise personal charisma over a mass of subordinates deeper down the hierarchy. Devolving substantial leadership responsibility to sub-leaders far down the chain of command is necessary to create small-scale leaders with face-to-face legitimacy. However, it potentially generates great friction if lower-level leaders either come to have different objectives than the upper leadership or are seen by followers as equally helpless pawns of remote leaders. Stratification often creates rigid boundaries so that natural leaders are denied promotion above a certain level, resulting in inefficient use of human resources and a fertile source of resentment to fuel social discontent.

Exploitation of symbolic systems

The high density, division of labor, and improved communication made possible by the innovations of complex societies increased the scope for elaborating symbolic systems. The development of monumental architecture to serve mass ritual performances is one of the oldest archaeological markers of complex societies, along with the rise in inequality of prestige goods in burials. Usually an established church or less formal ideological umbrella supports a complex society's institutions. At the same time, complex societies extensively exploit the symbolic ingroup instinct to delimit a quite diverse array of culturally defined sub-groups, within which a good deal of cooperation is routinely achieved. Military organizations generally mark a set of middle-level, tribal scale units with conspicuous badges of membership. A squad or platoon's solidarity can rest on bonds of reciprocity reinforced by prosocial leadership, but ship's companies, regiments, and divisions are made real by symbolic marking. Ethnic group-like sentiments in military organizations are often most strongly reinforced at the level of 1,000-10,000 or so men (British and German regiments, US divisions) (Kellett 1982: 112-117). Typical civilian symbolically marked units include regions (e.g. Swiss cantons), organized tribal elements (Garthwaite 1993), ethnic diasporas (Curtin 1984), castes (Srinivas 1962, Gadgil and Malhotra 1983), large economic enterprises (Fukuyama 1995), and civic organizations (Putnam 1993).

Many problems and conflicts revolve around symbolically marked groups in complex societies. Official dogmas often stultify desirable innovations and lead to bitter conflicts with heretics. Marked sub-groups often have enough tribal cohesion to organize at the expense of the larger social system, as when lower level military units arrange informal truces with the enemy or when ideologies of elite superiority support excessively exploitative institutions. A major difficulty with loyalties induced by appeals to shared symbolic culture is the very language-like productivity possible with this system. Language itself is a classic badge of an ethnic group. Dialect markers of social subgroups emerge rapidly along social fault-lines (Labov 1972). Charismatic innovators regularly launch new belief and prestige systems, which sometimes make radical claims on the allegiance of new members, sometimes make large claims at the expense of existing institutions, and sometimes grow explosively. The ongoing evolution of social systems can evolve in unpredictable, maladaptive directions by such processes. Gibbon (1776-1778) attributed the decline and fall of Rome in part to the rise of Christianity (a timid and pacifistic ideology unsuited to empire, according to his notorious hypothesis). The worldwide growth of fundamentalist sects that challenge the institutions of modern states is a contemporary example (Roof and McKinney 1987, Marty and Appleby 1991). Or, contrariwise, larger loyalties can arise, as in the case of modern nationalism, for better or worse.

Legitimate institutions

At their most functional, symbolic institutions, together with effective leadership and smooth articulation of social segments, create a sense of living under a regime of tolerably fair laws and customs. Rationally administered bureaucracies, lively markets, the protection of socially beneficial property rights, widespread participation in public affairs, and the like provide public and private goods efficiently, and along with a measure of protection of individual liberties. Boehm (1996) argues that acephalous societies often, but not always (Edgerton 1992), have legitimate, customary institutions by which the society can reach a consensus on actions to take in emergencies, such as the threat of war or famine. Individuals modern societies typically feel themselves part of culturally labeled

tribal scale groups, such as local political party organizations, that have influence on the remotest leaders. In older complex societies, village councils, local notables, tribal chieftains, or religious leaders often held courts open to humble petitioners. These local leaders in turn represent their communities to higher authorities. As long as most individuals feel that existing institutions are reasonably legitimate and that any felt needs for reform are achievable by means of ordinary political activities, there is considerable scope for collective social action. Turner (1995: 14-18) terms the ability of human societies to deliberately seek solutions to collective problems “Spencerian selection.” Sabatier and Jenkins-Smith (1993) and colleagues provide fine-grained descriptions of collective decision-making and policy change in the contemporary US. Note that legitimate collective decisions based upon prosocial principles are a shortcut, creating group-beneficial outcomes without requiring the much slower and more painful process of natural selection among alternative social systems.

