Teaching Darwin Seriously

Addressing Evolution & Ethics

Douglas Allchin

BEHIND the scenes at a televised debate on teaching evolution, arch-creationist Duane Gish turned to arch-evolutionist Michael Ruse during a pause in make-up and asked how any self-respecting person could believe in a moral society if evolution were true. Gish's comment epitomized why many persons find evolution disturbing, if not downright objectionable. Ruse responded to Gish wisely, I believe. He neither dismissed the comment as religious balderdash, nor balked at addressing ethics as a topic outside the domain of science. Rather, he tackled the problem head on and assembled a book on what evolution might say about ethics. He announced his posture in his title, *Taking Darwin Seriously*. What might this portend for teaching science?

Gish, of course, was merely echoing the sentiments of Darwin's critics over a century ago. History can be an important guide here for the teacher of Darwinism (Eichman 1996). Why should our students be so different from others who first encountered Darwin's revolutionary (and often difficult) ideas? Not much has changed in a hundred years, I contend. Students still wonder: What warrants ethical behavior, if humans are merely accidental products of history? How could we ever even explain the presence of ethics in our society in an evolutionary view? How can we justify enforcing moral norms? Or must we accept a society "red in tooth in claw," as suggested by today's gang violence, ethnic warfare, and competitive economic rhetoric?

From this perspective, educators simply waste their time trying to teach evolution through fossils, the age of the Earth, the anatomical similarities between humans and other primates, or—worse—Hardy-Weinberg equations and population genetics. I think the approach of presenting the brute fact of evolution and expecting the rest to fall into place has proven itself admirably ineffective. We need to abandon it. Nor is it clear that merely understanding nature of science takes the edge off evolutionary "theory" (Nickels, Nelson & Beard 1996). We are ready, instead, to teach Darwin seriously. We need to accept Gish's implicit challenge and focus on what really matters: how evolution explains ethics.

Again, history can be a resource. Darwin certainly realized the problem that his scientific theory posed for the religious outlook of his day. In *Descent of Man* (1871), he boldly devoted an entire chapter to the problem of morality, and he later researched its important themes further. These offer the teacher the first clues: Darwin wanted to explain the "moral sense" as an inherited motivation, for example, and he asked how (behaviorally) we can perceive the emotional state of fellow humans so that we may respond empathetically to their suffering. Darwin was by all accounts a gentle, moral animal—hardly the aggressive Social Darwinist many take his theory to imply. In recent years, historians have progressed substantially in understanding how Darwin started developing an evolutionary psychology that would explain mind and behavior (e.g. Ghiselin 1969, Richards 1988). Biologists, too, have renewed their interest in addressing some of the evolutionary puzzles posed by morality that Darwin left unanswered (e.g. Stent 1978, see also below). All these provide a rich array of resources for teaching an evolutionary view of ethics today.

What Are Ethics, Biologically?

Biologically, ethics must be viewed first as a form of behavior. It is something that humans *do*. But what is it about this behavior that is important or that needs to be explained? Is it merely the behavior itself and its evolutionary context that might be explained genetically? Or is it the cognitive or motivational state associated with a large number of behaviors—something that deserves a primarily neural or psychological explanation? Or is it a distinctively social behavior that must be understood as emerging at the level of interacting organisms? Each view is associated with a different conception of ethics. No view, fortunately, commits us to the despair of moral relativism. Biology has something to say about each of them, but it is worth sorting out the questions, because the answers for one do not answer the others (see Sober & Wilson 1998). The first task, then, is to

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articulate how morality might be viewed or defined on three levels:

1. Behavioral
2. Motivational or intentional
3. Social or cultural.

First, ethics may be defined as certain behaviors or acts themselves. This view is commensurate with one major tradition in philosophy (consequentialism or utilitarianism) that views ethics in terms of concrete acts or consequences that either benefit or harm individuals (cause happiness or suffering). In this view, altruism is defined, for example, as an *act* that benefits one organism at the cost of the organism performing the act. Altruism, thus conceived, poses a particularly intriguing evolutionary puzzle. How can a behavior that increases another organism's fitness while decreasing one's own be favored by natural selection and persist in a population? Students readily recognize the apparent discrepancy between the "selfishness" inherent in the concept of natural selection and the "unselfishness" of altruism—and the conflict is one common reason why persons reject human evolution altogether.

