

Warriors, Levelers, and the Role of Conflict in Human Social Evolution Samuel Bowles *Science* **336**, 876 (2012); DOI: 10.1126/science.1217336

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an intrinsic reward, known as the "warm glow" effect. Humans report feeling good when they do good and show activation of reward-related brain



Fig. 3. The Russian doll model of multilayered empathy. The doll's inner core consists of the perception-action mechanism (PAM) that underlies state-matching and emotional contagion (*15*). Built around this hard-wired socioaffective basis, the doll's outer layers include sympathetic concern and targeted helping. The complexity of empathy grows with increasing perspective-taking capacities, which depend on prefrontal neural functioning, yet remain fundamentally connected to the PAM. A few large-brained species show all of the doll's layers, but most show only the inner ones.

areas (28). It will be important to determine whether the same self-reward system extends to other primates. We do know from studies on rodents, apes, and humans that empathy is biased toward the ingroup. For example, while watching the yawns of videotaped conspecifics, chimpanzees frequently joined the yawns of their own group members but not those of unfamiliar individuals (23). This ingroup bias makes sense from an evolutionary

perspective, because it is with the members of one's own group that apes cooperate. At the same time, however, it poses a profound challenge for the modern human world, which seeks to integrate a multitude of groups, ethnicities, and nations. The flip side of the ingroup bias in empathy is lack of empathy for the outgroup, as is typical of xenophobia.

Nevertheless, empathy may be our only hope to deal with these issues. We know that it can be activated by outsiders, even by members of a different species, such as when we empathize with a stranded whale and move it back into the ocean. This is not an outcome for which empathy evolved, yet once in existence, capacities are often emancipated from their evolutionary origin. If it weren't for empathy with all life forms, including enemy lives, soldiers would have no reluctance to kill nor would they return from the battlefield with PTSD. Although it is true that empathy has trouble reaching beyond the ingroup, it is an automated response that does not allow itself to be fully suppressed by rationalizations and

political indoctrination. This is another lesson from World War II, with examples such as Oskar Schindler and the guardians of Anne Frank. To better understand the power of empathy requires investigation of its neurological basis as well as its evolutionary antiquity.

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PERSPECTIVE

WARRIORS, LEVELERS, AND THE ROLE OF CONFLICT IN HUMAN SOCIAL EVOLUTION

Samuel Bowles

The origins of such varied features of contemporary life as the national state and the desire to uphold generous and civic social norms are to be found in a combination of conflict between groups and attenuation of both inequalities and conflicts within groups. In contrast to the adoption of a better tool or a more productive crop, which can be adopted by a single individual, a new institution works only if most people adopt it. This explains why collective action against those benefitting from the status quo at the expense of others, as well as conflict between groups governed by different norms and institutions, figures so prominently in our capacity to adapt to changing circumstances and to harness new knowledge for human benefit.

onflict has a bad name, one that it richly deserves for the suffering, tragedy, and waste of human and material resources

that it brings about. But conflict—both violent and civil, both within and between societies—has also been a midwife for humanity's most cherished values and institutions: among them democracy, the rule of law, and a propensity to help others and to abhor injustice.

I will make the case that it was warfare that culled Europe's once-motley collection of governments to produce the modern national state, which, as a result of subsequent conflicts within nations, would become liberal and eventually democratic. This occurred because, not content to free ride on the sacrifices of others, people were willing to take mortal risks in pursuit of democratic and liberal values. And this, if I am right, is itself a result of millennia of conflict between groups of ancestral humans where, Charles Darwin wrote, the groups with large numbers of "courageous, sympathetic and faithful members, who were always ready to...aid and defend each Jownloaded from www.sciencemag.org on May 18, 2012

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other...would spread and be victorious over other tribes" (1).

Conflict and the Liberal Democratic State

Seven centuries ago, in what is now Italy, there were more than 200 distinct independent governing entities. Europe was governed by about 500 sovereign bodies: "empires, city states, federations of cities, networks of landlords, religious orders, leagues of pirates, warrior bands" (2). By World War I, fewer than 30 remained. A single political form had survived: the national state, a centralized bureaucratic structure maintaining order over a defined territory, with the capacity to mobilize substantial resources by taxation and borrowing and to deploy permanent armed forces.

