

Book Reviews

Rita Hoots

Department Editor

CLONING

Clone: The Road to Dolly, and the Path Ahead. By Gina Kolata. 1998. William Morrow and Company, Inc. (1350 Avenue of the Americas, New York, NY 10019). 276 pp. Hardback \$23.00.

 In *Clone*, Gina Kolata, science writer for *The New York Times*, presents an engaging 10 chapter overview of the events leading to one of the prominent stories in biology to end the 20th century, the cloning of the now famous sheep called Dolly. After breaking the announcement of Dolly to the general public on the cover page of *The New York Times*, Kolata was the first reporter to speak to Ian Wilmut, the embryologist from the Roslin Institute in Scotland, who lead the research team that produced Dolly.

Clone begins with a post-Dolly chapter. In the context of a right to reproductive freedom, this chapter provides a glimpse of some concerns and possible benefits of human cloning by comparing and contrasting ethical issues associated with cloning to similar issues associated with assisted reproductive technologies. Gina Kolata sets the stage for the story of Dolly by quoting scientists, clergy, ethicists, theologians and philosophers whose opinions are well summarized by her

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own quote: "Yet if there is one lesson of cloning it is that there is no uniformly accepted way to think about the ethical questions that it elicits, and no agreement, even among the most thoughtful and well-informed commentators, about what is right and what is wrong."

Seven chapters of the book are dedicated to a survey of pioneering scientists and their significant discoveries in embryology that eventually formed the scientific framework for the nuclear transplantation experiments which produced Dolly. Kolata presents an accurate saga of the scientific methodology and the people behind the work which ultimately made Dolly possible. One amusing theme incorporated throughout *Clone* is Gina Kolata's humorous and all too accurate description of the eccentric quirks of scientists, the vagarious nature of graduate training in science, and the rigors of establishing one's position in a research discipline.

In addition to exploring landmark scientific events in the field of embryology, *Clone* also considers how fabricated reports of cloning served to raise doubts among the general public and scientists alike that cloning would ever be possible. Kolata cites examples of how the emergence of ethical movements of the 1970s, the advent of recombinant DNA technologies, the infamous Tuskegee study, and pop culture movies such as "The Boys From Brazil" and "The Island of Dr. Moreau" have contributed to public skepticism of science and falsely, perhaps, alerted the public to possible misuses of science. She suggests that how society responds to human cloning may in fact reflect society's attitudes toward science, scientists, technology, and the general public's position of science in the world. Kolata poses the questions: "Do we see science as a threat or a promise? Are scientists sages or villains? Have scientists changed over the years from natural philosophers to technologists focused on the next trick that can be played on nature?"

Chapters eight (The Road to Dolly) and nine (Taken by Surprise) chronicle Ian Wilmut's training as a scientist and

describe the experiments that Wilmut and Keith Campbell performed. Discussions from previous chapters are interwoven to tell a wonderful story of how the science behind cloning cows, sheep and pigs by subdividing the cells of early embryos, and the motivations of the scientists who performed the work, ultimately led Ian Wilmut and Keith Campbell to clone Dolly.

The reader is treated to the human element of both Ian Wilmut's and Keith Campbell's emotions during sleepless evenings as they painstakingly prepared for the birth of Dolly. Wilmut's and Campbell's anticlimactic response to Dolly's arrival is emphasized by the fact that neither scientist was prepared to fully appreciate the implications of their work, and that, initially, cloning from differentiated embryonic cells was treated with blind indifference by most scientists, ethicists and reporters.

Clone concludes with a chapter titled, The Path Ahead, in which Kolata contemplates future possibilities for human cloning and cloning-related technologies. Gina Kolata presents her work in an interesting manner that is both easily understood by the casual reader of science and appreciated by the science professional. *Clone* is a very enjoyable and informative book that I recommend to anyone interested in developing an informed opinion on cloning.

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INSECTS

Insects Through the Seasons. By Gilbert Waldbauer. 1998. Harvard University Press (79 Garden St., Cambridge, MA 02138). 289 pp. Paperback \$14.95.

