



Virginia
Master
Naturalist



American Naturalists*

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The American Naturalists chapter will address the following curriculum objectives:

- Understand the history and current status of natural history as a discipline.
- Identify significant naturalists throughout American history and discuss their accomplishments.
- Describe the roles and contributions of early naturalists in Virginia.
- Describe the basic skills of a naturalist (e.g., observation, field journaling, species identification, sharing knowledge) and how to apply them in field studies.



Why Is Natural History Important?

Jared Diamond (2005), in his book, “Collapse: How Societies Choose to Fail or Succeed,” defines landscape amnesia as one of the primary mechanisms for the decline and ultimate collapse of societies. This phenomenon occurs when people lose knowledge of how the natural world once was, with each succeeding generation accepting a degraded environment as the status quo. Carried to its end, a society remains unconcerned until it reaches the point of no return.

Consider just one example from Virginia’s not-too-distant past. The American chestnut — once the defining species (biologically and economically) of our Blue Ridge, ridge, and valley regions — was destroyed by an introduced disease in the 1930s, arguably one of the greatest ecological disasters in Virginia’s forests. Two generations later, most children do not know such a tree existed and blindly accept a world without it.

Today, we are losing still another keystone species, the oyster, for which the Chesapeake Bay itself is named (“Chesapeake” is Algonquian for “great shellfish”). Will children in two generations even care? Natural history is important because society, especially its children, cannot afford to be unconcerned about the environment. Natural history is a way to share knowledge of how the world used to be.

Defining Natural History

In its earliest usage, natural history referred to the study of science in all its forms in order to differentiate it from

ecclesiastical or political history. By the 18th century, natural history became a scientific subject (Farber 2000). Today, natural history is a term that incorporates several scientific disciplines, mostly the study of living things but sometimes it includes meteorology, paleontology, and geology (Pyle 2001; Louv 2005).

Defining natural history can be a problem. The word “history,” as it applies in this use, has nothing to do with the past; instead it means “description.” Therefore, natural history is a description of natural systems. In earlier years, natural history was considered an analytical science (Schmidly 2005). In his book “The Nature of Natural History,” Marston Bates (1961, 7) defines natural history as “the study of life at the level of the individual — of what plants and animals do, how they react to each other and their environment, how they are organized into larger groupings like populations and communities.” It is the study of the whole organism rather than the parts, such as physiology, biochemistry, and genetics. It is the study of nature in its entirety.

For the purposes of the Virginia Master Naturalist Program, we will use the broadest of definitions: Natural history is the study of nature and natural systems as they have changed over time, as a prelude to understanding how these systems work today.

Definition of a Naturalist

In its early academic usage, “naturalist” was used to refer to a person committed to studying nature: mineral, vegetable, and animal. Later, naturalist was split into geologist, botanist, and zoologist.

*This chapter of the Virginia Master Naturalist Program training manual has been adapted from the original publication, “Natural History and Naturalist Skills,” by Amber L. Parker (2007).

Naturalist also referred to the many nonacademics who studied nature. They may be explorers, writers, teachers, or dedicated amateurs, but they are all drawn together by a passionate interest in nature and natural systems. A naturalist possesses a great knowledge of organismal ecology, behavior, systematics, distribution, and life history (Greene 2004). A naturalist uses knowledge to create ideas and hypotheses and develops intelligently designed research.

A Brief History of Natural History

Natural history is commonly considered the progenitor of all natural sciences. It is the oldest science in Western civilization, dating back to Aristotle's observations of animals. The term "natural history" was first seen in Pliny the Elder's masterwork, "Historia Naturalis" (Fleischner 2005). Looking back even further, indigenous people in Virginia and throughout the world, as well as other local groups dependent on an ability to understand the environment around them, have had natural history as a central part of their cultural traditions. This type of local knowledge is called "traditional ecological knowledge," and it may be passed down through oral or other nonwritten traditions (Huntington 2000). While this article focuses on Western naturalist traditions and methods, it is also important to acknowledge the wealth of expertise and skills that has existed in local, traditional cultures for thousands of years.

