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An Invitation for Engagement: Assigning and Assessing Field Notes to Promote Deeper Levels of Observation

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This paper explores current practices for teaching the discipline of keeping field notes within academic natural history courses. We investigate how journal projects can be structured to promote engagement with the natural world while emphasizing the importance of recording accurate and honest observations. Particular attention is paid herein to the assignment of field notes, and to the process of assessing the results of these assignments. Our discussion includes results from an informal survey of best practices among colleagues representing numerous natural history disciplines.

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Introduction

Describing, recording, and drawing field observations represent the first steps of field-based scientific inquiry and creativity. These observations fuel description (“what” questions), hypothesis testing (“why” and “how” questions), experimental design, and ultimately management decisions. A field journal, where notes on such observations are recorded, is the naturalist’s most important and least expensive tool that should be used daily. And a well-thought-out rubric for assessing field journals addresses and promotes this importance to students learning how to be field naturalists.

Here we use the term “field notes” and “field journal” as inclusive terms to describe the various forms of field recording. We differentiate this definition from the more exclusive field journal definition given by the Grinnell System (Herman 1986), which specifies a particular format for field journals.

Initially, field notes cultivate students’ attending to a landscape. Attending can range from lists of birds or plants, to personal reflections, to questions about what it is they are seeing. Field notes allow students to go beyond making passive observations, instead entering into an active, ongoing dialogue with the natural world

where they begin thinking about underlying processes. Field journals thus become an investigative tool, no less important than any other tool—a pH meter, a clinometer, a meter tape—that researchers use to gather data. We argue that field journals can be the most important tool for students because assigning such a journal casts students into an active role. With a book of blank pages to fill, each student becomes an author, and field courses gain depth when the journal becomes the place where good questions find a home.

An ancillary role field notes might play during the life of a course is to provide a place for play, for excitement, for awe, for experimentation. So much of what is taught in college courses is content-heavy, many students have had little opportunity for creativity and personal expression. Field journals, especially those with illustrations, can stimulate more inductive learning processes (Ainsworth et al. 2011). When students engage with drawing and sketching as part of their field notes, their attention to the natural world becomes transformative, moving beyond mere documentation. Within the meditative lines of a landscape drawing or a contour drawing of a plant, the marks on a page can move beyond a visual image to celebration. The science of ecology needs the joy of art. Students can name a moss, count a moss, and there is praise, but when they

draw a moss, it is not just their eyes, their mind, that know moss, it is also their hand, their arm, and their heart.

In this paper we will argue that while field notes should stress accurate documentation of the natural world, there is a place within a field journal for heartfelt expression as well. In positing this argument, we will examine various approaches to assigning and assessing field journals from throughout the field.

Assigning Field Notes

“Good field notes are the end result of developing a skill into an art, and the basis for learning those skills is a knowledge of fundamentals.” – Lehner 1998

A primary goal in assigning field notes is to help students realize that there are many ways to document and present natural history. In addition, educators hope to encourage the sentiment that natural history is a much needed and topical endeavor. Increasingly, colleagues fear that students situate natural history as an outdated practice of discovery. Requiring field notes allows each student to learn that natural history is a current and critical investigatory practice for understanding the natural world and for promoting conservation (Greene 2005, 2013).

Some field notes assignments are necessarily structured. For example, the Grinnell method (Herman 1986) of species accounts and journaling is used in many ecology classes and requires separate sections for species accounts, a catalog, and a journal. Each portion includes standardized guidelines. This method allows rigorous accounts of observations, and this in turn inspires observation as a part of systematic data collection where quantitative and qualitative data collection are an integrated system of discovery.

In field-based classes, one might assign readings that describe the value of field notes (e.g., Remsen 1977, Leslie and Roth 2003, Canfield 2011) but do not require students to follow strict guidelines. A lack of guidelines or more open field-notes assignment can be advantageous in facilitating creativity and journaling whereas relatively strict guidelines can promote rigor in ecological and behavioral observation.