What explains the competitive success of this novel form of rule? The simple answer is that national states won wars. An equally dramatic conflict-driven culling process took place in China between the fifth and third centuries BCE (3) and may also account for the first emergence of states not only in China but also in Mesopotamia, Mesoamerica, Peru, Egypt, and the Indus Valley (4). In Europe, success in warfare required mobilizing a willing or, at worst, compliant population. A system of taxation and military recruitment, coupled with the capacity to borrow large sums, made the difference, allowing rulers of national states to make war without resort to the unpopular ad hoc requisitioning of food, weapons, manpower, and animals (2).

All of this required a flourishing economy, the availability of credit, tax compliance, and the willingness to serve rulers in war. These, in turn, were fostered by the diffusion of civic norms voluntary tax compliance, willingness to risk danger in war for a ruler or nation, and respect for property rights—which, although costly to the individual, were essential to a nation's success in war.

In part as a result of its success in Europe, replicas of the national state were exported, often at gun point, but also by emulation on the part of those seeking to preserve their own autonomy. The European model of government—often in highly authoritarian form, as in the colonies flourished throughout the world, extinguishing competing forms of organization. With the national liberation wars and independence movements of the 19th and 20th centuries, together with subsequent social movements for expanded suffrage and civil rights, many of these states, too, would become democratic.

Some kinds of progress avoid the tragedies of war and civil strife: A more efficient energy source or an advance in personal hygiene comes along, and those who adopt it profit as a result. But the main dynamic of social norms and institutions has a different logic. A novel system of property rights, governance, or marriage, or a new medium of exchange or of communication, only works when it is widely adopted. These systems are termed conventions. Switching from one to the other is known as a coordination problem and, as the term suggests, this occurs through collective, not individual, action when the number of people rejecting the status quo is sufficient to tip the population to an alternative convention. A new convention is not something that you can opt out of, and it is often the powerful and wealthy in the status quo convention who will be the losers in the new. So it is no surprise that shifting from one to another generates conflict, whether violent or civil. This is why strikes, demonstrations, and wars provide so many of the punctuation marks of history (along with new technologies).

The eventual democratization of the national state exemplifies just this process. American high school students are taught that their democratic constitution was the gift of the landed and commercial elites of the 13 former colonies. James Madison and the other authors of The Federalist Papers, the story goes, convinced the haves that the have nots would never be able to unite sufficiently to redistribute wealth. The elites could safely take a chance on democracy. But that is just one of America's national myths. The United States would wait more than a century and a half to meet the elementary standard of democratic rule by extending suffrage to virtually all adults (with the Voting Rights Act of 1965), a process propelled by the victories of abolitionists, slaves and their descendants, workers, and women demanding the vote (Fig. 1, top).

Elsewhere, conflict played an even more critical role in the advance of democracy (5). With the exception of New Zealand, universal suffrage was not won anywhere until the 20th century, and elites rarely conceded it without a fight (6). Representative institutions with limited voting rights came first in Europe and its global offshoots, often as a result of the defeat of a landed elite, as in France. This was followed, in most cases much later, by the equally contentious extension of the vote. World War I sent millions of disenfranchised soldiers to their graves; in its course and immediate aftermath, nine European nations extended the vote to all males, most granting the vote to women at the same time (Fig. 1, bottom).

Democracy has belatedly come to El Salvador, South Africa, and many of the former Communist Party–ruled nations, but only because peasants, workers, and other ordinary citizens were willing to risk jail and much worse (7–9). A similar process may now be under way, if haltingly, in the Arab world. Conflict and elites' attempts to forestall conflict were no less essential to the eventual adoption of policies to ensure the modicum of equality of opportunity and social insurance that most citizens of liberal democracies now take for granted.

Cooperation and Conflict in Prehistory

All of this required collective action on the part of those excluded from the political process who, like the youth of Tahrir Square, were willing to

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sacrifice for others beyond the immediate family. The fact that humans, uniquely among animals, are like this is itself arguably the result of millennia of conflict between groups of ancestral humans, as Darwin wrote. Some have doubted Darwin's account because for most animals, gene flow (due to migration) would minimize genetic differences between groups, and hence nullify the genetic effects of group competition (10). But recent evidence suggests that this may not be the case for a number of species (11-13), including recent human foragers, whose population structures may resemble those of our Late Pleistocene ancestors (14). Others may have doubted Darwin's conflict-based account because they believe warfare to be a postagricultural revolution corruption of our naturally peaceful disposition. But hunter-gatherer burials with smashed skulls, broken or missing forearms (taken as trophies), and stone points embedded in bones tell a different story, as does ethnographic evidence that warfare was a leading cause of death among some recent hunters and gatherers (14).

