BOOK REVIEWS

The Marshes of Southwestern Lake Erie. Louis W. Campbell with Claire Gavin. 1995. Ohio University Press, Athens, OH. 233 p. $45 cloth, $24.95 paper.

The Marshes of Southwestern Lake Erie by Louis W. Campbell is a book by a naturalist intended for those who enjoy exploring natural areas. It provides the reader with knowledge about the ecology, geology, and history of southwestern Lake Erie. The book, written with the help of his daughter, Claire Gavin, is a compilation of Mr. Campbell's sixty years of events and experiences in and around the Lake Erie marshes. With his wealth of knowledge about northwestern Ohio, it is no wonder that the Division of Natural Areas and Preserves dedicated (in 1980) a nature preserve (Louis W. Campbell State Nature Preserve in Lucas County) in his honor.

Although not written as a field guide, *The Marshes of Southwestern Lake Erie* contains information that is an asset to have on any subsequent visit to the Lake Erie marshes. There are descriptions of wildlife areas, plants, and birds, along with an assortment of photographs that will aid identification. The "wetlands almanac" highlights what to look for at various times of the year. Divided into periods ranging from two to six weeks, the reader will be able to anticipate what the marshes have to offer. For example, from January 1 to February 15 "the marsh itself is barren and desolate. Cattails, reeds and long grasses are a brown, whispering sea tossed by an icy wind." During the winter, animals are visible only from tracks. Shorebirds reach their peak during the last week of May, and the entire month of June is when most organisms in the marsh reproduce.

Campbell researched the settlement history of the area, beginning with the native Americans. Maps illustrate the location of some of the early white settlements. Campbell discusses the preservation of the marshes through the establishment of hunt clubs and acquisition of specific marshes by the State and Federal governments.

Invasions of exotic species such as purple loosestrife, zebra mussels, and carp (1893) came with human settlement. Environmental problems discussed are those that have arisen from the arrival of sea lamprey, from the pollution of the water, and from the over netting of sturgeon. From purely an economical point of view, Campbell considers the deliberate introductions of smelt (1936) and white perch (late 1950s) as positive events.

The habitats used to describe the physical settings are Campbell's and not those of modern plant ecologists. Understanding his concept of a plant community is difficult because scientific names are not used in conjunction with common names. For instance, "cane" could mean *Phragmites australis* (reed grass), *Phalaris arundinacea* (reed canary grass), or *Arundinaria gigantea* (bamboo). Appendix A includes a partial list of plants from the marshes along with their scientific names. Discrepancies exist in the use of common names between the text and appendix.

The geological setting relies heavily on information provided by two well-known Ohio geologists, Dr. Richard Goldthwait and Dr. Jane Forsyth. Maps illustrate the various levels of the shore of Lake Erie as created by the position of glaciers during the Pleistocene. Maps also indicate the ever changing shoreline formed by geologic factors such as erosion.

Information about birds occurs throughout the text, including historic lists for different years. Appendix B provides a list of birds from the Ohio Lake Erie marshes stating their frequency at various times of the year. Chapter 3 features selected birds such as the bald eagle, herons, gulls, and terns.

Campbell's book is about cycles—cycles of the seasons, cycles of the migratory birds, cycles of the water levels of Lake Erie, cycles of the monarch butterfly, cycles of settlement. The cycle of Louis Campbell's life in the marshes of southwestern Lake Erie has contributed a wealth of knowledge for the reader. The Campbell cycle includes a philosophical analysis of the changes that have occurred in this once pristine wilderness of northwest Ohio.

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The Secret Chain: Evolution and Ethics. Michael Bradie. 1994. State University of New York Press, Albany, NY. 198 p. $14.95 paper.

As the title of this book indicates, the author tried to argue that evolutional history has contributed significantly to the general understanding of human conditions. Several themes have been addressed in this book. Human nature—which has been considered fixed and unchangeable by some—has been argued at great length. The author tried to justify that evolutionary analyses provided valuable insights toward moral phenomena. Bradie's task was not to provide ultimate truth but an explanation of selected aspects of human behavior. In a philosophical sense, evolution tended toward the betterment where biological, social, and moral evolution are being correlated. The intellect reflects on one's actions which pave the destiny where evolutionary ethics compete with or complement traditional values.

