Book Reviews

Introduction to Nuclear Engineering. Raymond L. Murray. Prentice-Hall, New York, 1954. xiii + 418 pp. Illus. $7.

The present-day writer of a textbook on nuclear engineering is handicapped, at the outset, because what he writes is determined not only by what is relevant and to the point, but also by what has been declassified and by what parts of this highly compartmentalized art are familiar to him. To write a textbook on nuclear engineering in the face of such handicaps requires a great deal of courage. One cannot help but admire Murray for collecting so much declassified information in a single volume of 418 pages.

Introduction to Nuclear Engineering is an outgrowth of a course of lectures that the author has given during the past 3 years to undergraduate nuclear engineering students at North Carolina State College. The tone of the book consequently reflects the current philosophic viewpoint in American engineering education—that the aim of undergraduate engineering education is to produce a large number of fairly competent practitioners rather than a smaller number of extremely skilled ones. Thus, the book is largely descriptive rather than analytic. For example, in the chapter on the design of liquid-metal cooled natural uranium reactors, the fine details have to be glossed over, even though the success of an actual design calculation must depend on such details.

What a student who reads Murray's book learns is how the expert in the field goes about dealing with various aspects of nuclear engineering; he hardly becomes an expert himself. Within this over-all limitation this will prove to be a useful book. It touches upon the basic sciences—nuclear physics, metallurgy, and heat transfer—necessary for an understanding of reactors. There are chapters on the "unit operations" of nuclear engineering—shielding, waste disposal, radiation detection and control, and isotope separation. There is an appendix on reactor theory as well as chapters on neutron experiments and the use of isotopes. Of particular interest are the chapters on specific reactor designs—on the water boiler and on several solid-fuel uranium reactors—and there is a table that gives design data for many of the existing reactors.

The choice of pedagogic material in a field that has grown up in such an unusual way as nuclear energy is very much a reflection of the viewpoint of the author. There is little educational tradition to guide him. Murray's choice and therefore, by implication, his *definition* of nuclear engineering can hardly be criticized. I would have liked a chapter on nuclear engineering gadgetry—canned rotor pumps, remote handling equipment, and the like—and in general, greater emphasis on the chemical aspects of nuclear reactors.

On the whole, the organization of the material is adequate. The chapters on specific reactor design are placed, somewhat oddly, in the middle of the book rather than after all the unit operations have been covered. This means that reactor design is conceived mainly as including reactor statics, choice of materials, and heat transfer. Such aspects of design as control and shielding are not included in the reactor-design chapters.

Nevertheless, the chapters on reactor design are illuminating, especially since they are the first accounts to appear in the open literature of how the conflicting design requirements imposed by considerations of heat transfer, nuclear physics, and materials limitations are resolved in a practical design. If the book were classified, the author could have indicated in greater detail how well the methods of design really work. As it is, the reader must be left with a slightly uneasy feeling that the chosen examples always come out "just right."

The book is written with a fair degree of authority. The most significant misstatement that I noticed is in the discussion of the temperature effect in natural-uranium reactors. The temperature effect on the resonance capture in a natural-uranium reactor is, contrary to the statement in the book, hardly affected by the neutron temperature; it is almost entirely determined by the fuel temperature.

Writing a textbook on nuclear engineering under present-day handicaps is an extraordinarily difficult task. Although Murray's book cannot be considered definitive, even in terms of what it is intended to be, an elementary textbook, it nevertheless contains much interesting material and ought to prove to be a useful introduction to nuclear engineering.

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Principles of General Ecology. Angus M. Woodbury. Blakiston, New York, 1954. viii + 503 pp. Illus. $6.

This is the third American textbook on ecology to appear in 5 years, but in some ways it appears to antedate its successors. While here and there traces of recent thought are evident, the statement in the introduction that the "eco-system approach . . . is used by some geographers and is the one utilized in this work" is on the whole unfulfilled. The book follows the conventional pattern of organization: part I, "General considerations"; part II, "The physical environment" (7 chapters, on soils, water, radiant energy, gravity and periodicities, climate, and physical adaptations); and part III, "Biotic interrelationships" (16 chapters).