We have encountered two major categories of field notes assignments. In the first category, instructors assign field notes to supplement a methods or survey course (e.g., mammalogy, herpetology, ecology). In many of these courses, there are strict guidelines for recording site information, weather, vegetation, species,

on so on. In our second category, field notes are instead a critically important component to the entire course. Field notes are kept daily and guidelines are relatively open. In this regard, field notes can range from journaling to narrative or descriptive data for later analysis. For students of ecology, we conceptualize “field” to mean a natural area that is objectively observed and described by an observer. The field is a place we return from having made observations and learned new information. These observations are systematically and quantitatively described with regard to data collection and then qualitatively and creatively (e.g., illustrations) described in field notes. Field journals can be used contextually for data collection, provide a space for anecdotes that may fuel new research questions, or as a diary for field time.

Therefore, field notes are an essential tool allowing first-hand engagement, integration, and reflection. Initially, students may not understand the range of possible activities that can be included in a field journal. They may feel constrained by strict rules they have learned in their English and Natural Sciences courses. They may wonder if there is room for creativity and self-expression. Are sketches important for students that fear assignments involving artistic talent? If they include a haiku at the bottom of a site map, will that lower the grade? Are there times when sentences are called for, or are bullet lists acceptable?

Like any assignment, the better the student understands the instructor’s criteria for grading the field journal, the more likely they will be able to meet those criteria. In addition, an instructor’s examples, published examples, or copies of previous students’ field notes can be excellent guidelines for the possibilities (e.g., Canfield 2011, Salomon and Rowell 2012). In the “Best Practices” section of this paper, we compile details from a selection of field notes assignments for undergraduates. Some assignments build on the Grinnell method and stress the importance of illustration while others emphasize writing style or interpretation. It is clear that these instructors value and encourage individual observation, creativity, and reflection in conjunction with scientific details.

Like all assignments, field notes activities require examples, explicit outcomes, and detailed guidelines that define the criteria for assessment and success. For the student, field notes provide novel creative choice. If the field journal assignment is open or unstructured, a student may choose to highlight lists and the fact they have learned to identify organisms. Another student may focus on illustration, while another may use the journal for reflection via prose or poetry. If the field

journal assignment is guided, the student will learn new skills about detailed recording. Species lists provide a new way of cataloging their own natural history experience. Illustration provides a new way of seeing. Reflection provides a new way of remembering.

Assessing Field Notes

As with any evaluation of student work, field journal assessment should support a teaching and learning practice in which students are given multiple opportunities to practice before the final evaluation (Bain 2004). For many students, the overt act of creation that is inherent in a field journal (all those blank pages to be filled in) can be intimidating. And given that natural history field journal assignments vary widely in their organization and expectations, even students who have kept a field journal before may have never “practiced” the type of work that is expected in a specific class. Assessment of field journals may be summative, where feedback is provided at the end of a course as an evaluation of learning and/or student performance, or formative, where feedback is provided throughout the course in support of student learning (Moss and Brookhart 2009). Low-stakes assessments (i.e., those contributing relatively little to students’ final grade) used early and frequently throughout a course contribute best to student learning.

Summative methods of assessing field journals vary from the subjective ranking of student work that can then be translated into grades (e.g., this field journal deserves an A, compared to this one that is B work) to the use of a simple scoring sheet (a table showing each dimension of an assignment, its relative worth, and the score a student received for each dimension) to more detailed assessment rubrics that include both the different dimensions and a verbal description of the different levels of assignment.

For example, in a field course that one of us (LB) co-teaches, a scoring guide (Table 1) has been regularly used in summative evaluations of field journals. But this scoring guide could also be developed further into a complete grading rubric that would provide more detailed feedback (Table 2). Well-established grading rubrics, while controversial in some arenas, have been lauded for their ability to provide timely and effective feedback that promotes student learning (Stevens and Levi 2004). Certainly our expectation is that specific feedback provided formatively will promote student learning.

