BOOKS

THE DARWIN READER
edited by Marston Bates and Philip S. Humphrey
Scribner's, N.Y. $6.75

Reviewed by George W. Beadle
Chairman of the Division of Biology

CHARLES DARWIN'S life should be an excellent antidote to the despondency said to characterize Tech sophomores.

Here was a man who overturned the foundations of man's thinking about his origins and those of his fellow creatures on earth. His concept of organic evolution is one of the great ideas of all time. Yet, as a youth, he was regarded as a "very ordinary boy, rather below the common standard of intellect." His father once said, "You care for nothing but shooting, dogs and rat-catching, and you will be a disgrace to yourself and all your family."

Had there been a Caltech in his day, Darwin would surely have been denied admission. He says of himself that his power of sustained abstract thought was limited and that he could not have succeeded in *mathematics. In spite of his prodi*gious productivity and success as a writer, he complains that he had great difficulty in this form of expression, tending frequently to put his first statement or proposition in "a wrong or awkward form." He was "singularly incapable of mastering any language" and could not "perceive a discord, or keep time and hum a tune correctly."

His professors of humanities must have made no lasting impression, for in his later years he could not endure to read a line of poetry, found Shakespeare so intolerably dull that it nauseated him, lost his taste for pic*tures, and was disturbed by music.*

At 16, Darwin was sent to Edinburgh to study medicine. He found the lectures incredibly dull; he says the sole effect of Jameson's lectures on geology was a determination never to read a book on geology. He

CONTINUED ON PAGE 10

recovered, however. Had his fame as a biologist not so eclipsed his other remarkable achievements, his work on the origin of coral reefs alone would have insured his place in geology's hall of fame.

Finding he had no heart for medicine, Darwin went to Cambridge to become a clergyman. For a time he was convinced of the "literal truth of every word in the Bible."

Little did he dream that he would one day provide the proof that it could not be, and that he would be responsible for jolting religious thought out of a complacency that had lasted for 17 centuries.

There followed a time-wasting phase of his college days, which he describes in the following words:

". . . I got into a sporting set, including some dissipated low-minded young men. We used often to dine together in the evening, though these dinners often included men of a higher stamp, and we sometimes drank too much, with jolly singing and playing cards afterwards."

To shorten the story, with the help of Professor Henslow of Cambridge, Darwin finally found himself and henceforth devoted himself completely to natural science. Soon after he signed as naturalist "without stipend" on the famous five-year voyage of the *Beagle*. He almost missed going because of his father's objections.

Three years after his return he had clearly formulated the theory of the origin of species through natural selection. With characteristic deliberateness, however, he did not publish it in full until 20 years later.

Darwin wrote voluminously and methodically. It was this attention to every detail that made the *Origin* at once so convincing and so time-consuming to read. Today, every informed biologist is supposed to have read this most important of Darwin's 20-some books. The fact is many have not. The words are so numerous for an idea that now seems so obvious and elegantly simple.

With the publication of *The Darwin Reader*, the task of reading Darwin is much lightened. The editors have so wisely and skillfully selected, arranged, abridged and annotated excerpts from Darwin's works that it is now possible to have, within a single 470-page volume, the meat of most of them. Short, informative and well written editorial comments provide continuity.

ELEMENTS OF ENGINEERING THERMODYNAMICS

by Rolf H. Sabersky
McGraw-Hill, N.Y. $7.50

Reviewed by Edward Zukoski
Assistant Professor of Mechanical Engineering and Jet Propulsion

THIS BOOK by Dr. Sabersky, associate professor of mechanical engineering at Caltech, is designed as an elementary text for a one-half year course in thermodynamics. Because of the time limit, the author has restricted the material to be discussed and confines himself to a

CONTINUED ON PAGE 14

Books . . . CONTINUED

thorough discussion of fundamental concepts.

For purposes of discussion, the 23 chapters of the book may be grouped roughly into three sections: (1) the development of basic concepts; (2) discussion of general substances and their working cycles; and (3) application of thermodynamic laws to flow of compressible fluids.

Although the development of the concepts of temperature, internal energy, enthalpy and entropy follows a rather conventional pattern, the treatment is unusually thorough and the implications are carefully explored. The extension of the basic conservation laws to systems of particles in motion is made early in this section of the book.

In the second section, the properties of perfect gas and real substances are described. The deviations of real gases from ideal behavior are illustrated by a discussion of van der Waals gas and by problems involving the use of tabulated values of thermodynamic functions of real gases. The working cycles of a wide range of engines are presented and discussed in general terms. The cycles described include the Otto, Diesel and gas turbine cycle and also cycles using a condensable fluid. Some of the economic factors involved in the choice of a cycle for a particular application are also considered.

The one-dimensional flow of a compressible fluid is treated in the third section in considerably more detail than is usual in thermodynamics texts. The equations of motion are developed and applied to the description of pressure waves, the normal shock relations and flow in a convergent-divergent nozzle. With this background, some problems of gas turbine design are analyzed.

The last chapter of the book serves as an introduction to some of the concepts of combustion processes.

Because of the emphasis placed on the analysis of compressible flow problems, this book is particularly suitable as an elementary thermodynamics text for students interested in the study of fluid dynamics.