The emphasis is on upland terrestrial ecology (indeed, it has been facetiously described as the "ecology of Utah"). Most of the statements about conditions in the ocean are misleading when they are not erroneous, and, although this might be forgiven on the ground

that this book will obviously be used in regions far from the sea, another way of looking at it is to remember that the students will not be able to realize this, inasmuch as the author has stated in at least two places that such a book as this is supposed to provide a background in ecology for oceanography as well as for many other fields. Even closer to home, as far as the book itself is concerned, is the paucity of material concerning fresh-water environments. A lake is simply a wide place in a stream, and streams are mentioned much less frequently than Great Salt Lake. (The diagram of "important habitat types in North America" on page 48 omits streams entirely). On the other hand, the terrestrial aspects are well covered; the chapters on soil and climate are outstanding; and those on populations, geographic distribution, and the like are good workman-like jobs. There are many interesting illustrations, especially photographs of scenes in Utah, but the reiterated tree of life, modified to suit the discussion (in one place there are six versions of it in a row), becomes tiresome.

It might be best if those who decide to use this book think of it as "Principles of Terrestrial Ecology," and refer to a limnology textbook to fill out the details that they may need to understand that aspect of the transmontane environment, which is otherwise treated in such detail. Conversely, aquatic ecologists will find this a useful summary of matters unfamiliar to them.

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The Origins of Psycho-Analysis. Letters to Wilhelm Fliess, drafts and notes: 1887–1902. Sigmund Freud. Marie Bonaparte, Anna Freud, and Ernst Kris, Eds. Trans. by Eric Mosbacher and James Strachey. Basic Books, New York, 1954. xi + 486 pp. $6.75.

The student and practitioner of psychoanalysis is provided with an opportunity to look behind the scenes and to get a fascinating intimate glimpse into the background of personalities and circumstances that led to its development. Skillful footnotes and introduction by Kris tie the content of the letters together and permit the reader to link thoughts and formulations with the corresponding well-known literature.

The less biased reader will also be impressed by the brilliant creativity of Freud's mind, but he cannot fail to notice the precarious scientific ground on which the whole edifice of psychoanalysis seems to be built.

When Breuer, who had introduced him to a new method of therapy, could not follow Freud's emphasis on sexuality in the etiology of the neuroses, Freud turned to the only contemporary who, like him, had accepted a pan-sexual theory of neurosis. Fliess became his "only audience," the two men uniting and fortifying each other against the rest of the scientific world. Kris does not see the attraction of the two men for each other as being based on their preoccupation with sex and on the similarity of their personalities. Both are visionaries (in Freud's own words, p. 130). Both are fond of far-reaching speculations. Fliess is criticized by Kris for working on his theories "with an obstinacy and a lack of objectivity which ignored all inconsistencies and inconveniences" (p. 8), while Freud is praised for the "consistency which holds his objective in mind in spite of all difficulties and contradictions" (p. 26).

The critical reviewer of Freud's writings has always wondered how Freud could use "free association" as a method of investigation, not recognizing it merely as a method of therapy. This volume explains why the fallacious findings of his approach, leading twice to a near personal and scientific collapse in 1897 and 1900 (letters 69 and 130), did not stop Freud from continuing with the same clinical procedure. He developed his ideas first and then sought the clinical evidence, thus imposing his ideas upon his patients, as Fliess discovered after 15 years of closest friendship and collaboration (pp. 40, 344). The technique is little mentioned in the published letters, except in one "Draft J." Here the method of putting pressure upon the patient until his mind yields what Freud expects to find is clearly described.

Freud waited for his inner voice to reveal to him the deepest secrets of the human mind, a process that Kris calls a "surge forward from the preconscious" (p. 307), which "worked over scientific connections before they became conscious" (p. 230). This tendency to gain scientific insight from within himself was accentuated when Freud decided to get at the roots of his scientific errors by analyzing himself and his dreams —a curious way of scientific investigation, indeed.

The intimate revelations provided by this volume about the origins of psychoanalysis may facilitate the recognition of the pattern behind the unrealistic constructs of psychoanalysis.

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Economic Geography. Clarence Fielden Jones and Gordon Gerald Darkenwald. Macmillan, New York, rev. ed., 1954. xxv + 612 pp. Illus. $6.75.

Would you like to know about iron ore production by states and its movement to smelters? Or are you interested in rubber output in Malaya and Liberia? Clarence Jones and Gordon Darkenwald have provided 612 pages of encyclopedic yet meaningful data on man's utilization of the earth, illustrated by 442 maps and photographs.

Geographers divide their subject into three broad categories: systematic, regional, and techniques such as cartography. Within the field of systematic geography the main divisions are economic, social, and political. Each considers the distributional aspects of human affairs. *Economic Geography* is organized along occupational lines, and is thus an evaluation of hunting and fishing, forest industries, grazing industries, agriculture in its many aspects, mining, manufacturing, transportation, and trade.