There are a number of books which deal with evolution in relation to the justification for norms. To name a few: *Principles of Ethics* [H. Spencer]; *Evolution and Ethics* [J. Huxley]; and *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior* [R. Richards]. Bradie has provided a monumental synthesis of many points of view where several themes run through this book. Obviously, we regard ourselves as divine creations and highly privileged agents of this planet. We need to be reminded that we live in a universe governed by natural laws. But Darwinian legacy dictates that we should believe in empirical facts that human beings have evolved through the evolutionary process. Does the evolutionary process contribute anything toward the understanding of ethics? As the author stated: ". . . if ethics are rooted in human nature, and human nature is rooted in our biology, then it would seem that ethics should be rooted in biology as well." Then it can be

predicted that moral or ethical values are influenced by our genes which have evolutionary relevance.

The author has briefly addressed ethics and evolution in Chapter 1. Altruism, benevolence, and self-love are some major themes of Chapter 2. There, it is clearly stated that human beings have clear consciences concerning what should and should not be done. Once upon a time, Desmond Tutu stated in his Nobel lecture, and I quote: "Human beings are actually created for the transcendent, for the sublime, for the beautiful, for the truthful, and you don't teach people these things. It comes with the package of being human, and all of us are given the task of trying to make this world a little more hospitable to these beautiful things—to love, to compassion, to caring, to sharing, just to being human." But does this packaging always perform as it is supposed to. How does the conscience know what to condone or condemn? What is the role of education in social consciousness? The evolution of conscience through social instincts with higher mental power is a foundation of morality. This concept is aided and abetted in Chapter 3. The various nature of human beings which is prescriptive as well as descriptive is being sleeved in Chapter 4. In a general sense, we humans are moral agents, devising moral systems for social values. Chapter 5 covers in depth three contemporary approaches to evolutionary ethics. These have been extended to nonhuman animals based on evolutionary considerations in Chapter 6. Vegetarians have always argued against killing animals. Nevertheless, those who have moral sanctity for plants can equally win the argument against them. Prenatal selection for healthy children through technological innovation has clearly been refuted by religious fundamentalists who are the traditional foes of science. At the same time, scientists are trying to justify their own position by overriding those opposing their positions. Of course, these issues simply cannot be solved because scientists are trying to establish their values based on facts while fundamentalists' sacred views are based upon miracles. Scientists do not have any claim to greater intellect or virtue, but it is science which unveils the problem and in turn solution. The author, unequivocally stated in Chapter 7: ". . . that the human capacity to be moral is an evolutionary product. We would not be what we are today were it not for the evolutionary development of the human lineage." This concept is a matter of dispute.

The book is a rich source of reading by providing an extensive bibliography. In my opinion, as the highest living form of life we must inquire "who are we?" From a scientific point of view it is a gem filled with puns and does provide an insight to many issues concerning evolution and ethics. Whether readers agree with its content is another thing entirely. Bradie's provocative attempt to explore human tendencies and propensities in relation to evolution needs the support of behavioral scientists. This book is a treasure for philosophers and evolutionists alike. So there you have it.

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The Extraordinary Chemistry of Ordinary Things, Second Edition. Carl H. Snyder. 1995. John Wiley & Sons, Inc., New York, NY. 703 p. $64.95 cloth.

At 5:30 AM on 16 July 1945, in Alamogordo, New Mexico, the first nuclear bomb was detonated. A little more than 13 pounds of plutonium generated the force of 20,000 tons of TNT creating a fireball 10,000 times hotter than the sun. The blast was seen or felt for hundreds of miles and produced a cloud rising eight miles high. The hundred foot tall steel tower that supported the bomb was vaporized and the desert sands surrounding it were melted into glass for a half mile around. Nowhere else on earth was such power ever before unleashed by humans. This profound birth of the nuclear age introduces Carl Snyder's chapter on "The Secrets of the Nucleus." It is an example of how Snyder uses real world events and experiences to illustrate the value and importance of chemistry and to make connections to students lives.

The lack of interest in science among most American students and the shortfall in science literacy among most Americans is well documented. In 1990 sociologist Sheila Tobias published a landmark book titled *They're Not Dumb, They're Different* in which she presented the results of a study of the factors that account for the dropout of so many students from science classes. She found that those students who chose other fields for careers faulted science classes because the instructors often expected students to already be fully committed to and interested in the subject. Tobias found that the students "hungered . . . for information about *how* the various methods they were learning had come to be, *why* physicists and chemists understand nature the way they do, and *what* were the *connections* between what they were learning and the larger world."