Second, ethics might be construed in terms of "conscience." It is not *what* we do that counts, it is *why* we do it—and the *feelings*, *reasons* or *motivations* that we associate with our acts. This view parallels a second major tradition in philosophy (deontology) that emphasizes intent and moral choice rather than consequences alone. Feelings of guilt or remorse, for example, thus reveal our status as moral organisms because they show how we can appreciate and respond emotively to the meaning of our acts. Any given *act* cannot be declared moral or immoral until we understand the intent or motivation of the choice behind it. Consciousness is essential, and to understand ethics, we must draw heavily on psychology. Darwin was most interested in this aspect of morality, the impulse to help our fellow humans—or the *moral sense*, as he called it. In this view, ethical *behavior* results from ethical intentions, and ethical *societies* are the collective result of individuals, each acting ethically.

Third, ethics may be defined or conceptualized socially. That is, ethics might not best be viewed in terms of individual acts or choices, but rather as a *system* established by a *group* of organisms. This fits with the philosophical tradition that construes ethics in terms of an implicit social contract, a code of behavior for mutual interaction. Thus, the individual alone cannot judge the morality of his or her act or feeling; other organisms in the society must acknowledge it as such. Here, ethics is evidenced in a social system of justice involving rewards and punishments, for example. In this view, an individual's moral sense emerges primarily from socialization and education, not from an innate moral force. Conscience serves to regulate on an individual level behavior that is created and enforced on a social level (akin to Freud's notion of superego).

Note that these three conceptions of morality differ considerably in the ways that we might assess or justify ethical rules. We cannot necessarily regard ethics as an *organismal* trait that can be simply correlated with one or more genes and inherited. Especially given the three traditions in ethical philosophy, we must be wary of teaching reductionistic strategies (prevalent among many sociobiologists) that cast ethics as a simple biological trait, rather than as a potentially complex biological phenomenon with psychological or social foundations.

Which of these three conceptions best characterizes ethics? Philosophers do not agree. Perhaps all three are important in different ways. No matter. Biologists can explain the origin of ethics in each version. But for the student of the biology of ethics, teasing apart these interpretations and seeing their different implications and relationships is a first step.

How Did (Might) Ethics Evolve?

Theories about how ethics evolved differ based on what one wants to explain, as noted above. First, consider ethical behaviors by themselves. Why might an organism act ethically or "altruistically"? Darwin certainly perceived the problem of sterile individuals in insect societies who helped others in the community (*Origin* 1859, Ch. 7). In a passage now frequently debated, Darwin asked his readers to remember "that selection may be applied to the family, as well as to the individual" (p. 237). In suggesting that selection acted on whole lineages and not just on individuals, Darwin advanced a primitive version of the concept of kin selection. Most introductory texts now describe naked mole rats, Belding ground squirrels, or other examples. "Altruistic" behavior, viewed genetically, may actually be favored by natural selection in the long-term or in broader contexts.

Most textbook accounts of kin selection are incomplete in explaining human ethics, however. How did humans become "altruistic" towards non-kin? Evolutionary biologists and anthropologists offer several plausible scenarios. First, it may be that altruistic behaviors evolved originally in small kin groups and were already in place when larger, multifamily groups developed. A second hypothesis suggests that kin selection would favor altruistic behavior, even if others in the community benefited as well, so long as the primary beneficiaries included kin. Alarm calls warning of predators, for example, would benefit nearby kin, while also distributing the benefit beyond kin. (This might suggest, though, that while we could be altruistic towards others, we would be "more

altruistic" towards kin—a hypothesis well worth debating.) A third contributing factor may have been the inability to discriminate between kin and non-kin, resulting in the conferring of benefits to all members in a social group, not just kin. All these contexts suggest that a crude one gene-one behavior formula by itself may be grossly inadequate to describe the more diffusely organized case of humans.

Another striking case of "altruistic" behavior is the Florida scrub jay—an apparent exception to the rules of kin selection. Scrub jay offspring remain with their parents and help raise their younger siblings. While this might initially seem a candidate for kin selection, the helper offspring are reproductively mature and could potentially raise their own offspring (with twice their genetic component). The situation of "potential" reproduction is more complex, however. Woolfenden and Fitzpatrick (1978) have shown that territory is an important limiting factor for the scrub jays. Young males compete for territories and females compete for males with high quality territories. By ostensibly helping their parents, male offspring are able to bud off territory from their father. Female offspring, likewise, may be more selective in their choice of males. In each case, the "stay-at-home" strategy enhances individual fitness (however much it may also enhance sibling survival). The case shows students how they might interpret an apparently "unselfish" behavior as fundamentally "selfish" in nature. It also demonstrates that what we construe as "ethical" *behavior* is not *necessarily* self-sacrificing. It also suggests that focusing exclusively on behavioral acts is incomplete or fails to capture all of what we mean when we say something is ethical. To satisfy skeptical students, especially, an explanation must address ethics as conscious decision-making (Waller 1998).