On the other hand, individuals who do not trust the current institutional order’s justness are liable to band together in revolutionary organizations, such as the terrorist groups of the contemporary world. Trust varies considerably in complex societies and variation in trust is the main cause of differences in happiness across societies (Inglehart and Rabier 1986). Even the most efficient legitimate institutions known are prey to manipulation by small-scale organizations and cabals, the so-called special interests of modern democracies.

A Test: World War II Armies

Modern armies are useful organizations with which to test the workaround hypothesis. Armies are very large, deeply hierarchical, authoritarian organizations. During wars, they demand very great exertion and extreme sacrifices of soldiers. No institution is more different from those that animated social life in the Pleistocene. Yet, if the cultural workaround hypothesis is correct, the most successful armies will have institutions that more or less successfully mimic those of small-scale egalitarian societies. To the extent that an army can simulate the social psychology of such societies while maintaining the reality of effective command and control, it will function more effectively. Egalitarian

tribal warriors—Nuer, Sioux, Montenegrins, Pathans, and so many more—are second to none in bravery and initiative on the field of battle (Boehm 1983). These traits make them highly effective fighters. Soldiers living under the bureaucratic apparatus of a modern army, often compelled to fight for causes they do not understand or do not sympathize with, tend to lack the bravery and initiative of tribal warriors. On the other hand, command and control institutions afford the potential to put the advantages in scale of cooperation, coordination and division of labor of complex societies to military uses. Absent a dominant advantage of terrain or something similar, tribal warriors cannot withstand the larger, better-coordinated, better-equipped forces of complex societies. The most successful modern armies ought to be those that minimize the tradeoff between command and control and tribal warrior esprit.

The countries that participated in World War II had rather different policies and attitudes about how to form, train, and lead troops. Their performance in WWII also differed significantly. Dupuy (1984, 1987) conducted a quantitative historical analysis of combat effectiveness of soldiers that have faced one another in battle in WWII. He analyzed engagements between competing divisions, mostly in the fighting in Italy and France 1943-45. Controlling for equipment, surprise, posture (e.g. attacking or defending), and many other factors as well as possible, Dupuy found large residual differences he attributed to the fighting effectiveness of soldiers. In WWII, German per capita effectiveness was highest, followed by the Americans and British with about a 20% handicap relative to Germans (all else equal, it would take 120 Americans or British troops to accomplish the same objective as 100 Germans). This difference persisted until the very end of the war, despite a steady diet of defeat after 1942 for German units, very heavy casualties, and a poor supply situation. The German advantage relative to Russians was approximately twofold, as was the Israeli advantage relative to the Arab armies in 1967 and 1973.

Military analysts generally agree that the fighting power of German ground forces was exceptional, and that certain other armies, such as the Israeli Defense Force, similarly outclass their opponents. Shils and Janowitz (1948), van Creveld (1982) and Fritz (1995) offer ethnographic analyses of the performance of the German Army, relative to the

Western Allies. Shils and Janowitz' study is based mainly on prisoner interviews during the War. Van Creveld, an Israeli unlikely to romanticize the Wehrmacht, systematically compares the German and American armies' general philosophies, leadership, training, personnel practices, and casualty management. Fritz's analysis is a psycho-ethnography based on letters, diaries and autobiographies of ordinary Wehrmacht troopers. Cockburn's (1983) account of the Cold War Soviet Army is similarly detailed. Kellet (1982) describes institutions of combat motivation of the British and Canadian armies in a broadly comparative framework. Luttwak and Horowitz (1975) provide an analytical history of the Israeli Defense Force, and Shalit (1988) gives an interesting account of the psychology of combat based on his studies as a member of the IDF. Though not a WWII army, the IDF fought in 1967 and 1973 using the basic tactics and equipment of WWII, so we include some comments on it and its enemies.