The 18th and 19th centuries and the beginning of British expansion saw natural history study become a formal, regulated discipline. After getting a start in Great Britain, natural history societies flourished across Europe as the British Empire began its exploration and colonization in tropical areas and as England continued its interest in the American colonies. By 1750, Carl Linnaeus developed his "Systema Naturae," a monumental step that influenced



the field of natural history by creating a common language and taxonomic system with which to communicate. Soon naturalists trained in the Linnaean taxonomy, such as the Bartrams, Nuttall, and Townsend, began their famous and intellectually profitable explorations (Farber 2000). The incredible natural history text, "Travels of William Bartram" (Bartram [1791] 1955), is an astonishing trip through the early landscapes of southeastern North America. His detailed descriptions of plants, animals, weather, people, and landscape are as fresh and exciting today as they must have been in his day.

Natural history in the 18th century (and earlier) was not left to the trained specialist. Many early leaders such as George Washington and Thomas Jefferson were avid naturalists, enjoying nature study as a commonplace part of the educated gentry's life (Bates 1961).

Colonists and explorers also provided important natural history accounts. For example, the French colonists Jean Ribault and Rene Laudonnière gave us detailed accounts of the Florida to North Carolina coastal landscape they encountered in the 1540s. At least four accounts of the Spanish expedition led by Hernando de Soto describe the vast interior landscape of the southeastern U.S., including the present states of Florida, Georgia, South and North Carolina, Tennessee, Alabama, Arkansas, and Louisiana. Captain John Smith and William Strachey gave us overlapping and detailed accounts of

the Chesapeake region at the time of Jamestown.

When Thomas Jefferson commissioned Meriwether Lewis and William Clark for their epic journey of discovery across the western United States, he gave them specific instructions for observing and recording the natural world. Although neither was trained as a botanist or zoologist, their observations and descriptions of hundreds of new and unknown plants and animals were devoured by a nation highly interested in natural history and fascinated by new information and ideas. Lewis and Clark's lack of formal training was mitigated by the fact that natural history was a regular part of early education, and most educated people had a working knowledge of its concepts and descriptive methods (Bergon 1989).

The 19th century saw natural history study become even more formalized as its various subjects were split into specific disciplines. Soon zoology, botany, ornithology, and biology were common courses offered by universities, and so began the trend toward specialization. Many of our well-known giants in the natural history field did their work during the 1800s. Asa Gray, John Muir, and, of course, Charles Darwin all represented different types of natural history study.

Perhaps the most influential 19th century naturalist in America was Jean Louis Rodolphe Agassiz, a Swiss zoologist and geologist who was responsible for the creation of the Museum of Natural History at Cambridge and authored the book "Natural History of the United States." His enthusiasm for the subject and his belief that nature study should not be gained from books but from field study and observation resulted in every prominent teacher of natural history in the second half of the 19th century either studying with him or with one of his pupils, thereby propagating his beliefs in firsthand field experiences (Pyle 2001).

Explorers and Naturalists of Virginia and the Southeast U.S.



No discussion of the efforts of early naturalists would be complete without mentioning some of the early explorers and naturalists in Virginia and surrounding areas. Although the list starts with the 16th century which provides the first written descriptions available, natural history begins much earlier!

Giovanni da Verrazzano – Italian explorer who described an expedition up the Atlantic coast from South Carolina to Rhode Island, including the Eastern Shore of Virginia (1524).

Hernando de Soto – Spanish explorer who led a four-year expedition through 10 states, from Florida to North Carolina, west to Tennessee, Alabama, and Arkansas, then south to the Gulf of Mexico (1539-1542).

The French in Florida – Jean Ribault and René Laudonnière first entered the St. John's River in Florida, then traveled north to present-day Port Royal and Paris Island, South Carolina (1562-1565).

Thomas Hariot – English astronomer who — as part of the Roanoke Colony — described the land and people of the Coastal Plain of Virginia and North Carolina (1584-1588).

Gabriel Archer – One leader of the Jamestown expedition who described the expedition's first voyage to the falls of the James River (1607).

John Smith – A Jamestown colony leader who published journals and maps of Virginia and the Chesapeake region (1608).

William Strachey – Colonist whose writings borrow from others but give a wonderful description of the Virginia flora, fauna, and native inhabitants (1612).

John Lederer – Explored the Virginia frontier (Western Piedmont and Blue Ridge) then traveled south into North Carolina; his maps describe large savannahs (1669-1670).

