

a summary of research and conservation efforts over the last 20 years. It cannot serve as a complete compendium of crane ecology, but it complements the existing general literature. The book would be a good addition to the libraries of birders and others interested in the lives and conservation of cranes. Perhaps its most valuable contribution are the appendices, which provide readers with information on where they can observe cranes for themselves and resources to learn more about cranes. In that, Johnsgard has indeed been successful in his goal of informing others of these special birds.—*Jane E. Austin, 8711 37th Street SE, U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota 58401, USA.*

Teaching Children Science: Hands-on Nature Study in North America, 1890-1930. Sally Gregory Kohlstedt. 2010. University of Chicago Press, Chicago, Illinois, USA. 363 pages + xv. \$45.00 (hardcover). ISBN-13: 978-0-226-44990-6; ISBN-10: 0-226-44990-4.

Many scientists and educators agree that the goal of science education is to prepare students “to know, use and interpret scientific explanations of the natural world,” as cited in the National Research Council publication, *Taking Science to School: Learning and Teaching Science in Grades K-8* (Duschl et al. 2007). Yet, many science instructors of K-12 and post-secondary students often rely on teacher-telling modes of pedagogy and neglect to engage their students in natural inquiry and scientific study that model the research methods used by scientists. As a result, many young people are not aware of how scientists make discoveries about the natural world. Moreover, some critics argue that our children are so out of touch with the natural world that they prefer to be “plugged in” to electronic games rather than discovering the outdoors, a phenomenon coined as “nature deficit-disorder” by Louv (2006). In response to the realization that our students need more meaningful science instruction, scientists and educators actively proposed reforms and have been studying the effects of various instructional and assessment strategies. As I read about the nature study movement in the late 1800’s and early 1900’s, I realized that for the past 100 years, North American educators have been passionate about the same things—trying to find ways to improve science instruction by making it more relevant and interesting to students. We know that when people are passionate about topics, they are more motivated to learn, and this is exactly the sentiment that educators drew upon at the start of the nature study movement in the U.S. and Canada.

In her book, *Teaching Children Science*, Professor Kohlstedt provides a rich and detailed history of nature

study in the U.S. (with some description of Canadian perspectives but nothing south of the U.S.). The nature study movement initially grew from a philosophical approach about teaching people how to be environmental stewards. Soon afterwards, it developed into complex curricula grounded in geographical and biological lessons that could be presented to in-service and pre-service teachers in both rural and urban areas—most often it involved getting students outdoors to experience their natural environment and to engage in in-depth study through collecting, preserving, recording, gardening, and sharing of data.

Normal schools and laboratory schools (associated with university teacher education and educational research programs) played important roles in testing innovative instructional nature study curricula. Educators of science teachers had an important voice in influencing curriculum and instructional approaches of formal and informal teachers of children. Instructors and professors at Cornell University, SUNY campuses, University of Chicago, McGill University, along with others offered not only teacher education courses, but also professional development workshops to teachers on nature study and outdoor studies. In some cases, university faculty teamed up with non-formal science educators (such as those at museums or botanical gardens) in their effort to reach teachers. As a result, teachers started integrating school gardens, field trips, and nature study into their curricula. On occasion visiting scholars from abroad transported ideas from the U.S. to their peers back home.

Not all educators adopted the same curricular and instructional approach when it came to nature study. These varied according to teachers’ geographic location (north vs. south, urban vs. rural, etc.). For example, some educators felt that agricultural study was not to be confused with nature study, whereas others felt that rural interests needed to be incorporated in nature study. In the southern states and on Native American reservations, nature study was sometimes introduced as an extension of vocational education during which students learned about building character (such as self-reliance) through horticultural activities. Kohlstedt points out the stark contrast of this interpretation of nature study intended for African American and Native American students, compared to the experience that Euro-Americans students enjoyed in northeastern states which involved field work in natural, uncultivated areas.