Plenty of Coercive Dominance

All modern armies place considerable emphasis on obedience to authority and the use of coercion to compel obedience (Kellett 1982: 89-93, 110). All armies threaten to execute deserters, for example. In Western armies, the number shot in recent wars for desertion have been relatively small (Fritz 1995: 90, van Creveld 1982: 113-116). According to Cockburn (1983: 88), Soviet practice included much more direct coercion than in German, British, and American armies. The German army did cease to become an effective fighting force at the very end of WWI due to mutiny and desertion. Hitler believed that German punishment for misbehavior had been too lenient in WWI, and insisted on a tougher policy when he came to power. As WWII wore on, and catastrophic defeats led to chaotic retreats, the Germans organized a brutally efficient Field Police that rounded up misbehaving stragglers (Fritz, 1995: 93-97). Field Police freely executed those guilty of theft, desertion, and other crimes common when normal discipline broke down. Notably, a completely different, specialized unit, not a man's normal commanders, administered the worst punishments. Sensible stragglers rejoined their units, where officers would ask few questions, as quickly as possible. Compared to the Russians, all three principle Western armies did not routinely use raw coercion in motivating soldiers to fight, in favor of other

techniques. The Israeli army, because it grew from pre-independence militia, emphasizes top-down command less than other modern armies (Luttwak and Horowitz 1975: 54ff).

Better Exploitation of the Segmentary Principle

All of the armies under consideration had the same basic hierarchy of units, starting with squads of 8 or 10, platoons of 30 odd, companies of around 100, and so on up to field armies of 100s of thousands and national forces numbering in the millions. This structure is in part a device for communication, like a telephone tree. The test of our hypothesis is whether it also serves work-around functions. The smallest units should function to tap mainly the ancient social instincts, especially reciprocity. We would expect from our hypothesis that tribal scale units—up to regiments (around 3,000 men) and divisions (around 10,000)—will be most effective at tapping the old, tribal, social instincts. Egalitarian tribes sometimes field forces on this scale. Nationalism taps the tribal instincts at an even larger scale. Unit leaders at each level should exhibit much of the informal charisma of band headmen and war “chiefs.”

Solidarity of Small Groups

German doctrine placed great emphasis on developing a sense of cohesion and solidarity among the members of small units (squads, platoons, and companies) (van Creveld 1982: 46; Fritz 1995: 24, ch. 7, 235). Regiments trained their own recruits and marched them to the front in a body, often commanded by officers that would lead them in battle. A German soldier always served in the company of comrades, whose bonds of loyalty and fellowship were deliberately designed to cumulatively increase from the day of induction onwards. At the opposite extreme, the American system gave recruits basic training in temporary groups, and sent them on to advanced schools—eventually to combat—as individuals. Socially isolated neophyte infantrymen suffered considerable psychological turmoil during their long, lonely journeys to the front. They were only slowly integrated into the fabric of the units they joined, and were disproportionately likely to become casualties in their first weeks of fighting (van Creveld 1982: 76-7). The German army thus took much greater pains than did the Americans to build the segmentary system from the

bottom up. The solidarity so generated, according to van Creveld (1982: 45), goes far towards explaining how badly mauled German units could endure defeats that would render British and American units non-functional.

Solidarity of Larger Units

Territorial recruitment of the German army contributed to a sense of tribal solidarity (van Creveld 1982: 43, 45). All members of a division would be Bavarians, Saxons, Brandenburgers, or whatever. Recruits would find many fellows from their town or district serving with them. Despite some inefficiencies in this system, the Germans believed that sub-ethnicity played a significant role in the creation of unit solidarity. The British and Canadian, but not the American, armies also leaned heavily upon the regimental system to build a tribal scale sense of solidarity (Kellett 46-54). Once fighting, the German Army was very careful with its replacement policy clear up to the division level (van Creveld 1982: 72-9; 89-91). German practice allowed divisions to shrink from casualties while they formed up fresh soldiers into new divisions rather than feed them into weak ones piecemeal. To renew weakened divisions, the Germans would withdraw them from the line, bring up replacement troops trained by officers from the mauled division, and conduct field training for a period to integrate the new men into the old unit. Van Creveld (1982: 45) notes that when, toward the end of the war, mixed units, for example units formed from stragglers originating from different units, performed much more poorly than socially homogeneous ones. Given the great stress in Hitler's Germany on pan-German nationalism it is interesting that the army encouraged sub-national identities this degree.

