Natural History: Hobby or Science?

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I found the discussion in *Conservation Biology* (**10:** 923–927) interesting and was inspired by Reed Noss's editorial (1996*a*) on naturalists disappearing and being replaced by modeling and computer scientists. Living in a remote field station in the heart of the Venezuelan Llanos (perhaps because I am trying to become a naturalist), I am late for this discussion in which I think a point was not well attended. I was surprised to read how supporters of natural history acknowledged it as something "good," yet they did not give it the value of a science or stress the importance of it for conservation in places where biodiversity is unknown.

The disappearance of naturalists is especially troubling when we think about the lack of people studying natural history in places such as the tropics, where many animals and plants are known only by name, if at all. Noss (1996*b*) calls us to load our backpacks with field guides and keys and go out to learn about nature. This may be possible in North America and a few sites in the tropics where field guides and keys exist, but in most tropical places the lack of basic information makes field research harder to do. In conservation biology, knowledge of natural history is critical in that we need some basic information about the species we want to preserve.

Why are naturalists dying off? In a recent seminar I listened as two colleagues argued that Ph.D. dissertations could not be about natural history because it was not "hard science." (I had a difficult time trying to think of what "soft science" might be.) I wondered whether these days we would grant a Ph.D. to someone for work like that of Alexander von Humboldt. If work like that of Humboldt, or Archie Carr, or Dan Janzen is still needed in the tropics and places where the high diversity of species is both unknown and increasingly endangered, then who is going to do it if we do not acknowledge it as a science—Hikers and nature lovers with little scientific training and little commitment to objectivity? Who is going to provide the basic information to test models? What is the so-called hard science going to feed on? Testing models of sexual selection with fruit flies is possible because we know what they eat and how to breed them. The only way we can continue doing "hard science" is by learning basic information about the species we are going to test.

A good part of the difference between natural history and model testing is one of attitude. When we are trying to do field work with little time and money, with a tight schedule in which we need to fit a heavy field season and accomplish several goals and test several hypotheses at once, we have little time to sit and contemplate the whole picture. By learning from nature without the pretext of predicting it, a naturalist is in good position to detect and understand the epiphenomenas and emergent properties of the system that might go beyond a set of hypotheses being tested.

Natural history is both a solid science and exceedingly needed. If I see a frog eating a bug I know it is a fact—it happened. It is rock-hard knowledge and not dependent on premises or assumptions that can change its validity with new trends or new interpretations of the biological models. The number of eggs an iguana lays or the different twigs that a gnatcatcher uses to build its nest is first-hand information, we still need to collect if we are to have the information we need for conservation.

Bowen and Bass (1996) explain how trends in biology change. "A description of the herpetofauna of Florida" by Archie Carr was considered a dissertation in 1936, whereas in current times it would not be acceptable. Natural history teaches us about flora and fauna, and modeling and laboratory experimentation teach us about processes and systems. We have collected some natural history data and begun developing models and testing theories based on these data, but have we learned all that we need? Should we use the information collected from the few species we have studied to extrapolate to all the organisms yet unknown? In certain contexts someone could answer "yes" to this question, but in conservation biology "yes" is not an option. For those who are concerned about biodiversity, that awkward species that falls beyond the 95% confidence inter-

Paper submitted January 23, 1997; revised manuscript accepted February 24, 1997.

val might be the one that makes the difference. It is interesting how we can acknowledge the importance of diversity in the genetic make-up of a population for conservation, but we overlook the importance of diversity in the sources of scientific knowledge. The claim that we need only one way to do science is no better than the claim that we need to preserve only one type of forest or one ecosystem. We realize that a population with no genetic variability is doomed to extinction, yet we seem oblivious that science without diversity is equally doomed.

I do not deny the importance of modeling and computer work, but it should not replace natural history. The approaches are not mutually exclusive; they are actually very compatible. Model testing must be preceded by natural history, and conservation biology needs both of them. The growth of science should not be about replacing and discarding original sources of knowledge, but about adding new ones and orchestrating them wisely. Noss invites us to spend more time studying natural history; I further insist that natural history is a necessary, invaluable science, especially if we are to build solid management programs to conserve what diversity remains.

Literature Cited

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