Dissemination of nature study approaches occurred not only through workshops and classes, but also through publications. We learn, in great detail, how important pamphlets were, such as Anna Botsford Comstock’s *Home Nature-Study Course* series, which was later published as *The Handbook of Nature Study* in 1911. Wilbur Jackman (University of Chicago) collated his pamphlet series and published *Nature Study for Common Schools* in 1891, which combined both content information and child development theories. Pamphlets often were published by universities

and distributed through workshops held either at the university campuses or throughout the states. Teachers who had low budgets and could not afford textbooks welcomed these pamphlets and used them as resources in their classrooms. Besides Comstock and Jackman's publications, other important contributions included *A First Lesson in Natural History* by Elizabeth Carey Agassiz in 1879 and published by the Boston Society of Natural History and Liberty Hyde Bailey's (Cornell University) *The Nature-Study Idea* in 1909.

This book is not a quick read because of the amount of detail presented; however, I found the descriptions to be enjoyable in part once I discovered two interesting points: 1) the efforts of science teacher educators have not changed much in the past 100 years and 2) women played an incredibly important role in developing and promoting science education through nature study. I was surprised to learn that educational issues of 100 years ago are actually quite similar with those of today (creating policy to standardize curricula, exploring ways to make instruction more learner-centered, introducing urban students to rural issues and vice versa, and preparing students for future education through transferable skills). In addition, I had never realized that women were important proponents of progressive science education in the U.S. When we hear the names Agassiz, Comstock, and Dewey, we often think of male scientists; however, Elizabeth Cary Agassiz (the founder of Radcliffe College), Anna Botsford Comstock (professor at Cornell University), and Alice Chipman Dewey (University of Chicago Laboratory School) all played critical roles in our country's educational history. Through nature study some women found new opportunities as environmental educators in informal settings (zoological and botanical parks, summer camps, after-school gardening programs, etc.), outside of the traditional role of school teachers. Kolstedt's in-depth knowledge on the role that women played in promoting nature study is not surprising, considering that her past publications have highlighted the contributions that women scientists have made. That being said, there are probably other insights in this book that readers will find fascinating, based on their own interests.—*Meena M. Balgopal, School of Education, Colorado State University, Fort Collins, Colorado 80525-1588, USA.*

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Effects of Climate Change on Birds. Edited by Anders Pape Møller, Wolfgang Fiedler, and Peter Berthold. 2010. Oxford University Press, New York, USA. 344 pages. \$117.00 (hardcover), \$62.95 (paperback). ISBN: 978-0199569748 (hardcover), 978-0199569755 (paperback).

Climate scientists from across the globe predict vast changes during the next century in the planet's temperatures, precipitation, storm intensities, fire regimes, hydrologic cycles, and atmospheric, water, and soil chemistries. The changes will be global, but their effects will be felt locally everywhere. To find a scientifically and socially engaging bellwether of these events, we need to look only through the lens of avian biology. Birds are found from pole to pole; their movements connect continents. They are loud, colorful symbols of the changing of the seasons, and the body of work describing how changes to our climate are altering their evolution and ecology is growing nearly as quickly as the changes are occurring.

Anders Møller, Wolfgang Fiedler, and Peter Berthold have put together a compilation of review papers on climate change as seen through that ornithological lens. In a text written for ecological professionals and graduate student study, the authors show the breadth of ways that birds illustrate the implications of climate change for wildlife, lay out numerous needs to improve our predictive abilities, and provide some brief descriptions of the quantitative tools that might be used to answer those needs.

The size of the editors' objective, shown by their lofty title, is herculean if not tantalusian. Certainly, understanding the impact of modern climate change on organisms, avian or otherwise, is of the highest priority for those interested in preserving the planet's biodiversity. There is a deep need for accurate models to predict these impacts in any applied field that deals with the natural world. The problem, the "effects of climate change", is anything but discretely defined as a field of study, however. In point of fact, it might be more tractable to study the aspects of avian biology that *aren't* affected by climate. Climate is the major selective and driving force on nearly every aspect of the collective avian phenotype. Studying the effects of climate change on birds is, and this book agrees, often presented as a discrete investigation. This is likely because the climate change problem represents a