Leadership, Discipline, and Individual Esprit

The issue of training and leadership is crucial to the performance of modern armies. Training has to emphasize obedience to orders from superiors to make command and control effective. On the other hand, according to our hypothesis, our egalitarian social instincts will rebel at authoritarian control. Soldiers self-motivated by a tribal-warrior like ethos should make better soldiers than ones rigidly obeying orders from on high.

It is interesting to read, in an advice manual for junior officers in modern Western armies, how much like a tribal leader modern officers are expected to behave (Malone 1983). The rules of command grant officers substantial coercive authority over their troops. Perhaps surprisingly, Malone advises leaders of small units to display such traits as humility, justice, tact, and selflessness, as well as more conventional military virtues—courage, decisiveness, dependability, and loyalty. Under several different headings he encourages leaders to conspicuously recognize the contributions of subordinates, downplay their own roles, and defend their subordinates against unfair treatment from outside and from up the chain of command. Formal studies of bureaucratic leadership, of which military leadership is only a special case, emphasize similar points (Van Fleet and Yukl 1986; Taylor and Rosenbach 1992). Ideally at least, modern armies seem to expect leaders to behave much the same way an influential man might in an egalitarian society. They seem to be attempting to construct a reasonable simulation of the *primus intra pares* form of leadership that exists at the band and tribal scale in simple societies.

German practice in WWII managed to minimize the tradeoff between command and control and individual initiative better than its competitors due to several facets of training and leadership. German basic training, conducted at the hands of non-commissioned officer drill sergeants, was extremely rigorous physically and mentally. However, training personnel took pains to legitimate such training as realistic preparation for battle, not as exercises inculcating lessons of mindless obedience to orders. Kellett (1982: 81-87) notes that increases in the realism of training in the British, Canadian and US armies at various times during WWII were effective and valued by the troops. German instructors were typically fair as well as hard (van Creveld 1982: 72-4). Most drill instructors earned grudging admiration or better from recruits (Fritz 1995:Ch. 2). Training of commissioned officers as well as non-commissioned officers emphasized the responsibility of officers for the welfare of their troops. Enlisted troops tended to respond to the paternalistic concerns of their field grade officers. At every level of the chain of command, the German army trained its soldiers to seize opportunities and act on individual initiative, rather than await orders. As a matter of fundamental doctrine, a German superior drafted orders to subordinates to emphasize the mission to be accomplished. This philosophy put the burden

and privilege of devising the means to accomplish the mission on subordinates, right down to the level of squad and section leaders, and individual enlisted men (van Creveld 1982: Ch. 4 & 5; Fritz 1995: 235-6).

According to van Creveld (1982: 44, 49-53, Ch. 10, 11) the German designed a command system well designed to provide soldiers with leaders that they could believe in. The Germans went to considerable pains to move the best officers to the front lines, at the expense of leaving rear areas under- and poorly staffed. German procedure greatly simplified reporting by field commanders in the interest of reducing the paperwork burden on fighters (van Creveld 1982: 44, 49-51, 62-5). After the war began, successful combat experience became the most important criterion for advancement (van Creveld 182: 144). The Americans had a much more manage-by-numbers approach. Talented men tended to remain in rear-area jobs and be amply rewarded for non-combat service. Of course, American managerial talent moved a flood of supplies to the troops, whose advantage in materiel substantially offset the German advantage in soldiers' fighting power.

According to Fritz (1995: 18, 25, 158, 167) and van Creveld (1982: 129), the German emphasis on the prosocial traits of NCO's and field officer leaders was a good deal stronger than in the American Army of WWII. No doubt, the chain of command exists, and no doubt it is widely resented. Nothing is more familiar to all of us than complaining about superiors. Without dedicated small-unit leaders that can inspire common action by the same deft force of personality the informal leaders of simple societies use, soldiers would not undertake their customary desperate deeds.