Comprehensive rubrics also benefit instructors in that they are forced to articulate their expectations more

completely. Teacher clarity and explanation of intention are critical factors in student learning (Hattie 2009). The best assessments of field journals derive directly from the assignment itself. If the assignment specifies that sketches are mandatory, the assessment should include some means of evaluating sketches. Similarly, if the assignment recommends that observations be anchored in time, date, and weather conditions, the rubric should evaluate the consistency of these observations. There are multiple dimensions to completing any assignment, and the assessment should include the relative importance of the different contributions. Does completeness matter more than consistency? Do independent observations matter more than a rigorous transcription of the day’s events? Scoring guides provide a first estimate of the criteria used in field journal assessment, but numbers alone may be insufficient. Verbal descriptions of what constitutes “exemplary,” “competent,” or “developing” work for each criteria provide greater explanation for our students.

However, handing out a detailed assessment rubric doesn’t necessarily mean students will understand what all the words in a rubric mean in practice. One way to increase student understanding of both the individual criteria and the designated levels for each criteria in the rubric is to include students in the rubric design. Our example rubric (Table 2) was designed by course instructors reflecting on the relative importance of each dimension of student learning for a field journal assignment. Alternatively, the instructors could have collected examples of previous work varying in quality and then led their students in a rubric-building exercise based on examination of field journal entries completed in previous classes. Students gain both increased understanding and ownership of the assignment expectations if they help design the rubric (Moss and Brookhart 2009). Rubrics can also be designed for specific tasks, rather than for the entire field journal. If there are tasks in the field journal that are regularly repeated (e.g., lists of species, daily accounts, sketches), formative use of the same rubric would provide students with the information they need to improve from one assessment to the next.

However, even at their most sophisticated, rubrics can be impersonal. Based on personal experience, a short paragraph highlighting the strength and weaknesses of a journal can allow assessment to evolve from an arbitrary decision into a conversation with the student. Tovani (2011) argues that when educators engage students in conversation as people, the more willing students will be to engage with course content. This may be especially important, as field journals, especially those

based on students' personal observations, often become more than academic exercises. Field journals provide both a record of the natural world and the students' experience of that world, including the student's engagement with the natural world.

In assessing field journals, rubrics can work as roadmaps, providing direction for both student and instructor. Certainly, student anxiety about field journals and their eventual assessment may be calmed with a well-designed rubric. However, if the ultimate goal of field journals is to promote our students' engagement with the natural world, then assessment flexibility may matter. For instance, some students may engage deeply with drawing as a way of investigating the natural world, but may make minor errors in data-recording (e.g., specifics of time, place, weather). Faculty using the example scoring sheet in Table 1 noted deficiencies in data-recording but allowed strong evidence that a student was having fun or developing a habit of engagement with their journal to compensate for a reduced mark in data-recording.

Alternatively, if the primary role of the field journal is to collect systematic data, evidence of engagement may not compensate for other deficiencies. If the field journal is viewed as a tool that students are learning to use, then it may be more appropriate to devalue (or not include at all) early entries when students are just learning to use the tool in the students' final grade. Ultimately, it will be up to each instructor or team of instructors to articulate both the learning objective for field journals in their course and what role assessment flexibility could play in promoting that learning objective.

Best Practices

Field journals are more than a record of what has been observed; exemplary field notes guide the naturalist toward deeper levels of observation. Natural history comes alive on the pages because composition is part of the process of observing. Natural historians not only see through their binoculars, they see with their pencils as well. The composition process is where connections are ultimately made between organism, behavior, environment, and observer.

Too often, students new to natural history view it as a discipline where everything important has already been published in field guides; natural history therefore appears to be a process where the most important mental activity is memorization. Field notes can serve as a corrective to this attitude, especially when students are encouraged to observe behaviors, traits, and patterns

that are not mentioned in published sources. These can be relatively simple observations, such as recording that on a windy day Great Blue Herons were observed hunting on the leeward side of rocky points rather than the windward side.