Thomas Batts and Robert Fallam – Explored Western Virginia all the way to the New River (1671).

John Banister – Recognized by some as Virginia's first university-trained naturalist, he collected seeds of North American plants that he sent back to England, along with descriptions and drawings of both flora and fauna (1678-1692).

Robert Beverley Jr. – Wrote "History and Present State of Virginia," which borrows from the Jamestown explorers and contains descriptions of Indian gardens, orchards, and "wild fruits of the country" (1705).

Mark Catesby – Lived in Virginia and traveled in eastern North America; his "Natural History of Carolina, Florida, and the Bahama Islands" contained large color illustrations of flora and fauna (1731-1743).

William Byrd – Landowner in the Dan River watershed of Virginia and North Carolina whose "Natural History of Virginia, or the Newly Discovered Eden" includes accounts of buffalo (1737).

John Clayton – Clerk of court in Gloucester County who collected plant material that was the basis of Linneaus' classification of plants and was eventually published as the "Flora Virginica" (1739-1742).

Thomas Jefferson – Wrote "Notes on the State of Virginia," containing an economic natural history (1781).

William Bartram – His book title says it all: "Travels Through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the Extensive Territories of the Muscogulges or Creek Confederacy, and the Country of the Chactaws" (1791).

John Fraser – Botanist who collected extensively in the southern Appalachians and introduced many American plants to Britain for the nursery trade (late 1700s).

E. Lucy Braun – Ecologist who spent a lifetime studying plant ecology and forests and published the definitive text, "Deciduous Forests of Eastern North America" (1950).

Annie Dillard – Wrote "Pilgrim at Tinker Creek," now considered a classic of 20th century nature writing, while living in the Roanoke Valley of Virginia. (1974).

The Victorian Era in the second half of the 19th century was also a time of great interest in nature, particularly collections of natural objects. Many comprehensive collections of every imaginable plant or animal were made during this time and exist today as the foundation of museum collections. The Victorians also promoted nature study as a healthy and wholesome occupation for women. Ladies were encouraged to take “healthful” nature walks and to sketch and write about their experiences (Bellanca 1997).

It should be noted that the Victorians employed many destructive collection methods, both for scientific and popular use, which depleted many populations of animal and plant species. We have learned much of what we shouldn’t do in the name of science from the consumptive collection methods of the Victorians.

The Nature Study Movement

The nature study movement began in 1896 when Liberty Hyde Bailey, a botanist and director of the New York State College of Agriculture at Cornell University, used extension funding to disseminate a series of nature study leaflets that encouraged teachers to use the environment as a natural classroom. Cornell even organized youth clubs, a precursor to 4-H clubs, to ensure their use.

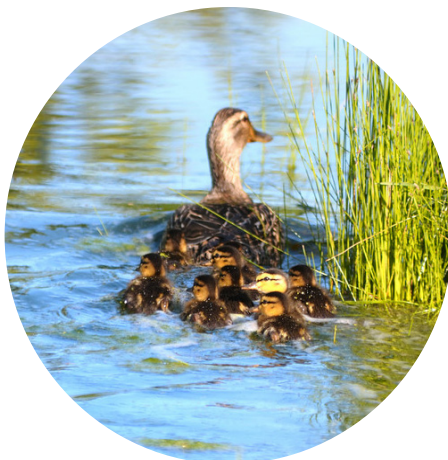
Anna Botsford Comstock succeeded Bailey as director and fully developed the nature study movement. This movement emphasized a direct appreciation of nature and its beauty instead of a more analytical study of the natural world. Comstock, the first female professor at Cornell, recognized a need for natural history education for all students. To correct this shortcoming, Comstock ([1911] 1967) published the “Handbook of Nature-Study” in 1911. This large volume is chock-full of lessons, photography, and appropriate readings. The creation of this study guide made nature study accessible across the country, and Comstock’s book became a common text in most American classrooms.

The Decline of Natural History Study

During this same time period, giants in nature writing such as Joseph Wood Krutch and Edwin Way Teale were publishing works to the great delight of the nation. Nature study societies such as the Audubon nature clubs were developed, and the public was captivated by nature. Natural history knowledge was considered an important part of primary, secondary, and university educations, and naturalists were well-respected members of university faculty (Pyle 2001).