Van Creveld (1982: 123, 129, 131, 135, 139) and Fritz (1995: 210, 216) attribute much of the success of the German leadership system in WWII to a dramatic democratization of the German officer corps, including much promotion from the NCO ranks, after 1933. Hitler despised the traditional aristocratic German officer and demanded a social revolution in the Army. German officers were expect to live and eat with their men and to participate in the comradeship of their units to a degree that would be condemned as "fraternization" in the American army even today. It is most counterintuitive that

Germany, with its tradition of aristocratic leadership and reputation for tolerance of authoritarianism, should have had a more egalitarian army at the field level than the more democratic Americans and British. It is interesting that in Hofstede's (1980) massive cross-cultural study, Austrians ranked lowest on a scale measuring tolerance for inequality in the work environment of any country studied, distinctly lower than Germany, Britain and the USA. Hitler's Austrian background and enlisted man's experience in WWI gave him an intuitive sympathy for ordinary soldiers' motivations for fighting. Hitler's concept of soldierly solidarity, an ideological linchpin of his regime's claim to legitimacy, happened to work rather well when applied to the army. He had the dictatorial power to enforce his ideals of leadership upon the traditional officer class. He exercised it with sufficient vigor to result in von Stauffenberg's 1944 attempt on his life, organized by aristocratic officers. Fritz (1995: 183), in characterizing the appeal of socially "flat" German leadership to ordinary troopers, describes "the tug of this rough democracy, this meritocracy based on character and achievement." German officers and NCOs routinely had more personal charisma than those of competing forces.

Anglo-American training and leadership practices were less meticulous versions of the German system. For example, the managerialism of the American command system limited individual initiative, and the replacement system gravely handicapped the development of unit cohesion (van Creveld 1982: 39-40, 76-79). However, Dupuy (1984) notes that the best led American divisions in WWII were better than many Wehrmacht units. Given a gifted commander, American and British troops could be brought up to the standard that the Germans made routine (van Creveld 1982:78). Soviet practice was very different according to Cockburn. Recruitment and training were haphazard. In the Soviet Army, the NCO system was very rudimentary; lacking the long-service career NCO cadre that is one of the key components of German, British, and American armies. Commissioned officers were socially remote from recruits, who were informally ranked in terms of length of service (postwar recruits served 2 or 3 years). The effective face-to-face leaders of Soviet soldiers were typically young, inexperienced draftee junior officers. As a consequence Soviet units not only lacked effective small unit leadership, but the recruit experience engendered divisions between older and younger soldiers within units rather than the

strongly felt solidarity of Western European, especially German, small units. Blind obedience to orders coming down from a remote high command was the rule, and local initiative was discouraged. By Dupuy's measures, such an army is quite deficient in individual fighting power, although given the numbers of Russians available, and the ruthless driving of them by the Soviet system, they defeated the Germans.

The training and leadership system of the Israeli army is even more democratic than the German (Luttwak and Horowitz 1975: Ch. 3). The largest and most successful socialist militia of the War of Independence formed the core of the IDF, despite the dismissal for political reasons of many of its leaders and the disbandment of its brigades when Ben Gurion, from an opposing, center-left party, became Prime Minister in 1949. To further reduce the influence of leftists in the army, Ben Gurion promoted the use of British trained officers to reconstruct the IDF along more conventional lines. The chief role of reforming the IDF fell to the apolitical War of Independence veteran Yigal Yadin, who had great respect for the "amateur" militias. Yadin himself was an archaeologist before and after his career as a soldier, and had no formal military training. Israel was far too small relative to its Arab enemies to rely on a professional army for even the most basic rapid-reaction force in emergencies. Thus Yadin and his associates based their army on the rapid call-up of well trained reserves from the civilian sector. This required rather long initial terms of enlistment for young inductees (2-3 years) and continuing training of reserves (up to 31 days per year). Long-service officers and young enlistees provided the core for some brigades, but some brigades were entirely reservists, albeit well trained ones. The debate over British style emphasis on hierarchical command versus militia style democracy and "internal" discipline was largely won by the latter, despite Ben Gurion's support for the former and Yadin's attempt to execute it. The informality of Israeli society and the prestige of the heroes of the War of Independence won out in the end.

