Planning from the Beginning

Alaska, A Challenge in Conservation. RICHARD A. COOLEY. University of Wisconsin Press, Madison, 1966. 186 pp., illus. $5.50.

Almost one-third of the federal domain in Alaska is to be donated to the new state over a period of 25 years. This extremely liberal donation will amount to some 104 million acres, to be selected by the state. The state has taken significant steps to insure the wise use of this great natural resource. Its constitution, adopted in 1956, prior to statehood, contains an article stating a policy "to encourage the settlement of its lands and the development of its resources by making them available for maximum use consistent with the public interest." In 1959 the legislature passed a Land Act which provides for classification of the selected federal lands according to their best use, limits the state's disposal of certain classes of lands such as mineral and renewable-resource lands, requires advertised, competitive lease and sale bids, includes provisions for multiple use, and, by providing for public hearings on rule-making and land classification or reclassification, insures that the state's land programs will be responsive to the public will. The program has been made flexible so that it will be able to meet changing situations.

Richard A. Cooley, a research economist and former director of the Alaska Research Center, knows the state, its people, their problems, and their new government. His book is a refreshing revelation of Alaska's entirely new concept of statewide land classification and use. Cooley has brought into sharp focus the contrast between the exciting new Alaska land-management policy guidelines and past policies in the American West, which were steeped in fraud, speculation, and waste. The old "economic determinism" of laissez faire that prevailed during the settlement of the western states led to needless errors which today can be rectified only at tremendous cost. The Alaska program may point the way to belated land-management reforms in other states.

Cooley does not accept the dogma that man's progress is measurable solely in terms of economic factors. He is convinced that land use should be planned to effect a desired total environment so that the selection, classification, and management of wilderness, scenic parks, recreation areas, historic sites, beaches, parkways, and highway waysides will contribute to the fulfillment of social and economic goals. He stresses the need for "a broader and more comprehensive knowledge of intricate ecological interrelationships in the natural and human environments" and cites problems in land management which arise from "the antiquated governmental machinery for decision-making." As a remedy he recommends "a new approach to the education of public officials in the resource fields" and points out the great need for federal-state coordination in research and planning. Strides in this direction are hoped for from the new federal-state Alaska Field Committee and the President's Review Committee for Development Planning in Alaska.

Problems in Alaska are numerous and difficult. The state's income is limited, its administrative responsibilities are extensive and expensive. Its population is only 255,000, and one-quarter of these are military personnel and their dependents. There are conflicts of interest, problems of "aboriginal rights," absentee ownership, lack of risk capital, and a present inability to compete fully in world markets because of high labor and transportation costs and seasonal unemployment. But in spite of its problems, the future of this fabulous land is a bright one if its government, responsive to the will of the people, can avoid the mistakes of the West. The political structure that can enable the state to realize its great potential has been provided, but, more importantly, the determination and wisdom of Alaskans will be needed to recognize and implement the long-term planning to meet the challenge in conservation of all its resources.

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Sequential Decision Problem

Algebraic Structure Theory of Sequential Machines. J. HARTMANIS and R. E. STEARNS. Prentice-Hall, Englewood Cliffs, N.J., 1966. 221 pp., illus. $12.

In the analysis of discrete systems two of the most fundamental considerations are the combinatorial and the sequential decision processes. The study of combinatorial (time-independent) decision processes has an ancient heritage in propositional logic, with recent extensions being directed toward achieving optimum algorithmic implementations (the synthesis problem) and theoretical (analysis) work in Boolean algebra. The sequential problem, treating transitions from one logical state to another, has no such long history: E. F. Moore presented the first definitive work in this area in 1956. The decade following has been very active, much of the research being sponsored with a view toward achieving optimum implementation of computing machines (the general use of the word "machine" rather than "system" is a tacit acknowledgment of this).

More recently the sequential decision problem has been viewed as an essential ingredient in many other discrete systems: biological, linguistic, econometric, and general learning models. The emphasis in this broader area is less on implementation algorithms (synthesis of such systems) than on analysis and understanding of general behavior patterns.

The synthesis problem is commonly restricted to what is called the "state assignment problem"—finding an optimum implementation for the states of the system—that is, coding at minimum cost. Initially, "minimum cost" was construed to mean the implementation which afforded the least number of components. Recent technological developments have rendered this objective questionable.

Of the earlier researchers in the area, Hartmanis and Stearns were among the most active in utilizing results based upon algebraic decompositions on the set of machine states. While the work was largely directed at the solution of the state assignment problem, they have provided some of the definitive abstractions for sequential systems. *Algebraic Structure Theory of Sequential Machines* is a monograph covering primarily the work and contributions of the authors in this area. The book begins with a review of algebra and sequential machine models. The key concept of the state set partition with the substitution property (state homomorphism or the partition congruence property) is then developed for series-parallel machine decompositions. This is then extended with partition pairs and arbitrary loop-free decompositions. Implementations using overlapping or shared partitions are then discussed, together with feedback partitions. The final chapter cov-

ers the elegant work of the K. B. Krohn and J. L. Rhodes, who introduced the theory of semigroups into the more general analysis problem of machine decomposition.

