

Good English, God's Nature: Science Education

What makes an educated scientist? Expert knowledge, including an understanding of experimental design and data analysis, is essential to being an innovative scientist and a leader in one's field, but it is only part of a scientist's education and may not even be the most important part. Paul Ehrlich and I have been fond of saying that research is not complete until it is published; communication skills are also essential to being a good scientist (Recher and Ehrlich 1999). However, communication is more than just being able to exchange ideas and information with colleagues sharing a common technical language; leaders among scientists communicate with a much wider audience, including the lay public (Recher and Ehrlich 1999, 2005). Being able to communicate with a wider audience requires different skills from those needed to speak with one's peers. Few scientists have these skills and the fault lies with the way scientists are educated and in the ways the scientific community has chosen to measure the quality of scientific endeavour (Recher 1992a,b, 1998, 2006).

I have been repeating this mantra ever since I arrived at the Zoology Department at Sydney University in 1967, but with no tangible progress. At the University of New England where I co-taught the 1st year unit in Natural Resources with Malcolm Jones from 1988 through 1993, we were able to instruct undergraduates in the basic skills of written and spoken communication, as well as in computing, experimental design, data analysis and how to use a library without in any way compromising their learning of the fundamentals of resource management and engineering. However, as soon as I took a sabbatical in 1994, the programme was terminated, despite its obvious success in improving the School's retention rate and student achievement in other subjects.

You really have to ask "why?". Why is there this deep-seated resistance within university science programmes to ensuring undergraduate and postgraduate students graduate with the communication skills they need to be leaders or even just to be able to express themselves clearly. To be professional. With those skills should go a desire to communicate with the lay public and to use the media to achieve this (Recher 1992a,b, 1998). It is not as if there are no role models: Tim Flannery, David Paton, Denis Saunders and Ian Low are scientists who regularly appear in the Australian media talking

with ordinary people about their science and how to protect the Australian environment for future generations. They are effective public speakers and most of us admire their efforts, but few of us seek to emulate them or to encourage our students to acquire the communication skills and confidence to bring science to the people. It is not difficult, but the failure to do so is a major reason why science and scientists lack the respect and understanding from the community needed to achieve good conservation outcomes.

For a decade now, Judy Recher has instructed postgraduate students variously at Edith Cowan, Curtin and Macquarie Universities in public speaking and seminar presentation. The results from a few weeks of intensive training are outstanding; listening to her students present seminars or papers at a conference is actually enjoyable. In the process, the students gain confidence and mature as scientists. They have the potential to become emissaries for the scientific and conservation community. Such programmes need to be a core component of undergraduate and postgraduate science education at all universities. But they are not and we witness the results daily whenever we read a newspaper or listen to a scientific presentation. Many government technical reports are written in such poor English that one doubts the accuracy of the data presented and the competence of the authors. There are plenty of Australian examples, but Jerry Jackson recently commented to me on the recovery plan of the Ivory-billed Woodpecker *Campephilus principalis* from the United States that "The recovery plan is incredibly poorly written with considerable repetition, factual errors, statements distorted to serve biased purposes, and very poor grammar."

As the recovery plan dealt with an emotionally and politically charged issue, the rediscovery or not of an extinct species, distortions, even errors, might be taken as inevitable, but why repetition and poor grammar. The answer is simple. Without even knowing the authors of the report, I can guess they are of the generation (generations now) never taught the basics of the English language, much less how to write and structure a report or paper. Worse, they were never taught that good English and correct spelling are important. I recall the words of two professors, one at The University of Sydney and the second at the University of New England, who derided my pleas that we teach

English to science students. The first explained patiently, if somewhat arrogantly, that, unlike America, Australian students received a sound education in English at high school. The second dismissed it (good English) as “not important”. Both were and are wrong. Correct use of English is important; it is the basis of effective communication and understanding. More than any other skill, it is what private industry expects from graduates in environmental and resource management. As an editor, I spend considerable hours inserting punctuation, correcting spelling and word choice, breaking up sentences run together with “however”, and deleting repetition and redundant words, all to make the words of the author mean what the author intends. These are not new problems with technical and popular writing.

English and oral communication are not the only subject areas where we fail our students. In the ecological and conservation sciences, we desert them by failing to provide them with an understanding of natural history and a compassion for other life forms, the foundations of the sciences in which we expect them to be leaders. Citing Wilcove and Eisner (2000), David Steadman (2006; pp. 518–9) wrote:

“The trend in science away from natural history and toward specialization and theory is out of control . . . Graduate students and upper-level undergraduates are funneled into theory-revising long before they know enough about nature to even evaluate whether what they’re trying to support or refute has any biological merit in the first place. Our academic infrastructure has created legions of young biologists who scoff at description even though they cannot describe a natural situation themselves. Their professors are to blame. . . . How ironic that biologists with increasingly specialized backgrounds are searching for universal truths.”

Having received my education in the 1950s and being given the opportunity to learn from

people who understood nature and valued natural history, I can only agree with Steadman. I do struggle with computers, and I detest the current preoccupation with statistical design and analysis, but I also recognize them as useful tools in the modern world. I would no more discourage a student from learning statistics than I would discourage him or her from learning the difference between a magpie and a currawong or from hugging a tree. I think we would all benefit if we aimed for a better balance in the use of our education dollars and once again expected science students to understand both Good English and God’s Nature, as well as becoming proficient in the latest version of SPSS.

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