I have shown (15, 16) that we can plausibly infer from these data that the degree of mortal conflict and extent of genetic differences among ancestral forager groups were jointly sufficient to have allowed the evolution of a genetically transmitted predisposition to contribute to common projects (including defense and predation vis a vis other groups), even when one's individual fitness would have been enhanced by free riding on those who would "aid and defend each other." Whatever the balance of cultural and genetic factors in the evolution of human cooperativeness, between-group conflict almost certainly played a pivotal role. Related empirical and theoretical results are consistent with this view (17-18).

Warriors and Levelers

This explanation of a warlike provenance of human altruism comes with an interesting twist: In addition to making war, our hunter-gatherer ancestors almost certainly built institutions to share food and information, to make decisions by consensus, and to gang up on would-be dominants or free riders who would monopolize reproductive and material resources or exploit the cooperation of others (19-21). These practices, called reproductive leveling, reduced within-group differences in material wealth and reproductive success, resulting in a less tilted evolutionary playing field and thereby giving the altruistically inclined a better chance of survival. The result, paralleling natural selection and affecting its course, was a prehistoric culling of institutions not unlike that which produced the national state in early modern Europe. In simulations of this gene-culture coevolutionary process in prehistoric populations, when these leveling processes are prevented from evolving, natural selection produces a self-interested species (except under empirically implausible



Fig. 1. (Top) Battle of Antietam, 17 September 1862, during the U.S. Civil War that ended slavery. (**Bottom**) British Chartists demonstrating at Kennington Common on 10 April 1848. Enactment of their demand for universal male suffrage would not come about until 70 years later as World War I drew to a close.

parameter values) just as the group selection skeptics predicted (22).

The great shake-out of European protostates favored a similar kind of leveling. In many of the states that survived the winnowing process, the rule of law limited the predations on the weak by the strong. As celebrated in a House of Commons speech in 1763 attributed to William Pitt the Elder, "The poorest man in his cottage may bid defiance to all the forces of the Crown. It may be frail—its roof may shake—the wind may enter—the rain may enter—but the king of England cannot enter—all his force dares not cross the threshold of the ruined tenement" (23). Eventually, democratic rule and the organization of trade unions allowed the have nots, like their distant forager ancestors, occasionally to curb those claiming too large a share of the economic pie. Thus, not unlike the Late Pleistocene, the institutional selection that produced the modern liberal state was driven by processes attenuating inequality and conflict within nations, working in combination with conflict between nations. The modern nationalistic welfare state (e.g., France) is a result of this evolutionary process.

The biologists John Maynard Smith and Eörs Szathmary proposed that the major transitions in biology—for example, the emergence of multicellular organisms—occurred when competition within entities was suppressed (24). There may be a similar process at work among our forager ancestors and in early modern Europe: Success in competition between entities is more likely when competition and conflict within entities is moderated (15, 19, 25, 26). In a paper on slime mold, Frank writes (27): "...competition among lower-level units is suppressed in the formation of higher-level evolutionary units, ...mutual policing and enforcement of reproductive fairness are also required for the evolution of increasing social complexity."

Unlike multicellular organisms, forager bands and nations cannot ensure their competitive effectiveness the way slime molds do it: by suppressing the autonomy of the lower-level entities making them up. Instead, for human groups, prevailing in intergroup contests requires cooperation among individuals. If the above account is correct, this is fostered both by an altruistic predisposition among group members and by reproductive leveling, the rule of law, democracy, and other practices that limit the extent to which leaders take what is considered to be unfair advantage over others.

However, there is nothing intrinsic to warfare that guarantees similar outcomes. For all their cooperativeness and reproductive leveling, forager bands were no match for the hierarchical agrarian and later industrial states that decimated them. In the two cases here-forager bands and national states-a combination of within-group cooperation and leveling appears to have contributed to success in between-group conflict, and hence was favored. But the logic of competition among differing institutions and social norms does not guarantee such benign results anymore than natural selection maximizes the fitness of a species or competition among profit-seeking firms results in an efficient allocation of economic resources.