The march away from nature study and toward the modern scientific process began as scientists saw the benefits of mathematical proofs, quantitative data, and statistical analysis in the natural sciences. Because traditional natural history study focused on observation and description, the experiential nature of natural history study made it difficult to duplicate observations (Pyle 2001).

In response to this trend, Marston Bates (1961, 7), in his book “The Nature of Natural History,” stated that although ecology is seen as “erudite and profound; while natural history is popular and superficial ... as far as I can see, both labels apply to just about the same package of goods.” Bates believed that both experimental and observational methods were important, and that all who study life science should have a solid foundation in natural history upon which they build mathematical models and theoretical thought.



Other natural historians rallied to create scientific rigor in natural history, one of the best examples being Joseph Grinnell, zoologist at the University of California-Berkeley. Grinnell, in an effort to make field studies and field observation as meticulous and detailed as possible, developed a standard for field note-taking that is used to this day. Commonly called the Grinnell Method, it emphasizes a rigid form of note-taking that included categories for weather, location, habitat type, observations, species lists, and other required entries that would assist naturalists in their field observations. It also benefits naturalists, who may read notes taken by another person to find their way to the original field location. These original field notes can be valuable in tracking the temporal distribution of species, determining climate change, or simply as a source of anecdotal information (Herman 1986).

The hammer stroke finally fell on natural history during and after World War II. The race to produce atomic weapons and, after that, to be the first in space, stressed the importance of mathematics, physics, and other nonbiological sciences. Biology moved from the field into the laboratory as new tools made cellular biology and microbiology more accessible. At the same time, the post-World War II flight from the country to the city and suburbs reduced a large percentage of the population’s daily contact with nature (Pyle 2001).

Although the study of natural history has been greatly diminished through the years, it is still practiced in a variety of ways by many people and organizations throughout Virginia. Professional and amateur Virginia naturalists can be found in colleges and universities, national and state parks, the Virginia Department of Conservation and Recreation’s Natural Heritage Program and other state agencies. The Virginia Museum of Natural History and other museums, nature centers, and informal educational

institutions employ enthusiastic naturalists. And, of course, the many natural history societies, associations, and professional organizations such as Virginia Native Plant Society, Virginia Ornithological Society, Virginia Herpetological Society, and the Virginia Natural History Society all offer resources and learning opportunities for growing and professional naturalists.

The Virginia Master Naturalist Program is doing its part to revive natural history study by sharing the knowledge and practice of naturalist skills through its many trained volunteers.

Naturalist Skills and Tools

While the notable naturalists discussed here varied in their interests and approaches, they had four basic skills in common: (1) observing, (2) identifying and recognizing flora and fauna, (3) documenting their observations, and (4) sharing their observations with others through engaging writing, art, and interpretation. Honing these skills is a lifetime's work.

1. Observational Skills

Good observation is built on a foundational knowledge of habitats, species, species behavior, and distribution. We see more because we understand more of what we are seeing. Therefore, observational skill goes hand in hand with the ability to use a variety of tools available to the naturalist. These include journals, field guides, identification keys, collection equipment, optics, etc. Understanding how we observe and the tools used in observation are the first part of a lifetime's journey as a naturalist.

Naturalists learn everything they know through patient observation and study. Therefore, naturalists must hone their observation skills in order to collect as much information as possible. How people observe can be different, depending on the individual; there are, however, some methods that work for everyone.

2. Species Identification

Knowing how to identify plants, animals, geologic formations, weather conditions, etc., is at the heart of natural history study. A naturalist is lost without this knowledge, which is only as good as the resource the naturalist is using. Due to the diversity of life in Virginia, it is difficult to have immediate knowledge of every species encountered. Therefore, the ability to use taxonomic keys, references, and field guides is very important. Virginia naturalists are lucky to have hundreds of years of natural history information gathered by their early naturalist counterparts and present-day observers at their disposal.

This information is organized in a variety of forms, such as field guides, identification or dichotomous keys, reference books, professional journals, and nature writings. Each type serves a particular purpose. Naturalists should take time to learn what each resource has to offer and practice using them so the skills are hard-wired for future use.