Where natural history becomes exciting is the moment when patterns are noticed, and it becomes possible to speculate as to why they exist. For example, a student might infer that since the Great Blue Heron is a visual hunter, greater success is probable while hunting in less-disturbed water. The field journal can become an ideal venue for such speculation, providing the initial observations are sound, and go beyond rote repetition of material from field guides.

Our survey entailed a communiqué sent out to members of the Natural History Network (naturalthistorynetwork.org) where members were encouraged to send assignments and/or rubrics they currently use in their natural history courses. This informal survey surfaced a divergent variety of approaches, typified by the selections summarized below:

Thomas Fleischner of Prescott College advises students to seek a balance between biological detail and landscape-scale ecological description, noting that the beginner's instinct is commonly to focus on details pertinent to species identification while ignoring the larger patterns. He also counsels that speculation is appropriate in field journals.

Ashton Nichols of Dickenson College, who assigns a field journal for a "Writing about Natural History" class, encourages students to copy "commonplace" passages from authors such as Thoreau, Wordsworth, and Dillard into their journals, pointing out that writing is a social and cultural practice. Although the field journal assignment has no length requirement, he stipulates that "it must, however, be complete."

Jeff Antonelis-Lapp of Evergreen College assigns three distinct-but-related projects during his field classes: a small field notebook (recommending a "Rite in the Rain" type for the Pacific Northwest), a natural history journal where field notes are rewritten in prose form at the end of the day, and species accounts, which are recorded in a separate section of the natural history journal. He insists that entries in the natural history journal are made on the same day that they were noted in the field notebook so that they will be more robust.

Trileigh Tucker of Seattle University requires students to include an "Interpretations" section (250-500 words)

in their natural history journals at the end of every week during her course. She describes this as a place for thinking about observations and considering what may have given rise to the phenomena that were observed during the week. She points out that beginning naturalists often find it difficult to distinguish between observations and interpretations, and she provides structured experience for students to learn how to separate characteristics of the natural world from their conceptions about it.

Virginia Matzek of Santa Clara University, who teaches in a truncated quarter system, suggests for lower-division classes that students combine their lab and field notebooks. She emphasizes contemporaneity (no filling in dated entries after the fact) and accuracy (no neatening up messy data or copying someone else's observations.) She wants the notes to record only what was observed that day, "warts and all."

Tim Parker of Whitman College requires drawings as part of specimen descriptions and suggests that drawings be augmented with written notes. He wants students to focus on details from their direct observations and counsels, "Do not draw what you think you should see; draw what you actually see." He admonishes, further, that students are never to copy from field guides, since drawing from life not only forces close observation of an organism, but provides a record of the specimen as well.

John Anderson from College of the Atlantic tells students that Rule One is, "Write for your great granddaughter, who has found your journal in the attic and wants to see if she can duplicate your observations." He notes the importance of setting an example himself by taking notes in the field, and observes that course leaders need to create space for note-taking to occur in the field by setting a time when journaling happens.

Regardless of the diversity of approaches, two clear values seem to be embraced by those who teach natural history at the collegiate level: first, that notes, drawings, and recorded data should result exclusively from direct observations, and second that immediacy plays a role in recording observations. The greater the time lapse between observation and noting the observations, the less value the field notes have.

While perusing the assignments of our colleagues, we noted degrees of flexibility that we had not anticipated finding. Gone are the days where there was only one right way to compose a field journal, even for a specific class project. While greater levels of freedom seem to be encouraged than in the past, ecological

contextualization seems to be a stronger value than ever. The importance of anchoring observations in time, date, conditions, and habitat seems to be of universal value among those who teach natural history at a collegiate level.

A few correspondents mentioned the benefit of instructors opening up their field books for students to examine, especially if the instructor is actively conducting research. We have all learned from senior colleagues who have allowed us a peek into their own field notes, not necessarily to serve as a model, but more as an opportunity to experience different ways of recording observations. Some of us have met with success inviting colleagues into our classrooms to "show and tell" their methods of keeping a journal, and students respond to such sessions eagerly, especially if they are able to page through old, treasured notes. It was also mentioned that encouraging students to share entries from their own journals is valuable, especially if done in non-threatening ways such as inviting them to share the sketch they like best or notes about something that surprised them in the field.

