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When It Comes to Waging War, Ants and Humans Have a Lot in Common

In both humans and social insects, the capacity to engage in total war seems to hinge on population numbers

Look closely enough, and you'll find that modern societies resemble those of certain ants much more than our nearest relatives, the chimpanzee and bonobo. No chimp has to create highways, traffic rules, and infrastructure; participate in assembly lines and complex teamwork; or allocate a labor force for effective division of labor — the list goes on.

The reason is that societies of all species have organizational imperatives that depend on size, and only humans and certain social insects have populations that can explode into the millions. A chimpanzee community with a hundred members, for example, doesn't address public health issues, but some ant metropolises have sanitation squads. Whether assembled largely by intelligent thought (in humans) or genetic inheritance (in ants), certain features are needed before many individuals can live together harmoniously over the long term.

The flip side is that the larger the group, the more diverse — and extreme — the aggressive responses to outsiders can be. When considering the often-striking similarities between humans and social insects, one fascinating parallel is the existence of warfare in both.

The word war has been used, I think imprudently, to describe all kinds of conflicts among animals and early humans. Those might include raids or other small or one-sided attacks, but what interests me most is the emergence of conflicts we generally have in mind when we think of a war, which I defined in a 2011 article for Scientific American as "the concentrated engagement of group against group in which both sides risk wholesale destruction." How do such wars arise?

A party of chimpanzees creeping into another's territory to slaughter a single chimp — their normal modus operandi when attacking outsiders — isn't really war. Similarly, small ant societies rarely take big risks. Costa Rica's *Acanthogonathus* trap jaw ant, for example, has colonies with only a few dozen individuals that nest in a twig rotted out down the center. With a home that requires so little effort to maintain, conflicts with neighbors are resolved by flight rather than violence: A colony composed of just a few ants can pull up stakes and hike to the next twig at a moment's notice.

The same was true for hunter-gatherers living, as our ancestors usually did, in small bands. They had few possessions and no permanent structures to protect; while massacres weren't beyond them, carrying one out would have yielded little and been foolhardy. When relations with neighboring groups went south, it was usually easier to relocate, or, if retribution was required, creep into the rival territory, kill one or two people, and sneak out — a chimpanzee-style raid.

The epic story and ultimate big history of how human society evolved from intimate chimp communities into the sprawling civilizations of a world-dominating species.

As human societies grew, so did the forms of aggression open to them, and their scale and intensity. On the island of New Guinea, tribes of several hundred traditionally engaged in occasional battle. When traveling through the highlands 25 years ago, I barely missed such an event. In the initial phase of war, the sides would face off at a distance to throw spears or shoot bow-and-arrows toward enemy lines, with the targets largely protected by wooden shields. Fights were more symbolic than dangerous, and deaths were few. While such events sometimes gave way to closer combat, they could also end without further escalation.

The biologists Bert Hölldobler and Edward O. Wilson have compared these New Guinea frays — called "nothing fights" by the Maring tribe — to the equally ritualized clashes between modest-sized colonies of honeypot ants, whose nests reach up to a few thousand individuals.

Honeypot ants feast on foraging termites. Should two colonies come across the same cluster of these plump prey, the ants gather at a tournament site where the workers from each colony circle each other while standing high on their legs. Generally, larger workers come from larger nests, and the size difference is an indicator of which team would win if the colonies fought each other. Once one group appears to be outsized, its workers retreat, and fast: The standoff only turns lethal if the big ants are able to track the small ones home.

There are other strategies that avoid full-scale war. An ant I recorded in Ecuador with colonies of similarly middling size respond to attacks from more powerful enemies by rolling pebbles over the nest entrance to seal it from assaults, a technique employed by the ancient Cappadocians of Turkey. When a worker of certain Borneo ant species contacts an enemy she blows up by squeezing her body so hard that the cuticle ruptures, spewing out a toxic yellow glue from an internal gland. The intruder dies before it has a chance to run home and report the location of the suicide bomber's nest.

In some cases, though, nothing fights and small-scale raids can lead to the eradication of an entire society if the engagements continue year after year until one side is killed off. This is true for chimpanzees: In the 1970s, Jane Goodall, working in Gombe Stream National Park, Tanzania, saw one community incrementally but brutally obliterate another.

All-out wars are almost always carried out by large societies — in our case using techniques refined over centuries dating back before the Roman Empire. No other vertebrate regularly conducts aggressive operations that can endanger their society in this way — but some social insects do. The population size at which both ant and human societies shift from low-risk raids and ritualized fights to full-bore warfare in my estimation is somewhere in the neighborhood of 10,000 to a few tens of thousands.

In most cases, aggression reaches epic levels in societies of hundreds of thousands or more. The wars between colonies of the Argentine ant, an invasive species that controls entire regions across southern California and other parts of the world, feature millions of casualties each week along borderlines that extend for miles near San Diego. Lacking guns and bombs, the ants use sheer numbers and muscle power to overwhelm their rivals, gathering around each enemy and pulling it apart.

One likely reason for the possibility of warfare in large societies, among both ants and humans, is simple economics. Big communities are more productive per capita: fewer resources are required to feed and house each individual. The outcome is a reserve labor force that can be quickly deployed as needed —in ants, typically as soldiers. Fortunately, our nations can make choices not open to insects by investing excess labor not just in armies but in a host of other areas, among them entertainment, the arts, and sciences.

Rather than hiding behind stones like Ecuadorian ants, people can also choose to develop alliances among societies of their kind, something ants find impossible. It’s in the pursuit of peace that the brainpower of humans shows our species at its most impressive.