Field Guides

Field guides are books that are usually written about particular taxa in a specific region. They typically contain short descriptions of each species along with an illustration of the species and a range map. Guides that arrange illustrations, descriptions, and maps on the same page are particularly helpful. Some examples of field guides are the Peterson's, Golden, and Audubon guides. As their name implies, field guides are often used in the field and therefore must be small enough to fit into a backpack or back pocket.

Identification or Dichotomous Keys

An identification key is a tool used to identify a particular species. Printed keys found in books and field guides are usually dichotomous keys. As the name implies, a dichotomous key works by giving two (or sometimes more) choices at each



Naturalists should:

- Improve their patience in order to slow down and watch.
- Pay close attention to their surroundings: who, what, when, where, and how.
- Be aware of animal reactions, plant locations, interactions between individuals, and any causal effects of note.
- Use all available senses.
- Learn to recognize common patterns in nature as well as anomalies. Revisiting the same location over time will help develop this skill.
- Ask questions that can be answered through observation.
- Know themselves — what affects their concentration, what they are likely to overlook.
- Use available tools (journals, field guides, experts, etc.) to increase their knowledge and understanding.
- Be curious.
- Be ethical.

level. Choosing one alternative leads to the next level, narrowing the alternatives until the final choice leads to the species in question. Dichotomous keys can be fairly simple, such as those found in many field guides, and may only contain a few of the many species found in an area. Or they may be complex keys (often called taxonomic keys) that include all species for a group and require knowledge of specialized terminology or examination of characteristics not always available in the field.

The Web environment allows for different types of identification keys, such as multichotomous keys. Multichotomous keys work by the process of elimination by presenting many choices and asking the user to choose all the traits that apply to the organism at hand. The dendrology program at Virginia Tech offers both dichotomous and multichotomous tree keys on its website at <http://dendro.cnr.vt.edu/dendrology/ident.htm>.

Reference Books

Books that are either too large to take into the field or that contain copious amounts of information on a particular subject are often called reference books. One that is indispensable is your county soil survey, which in addition to soil descriptions, provides information on local climate, common trees, site indexes (growth potential) for trees, and wildlife habitat. "Flora of Virginia" is a comprehensive botanical reference for the state that was published in 2012. Another useful reference is "Life in the Chesapeake Bay: An Illustrated Guide to the Fishes, Invertebrates, Plants, Birds, and other Animals," by Lippson and Lippson. Many Master Naturalist chapters use "A Field Guide to Eastern Forests" by John C. Kricher (1998) as a text for their basic training course.

Websites



There are thousands of websites that provide natural history information, identification tools, access to experts, species accounts, maps, and more. Following is a small sampling.

- **Trees** – www.cnr.vt.edu/dendro/dendrology/main.htm
- **Fish** – www.cnr.vt.edu/efish/index.html
- **Geology of Virginia** – <http://web.wm.edu/geology/virginia/?svr=www>
- **Aquatic invertebrates** – www.dec.ny.gov/animals/35772.html
- **Butterflies and moths of North America** – www.butterfliesandmoths.org/
- **Birds of North America** – <http://bna.birds.cornell.edu/bna>
- **Animals** – <http://animaldiversity.ummz.umich.edu/site/index.html>
- **U.S. Department of Agriculture PLANTS Database** – <http://plants.usda.gov/>
- **Discover Life** – www.discoverlife.org/

Maps and Place Names

Maps and the place names they include are often overlooked as a source of natural history information. Place names often give a clue to historic landscapes and biota. For example, names that include the words "elk" and "buffalo" may indicate the historic presence of these species, along with the habitat (including grassland) they required for part of their life cycle. Likewise, the words "mulberry" or "plum" may indicate the historic presence of American Indian orchards.

3. Keeping a Journal

The journal is the traditional tool of a naturalist. It contains all the observations the naturalist makes and, therefore, serves not only as an observation record but also as a reference tool. Journals assist in the learning process, scientific study, and personal expression. A journal is a reflection of the author's interests and writing style. Therefore, it must suit the needs and goals of the author. Most journals include daily entries; in fact, "journal" is a derivation, through French, of the Latin word "diurnalis," meaning "of a day."

Often, journals kept for personal pleasure or interest contain more than just observations of the day. They could also include poetry, illustrations, and other creative elements. Some journals contain more illustrations than written observations. These are a delight to look at and are a great way to describe the natural world. If kept for research purposes (i.e., to document observations about a particular area, habitat, species, etc., for the purpose of scientific study), the journal is usually more formal and includes particular standard elements.