Legibility can be one of the great bugaboos for those who assess field notes, and we found it referenced in both assignments and rubrics. One of our correspondents expressed the concern that the promotion of "old skills like cursive" contribute to students sometimes seeing natural history as "old school," especially given the critical role that hand-held PDA's play currently in field science. Certainly, consideration of new technologies that may supplant traditional pen and ink is an ongoing concern for those who engage younger naturalists in field studies. At the same time, many colleagues find it beneficial to set standards for neatness and legibility.

Conclusion

Field journals serve as a natural history reference. Time after time, those who begin working as natural history guides find their early notes from field courses to be an incredible asset for future teaching, research, and work as a naturalist. In response to the student question, "What do I have to write down in my field journal?", the best answer might be—"Everything that you think might be important if you were leading a group here in 10 years."

Comprehensive assignments and detailed rubrics can be a trail map to calm student anxiety, but the most thoughtful and committed instructors will always be attentive to the style of their students' travels. While honesty and accuracy are tantamount to the practice of

natural history (Fleishner 2005), it becomes equally important that natural history courses foster habits of engagement. Teaching a student how to keep field notes becomes more than just a course outcome, but rather it becomes an invitation to engage in a lifetime of observing natural history.

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Table 1. Scoring guide used to assess field journals in a course co-instructed by one of us (LB).

	Marks Possible	Marks Given
1. Includes and identifies observations, analysis and interpretation	5	
2. Identifies source of the above information	1	
3. Will the journal be useful as a natural history reference?	5	
• Organization (titles/labels)		
• Consistency		
• Format (minimum data for each entry, Latin names underlined, etc.)		
4. Includes both verbal and visual descriptions.	2	
5. Overall aesthetic	2	

Table 2. Potential rubric that could be used in a similar course.

		Scale		
		Marks Possible	Exemplary	Competent
1. Includes and identifies observations, analysis and interpretation	5	Notebook contains continuous, detailed, independent observations of the natural world that support rigorous analysis and sophisticated interpretation. Text clearly separates observation from analysis and interpretation.	Notebook contains infrequent independent observations; analysis and/or interpretations present but not detailed.	Independent observations lacking; little analysis or interpretation of natural world present.
2. Identifies source of the above information	1	Clearly identifies source of information for all entries (visiting lecturers, reference books, independent observations).	Intermittently identifies source.	Rarely or never identifies source.
3. Will the journal be useful as a natural history reference?	5	Complete list of major taxa (birds, plants and other interesting natural history) detailed for each location visited. Behavior (phenology, interactions) also noted.	Most dominant taxa noted; few independent sightings or behavior of species not mentioned by instructor.	Species lists lacking or incomplete; no independent sightings of either new species or new behavior.
• Organization (titles/labels)		Clearly identifies location of observation, all pages numbered with a table of contents.	Organization generally clear, a few entries ambiguous or observations mislabeled.	Consistent lack of organization, missing page numbers or table of contents, few labels.
• Consistency		Uniform throughout journal.	Mostly consistent.	Not present.
• Format (minimum data for each entry, Latin names underlined, etc.)		Maintains high standard of formatting including minimum data for each entry throughout journal.	Inconsistent standard.	Format lacking.
4. Includes both verbal and visual descriptions.	2	Notebook includes ample examples of natural history phenomena recorded in BOTH visual and verbal descriptions. Drawings and diagrams	Many entries use only one form of recording.	One mode or another (visual or verbal) largely absent from notebook.

		used throughout journal.		
5. Overall aesthetic	2	Overall appearance of notebook engages reader and reflects considerable effort made by the student; lettering and other aspects of “page design” used attractively; drawings detailed and impassioned.	Notebook easy to read and engaging but no obvious sign of extra effort.	Minimal effort made to present notebook in engaging fashion.