Our second article is by William E. Magnusson, Coordinator of Ecological Research with the National Institute of Research of Amazonia, in Brazil. Dr. Magnusson has many years of experience in teaching scientific writing, and reports on an interesting and effective method for teaching students to communicate ecology in writing.—Ed.

HOW TO WRITE BACKWARDS

Lertzman (1995) presented many useful suggestions for writing papers and theses. Many of these appear to relate to form, but experienced writers will realize that most are intimately related to function. The paper summarized many interesting ideas that are to be found in how-to-write books, and as such may make them more accessible to beginning writers. However, in a decade of teaching scientific communication, I have found that even five pages of text, with a dozen grammatical suggestions, are too much for the beginner trying to punch out his/her first draft, especially if English is not his/her mother tongue. If the writer gets the content right, it is relatively easy to correct the draft for style using a text such as Lertzman's, or for a more experienced writer to indicate the flaws.

The following five simple rules have helped many inexperienced writers to get started, and have also helped more experienced writers, such as myself, to get out of a hopeless tangle of observations and inferences.

Rule 1: Write the conclusions to your paper. Even a large paper or thesis chapter will not have more than five or six substantial conclusions. Each conclusion must be succinct, and occupy one sentence and less than two lines. The conclusions as written here will not enter into the final work so they do not need modifiers such as "however" and "that is."

Rule 2: Write only the results necessary to make the conclusions you presented.

Rule 3: Write only the methods necessary to understand how these results were obtained.

Rule 4: Write the discussion, which should present only additional information (e.g., literature) that modifies, extends, confirms, or contradicts the conclusions based on your results.

Rule 5: Write the introduction, which will have only the minimum information necessary to present the questions to which the conclusions are the answers.

When you have this, the story is told. You can go over it for stylistic errors, such as those pointed out by Lertzman (1995). If your major professor requires that you include other things such as reviews of the literature about the species/ecosystem, speculations not based on your results, etc., put them in separate chapters, sections, or appendices. After the thesis defense, these can be thrown out and the rest sent off for publication. The process is direct, the student learning to write a thesis and publish at the same time. This avoids having to unlearn all the techniques acquired during the making of the thesis so that he/she can start to learn to be a researcher and publish.

Acknowledgments

I thank all my students who, when all else failed, adopted these rules and made their theses coherent.

Literature cited

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Our third article is by Bill Streever, University of Newcastle, New South Wales, Australia. You may remember that Dr. Streever authored an article in our September 1995 issue entitled "Ecology for liberal arts students." This time, Dr. Streever has clarified some of the basics of statistics most often used (and sometimes misused) in ecology courses. After reading this article, I'm sure many of us will want to contact Dr. Streever with some statistics questions related to our own teaching/research specialties.—Ed.

STATISTICS FOR ECOLOGY AND ENVIRONMENTAL SCIENCE STUDENTS

Ecologists are statistics junkies. The vast majority of articles in *Ecology, Ecological Applications,* and *Ecological Monographs* discuss methods and report results in a form assuming at least a basic understanding of statistical methods; *P* values, confidence intervals, and regression coefficients abound. Some articles concentrate solely on statistical methods, and in June 1993 *Ecology* published a special feature entitled "Statistical Methods: An Upgrade for Ecologists." Critical reading of Ecological Society of America journals requires a good working knowledge of statistics; for example, to fully understand all of the articles in the September 1995 issue of *Ecology,* readers need the ability to evaluate ANOVAs, Ryan's *Q* test, stepwise multiple regression, various nonparametric methods, Principle Components Analysis, and Canonical Discriminant Analysis. Despite the importance of statistics, instructors of undergraduate classes seldom integrate statistical methods with ecology or environmental science. Statistics training given through statistics departments focuses on numerical