 In a sense the title of this book is misleading as the author includes a wealth of other interesting species of animals and plants as they relate to insects. In addition he includes examples of many analogous behaviors and structural adaptations of other species in comparison with

those of insects. His extensive knowledge in natural history combined with a commitment to the use of the scientific process is used to help him answer the many questions posed by his observations throughout the book. On this basis alone I would recommend this book to elementary and secondary school educators looking for scientific material for their courses and for examples of the many ways to test hypotheses with inexpensive materials.

The author first presents an accounting of how *Cecropia* moths (his research interest) cope with their task of reproduction after emergence of the adults in the spring. Before this biological imperative is achieved two other imperatives must be met, namely, the avoidance of being eaten and the necessity of finding food for growth. The book takes us through the seasons enumerating and explaining how evolutionary adaptations have eased the struggles to attain these ends.

In anecdote after anecdote he covers a range of behavioral events from crickets engaged in a chirping match over territory to complex behaviors such as a female firefly attracting and eating the male of another species having somehow broken the species-specific flashing code. He even covers the relationships of ants and Lycaenid caterpillars possessing honey glands and the parasites of the immatures, both of which are my particular interests. Arguments are presented to account for the behaviors and in many cases the author designs simple experiments to answer the questions. In one intriguing example he determines if hawk moths have ears by jingling his keys.

As the author explains in his preface, he has attempted to aid the understanding of insects by describing them in context of their "ecological milieu." In addition he feels it important to consider how insects affect people for good or bad and the detrimental effect of causing the extinction of countless beneficial insects. Cases in point for the latter include the absolute necessity of bee pollination for the survival of red clover and the effect of insecticides on insects that control the spread of cactus in areas which cattle ranchers use for grazing.

If I were still in the classroom I would make the third chapter, "The Most Successful Animals on Earth,"

required reading. This chapter manages to cover an introduction to most of the themes and concepts of biology, theoretical and applied, including ecology, evolution, population numbers and distribution, diversity, biological control, relations to man including historical importance, communication and others. Other chapters give numerous examples of testable hypotheses that students could use for science fair experiments ranging from cricket chirp rate varying with temperature to onset of larval diapause related to day length. I would even recommend that college students in search of ideas and motivation preliminary to doing a paper or thesis consider giving this book a read.

The book makes for easy reading. Waldbauer's use of a special character similar to a tilde ~ breaks the chapters into groups of paragraphs covering a topic too long to be covered by one paragraph. I'm not sure why, but it increased my reading interest and sense of completeness as I went from topic to topic. He did not fully cite his references in each chapter as was done at the end of the book. However, this considerably enhanced the speed and ease of reading, and contributed to the readability of a thoroughly enjoyable book. The serious reader looking for backup to the many assertions and conclusions presented should easily find them as his bibliography is organized chapter by chapter in his "Selected Readings" at the end of the book. The book also offers an extensive and comprehensive index.

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HANDS-ON SCIENCE

Great Experiments with H₂O. By Noel Fiarotta & Phyllis Fiarotta. 1997. Sterling Publishing Company, Inc. (387 Park Avenue South, New York, NY 10016). 80 pp. paperback \$9.95.

Simple Experiments in Time with Everyday Materials. By Muriel Mandell. 1998. Sterling Publishing Company Inc. (387 Park Avenue South, New York, NY 10016). 96 pp. Paperback \$4.95.



While each of these books is clearly intended for elementary school children, I feel that the high school teacher will find some very useful demonstration and lab ideas.

The connection between life on Earth and water is not only important but interesting to students. The little (80 pages) book by Noel and Phyllis Fiarotta contains experiments and demonstrations that might be used in a beginning biology class or in an environmental science class. Water's special properties such as cohesion, adhesion, high heat of fusion, and high heat of vaporization are considered and demonstrations or experiments are suggested. The physical states of water and the water cycle are clearly explained. The book is illustrated and includes a complete and useful table of contents and a very inclusive index.

The book about time has experiments more appropriate for physical sciences. However, the biology teacher might use this book when teaching about radioactive clocks and carbon 14. It would also be a good source of science fair ideas. The experiments in the book are simple but could be expanded and made more sophisticated for high school students.

In summary, the biology teacher might wish to have these books available on a shelf of resources to be used by teacher and/or students.

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Classifieds

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