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Letters

Scientists Can Ask 'Why' Questions

Dear Editor:

In a letter about teaching evolution in the May 1999 issue of the ABT, Alta Sivon Lahner stated: "We can ask questions of 'Why?' philosophically but not in science. We can ask questions [of] 'How?' scientifically." Although I do not disagree with the general theme of Lahner's letter, I do take issue with the notion that scientists cannot ask "Why?" questions. As a behavioral ecologist and evolutionary biologist, it is my job to ask "Why does organism X exhibit trait Y?" Our disagreement results from a misunderstanding that goes back decades: confusion about the levels of analysis. To quote from Sherman (1988, p. 616):

"In his 1961 paper, Mayr observed that life scientists conceptualize research questions in two ways: functional biologists study 'proximate' causality, and evolutionary biologists concentrate on 'ultimate' causes. . . Tinbergen (1963) suggested that each of these categories should be subdivided. Thus, proximate or 'how?' questions require investigations of both individual ontogeny (e.g. effects of age and experience) and physiological substrates, including neuronal, hormonal and biochemical mechanisms. Ultimate or 'why?' questions require understanding both evolutionary origins and current adaptive value. Answering the former entails unravelling the history of phenomena in geological time, while the latter involves comparing the fitness consequences of naturally occurring variants in ecological time. . . In summary, there are four different levels of analysis: evolutionary origins, functional consequences, ontogenetic processes, and mechanisms; the latter includes both cognitive processes and physiological processes. Every hypothesis in biology is subsumed within this framework; competition between alternatives appropriately occurs only within and not among levels (Mayr 1982, pp. 59-77). This means that there are multiple types of 'correct' answers to any question about causality. Which category of answer is most satisfactory or interesting is a matter of training and taste; debating the issue is usually fruitless."

As a behavioral ecologist, I have worked on differing levels of analysis. Why do some acorn woodpeckers forego breeding and assist their parents in raising additional young? Because they are a member of a clade predisposed to cooperative breeding? Because it increases the representation of their genes in the next generation? Because they have no breeding options of their own? Because they are hormonally primed to engage in such behavior and begging conspecific chicks on one's territory easily elicits provisioning behavior? All of these are legitimate answers to a "Why?" question.

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References

- Mayr, E. (1961). Cause and effect in biology. *Science*, 134, 1501-1506.
Mayr, E. (1982). *The Growth of Biological Thought*. Cambridge, MA: Harvard University Press.
Sherman, P.W. (1988). The levels of analysis. *Animal Behaviour*, 36, 616-619.
Tinbergen, N. (1963). On aims and methods of ethology. *Z. Tierpsychol*, 20, 410-433.

HSUS Seeks Participants for Life Science Education Project

Dear Editor:

Douglas Allchin's thoughtful guest editorial in a recent issue of *The American Biology Teacher* ("Close to Nature," October 1999, pp. 562-564) celebrates the virtues of meaningful field experiences in life science education. Allchin views "an aesthetic appreciation of nature and life

[as] integral" to the goal of fostering enthusiasm for biology. A simple field trip to an undisturbed desert habitat provided some of Allchin's most profound teaching experiences, and by his own estimation, "it is the basic values of long-term self-preservation and respect for life that support the biodiversity banner *morally*" [his emphasis].

Another, related goal of life science education is embodied in the following buzz-terms of our day: "learning by doing," "active learning," "inquiry-based learning," and "hands-on explorations." One need only look at the National Science Education Standards to see that expert opinion on learning science recommends these approaches.

An article in the October 1999 issue of *Scientific American* ("The False Crisis in Science Education," pp. 86–93) provides some fine examples of this in physics education. For example, a Canadian high school instructor lets his students choose their own curriculum for 90 percent of the course. If the topic is energy, he asks his students what they want to learn about it. Students soon realize that they need to know some basic facts and principles first, but they want to know them. In another class at the same school, students are posed a problem and asked to design and conduct an experiment to solve it (e.g. determining the velocity of a marble coming out of a slingshot). As one student remarks: "What I like is that we get the skills to get knowledge rather than having the knowledge force-fed to us."

