

OTHER

Field Notes on Science and Nature

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Recently, one of my colleagues dropped by and asked me to look up some information from field research we'd done about twenty years ago. Should be straightforward, I thought. I dug out my field notebook and attempted to interpret my notes. That's when I realized that my note-taking wasn't as good as it should have been. Clearly, the notes made sense to me at the time, but decades later not so much. Yet field notes, just like specimen records, should be a permanent record of work done. And if I can't figure out what my own field notes mean, then how can they be useful to anyone else following up on the same project or field area after I am gone? How do you take field notes that remain comprehensible years later?

So I opened this book with great anticipation, interested to see how other field scientists take records. Some have clearly had the same difficulty: "Few things are more frustrating than not being able to understand your own notes from several seasons ago". Well, yes, I would agree! "Write so that the picture is clear for an external audience, and it will be clearer to you as well." So advise John Perrine and James Patton in their account of resurveying wildlife in areas of California originally studied by teams coordinated by Joseph Grinnell, director of the Museum of Vertebrate Zoology, in the early twentieth century. The notes taken at that time were so good that the modern teams were able to go back to the same sites to resample. Now that is good field recording!

Biologist Michael Canfield has gathered articles about field note taking by thirteen eminent scientists from different fields of bioscience, geoscience, and ecology. Besides Perrine and Patton, the contributors include George Schaller, Bernd Heinrich, Kenn Kaufman, Roger Kitching, Anna Behrensmeyer, Karen Kramer, Jonathan Kingdon, Jenny Keller, James Reveal, Piotr Naskrecki, and Erick Greene. There are many different styles of note-taking represented here, from narratives with sketches, to detailed drawings and sketch maps, to predefined forms to be filled in, to an entirely digital database. All these accomplish the same task: that of keeping an accurate (and understandable) record of what was seen, collected, or experienced in the field. It is interesting to see that there isn't a standard way to keep notes; each field scientist has developed their own

style, which is customized according to their research focus and field methods.

The book is fascinating to read and beautifully produced. Chapters are copiously illustrated. All include sample pages from notebooks or records, showing exactly how different observers approach recording field information. Often, notetaking techniques have evolved over the course of a lifetime or a career. Both Bernd Heinrich and Anna Behrensmeyer show examples of notes taken early in their career as comparisons with more recent notebooks. Behrensmeyer points out that an early field site drawing lacks a scale, something that would have been helpful when returning to the study later. Heinrich describes how he started taking field notes – records of plants and animals that he encountered while he was out running – when he was a child and young teenager. The lesson is clear. Note taking is a skill that develops over a lifetime, and the earlier it is started, the better.

Why keep a field notebook? A good question, to which Erick Greene and other contributors give cogent answers. Perrine and Patton describe field notes as "letters to the future". Many contributors maintain that a field notebook is not just for projects. Greene makes an eloquent case that a field notebook should be like an everyday journal – a place for recording observations and thoughts about the natural world. George Schaller shares that he keeps two notebooks: one to record his scientific observations, the second as a personal journal, "a daily record of impressions, ideas, concerns, and complaints".

Anthropologist Karen Kramer indicates that her personal field journal helped her "to maintain normalcy under circumstances that at the time seemed far removed from my cultural frame of reference". Greene emphasizes the value of notebooks as "an incredibly fertile incubator for your ideas and observations", noting that "one of the hardest parts of science is coming up with new questions". He describes an exercise in which he asked university students in an ecology class "to pick one 'thing' and observe it carefully over the entire semester". Many students were extremely resistant to doing this, although some became enthusiastic converts to field observation and note taking. I thought it was rather sad that students in university had not al-

ready been exposed to the discipline of note taking and field observation. There is clearly still a place for natural history clubs in developing these skills, as Roger Kitching acknowledges in his account of his childhood years in Hull, Yorkshire.

Sketching and drawing often supplement notetaking. In other cases, sketches are the main form of recording, as Jonathan Kingdon shows with sample pages of his observations on Caracal cat and guenon monkey behaviour. Kingdon is an immensely talented and justly famous wildlife artist, as well as a respected scientist. His pages are both beautiful and informative. Scientific illustrator Jenny Keller provides some hints on making accurate field sketches and recording colour. She works primarily on marine lifeforms. Colour records are especially important for these because specimens' colours can change dramatically and quickly when they are out of water or dead.

Besides a notebook, a camera is an essential piece of field equipment. Perrine and Patton show examples of "then and now" photographs, with images of Emerald Lake taken in 1924 and retaken in 2006. The comparison of vegetation composition and density is instructive to document landscape change. Their examples show why images are such an important part of field records. Beginning in the mid-1960s, Polaroid photography was a useful adjunct to field record keeping. Images could be annotated right in the field and taped into the notebook. Behrensmeyer shows several examples of this. Nowadays, digital photography is the norm, and images can be added to electronic records and annotated, as Naskrecki shows. His digital records also include sound recordings and sonograms of the katydids he studies, examples of the expanding data types that can now be captured and processed directly in the field. Digital imagery allows an instant assessment of record quality. This is a far cry from earlier times when there was much anxious waiting to get photographs or slides developed after returning from the field, hoping that they

would turn out well and provide good visual documentation.

An especially important aspect of fieldwork is knowing exactly where you are when you collect a specimen or record an observation. The field notes show different ways of documenting location. In 1961, botanist James Reveal recorded the location of a specimen of *Polygala* by using a legal land description, the familiar section-township-range system. In October 1975, he recorded another collecting location with reference to distance along a major highway from a specific junction. Today, most contributors mention using a Global Positioning System (GPS) unit to record location and elevation information. Both descriptive and instrumental locational data are valuable because they capture different aspects of location. GPS coordinates give a precise point on the landscape, whereas descriptive accounts usually tell you how to get there.

In his introduction, Canfield situates modern field notetaking in the tradition of great naturalists of the past, including Gilbert White, Henry David Thoreau, and Charles Darwin. Their field notes formed the basis for classic natural history works – *The Natural History of Selborne*, *Walden*, and *The Voyage of the Beagle*. The published accounts may be polished for literary effect but the field notes provide the straightforward record of what happened. Several contributors to this volume have also drawn on field notes for popular works. Notable among these are Schaller's *Stones of Silence*, Heinrich's *Winter World*, as well as many books by preface-writer Edward Wilson. Indeed, all contributors are accomplished writers as well as scientists, and their words are worth reading, re-reading, and savouring. With this well-chosen and thoughtful suite of essays, Canfield has achieved his objective "to encourage more rigorous and long-lasting documentation of our natural world".

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