

ment figures and innumerable arrows. The use of printed symbol patterns would have clarified many of them.

As a volume entitled *The Archaeology of the Palau Islands: An Intensive Survey* the monograph falls short of expectations. While pottery is given ample description and analysis, other artifacts were too scarce to treat in like manner. The numerous architectural and sculptural manifestations, however, are given only cursory descriptive treatment. The best that is offered is an inadequate two-page summary of terrace and earthwork features followed by three and one-half pages theorizing on their origin and use. Obviously the author was working under limitations of time, and survey equipment required for a thorough study, especially of architecture, was not available to him, and no one can condemn him for that. To have undertaken such a study in the allotted time would have meant sacrificing the immediately more important range of his site survey. For what this volume is, that is, a basic survey for all future archeological research planning in the Palaus, the author has done a commendable job. It is the title that is at fault, for it misleads the potential reader into expecting more than the volume was intended to give.

EDWIN N. FERDON, JR.
*Arizona State Museum,
University of Arizona, Tucson*

Surfactant Science

Nonionic Surfactants. MARTIN J. SCHICK, Ed. Dekker, New York, 1967. 1111 pp., illus. \$43.50.

Nonionic surface-active substances were invented in 1930 by C. Schöller. The industrial production of these substances has shown a remarkable growth, accompanied by widespread acceptance in commercial and household formulations, and concomitant with this commercial development there has been a surge of applied and basic research on their preparation, properties, and uses. The present volume, the first of Dekker's Surfactant Science Series, undertakes to review this rapidly developing field.

Thirty-one authors have contributed 29 chapters in a largely successful attempt to provide the research worker with critical and authoritative reviews. A partial indication of their success is given by the almost 2900 references

in the book to patents, original research papers, and other sources. In addition someone has done an extraordinary job of indexing; there are 83 pages of indices.

Nonionic surfactants are usually prepared by reacting ethylene oxide with hydrophobes such as fatty amides, fatty acids, fatty alcohols, alkyl phenols, fatty amines, or polypropylene glycols. A remarkable flexibility in surface properties, solubility, and performance may be achieved by suitable modification of the reactants. Thus, variation in the number of ethylene oxide groups will yield products with different solubilities in water; on the other hand, the solubility in organic solvents will be determined primarily by the nature of the hydrocarbon group or groups on the hydrophobe.

The first portion of the book is concerned with the organic chemistry of nonionic surfactants, with the methods for the preparation of the different types, with their properties, and with their commercial applications. The research worker interested in the synthesis of these substances should find the chapter on the mechanisms of ethylene oxide condensation under acidic and basic conditions a helpful introduction to the field.

Ten chapters are concerned with various physical chemical aspects such as surface films, micelle formation, solubilization, emulsification, stability of dispersions, detergency, foaming, and configuration of the polyoxyethylene chain in bulk material and in solution. A section on analytical chemistry discusses some of the problems unique to the analyst concerned with the identification and determination of nonionic surfactants. A thorough review of the physiological activity of these substances and a chapter on their degradation by microorganisms complete the book.

On the whole, the editor has done a remarkable job of maintaining a high standard from the many authors. In particular, the reviews on the mechanism of ethylene oxide condensation, on the thermodynamics of micelle formation, on solubilization, on stability of dispersions, and on physiological activity should appeal to those interested in fundamental research in this field.

It is unfortunate that the publisher has fixed the price of the book at a level which will keep it out of the personal libraries of many chemists. Since the book has been organized into four parts, each representing a different discipline, it would seem that it could have

been published as four separate volumes, some of which could perhaps have found a wider distribution among graduate students and research workers.

HORST W. HOYER
*Department of Chemistry,
Hunter College, New York City*

A Dream As Yet Unfulfilled

The National University. Enduring Dream of the U.S.A. DAVID MADSEN. Wayne State University Press, Detroit, 1966. 178 pp., \$7.50.

Efforts to found a federally supported national university in Washington, though intermittent, have persisted since the founding of the Republic. Although Presidents Washington, Jefferson, and Madison, and others proposed congressional action, the Congress has consistently failed to bring any of the numerous bills to a vote.

The history of these efforts has been recorded a number of times; this volume, however, adds significantly to the record. The author discusses and compares the various plans in more detail than has been done in any earlier treatment. He reviews briefly the congressional history of the principal plans. He makes the story interesting and provides the most complete account yet to appear of the national-university movement. Yet the efforts since 1900 are reported less fully than the evidence would permit. In particular, the recent efforts to arouse congressional interest in a federal university, or in other specialized academies or research centers, are sketched only briefly if at all. Even the current efforts of Oscar H. Steiner of Cleveland to promote the realization of President Washington's dreams are not brought up to date.

From the first, the sponsors of a national university have talked vaguely of the advantages of having such an institution in Washington, but few have attempted to analyze the need, or to appraise realistically what could be reasonably expected of a federally financed institution. Until analysis replaces imaginative rhetoric the case for a federal university is likely to remain unconvincing. For historical background this is a useful book, but to evaluate current proposals more will be needed.

ROBERT D. CALKINS
*Brookings Institution,
Washington, D.C.*