The Israeli army trumps the Germans of WWII in its de-emphasis on privileges of rank. There is no officer school; all officers are promoted from the enlisted ranks. Officers are selected for their military performance alone; there is no special educational qualification for higher ranks. As a result, military and civilian rank are poorly correlated. When a unit

is called up, a boss may be commanded by his employee, or a professor by one of his students. The performance of all-reserve brigades proved equal to those stiffened by regulars. In the 1967 and 1973 wars, the IDF defeated numerically superior and, in 1973 very well equipped, Arab armies. The hallmarks of the IDF are great initiative at every level, flexibility, and rapid recovery from surprise and tactical defeats.

The Role of Ideology

The crudely racist ideology of the Nazi regime is of course notorious. Hitler's relentless propaganda machine encouraged all Germans to believe that the war was a crusade to save Europe from the Jews and Bolsheviks. His personal charisma, especially his appeals through the mass media, was the foundation of his power. There is debate over the role of Nazi ideology in explaining the effectiveness of WWII German soldiers. Shils and Janowitz substantially discount its impact relative to the details of training and leadership that we have discussed. Their view may derive from a biased sample, since soldiers from standard Wehrmacht units surrendered in small numbers compared to bottom-of-the-manpower-barrel units (van Creveld 1982: 45). Fritz (1995: 159-163, Ch.8, 236-238) argues diaries and letters show that Nazi ideology underpinned soldier's attitudes in several respects. First, Hitler built the Nazi ideology of national solidarity by analogy with the deeply felt front-line solidarity of small combat units. A decorated WWI front-line corporal, he could expound on these sentiments with genuine personal familiarity. He endowed army service with an idealistic demonstration mission for the whole German Volk. Fritz elaborates considerably on Hitler's charismatic appeal to at least some considerable minority of soldiers. If his material is representative, many German soldiers sustained a palpable, if decidedly warped, sense of idealism, even in the midst of the horrors of the Eastern Front. On the other hand, van Creveld (1982: 84-89) doubts that field level army propaganda had much effect in either the German or American army.

Fair and Humane Rules

The German army took great care to demonstrate concern for individual soldiers. The quality and paternalism of the officer corps, already mentioned, was important (Creveld (1982: 97-100, ch. 9). The German system for awarding medals was more prompt in its recognition of merit, and more strongly restricted to actual combat accomplishment, than the American system. The development of a very efficient field postal system kept soldiers in touch with their families, and hardship leave (e.g. when the family home was bombed) was common. The Wehrmacht thus went to considerable extremes to demonstrate an interest in a soldier's personal well being, minimizing apparent conflicts between soldierly duty and personal and family interests. Objectively, these small rewards were scant recompense for the near certainty of death or a maiming wound, but they had a large impact on morale. German soldiers *felt* well cared for even as they suffered and died under objectively appalling conditions.

The irony is cruel but instructive (van Creveld 1982: 165-6; Fritz 1995: ch. 10). The criminal, reckless, totalitarian, Nazi regime managed to find the most successful formula of the period for meeting the conflicting demands of national command and control and the need to provide for the felt needs of individual soldiers. The common theme of both the innovative and traditional differences between the German army and its WWII enemies is attention to the psychology of the fighting soldier. By paying such meticulous attention to the needs and motives of ordinary troopers, the Wehrmacht constructed a sort of virtual reality that successfully simulated the situation of a segmentary society fighting for its existence. For its pains, it routinely elicited dedicated, skillful, death-defying performances from the ordinary landser. Other modern armies do the same, of course, but most at least a little less well than the Germans did in WWII.

Conclusions

Our most fundamental point is that cultural evolutionary processes play a dominant role in the evolution of human social institutions. In the short run, cultural evolution, partly driven by the social instincts, gives rise to the institutions we observe. In the longer run,