Why Keep a Field Journal?

Keeping a field journal is a way to codify the observations and revelations that arise from an outdoor field experience. Journals serve as a memory of natural history events, aid in observation, record behaviors and habits of flora and fauna, and document unusual sightings or rare species. They can make field observations empirical through the careful recording of events, or they can be a creative outlet, using creative writing and drawing to explore our connection and relationship with the natural world.

The human memory is a capricious thing. What may appear to be permanently etched in the mind is often easily forgotten. Memories of events can also change due to a variety of influences, including the observer's biases. Because of this, naturalists cannot trust themselves to remember events, measurements, or field markings with faithful accuracy. They must record observations at the moment they occur in order to consider them legitimate. This type of recordkeeping provides the opportunity to compare observations to ones made earlier, to consult field guides and other references, and to share these firsthand observations with colleagues. It also provides the opportunity to reflect on them at a later time, perhaps even drawing new conclusions about them.

Natural history study is based on this type of observation and attention to detail. Only through hours of patient watchfulness and proper recordkeeping can naturalists learn about and understand the behaviors of birds, the pollination of plants, or any of the myriad other actions and interactions of species. Field notes aid in field study by allowing the observer an immediate place in which to record observations while they are fresh and accurate.

Writing and sketching require observers to slow down and record all the actions or physical elements of a species or



community, thereby evoking the attention to detail necessary to their craft. Observers often find that they see details they might have missed — such as hairs on a plant stem or a particular wing movement — if they had not been required to look closely at the organism and record the information immediately.

The current collective knowledge of animals and plants is derived from hundreds of years of careful observations and journal-keeping by professional and amateur natural historians and their subsequent publication. Although they provide a basic and sometimes thorough understanding of many organisms, millions of new species are yet undiscovered, and there is more to be learned about even the most prosaic species. Good recordkeeping will give us further insight into the ecology of these species.

As new species are discovered, journals provide the important element of proof of sighting. Documenting sightings of new or rare species is critical to give veracity to the event. Being able to show a field record of a species' location, actions, and characteristics gives credibility to the sighting, particularly if the observer could not collect a voucher specimen. If a voucher specimen exists, then information about the collection location, conditions, collection method, and related events must accompany the specimen.

Many people, however, are not as interested in maintaining a journal to

record observations related to a scientific interest. Their purpose instead is to explore their relationship with the natural world, to derive pleasure from interactions with flora and fauna, and to develop knowledge of and a connection to nature through journaling. Their journals may not follow a regimented format but may include a variety of observations, poetry, drawings, and other creative methods of exploration. These journals — while not always relevant for scientific purposes — are useful to their creators and often inspirational to others. They are not lesser than formalized field journals but are different, vital ways to learn about nature.

Field Notebooks and Field Journals

There are two components to a field journal system: the field notebook and the field journal. Both are integral parts of good recordkeeping. The field notebook is the primary recording device. In it are written all observations as they occur, in chronological order. This information will later be entered in the field journal. The field notebook is an important companion of most field scientists and many amateur nature enthusiasts. Many use them as all-purpose recording devices and include their field notes as well as telephone numbers, meeting notes, and schedules.

The field notebook is typically small enough to fit in a pocket for ease of carrying. It is best not to use a larger notebook that must either be carried by hand — which can be cumbersome when needing quick access to binoculars — or in a backpack. An inexpensive, 3-inch by 5-inch flip-top notepad is adequate.

A pencil is the only implement that should be used to write in the notebook. Unlike ink, pencil markings will not run when wet, and pencils can be used to write on waterlogged paper. Pencils are also excellent drawing tools and can be used to create renderings of specimens for later identification.

The field journal is the permanent record of all field observations, research, and collections. In it, all the notes from the field notebook, along with ideas derived from those observations, are organized. The field journal is traditionally kept in a loose-leaf notebook with sections for daily observations, species records, and collection inventories (if applicable); however, some people keep their journal in bound blank books, composition notebooks, and even computer files. Whatever format meets the needs of the user is appropriate.