A second biological approach to ethics focuses on moral *feelings*. Why do we feel moral impulses? Why are we motivated to perform acts that we describe as moral? More simply, perhaps, why do we have a conscience? This is a distinctively psychological phenomenon that sociobiological or genetic accounts cannot address fully. Darwin, though, considered empathy central in his own approach to morality. He was especially curious about how this feeling was triggered. Darwin recognized that organisms needed to be aware of the internal mental states of other organisms in order to respond to their needs, and he sought to understand how such emotions could be communicated unconsciously. In his 1872 *The Expression of the Emotions in Man and Animals*, he summarized studies on what we now call "body language" and how various muscles controlled human facial expressions, discussing their implications for moral response. Darwin speculated that such responses probably originated in caring for offspring, then spread to interacting with others in the species.

Do such feelings of empathy exist in other primate species? Apparently, yes. In 1964 Jules Masserman and his colleagues studied whether rhesus monkeys would forego food if they knew that by securing the food, another monkey would suffer an electric shock. In many cases monkeys prolonged their hunger rather than administer the painful stimulus. One monkey refrained from eating under such circumstances for 12 days. Extended investigation showed that:

1. Self-starvation was more likely in animals that themselves had experienced electroshock as subjects.
2. Sacrificial behavior was not biased towards members of higher dominance rank.
3. "Altruistic" behavior was stronger for cagemates (though not statistically significant).
4. Visual contact even without auditory cues was apparently sufficient to induce the response.

Much work remains in documenting the cognitive aspects of moral sentiment and judgment. Masserman's studies, however—along with other provocative ethological findings—strongly suggest that rudiments of such skills exist apart from and/or prior to a distinctly human existence (see especially de Waal 1996). Students are often markedly impressed by ostensive evidence for compassion in another species. As a discrepant event, it prompts many students to rethink morality as the feature that separates humans from nonhumans or that can give us a special status outside the "brutish," nonmoral world of animals.

Finally, biologists may approach ethics as a social phenomenon. Primatologist Hans Hummer, in particular, has underscored the role of rewards and/or sanctions in establishing an ethical system among many organisms (see Stent 1978). Individual behavior is thereby accountable to the group and may be reshaped accordingly. For many philosophers, this accountability is the essence of ethics. Accountability presupposes, of course, a social structure that can enforce sanctions. The very existence of ethics in humans may result naturally, then, from a preexisting society. An understanding of the origin of ethics may likewise rest on an appreciation of how a society itself can evolve and the sociological principles that govern it.

An engaging case of sanctions in a nonhuman society was discovered recently in a group of rhesus monkeys on Cayo Santiago, a small island off Puerto Rico. The monkeys forage as a group and individuals often call to others when they find food, leading others to share the food. The motivation and selective context for cheating by remaining silent is clear. Cheaters are occasionally caught, however. Hauser

(1992) reported that the cheaters which are detected receive more aggression (biting, hitting, chasing, rolling) than other members of the group. Silent females also eat significantly less food. "There are significant costs to withholding information," Hauser noted. "Such costs may constrain the frequency with which deception occurs in this and other populations."

These rhesus monkeys display a modest ethical system for maintaining honesty by keeping dishonesty in check. No one individual created the rule of cooperation. Nor, given the sporadic cheating attempts, would we expect an individual to cooperate freely without constraint. Nor can we suppose that the group reached its "consensus" through conscious deliberation ("mutual coercion, mutually agreed upon," in philosopher Garret Hardin's apt phrase). Nevertheless, the concerted action of many members of the group, each acting in his own self-interest, seems to have generated a system that dictates appropriate acts that each (other) individual monkey is "obliged" to follow. Reciprocal interaction means that all but the highest ranking members are held accountable.

The rhesus monkey group may model ethics in humans, though human societies are obviously much more complex. For example, humans demand reasoned justification from each other, articulated in a well developed language. They can also conceive and establish mutually beneficial relationships. Sophisticated collaboration can easily occur through conscious interaction. The ethics of honoring contracts or social agreements, though, may likewise depend on the ability to sanction violators, either individually or collectively. In this way, ethics might well be an inevitable consequence of our social organization, not an extraordinary trait that begs special evolutionary explanation. Society itself, not ethics alone, deserves evolutionary explanation—and this, too, is addressed in introductory texts.

What Justifies Ethics, Biologically?

A biological explanation of the origin of ethics, alone, cannot justify any specific moral principle. No study of the way nature *is* can tell us what we *ought* to do. Yet a good description might nonetheless help us understand *how* we justify such principles and thereby clarify ethical reflection and dialogue.

Adopting kin selection as an account of the evolution of ethics suggests that behavior is justified at a level far removed from the human scale of existence. Natural "selection" does reflect "choices." Survival and reproduction are its "values." Humans may well

question from their own perspective, however, why or whether survival (of a lineage) is itself an exclusive value. As organisms with complex brains, they have other frameworks of meaning that place *value* on specific features of human behavior, for example. Humans have no choice but to follow the values of natural selection; hence, the "ethics" of this realm are hardly a *human* ethics (see e.g. Paradis *et al.* 1989).