Thus, war is hardly sufficient for the evolution of altruism or leveling. Nor is war necessary. People routinely act generously in workaday situations. Natural disasters often bring out the best in us and inspire heroic sacrifices on behalf of others. During the Late Pleistocene, groups of cooperating foragers would have been more likely to survive not only challenges by other groups but also the extraordinary climatic shocks of that period. Could not human cooperativeness and leveling have thus evolved in the absence of between-group conflict? It could have, but, in light of the evidence, I doubt that it did.

Legacy and Destiny

It seems likely, too, that conflict will remain important for human progress. But does this require the violence, suffering, bigotry, and waste characteristic of the conflicts of the past along with the cultural inheritance of this dismal trajectory, an unpleasant nexus of predispositions that Choi and I call "parochial altruism," marked by gen-

I do not think so: Our legacy need not be our fate. We could not have become what Gintis and I call a cooperative species (28) were we not, par excellence, a cultural animal. Among the lessons of our past are not only the grisly truths on which I have dwelled but also the fact that our us's and them's are not primordial. On world historic time scales, we make and unmake these pronouns of exclusion at lightning speed. For ancestral humans, making peace was no less essential than surviving wars [as Boehm points out in his contribution to this issue (29)].

The unsung virtue of European and many other forms of nationalism is that it obliterated the hundreds of petty us's and them's that once divided valley from valley, dialect from dialect, and even neighborhood from neighborhood (30, 31). The tricolor, the stars and stripes, and the other national banners have not, of course, put an end to intolerance and bigotry within nations. But the willingness of voters to elect members of groups whom they recently despised, exploited, fought, or enslaved, and to pay taxes to extend economic opportunity and a modicum of security to onceexcluded peoples is testimony to the fragility of the parochial aspects of altruism.

Nationalism helped convince once-warring peoples-Protestant and Catholic, Florentine and Roman-to bury the hatchet, if not their differences. Paradoxically, globalism may carry a similar process across national boundaries. The parochial face of nationalism itself may be softened by the globalization of interpersonal contact and

concern, now facilitated by the shrinking of space. And if, as seems likely, democracy should continue to spread, relations among nations may come to reflect what political scientists call the democratic peace (32) and follow the less bellicose avenues of economic and cultural competition and emulation.

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REVIEW

LIFE WITHOUT WAR

Douglas P. Fry^{1,2}

An emerging evolutionary perspective suggests that nature and human nature are less "red in tooth and claw" than generally acknowledged by a competition-based view of the biological world. War is not always present in human societies. Peace systems, defined as groups of neighboring societies that do not make war on each other, exist on different continents. A comparison of three peace systems-the Upper Xingu River basin tribes of Brazil, the Iroquois Confederacy of upper New York State, and the European Union-highlight six features hypothesized to be important in the creation and maintenance of intersocietal peace: (i) an overarching social identity, (ii) interconnections among subgroups, (iii) interdependence, (iv) nonwarring values, (v) symbolism and ceremonies that reinforce peace, and (vi) superordinate institutions for conflict management. The existence of peace systems demonstrates that it is possible to create social systems free of war.

rar—a group activity involving lethal aggression between communitiesand other forms of violent conflict occur all too regularly in the 21st century and contribute substantially to human suffering. At the same time, most daily human behavior, within and across societies, is nonviolent. Conflictdefined generally as perceived divergence of interests-occurs regularly within and between societies and can be handled in many ways, only a few of which involve any physical violence (1, 2). With variation from one culture to

the next, disputants, for example, may seek the help of an impartial mediator to resolve their disagreements, appear in court, negotiate the payment of compensation, or practice avoidance.

A New Perspective

A dominant evolutionary perspective, as captured in Tennyson's famous phrase "nature, red in tooth and claw," has proposed that competition, often in the form of violence, is the evolutionary norm (3-7). It appears, however, that this perspective may be shifting toward a new understanding that, although not totally dismissive of self-interested competition and conflict, nonetheless draws on recent advances in evolutionary theory (3-5) and a substantial body of human and nonhuman animal data (7, 8) to show that cooperation, sharing, helping, and reconciliation also have a solid evolutionary basis (3-11).

Traditionally, warfare has been seen as ancient (12-14), but this view is also being recon-

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