Such an approach may sound disconcerting to many teachers who feel beholden to curriculum learning requirements. But what is it we really want to achieve in our classrooms: students who can regurgitate knowledge, or students who know how to acquire it and appreciate its relevance to their lives?

In the above principles—students nourished by a unifying respect for life, and learning in a dynamic, flexible, inquiry-driven environment—lie the elements of life science education at its best. Such an approach to teaching forms the basis of a series of curricular modules soon to be developed by The Humane Society of the United States. We are developing this project in consultation with biology teachers and other experts in curriculum development and life science education.

Any readers who might be interested in working with us on this project and/or field-testing some of the curriculum modules, or just wanting to be kept informed of its progress,

please contact me at jbalcombe@hsus.org (phone: 301-258-3046).

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Science & Values Questioned

Dear Editor:

In Douglas Allchin's Guest Editorial, "Close to Nature," in the October 1999 issue of *ABT*, Mr. Allchin seems to think that teaching values should not be part of science or biology because it confuses students. In fact, it seems his real concern is that controversial values or values that differ from his own may be taught by science educators.

If science teachers cannot, or will not, consider values in conjunction with science education, then one risks conveying that values are simply not important. Mr. Allchin notes that "dissection is (ironically, perhaps) effective in developing a deeper respect for life (as is the case with my students)." However, this is exactly the opposite of what many science teachers tell us when they choose not to teach by dissection, as they believe dissection conveys to students a profound lack of respect for life. It is out of respect for students' ethical beliefs, as well as concern for animals, that NAVS runs its Dissection Hotline and provides the free loan of alternatives for students and teachers.

How we learn is as important as what we learn.

Teaching involves more than having students memorize facts or procedures; they need to learn to analyze facts and come to their own conclusions regarding issues in the real world.

Another article in *ABT*, Adrian Morrison's "A Scientist at Work" in the September 1999 issue also elicits concern about science and values. While reading this article, I searched in vain for any justification as to why these cats and dogs were used so extensively and invasively in the REM research. As admitted in this article, the findings could not be extrapolated to humans. Did no one question the ethics of subjecting these animals to invasive research that resulted in no usable data?

Science teachers must take responsibility for encouraging students to think about the ethics of all aspects of science, including the use of animals in research and science education. It is only in this way that we will instill

values in these young adults so they may produce a more humane and yet still more progressive world, especially within the sciences themselves.

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Authors Respond

I am pleased that Ms. Cunniff agrees with me that science teachers should open discussion of values (Allchin 1999a, 1999b), especially on use of animals (Allchin 1991, 1993, 1996), and also teach critical thinking skills (Hagen, Allchin & Singer 1996). Why she portrays me as condemning these views, however, I cannot fathom.

I assume that Ms. Cunniff wants to respond to my invitation to discuss how one teaches "respect for life." Of particular note is the *question* I posed on whether, paradoxically, dissection may be one means to help develop an appreciation of life and, hence, respect for life. Of course, I do not refer to "search-and-destroy" dissections, appropriately condemned in NABT's position statement (supplemental clarification). I refer interested readers to my comments cited above. Unlike Ms. Cunniff, I do not prejudge the educational value of dissection in any particular setting. Concrete ethical judgments (rather than abstract guiding principles) are simply empty without context. That is, *I respect my colleagues in using their professional judgment*, always enhanced, I believe, by deeper reflection and dialogue—hence, my query.

I might also remind readers that teaching values does *not* mean instilling *particular* values, as Ms. Cunniff ultimately seems to endorse (for *her* values?). We do not respect students by telling them *what* specific ideologies to believe. Rather, teaching about values involves: (1) posing questions to students, (2) nurturing well reasoned justification, and (3) fostering mutual listening among alternative views (Allchin 1991, 1999a, 2000).

Finally, I leave it to readers to decide if Ms. Cunniff's remarks honor the principle—central to academic discourse—of *respect for persons*.

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