The book is clear, concise, and well written and has a unified treatment uncommon in books of this nature. Despite the inclusion of several exercises, the work is more of a monograph than a text, in view of the relative narrowness of the topic. Further, I do not share the authors' view that their work will provide results that can be applied directly to the design of machines in any significant sense—and to try to make it fit such applications is to miss the more important theoretic ones. The work does provide excellent insight into the sequential decision problem and would be valuable for any researcher in that area. On the other hand, the absence of a treatment of regular sets and events, probabilistic automata, and the like limits the applicability of the work.

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Reactor Analysis

The Theory of Neutron Slowing Down in Nuclear Reactors. JOEL H. FERZIGER and P. F. ZWEIFEL. Pergamon, New York, 1966. 320 pp., illus. $12.50.

This is a well-written monograph covering the area described by the title with perhaps the main emphasis on the formalism. To workers engaged in the analysis of the behavior of neutrons in chain reactors, the book provides an opportunity to consider simultaneously in a common notation and in considerable detail a variety of approaches to the particular facet of their work involving the slowing down or moderation process. There is a rather nice balance between equations and discussion, with a sprinkling of perceptive insights. Graduate students of nuclear engineering and science will find the book excellent collateral reading; the mathematics will test the capability of those at the master's level. The practicing engineer whose main concern is with the design aspects of nuclear reactors might find interest in some of the finer details of the analytical formalism. Other applied scientists will find the necessary material to consider applications in their own fields of this extensive but rather specialized development of the ramifications of a linear Boltzmann equation. The aspects of this field currently receiving much attention, such as the use of thousands of groups for the generation of fast reactor constants or the implications of complex eigenvalues in certain slowing-down problems, are not well covered. However, this does not detract from the excellent presentation of the now classical methods of treating neutron slowing down essentially as they stood in 1962.

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The Maya

The Rise and Fall of Maya Civilization. J. ERIC S. THOMPSON. University of Oklahoma Press, Norman, 2nd ed., 1966. 344 pp., illus. $5.95.

The first edition of this book, published in 1954, has become a classic in the field of popular writing on archeology. The second edition, revised and enlarged, is basically the same book, incorporating information and ideas derived from excavation and surveys conducted by several institutions during the past ten years. A new subchapter on "Currency and commerce" has been added; otherwise chapter and subchapter headings remain as they are in the first edition. In all, 41 pages have been added, with eight new photographic plates and seven new figures in line-cut. With the exception of the new subchapter, which is only three and a half pages long, the new material is worked into the text, which has been revised in a number of places.

In the preface to this edition the author calls attention to the existence of new information from Mayapán and Dzibalchaltún in Yucatán, Palenque in Chiapas, Tikal and Altar de Sacrificios in northeastern Guatemala, the Belize River in British Honduras, and various sites in the Guatemala highlands. The preliminary reports of Richard S. McNeish on the work of the Tehuacán Archeological-Botanical Project, in the Mexican state of Puebla, have led to considerable revision (in the subchapter "Populating the New World") of Thompson's former views on the origins of native American agriculture. In short, although final reports on most of the excavations listed above are still in preparation, a great deal of important evidence on the development and decline of Maya civilization has been skillfully inserted into the new edition without changing the original flow of thought and style of the book.

For those who are not familiar with the old edition, it should be said that this is a book that could hardly be matched for readability. It is not a textbook in the usual sense. There are no references to the basic professional literature and no attempt at detailed summarization of architectural, ceramic, and other archeological and historical evidence. It *is* a book on the Maya as a people, written without a hint of pedantry, often with quiet humor, with strong emphasis on Maya character throughout history. For the reader who wants to know what the Maya were, and are, like, how they thought and acted, and what they achieved, it is worth more than all the textbooks put together.

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Book Received

Advances in Carbohydrate Chemistry. vol. 21. Melville L. Wolfrom and R. Stuart Tipson, Eds. Academic Press, New York, 1966. 584 pp. Illus. $19.50. Nine papers.

Advances in Chemical Physics. vol. 11. I. Prigogine, Ed. Interscience (Wiley), New York, 1967. 418 pp. Illus. $17.75. Six papers.

Advances in Food Research. vol. 15. C. O. Chichester, E. M. Mrak, and G. F. Stewart, Eds. Academic Press, New York, 1966. 373 pp. Illus. $15. Seven papers.

Aerodynamic Theory. vols. 1 to 6. vol. 1, *Mathematical Aids, Fluid Mechanics, Historical Sketch* (414 pp.); vol. 2, *General Aerodynamical Theory, Perfect Fluids* (377 pp.); vol. 3, *Theory of Single Burbling, Mechanics of Viscous Fluids, Mechanics of Compressible Fluids, Experimental Methods–Wind Tunnels* (371 pp.); vol. 4, *Applied Airfoil Theory, Airplane Body (Non-Lifting System) Drag and Influence on Lifting System, Airplane Propellers, Influence of the Propeller on other Parts of the Airplane Structure* (448 pp.); vol. 5, *Dynamics of the Airplane, Airplane Performance* (369 pp.); vol. 6, *Airplane as a Whole, Aerodynamics of Airships, Performance of Airships, Hydrodynamics of Boats and Floats, Aerodynamics of Cooling* (304 pp.). William Frederick Durand, Ed. Dover, New York, 1967. Illus. Paper, $2.25 per volume. Reissue of 1963 reprint, 1934–1936 edition.

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