Field journals are traditionally kept on an annual basis with a fresh, new journal started at the beginning of each year. They are kept at home or, on longer field expeditions, at the camp or hotel room. As the permanent record of the field experience, they should be kept in good condition and never exposed to the rain, mud, and coffee stains that often mark the field notebook.

Joseph Grinnell, former curator of the University of California Museum of Vertebrate Zoology, cautioned his students to write their field observations as soon as the day was done and before supper was taken. He believed that keeping a field journal required a certain level of discipline and that that discipline would be beneficial in other parts of the naturalist's life.



Elements of a Field Journal: Seven Essential Entries

There are certain elements that should be included with each journal entry. These seven elements ensure records that are useful seven days or seven years from the time of entry.

Date – The first element of each journal entry should be the date and time of day. This allows the recorder to track phenological events, can be consulted when planning trips to see the same events, and can even be used to track changes in weather patterns. Without a date, the journal entry loses a great deal of its usefulness.

Location and route – The location and route of any trip should be as specific as possible. It should include the state, county or parish, nearest town or area (park, national forest, etc.), and the particular trail or natural area. It is important to be as specific as possible, including GPS coordinates and landmarks, in case someone wants to return to this area for future study. A good location description includes the distance and direction from a fixed point (e.g., 100 feet north on the Appalachian Trail after the trail crosses Highway 56 in Nelson County, Virginia).

Weather – Meteorological elements, such as temperature, precipitation, wind speed, and cloud cover, can dramatically affect the day's observations. A cool, cloudy day will yield few dragonflies and butterflies; a rainy night will increase salamander sightings. Certainly, weather can affect collection methods and capture numbers. Recent past weather (e.g., it may be sunny today but perhaps a hurricane blew through yesterday) should also be recorded because it is important to understand what is being observed, and weather influences that.

Habitats – Any information that can be recorded about the plant community, forest type, geology, soils, and water sources of the area is important. A drawing of the site may be useful.

Vegetation – The dominant plant species in each forest layer, as well as any vegetative phenological events (what's blooming, what's in fruit, etc.), should be described. This information, along with the habitat description, can be used to paint a picture of the location that immediately gives an impression of the site.

General commentary – All other observations, information about the trip, a list of trip companions, descriptions of unusual activity, collecting methods, etc., are included in this section. The trip's events should be recorded in descriptive prose.

Observations – Descriptions of observations and species lists generally make up most of the journal entry. Describing an organism for later identification requires a thorough description of all the basic diagnostic characters needed to use the key for that taxonomic group, including notations for photographs that were taken. Species should be listed by major taxonomic groups — plants, mammals, herpetofauna, insects, etc. — and should include scientific names, if possible. Using scientific names in this manner is the best way to learn them.

The Nature Journal

The nature journal is in some ways similar and in others very different from the formal field journal just discussed. Often, the nature journal is a personal creation that embodies an individual's interests in a creative and artistic way. The nature journal is creative, lacks the structure of the field journal, and combines several methods and media such as drawing and sketching, painting, and creative writing. Certainly it can contain many of the elements of a field journal, but the main difference is the ability of the writer to explore nature through a variety of methods.

Because it is so tied to the interests and skills of the journal writer, the nature journal may often display a mix of creative and formal styles. It may include scientific and aesthetic observation. At times, its writing may be creative and at others quite technical in nature. It may contain ideas developed through perception and others through analysis. The layout and presentation of ideas and observations is left up to the writer or artist and follows no set guidelines. The nature journal may offer opportunities for meditation and personal healing, for reflection, and for focus on a subject. Often it is a way for observers to find their own voice and to find new ways to explore nature.

Teaching Nature Journaling

The nature journal is a reflection of the author; therefore, there is not one right way to keep a nature journal. There is no particular format that must be maintained and no proper method to follow. This makes it difficult to say what a nature journal should include and how to keep one. The fact that the nature journal is so tied to the abilities and interests of the author makes keeping a nature journal universally appealing. It is the best format to use when leading a general audience of adults or children.

Through the use of nature journals, students find their own voice or method



of expression, whether through creative writing, drawing, or math and science. The student may create a poem or short story, draw, or make a leaf rubbing, or they may be interested in phenological events or meteorology. Any and all of these methods assist the students in their goals, which may be to better understand natural systems, their relationship with those systems, or themselves. Even though the nature journal is such an individual project, the teacher can make suggestions for types of entries, teach drawing techniques, demonstrate descriptive writing, and illustrate a number of other techniques that may be employed by the journal keepers to increase their observation skills and enjoyment.