For some, perhaps, survival may seem an ultimate value. But natural selection acts locally, without foresight, based on the limiting factors of the immediate environment. Thus, survival in the past does not guarantee survival in the future. *Is* does not guarantee *ought*. Extinction *does* occur. The values of natural selection are, at best, contextual and circumstantial, not clearly permanent or universal.

An account of ethics in the cognitive dimension comes much closer to addressing commonplace notions of moral justification. A major unanswered (scientific) question is the degree to which moral judgment, motivation or conscience is innate versus learned. If indeed the choices are "hard-wired" in our brains, we might have to abandon the notion that they are justified "choices" at all, at least at the level of individual responsibility. The context for both individual blame and praise would dissolve—and dramatically alter our perceptions about moral rewards and sanctions. We do know, however, that human behavior is remarkably flexible and responsive, suggesting that *Homo sapiens* follows an "open" program of behavior: primarily learned, not instinctual. Assessments of moral responsibility would thus be closely linked to an individual's level of learning and intellectual maturity (for example, in a judicial system that distinguished between juveniles and adults). A psychological perspective on ethics invites us to consider motivation, reasoning, and justification in the context of learned versus innate behavior, and perhaps to reassess the role of moral education.

Finally, there is the view of ethics as a biosocial phenomenon. As noted in the case of the rhesus monkeys (above), justification may emerge as individual "interests" are expressed through collective interaction. In this view, individuals and their acts earn justification from their peers—perhaps from all those who have a personal stake in the outcome. We must view our behavior in the context of others—receiving their endorsement or avoiding their sanctions. The Golden Rule—adopted so widely as a fundamental moral principle—embodies well this concept of reciprocity. Here, the *system* for ethical warrant is clear, though it does not necessarily dictate *specific* moral rules.

The biosocial view of ethics places a burden on humans to interpret and discuss their values on a social level and to work towards consensus—no easy task. It does not leave us with simple answers about what moral principles to follow. Instead, it leaves us with challenges: to understand ourselves, to reason about our values and the consequences of our actions, and to listen to our fellow organisms about what is "right" and "wrong." Indeed, this very dialogue has engaged the community of moral philosophers and their fellow humans for centuries. And it is a dialogue whose conclusions continue to evolve and adapt as cultural environments themselves evolve.

Classroom Strategy & Results

In a recent college class for nonbiology majors, I adopted this strategy of emphasizing behavioral and moral aspects of human evolution, in lieu of anatomical and physiological aspects. This strategy was certainly well advised, given the initial views of the class. Roughly 90 percent of the class actively doubted the fact of human evolution. None found the anatomical relationships to other primates difficult to accept, however. *All* the students who objected to human evolution indicated that they did so based on issues surrounding behavior and morality. I certainly did not expect such uniformity of opinion, and I certainly invite other teachers to poll their own students to see if this response is widespread.

In the three weeks that followed, I focused on a series of topics, drawing mostly on material found in typical introductory college-level texts:

- The history of false distinctions between humans and other animals (tool-using animals, animal societies, infanticide in langurs, animal "art," etc.)
- Instinct versus learned behavior (from Darwin's studies on earthworms to insight learning in chimps, mating behaviors, imprinting, etc.)
- Animal "intelligence" and communication (sign language in primates, octopus problem-solving, honeybee "dances," etc.)
- The biological bases of sociality (family units, herding versus eusociality, etc.)
- The politics of reductionistic interpretations of behavior (e.g. Lewontin, Rose & Kamin, 1984—esp. Ch. 4).

Finally, I presented:

- Three major explanations for the evolution of ethics (discussed above).

I evaluated the effect of this series of lessons partly through a short essay question on a standard exam, asking students to give *one* of the three accounts of the evolution of ethics. The results were superficially quite disappointing. Only a fraction of the students had really mastered any single explanation. But in context this was not really outside the performance norm for the class. More importantly, I polled the class (again, informally) following the exam. At the end of the three-

week period, ***approximately 40 percent reported that they now found human evolution plausible; another 40 percent indicated that they were uncertain. Only 10 percent confidently dismissed the possibility of human evolution.***

Though these polls were informal, they revealed a dramatic shift in roughly 80 percent of the student views. The class population had shifted from roughly 10 percent comfortably supporting evolution to roughly 10 percent actively opposing it. That shift, I claim, was the result of teaching Darwinism seriously—that is, by addressing the most fundamental evolutionary issue for humans: the origin and nature of ethics and behavior.

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