information on stationary phases, column setup and operation, and detection is included. While the chapter offers much guidance for the beginner in column chromatography, more information on the nature of the solvents, or perhaps the eulotropic series, would be an added benefit. A few practical examples of column chromatographic separation of compounds such as rachelomycin and (+)-aphyllidine are detailed. Chapter 5, written by Claude Dufresne, outlines the use of ion exchange methods for natural products isolation. Although a few pages are devoted to the theory of ion exchange chromatography, the major emphasis is on practical applications. Tables of cation and anion exchangers, buffers, resin selection experiments and cartridge column data are included. Practical separations of compounds such as paromomycin, Paluamine, gualamycin and cephamycin using ion exchange chromatography are also detailed in stepwise sequence. Isolation of natural products by preparative high-pressure liquid chromatography (HPLC), written by Paul Stead, constitutes Chapter 6. This chapter focuses on the practical aspects of HPLC with minimal attention to theory. After the chapter is introduced, separation types such as normal, reverse-phase and gel permeation are addressed along with tables which detail stationary phase types and solvent properties. The chapter continues with topics such as HPLC hardware, modes of detection, methods development in isocratic, gradient, reverse-phase HPLC and ion-pair techniques. Scale-up in HPLC separations is given a great deal of attention in Chapter 6 as well as special methods and concerns such as recycling, fractionation and chiral separations. Chapter 7, coauthored by Simon Gibbons and Alexander Gray, renders an account of the many variations of planar chromatography in natural product isolation. The main emphasis of the chapter is on thin-layer chromatography (TLC) and the associated methods and techniques. Variations of the TLC theme include preparative TLC and centrifugal TLC. Detection methods are discussed including staining, bioautographic overlay assay/desorption and compound recovery. An informative table which outlines TLC separations of representative compounds by name, structure and method is included. Natural products separation by high-speed countercurrent chromatography (HSCC) is reviewed by Jim McAlpine in Chapter 8. The principles and equipment design surrounding HSCC is discussed although some type of schematic or sketch of an HCSS instrument would have been helpful to those unfamiliar with the technique. Examples of HSCC separations of compounds such as pristinamycin, taxol and the niddamycins are described which include structures and conditions. A table of HSCC systems employed for the isolation and separation of 30 natural products is presented along with the associated references. Crystallization and the final stages of purification are topics which comprise Chapter 9, contributed by Norman Shankland, Alastair Florence and Richard Cannell. This chapter focuses on the final stages of sample preparation prior to spectral or X-ray crystallographic analysis. Chapter 10, written by Frank VanMiddlesworth and Richard Cannell, covers dereplication and partial identification of natural products during the isolation process. Isolation, separation and extraction techniques are discussed in Chapter 10 within the context of dereplication. Special topics covered include mass spectrometric techniques, bioassays and natural product databases. Yuzuru Simizu discusses the purification of water-soluble natural products in Chapter 11. General extraction procedures dealing with heavy metal contamination and choice of chromatographic supports are the general topics along with methods used for the isolation of tetrodotoxin and domoic acid. Chapter 12, written by Gloria Silva, Ik-Soo Lee and A. Douglas Kinghorn, addresses special considerations with natural products isolation from plants. Topics such as treatment of fresh plant material, extraction processes, detannification, alkaloid isolation, glycoside and carbohydrate isolation are discussed. Flowcharts which outline alkaloid and saponin isolation are included. Chapter 13 focuses on the isolation of marine natural products. Authored by Amy Wright, the chapter discusses collection, storage, and extraction of marine organisms. Isolation methods with flowcharts describing the step-by-step isolation of compounds from marine sponges such as *Ptilocaulis* and *Cinachyra* are included. Isolation of compounds from ascidians is detailed as well as extraction and detection methods for compounds derived from deepwater sponges, echinoderms and cyanobacteria. The chapter is well-illustrated with structures which are representative examples of marine-derived compounds. Chapter 14, contributed by Michael Verrall and Stephen Warr, discusses the scale-up of natural products isolation mainly from the standpoint of fermentation. The chapter involves process improvement as applied to fermentation and covers medium development, optimization of fermenter conditions and removal of intra- and extracellular byproducts. Chapter 15, entitled "Follow-Up of Natural Products Isolation" concludes the volume. In this chapter Richard Cannell identifies several topics of investigation which may be stimulated by a newly identified natural product or its source. The topics encompass further extraction and isolation of minor components or analogues, maximizing gene expression, biosynthetic mutants, directed biosynthesis, biotransformations and combinatorial biosynthesis. Overall, *Natural Products Isolation* is well-written, practical and interesting. The book is highly recommended as a reference for the natural products library and would nicely complement the library of the organic chemist engaged in natural products synthesis.

