

cusing attention on timely topics not directly covered in the text; *point/counterpoint*, containing controversial topics written by outstanding environmentalists with opposing views; concise summaries; and discussion questions.

In addition, in most chapters there are *chapter supplements*, entitled a "closer look." In this section, a more detailed discussion of a timely topic is offered, such as acid rain.

The author has given much thought to various paradigms which he develops, explains and permits the reader to think about. Included are: the population, resource and pollution model; multiple cause and effect model; impact analysis model; risk analysis model; and an ethical analysis model.

The reader has the flexibility of using all these complements and supplements or a selected number. Compared to other textbooks in the field, this book is unique in that it offers a wealth of alternate approaches to a given topic. Some include: use of modeling; computer programming; essays; illustrations; points of view from prominent environmentalists and chapter supplements. All of these unique features and a clearly written text make this book an outstanding contribution to environmental science. Upon reading the book, you will find a philosophical point of view which the author summarizes as: "the future belongs to each of us. We can remain apathetic and permit it to become dirty, limited and dreary; or we can make it clean, full of opportunity and richly rewarding. The choice is ours."

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## EVOLUTION

### SEVEN CLUES TO THE ORIGIN OF LIFE—A Scientific Detective Story

by A. G. Cairns-Smith. 1985. Cambridge University Press, London, England. 131 p. Price not given. Hardcover.

"Odd Watson—very odd." A quote from the infamous detective from Baker Street sets the stage for a brief, but very thorough, account of how life might have begun. Each chapter of this snappy book is first prefaced, and then ended, by an appropriate quotation from Holmes. The reader is thus drawn into the story, not so much by scientific documentation (though this is deftly used), but more by a sense of drama that is developed. As all

models for the origin of life are based on insubstantial evidence, the style of presentation is well chosen.

This book hinges on the author's opinion that natural selection must have been as strong a force, directing the very first organisms, as it is today. This leads to the assumption that a system whereby information can be transmitted from generation to generation is the most fundamental element that divides life from non-life. Consequently some form of gene must have been present from the very start of life. Genes, as we know them today, are considered far too complex to fit this criterion, therefore a different form of "pre-gene" must have evolved at the outset. Evidence is presented and synthesized until the chief suspect is named—a clay crystal.

Much of the information presented in this book is not new. Several chapters review what is currently known about genes and gene action. Another reviews prevailing theories on the origin of life. And even the idea that the first genes may have been similar to present day clay crystals has been presented before. However the fresh insights and interesting style of presentation make for a very worthwhile book. It would be particularly appropriate as an element of courses in which developing critical thinking is an important objective.

Cairns-Smith uses some wonderful analogies as he develops his thesis. My favorite appears in the third chapter titled "Build your own E. coli." To allow readers the opportunity to fully realize the complexity of such a "simple organism, the author invites you to purchase a supply of beads, each of which will represent an atom, and then put them together. Be prepared, however! You will need at least \$2 billion dollars (assuming beads are a penny a piece) and a space about as large as the nave of Salisbury Cathedral. You'd also need a rather long time—a staff of a thousand should complete the job in about 35 years assuming a work rate of one bead connection every five seconds, eight hours per day, five days per week!

In true Holmsian style, the book concludes with a presentation of the seven clues which wrap up the case. These are drawn both from scientific research and relevant observations of everyday life. The juxtaposition of these clues provides a fitting illustration of what the creative and logical mind can do with seemingly disparate information. And the conclusion that life originated with clay crystals and

not nucleotides reflects one of Holmes' most famous quotes—"... when you have excluded the impossible, whatever remains, however improbable, must be the truth."

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## GENETICS

### GENETICS, Laboratory Investigations.

by Eldon J. Gardner and Thomas R. Mertens. 8th ed. 1985. Burgess Publishing Company (7108 Ohms Lane, Minneapolis, MN 55435). \$14.95. Soft cover.

The 8th edition of this manual of laboratory investigations in genetics includes 20 self-contained exercises, each designed to be completed in one laboratory period. These can be done independently with the sequence determined by the instructor. An instructor may use all exercises or select specific sections. Lab directions are clear and concise and should enable a student to work independently.

The lab investigations are divided into several groups: *Drosophila* exercises involving monohybrid and dihybrid crosses and giant salivary gland chromosome isolation and examination; monohybrid and dihybrid exercises in plant genetics using maize breeding experiments; mitosis and meiosis microscope labs, utilizing among others, squash techniques; isolation of DNA; mathematical problems in population genetics and chi-square; karyotype identification and chromosome banding, and an exercise in recombinant DNA techniques. Each laboratory exercise is followed by a list of recommended reference reading.

Illustrations are clear and easy to interpret. Chromosome pictures for use in the karyotype exercises are printed on glossy paper which facilitates identification of individual chromosomes. The final exercise involving human hemoglobin electrophoresis and genetic counseling is new in this edition.

The manual is a soft cover book with a three-hole punch, so that individual exercises can easily be removed and submitted to the instructor. The very fact that this is the 8th edition of the manual, repeatedly revised, speaks for its usefulness. It is an excellent manual, both for an introductory college genetics course and/or for an advanced high school genetics course.

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