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## No Time for Bullies: Baboons Retool Their Culture

By NATALIE ANGIER

Sometimes it takes the great Dustbuster of fate to clear the room of bullies and bad habits. Freak cyclones helped destroy Kublai Khan's brutal Mongolian empire, for example, while the Black Death of the 14th century capsized the medieval theocracy and gave the Renaissance a chance to shine.

Among a troop of savanna baboons in Kenya, a terrible outbreak of tuberculosis 20 years ago selectively killed off the biggest, nastiest and most despotic males, setting the stage for a social and behavioral transformation unlike any seen in this notoriously truculent primate.

In a study appearing today in the journal *PloS Biology* (online at [www.plosbiology.org](http://www.plosbiology.org)), researchers describe the drastic temperamental and tonal shift that occurred in a troop of 62 baboons when its most belligerent members vanished from the scene. The victims were all dominant adult males that had been strong and snarly enough to fight with a neighboring baboon troop over the spoils at a tourist lodge garbage dump, and were exposed there to meat tainted with bovine tuberculosis, which soon killed them. Left behind in the troop, designated the Forest Troop, were the 50 percent of males that had been too subordinate to try dump brawling, as well as all the females and their young. With that change in demographics came a cultural swing toward pacifism, a relaxing of the usually parlous baboon hierarchy, and a willingness to use affection and mutual grooming rather than threats, swipes and bites to foster a patriotic spirit.

Remarkably, the Forest Troop has maintained its genial style over two decades, even though the male survivors of the epidemic have since died or disappeared and been replaced by males from the outside. (As is the case for most primates, baboon females spend their lives in their natal home, while the males leave at puberty to seek their fortunes elsewhere.) The persistence of communal comity suggests that the resident baboons must somehow be instructing the immigrants in the unusual customs of the tribe.

"We don't yet understand the mechanism of transmittal," said Dr. Robert M. Sapolsky, a professor of biology and neurology at Stanford, "but the jerky new guys are obviously learning, 'We don't do things like that around here.'" Dr. Sapolsky wrote the report with his colleague and wife, Dr. Lisa J. Share.

Dr. Sapolsky, who is renowned for his study of the physiology of stress, said that the Forest Troop baboons probably felt as good as they acted. Hormone samples from the monkeys showed far less evidence of stress in even the lowest-ranking individuals, when contrasted with baboons living in more rancorous societies.

The researchers were able to compare the behavior and physiology of the contemporary Forest Troop primates to two control groups: a similar-size baboon congregation living nearby, called the Talek Troop, and the Forest Troop itself from 1979 through 1982, the era that might be called Before Alpha Die-off, or B.A.D.

"It's a really fine, thorough piece of work, with the sort of methodology and lucky data sets that you can only get from doing long-term field research," said Dr. Duane Quiatt, a primatologist at the University of Colorado at Denver and a co-author with Vernon Reynolds of the 1993 book "Primate

Behaviour: Information, Social Knowledge and the Evolution of Culture."

The new work vividly demonstrates that, Putumayo records notwithstanding, humans hold no patent on multiculturalism. As a growing body of research indicates, many social animals learn from one another and cultivate regional variants in skills, conventions and fashions. Some chimpanzees crack open their nuts with a stone hammer on a stone anvil; others prefer wood hammers on wood anvils. The chimpanzees of the Tai forest rain-dance; those of the Gombe tickle themselves. Dr. Jane Goodall reported a fad in one chimpanzee group: a young female started wiggling her hands, and before long, every teen chimp was doing likewise.

But in the baboon study, the culture being conveyed is less a specific behavior or skill than a global code of conduct. "You can more accurately describe it as the social ethos of group," said Dr. Andrew Whiten, a professor of evolutionary and developmental psychology at the University of St. Andrews in Scotland who has studied chimpanzee culture. "It's an attitude that's being transmitted."

The report also offers real-world proof of a principle first demonstrated in captive populations of monkeys: that with the right upbringing, diplomacy is infectious. Dr. Frans B. M. de Waal, the director of the Living Links Center at the Yerkes National Primate Research Center of Emory University in Atlanta, has shown that if the normally pugilistic rhesus monkeys are reared with the more conciliatory stump-tailed monkeys, the rhesus monkeys learn the value of tolerance, peacemaking and mutual hip-hugging.

Dr. de Waal, who wrote an essay to accompany the new baboon study, said in a telephone interview, "The good news for humans is that it looks like peaceful conditions, once established, can be maintained," he said.

"And if baboons can do it," he said, "why not us? The bad news is that you might have to first knock out all the most aggressive males to get there."

Jerkiness or worse certainly seems to be a job description for ordinary male baboons. The average young male, after wheedling his way into a new troop at around age 7, spends his prime years seeking to fang his way up the hierarchy; and once he's gained some status, he devotes many a leisure hour to whimsical displays of power at scant personal cost. He harasses and attacks females, which weigh half his hundred pounds and lack his thumb-thick canines, or he terrorizes the low-ranking males he knows cannot retaliate.

Dr. Barbara Smuts, a primatologist at the University of Michigan who wrote the 1985 book "Sex and Friendship in Baboons," said that the females in the troop she studied received a serious bite from a male annually, maybe losing a strip of flesh or part of an ear in the process. As they age and lose their strength, however, males may calm down and adopt a new approach to group living, affiliating with females so devotedly that they keep their reproductive opportunities going even as their ranking in the male hierarchy plunges.

For their part, female baboons, which live up to 25 years -- compared with the male's 18 -- inherit their rank in the gynocracy from their mothers and so spend less time fighting for dominance. They do, however, readily battle females from outside the fold, for they, not the males, are the keepers of turf and dynasty.

The new-fashioned Forest Troop is no United Nations, or even the average frat house. Its citizens remain highly aggressive and argumentative, and the males still obsess over hierarchy. "We're talking about baboons here," said Dr. Sapolsky.

What most distinguishes this congregation from others is that the males resist taking out their bad moods on females and underlings. When a dominant male wants to pick a fight, he finds someone his own size and rank. As a result, a greater percentage of male-male conflicts in the Forest Troop

occur between closely ranked individuals than is seen in the control populations, where the bullies seek easier pickings. Moreover, Forest Troop males of all ranks spend more time grooming and being groomed, and just generally huddling close to troop mates, than do their counterpart males in the study.

Interestingly, the male faces in the Forest Troop may have changed over time, but the relative numbers have not. Ever since the tuberculosis epidemic killed half the adult males, the ratio has remained skewed, with twice as many females as males. Yet the researchers have demonstrated that the troop's sexual complexion alone cannot explain its character. Examining other troops with a similar preponderance of females, the Stanford scientists saw no evidence of the Forest Troop's relative amity.

Dr. Sapolsky has no idea how long the good times will last. "I confess I'm rooting for the troop to stay like this forever, but I worry about how vulnerable they may be," he said. "All it would take is two or three jerky adolescent males entering at the same time to tilt the balance and destroy the culture."

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