In many ways, nature journaling classes for adults and children are very similar. Both types would include introductory warm-up activities such as blind contour drawing, flow of consciousness writing, and descriptive writing exercises. They would discuss equipment and ways it can be used. They would also include numerous, often progressively longer journaling excursions into the surrounding natural areas.

The differences between child and adult classes mostly involve time elements and activity levels (i.e., the time length of each exercise and the amount of walking and active play between each intense journaling exercise). Obviously, children need a bit more activity and shorter quiet periods. Adults often need more

encouragement than children, particularly regarding drawing and creative writing.

To describe the many different nature journaling exercises and topics would require an entire book, and, in fact, many fine books on this subject already exist. Some wonderful examples include those by authors Clare Walker Leslie ("Nature Drawing: A Tool for Learning"), Hannah Hinchman ("A Trail Through Leaves: The Journal as a Path to Place"), and Cathy Johnson ("The Sierra Club Guide to Sketching in Nature") and lead the way to nature journaling. Their books are wonderful resources, serving as demonstrations of technique and including beautiful, inspirational work. The Recommended Resources section that follows includes additional books and articles that will inspire and educate.

For some, keeping a journal is a way to develop observation skills and obtain data for biological study; for others, a journal allows them to explore nature and find a connection with plants and animals. Authors must choose the way of journal-keeping that best meets their goals from the many different ways available. It might be a strict method that produces standardized entries that are understood and used by field biologists and serious naturalists. It could be a modification of this method, something that contains the essential parts but allows the writer more latitude. Or, it could be a completely unique style that exhibits the creativity of the author. Whatever method used, the journal writer benefits from the direct observation and attention to detail that a journal encourages.

Through the journaling process, writers learn about their surroundings and may provide information that future readers find helpful as they continue to learn from the natural areas that surround them. Whether as a field journal or a naturalist's journal, a daily record of natural history events is the most beneficial way to explore and learn in the outdoors.

4. Sharing Knowledge

Sharing knowledge gained through natural history study is an essential part of the naturalist's job and an integrated component of the Virginia Master Naturalist Program. This creates a method for making teachers out of students and increasing the naturalist tradition exponentially. Sharing knowledge can be done in a variety of ways, including writing, Web pages, speaking engagements, classroom teaching, field workshops, volunteering for nature or environmental education centers, etc. As a naturalist, it is important to develop methods of sharing knowledge in order to continue the tradition of nature study. The Virginia Master Naturalist Program will assist in that endeavor.

Glossary

Field journal – The permanent record of all field observations, research, and collections.

Field notebook – The primary recording device. In it are written all the observations as they occur, in chronological order. This information will later be entered in the field journal.

Natural history – The study of nature, its components (living and nonliving), and how they interact to each other and their environment.

Naturalist – One who studies natural history.

Nature journal – A creative journal focusing on nature study that lacks the structure of the field journal. A nature journal combines several methods and media such as drawing and sketching, painting, and creative writing.

Recommended Resources

Naturalists are fortunate to have many wonderful natural history resources at their fingertips. From the Peterson Field Guide series to the wide variety of Virginia-specific natural history books, there are more resources than most can read in a lifetime. Beginning a collection of helpful field guides and references for the home library is one of the best ways to grow as a naturalist.

Because there is such a large amount of literature available, the following recommended resources focus specifically on the subjects covered in this article. It includes books, popular press articles, and journal articles that will help expand your understanding of the naturalist tradition and the tools of a naturalist.

Bates, M. 1961. *The Nature of Natural History*. 2nd ed. New York: Charles Scribner's Sons.

Bergon, F. 1989. *The Journals of Lewis and Clark*. 1st ed. New York: Penguin.

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Study and Review Questions

1. What is natural history?
2. Name three naturalists who have contributed to describing the natural history of Virginia.
3. What is a naturalist's most important skill?
4. What are some of the causes of the decline of natural history study in universities and primary education?
5. What kind of resources are commonly used by naturalists?
6. What are the seven essential entries in a field journal?
7. Why is it important to keep a field journal?

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