Carl H. Snyder's book, *The Extraordinary Chemistry of Ordinary Things*, breaks many of the rules about a chemistry text and threatens to not only make chemistry easy to understand, but also to uncover the connections of chemistry to a student's everyday life and experience. This is the second edition of a new type of chemistry text aimed at stimulating interest in and motivation for science among the "second tier" students in nonmajors chemistry courses. This text teaches chemistry, not as a set of abstract concepts dealing with simplified hypothetical examples, but as a way to explain the properties and behavior of real materials that surround us and that we all encounter and use on a daily basis. There are two ways that this approach may improve students' perception of chemistry. First, it should make the value of chemistry more apparent, thus improving interest and motivation. And second, by connecting abstract chemical concepts to things with which students are already familiar, it should make understanding easier and faster.

Most chemistry texts start each chapter with abstract fundamental concepts of chemistry. For instance, a typical chapter may start by describing the structure of atoms or by defining acids and bases in terms of hydronium ions or proton transfer. In contrast, Snyder's book begins each chapter with a directed observation regarding the properties or behavior of common materials. Each chapter then develops the chemistry

concepts that relate and explain these observations. Thus, from the start, students realize the purpose of what they are learning. And from the start, they see the connection to things that they already know and comprehend. Thus science becomes not a body of abstract facts and laws disconnected from the real world but, instead, a rationalization of phenomena that orders their knowledge of the real world.

For instance, the first chapter begins with a set of experiments using an ordinary flashlight and solutions of sugar and salt. These experiments demonstrate that, when dissolved in water, salt conducts electricity while sugar doesn't. This easily observed difference in the behavior of two common substances is explained in terms of differences in their molecular structures. And thus students gain insight into the nature of ions and their relation to electricity. The terms ions and electrolytes acquire real meaning related to their ability to conduct electricity and to light a bulb in a flashlight. Snyder explains that while scientific terminology such as electrolytes and ions takes time to learn, it simplifies discussion and communication by organizing our knowledge of the properties of matter into categories.

In the second chapter, atoms are demystified by comparing them to a pile of paper clips. By dividing a pile of paper clips repeatedly into half, eventually a single paper clip remains—the smallest unit that has all of the properties of a paper clip. Likewise, dividing a bar of gold repeatedly in half, would eventually lead to a single atom of gold—the smallest unit that has all of the properties of gold.

This text is characterized by simple, down-to-earth, effective explanations and analogies that show students that they need not fear chemistry and that, in fact, they can easily understand and master it. While aiming at nonscience majors, Snyder doesn't "dumb-down" the content. Quantitative problems abound and are interspersed with problems testing concept mastery and the ability to relate chemistry to social and technological issues. Real chemistry problems are tackled, such as calculating the amounts of products in grams from the amount of a reactant in grams. While many students often are stumped by such problems, not knowing where to begin, Snyder's text provides many examples with complex problems disassembled into a series of logical steps. Each step is simple and follows from the preceding one. Students can realize that they only need to master each step and remember the order in which the steps are assembled to conquer even such intimidating challenges as stoichiometry.

Some of the "ordinary things" with which Snyder demonstrates "extraordinary chemistry" are: the change in the attraction to a magnet of a scouring pad as rusting converts the iron to iron oxide; distilling pure water from tea as an example of how valuable products can be obtained from petroleum; using extract from red cabbage leaves to demonstrate how acid rain can form from a pot of water, matches, a candle, and a paper towel; and examining the chemistry that underlies batteries by seeing color changes in the reaction of galvanized tacks with iodine and household bleach. Why can a vitamin C tablet be used to remove an iodine stain from clothing? Because vitamin C is an antioxidant and therefore easily reduces the iodine to a colorless form. Why does milk turn sour when it spoils? Because bacteria in it produce the acid, lactate, and acids are sour. Why does Alka-Seltzer® bubble in water? Because the water dissolves citric acid so that it reacts with sodium bicarbonate to make gaseous carbon dioxide. These and many other common materials and methods are utilized in Snyder's approach for introducing students to the common sense and logic of chemistry and to illustrate its connections to things that we all know but don't always realize.