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Advances in Molecular Vibrations and Collision Dynamics, Vol. 3: Molecular Clusters. Series edited by Joel M. Bowman (Emory University). Volume Edited by Joel M. Bowman and Zlatko Bačić (New York University). JAI Press: Stamford, CT. 1998. ix + 460 pp. $109.50. ISBN 1-55938-790-4.

The excellent original volume of this series, published in 1991, was subtitled "A Research Annual", yet the second volume did not appear until 1994, and now four years later we have volume 3. Nevertheless, the subsequent volumes have been well worth the wait. Volume 1 treated molecular vibrations, and volume 2, reactive scattering. The subject of this new volume is molecular clusters, the floppy noncovalently bound groupings of atoms and molecules that are readily formed in low-temperature supersonic jets. These clusters are well-defined isolated systems, which makes them well suited for detailed theoretical and experimental study. Furthermore, the changes in properties with cluster size in principle allow one to follow the gradual evolution from gas to condensed phase. The book consists of 12 chapters by different specialists. Each chapter is focused on the authors' own work, but the editors have made a sufficiently wide-ranging choice of topics that this volume, taken as a whole, gives a representative overview of contemporary work in the field. In the first chapter, Syage and Zewail describe their real-time measurements of reaction dynamics, including photodissociation, electron transfer, proton transfer, isomerization, and aligned bimolecular reactions, where the reactants are in clusters of solvent molecules. Next, Christoffel and Bowman discuss molecular dynamics simulations of the effect of a solvent Ar atom on the photodissociation of H_2O. Then Heaven, Chen, and Lawrence present spectra of CN in rare-gas clusters (and rare-gas solid matrixes), as a prototypical study of a solvated radical. Buck presents results from IR spectroscopy of small clusters that have been size selected by deflection with a beam of He atoms. Dykstra describes the use of the quantum Monte Carlo (QMC) method to compute the vibrational ground-state energy of weakly bound clusters, and Whaley describes QMC results for doped He clusters, which are interesting on account of very large quantum effects. The remaining chapters deal with hydrogen bonding. Bačić and Qiu develop optimized basis sets that make it feasible for them to carry out variational calculations of vibration−rotation energies for $(HF)_2$ and $(HCl)_2$. There follows a treatment of HF clusters by Quack and Suhm that contains a nice summary of theoretical techniques and discusses spectroscopic results for the full range from dimer to bulk. Then Zwier describes his use of resonant ion-dip spectroscopy to obtain IR spectra of H-bonded clusters that are selected for size and for configuration. Xantheas and Dunning review the use of ab initio potential energy surfaces to determine minimum-energy configurations of small water clusters, and Gregory and Clary present a detailed QMC study of the vibrations of water clusters with emphasis on tunneling dynamics. Wales analyzes the complex patterns of tunneling splittings seen in IR spectra of water clusters. Each chapter contains a good deal of background material, which makes this a good starting point for physical chemists looking for an introduction to this interesting and vibrant subject. The book should also be of use to experts in this field because the narrow focus of each chapter allows for a fair amount of depth, and most of the chapters are quite up-to-date, with references through mid-1998.

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