cultural evolutionary processes created an environment that led to the evolution of the uniquely human tribal social instincts. Rational choice theory (e.g. Coleman 1990) and the various strains of human sociobiology inspired by Richard Alexander (1987), Lumsden and Wilson (1981) and Thornhill et al. (1997) all propose to derive social institutions directly from human nature. Such scholars are right to be suspicious of the merely descriptive, mechanism free, cultural accounts that anthropologists and historians often give for social institutions. However, we submit that our hypothesis provides a theoretically coherent, causal account of the evolution of complex human societies. Much empirical evidence is consistent with our account and not with those depending on human nature alone. The evolution of complex societies depends upon the pro-social tribal instincts, assisted by cultural group selection favoring functional large-scale institutions, ever undermined by social instincts and ongoing selection favoring narrower loyalties and individual advantage. The coevolutionary explanation of the evolution of complex societies is, we believe, the only hypothesis that explains the undeniable elements of macro-functionalism and the manifest crudity of complex societies in the same theoretical framework. It accounts for our species' peculiarly structured ultra-sociality, for the time scales over which institutions evolve, and for the patterns of conflict that routinely wrack human societies. It accounts for the segmentary structure of human societies and its associated leadership hierarchy. To function, human societies must employ a series of work-arounds that are unnecessary in other ultra-social systems. The much greater solidarity of social insect colonies, where individuals are closely related, allows them to dispense with all of specialized apparatus we have discussed here.

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ⁱ We are well aware that anthropologists have used the term “tribe” in such diverse ways that many feel that the term has become hopelessly muddled. Common English usage is also quite polysemous. We use it here in a minimalist sense. Tribes are a unit of social organization that incorporate people of relatively low degrees of biological relatedness into a common social system without depending upon formal authority. Extended kinship, sentiment and informal institutions animate tribes, rather than formal law and leadership with formal powers of coercion. Birdsell’s (1953) classic study estimated that the average Australian hunter-gather tribe incorporated around 500 people. Because of a fair dispersion of tribe size, the average *person* would have lived in a somewhat larger tribe. The creation of social units composed of many distantly related families, usually not co-resident in hunter-gatherers, is unique to humans. Usually, descent from a common ancestor, often fictitious, honorific or metaphorical, forms the core of the ideology enjoining feelings of solidarity, that are in turn the main wellspring of common action. Some restrict the term “tribal” to a range of societies of intermediate size and complexity usually characterized by sizes of a few thousand, fairly elaborate formal political institutions, but still no specialized full-time leaders with coercive authority (Service 1962). We argue in this paper that even the “band” societies of Service’s taxonomy are normally part of a multi-band community that functions to maintain local peace, resist incursions by other tribes, and provide aid in subsistence crises. Simpler societies vary continuously along several dimensions regarding social organization (e.g. Jorgensen, 1980), and clean classification is a vain hope. The emergence of social bonds among non-coresident, distantly related, people requires a convenient label and the choice is “tribal” or an awkward neologism.

ⁱⁱ There are two common objections to the term “instinct.” First, some critics say that the term is hollow; there is a pattern of behavior, merely labeling it an instinct adds nothing. To this we answer that we want to distinguish between influences on behavior that are genetic and those that are cultural. Second, some would restrict the term instinct to innate patterns of behavior that are little modified by environmental contingencies or culture. Wilson (1975: 26-7) notes that this sense of “instinct” applies only to extreme cases and so endorses the usage we adopt here.

ⁱⁱⁱ In our view, it is hard to imagine that there are no instincts at all. Despite vigorous attempts, chimpanzees cannot be taught to be human, though they can be taught to do some amazingly human-like things. There are some quite significant genetic influences on our behavior that make us, but not chimpanzees, able to learn language, suppress aggression, imitate freely, and so forth. Even the most radical cultural constructivist must admit that there are instincts in this sense.

^{iv} We would be quite unsurprised if some human universals turn out to be transmitted culturally rather than genetically. In theory, it is perfectly possible that traits transmitted culturally from parents to offspring could be as conservative as genes. Cultural transmission can mimic genetic transmission almost perfectly as regards evidence at the phenotypic level. Such cultural features would be functionally identical to genetically transmitted influences on behavior, so misidentifying them at this stage of our knowledge is not harmful. A symmetrical argument applies to genes. Genes with simple effects on phenotype, when subject to strong selection, cause easily measurable changes at the population level in a few generations, mimicking cultural changes. Current knowledge does not allow us to say much about the actual division of labor of genes and culture in human evolution and development. The coevolution idea suggests that it may be most complexly tangled.

^v It is also true that the institutions of small-scale societies vary for reasons that have no discernable correlation with ecological circumstances. Among the work cited here, Knauff (1985, 1993) and Jorgensen (1980) describe the considerable degree of variation that exists in simple societies, apparently independent of environment.