Snyder explains that science is a way of knowing the universe by asking questions, by observing and interpreting the answers, and by communicating the results to others for further testing and confirmation or refutation. He emphasizes that the risks and benefits of chemicals depends on how we use them. For instance, the chlorine used in World War I to kill soldiers can be used to save lives by disinfecting water and to improve the appearance of clothing by removing stains, but it also is responsible for depletion of stratospheric ozone.

So if you're planning to teach a course in chemistry to those who aren't already "converted" to the faith, I suggest that you consider this text. Its ordinary words reveal an extraordinary approach to a complex but fascinating subject.

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The Dicotyledoneae of Ohio. Part II. Linaceae through Campanulaceae. Tom S. Cooperrider. 1995. The Ohio State University Press, Columbus, OH. 655 p. $65.00 cloth.

This is the third component of *The Vascular Flora of Ohio* to be published, following those dealing respectively with the Monocotyledoneae and the Asteraceae. Long before this part was written, it was decided that *The Vascular Flora of Ohio* would follow the sequence of plant families established by Engler and Prantl, which dominated North American floras for many years but which is now declining in use. The present volume covers the second half of the Dicotyledoneae in that system, from the Linaceae through the Campanulaceae, leaving only one part yet to be published, to cover the dicots from the Saururaceae through the Leguminosae. The recognition of families, such as the Menyanthaceae and Cuscutaceae, follows the Cronquist system, so in that respect this volume will be in harmony with the *Flora of North America*. This volume covers a relatively large number of families, many of them represented by few species in the Ohio flora, but also includes such large and economically and/or ecologically important families as the Apiaceae or Umbelliferae (parsley or carrot family), Lamiaceae or Labiatae (mint family), and Solanaceae (nightshade family), as well as the tree genera *Acer* (maples) and *Fraxinus* (ashes).

The text provides descriptions of all of the species known to occur outside cultivation in Ohio, both native and naturalized. These are accompanied by dichotomous keys to the genera, species, and infraspecific taxa and also, where appropriate, by practical guides for distinguishing among frequently confused species. Because this volume covers only a portion of the Ohio dicots, there are no keys to families. The illustrations, which represent virtually every species covered, are clear and useful for identification. Distribution in Ohio is mapped by counties.

The author, Dr. Tom S. Cooperrider, is a professor in the Department of Biological Sciences at Kent State University and has published many papers on the systematics and distribution of Ohio plants. This volume represents the results of studies of thousands of herbarium specimens from many herbaria, not only for records of Ohio distribution but for the preparation of new descriptions and keys. Field studies were undertaken by Kent State students and others specifically or largely on behalf of this project. The entire manuscript was carefully reviewed by several systematic botanists before it went to press, and many additional authorities reviewed or otherwise assisted with portions of the work. The result is a manual in which one can have confidence that the descriptions are accurate and the keys are functional.

The availability of this modern work will permit students of the Ohio flora to follow a "standard reference" without, as is too often done, adhering to the taxonomy in works that are approaching their semicentennials. The literature citations indicate how thoroughly Dr. Cooperrider has reviewed the literature of systematic botany. His search has extended beyond the more obvious and conveniently available resources to include journals published overseas, the unspecialized journals of state academies of science, and unpublished dissertations. Consequently, both the classification and the nomenclature (which, contrary to many implications, are not the same thing) represent recent but "mainstream" treatments where such exist. The Ohio State University Press is to be commended for expediting the production of this volume, so that it incorporates the results of taxonomic studies up to a remarkably short time before its appearance. Where differences of opinion have persisted or further research is required, there are Ohio-oriented discussions of the problems with observations by the author and/or comments by other authorities. One of its many uses, therefore, could be as a source of potential thesis topics.

Not only are the taxonomic treatments modern, but so are the distributional data. This is an important benefit of a newly published manual because the spontaneous flora is changing rapidly. According to the introduction, about 25% of the species described in this work are naturalized rather than native, and as both the comments in the text and my own observations indicate, this number is steadily increasing. Some species, also, are spreading northward in response to factors that presumably include both local and widespread climatic warming.

One objective of this book is, in effect, to foster its own obsolescence. Dr. Cooperrider notes in the introduction that the previous volumes in this series have stimulated extensive field work in Ohio, which has resulted in many new distribution records. Nevertheless, the quantity and quality of information in this volume will sustain its status as a tremendously useful reference on the plants of the Great Lakes region and Ohio Valley for many years to come.

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