with 0.02 mL of Me_2SO followed by addition of 10 mL of maintenance medium to give a stock concentration of 200 μg of compound/mL.[18] Dilutions were then prepared in the same medium to give the various test concentrations. HeLa cell cultures in the microtiter plates were drained of medium and refed with 1.0 mL of compound-containing or compound-free maintenance medium. Appropriate monolayers were then challenged with 0.05–0.1 mL (10–100 $TCID_{50}$) virus while cytotoxicity and control cultures remained free of virus. Cell cultures were incubated at 36 °C in the humidified CO_2 incubator and examined microscopically at 48 and 72 h after challenge for compound cytotoxicity and viral cytopathic effect (CPE). Viral CPE was graded as a percent of the cell monolayer destroyed by the virus (percent CPE). The lowest concentration of compound reducing viral CPE by 50% or more compared to virus control was considered the minimum inhibitory concentration (MIC_{50}) of that compound. Cell toxicity was graded according to the degree of host cell death and/or a reduction in the growth or change in morphology of treated nonchallenged cultures compared to control cultures.

Mouse Feed Test for in Vivo Activity. Mouse feed containing compound was prepared by dissolving 150 mg of test compound in 10–15 mL of acetone and then adsorbing the acetone solution onto silica gel (Hi-SiL-233, PPG Industries, Pittsburgh, PA). The resulting silica gel containing compound was then mixed with granular mouse food (Wayne Pet Food Division, Continental Grain Co., Chicago, IL) on an automatic roller for 1 h to give a final concentration of 150 mg of compound/250 g of feed. This resulted in a feeding dose of about 75 mg/kg per day.[7] Control feed contained quantities of acetone/silica gel comparable to the test feeds. Cox/Swiss albino male mice (9-12 g; 19-day old) (Harlen Sprague–Dawley, Inc., Indianapolis, IN) were used in all in vivo assays. Animals were supplied ad libitum with compound-containing or control feed starting 24 h before virus challenge and continuing for the duration of the test. Test animals were challenged with an intraperitoneal injection of phosphate-buffered saline, pH 7.1–7.3 (GIBCO) supplemented with 1% antibiotic stock solution (PSN, GIBCO) and containing sufficient infectious virus to cause 85–100% mortality mice within 10 days of challenge. Animals were observed daily and deaths recorded.

Acknowledgment. We thank M. T. Kenny and J. R. McCarthy for their suggestions and comments.

Registry No. **2**, 99902-70-2; **3**, 99902-71-3; **4**, 99902-72-4; **5**, 99902-73-5; **6**, 99902-74-6; **7**, 99902-75-7; **8**, 78940-62-2; **9**, 78940-63-3; **10**, 82674-08-6; **11**, 82674-07-5; **12**, 82674-05-3; **13**, 82674-06-4; **14**, 78940-65-5; **15**, 99902-76-8; **16**, 99902-77-9; **17**, 78940-64-4; **18**, 99902-78-0; **19**, 99902-79-1; **20**, 82673-96-9; **21**, 99902-80-4; **22**, 63707-35-7; **23**, 99902-81-5; **24**, 99902-82-6; **25**, 82673-97-0; **26**, 82674-10-0; **27**, 82674-09-7; **28**, 99902-83-7; **29**, 78940-72-4; **30**, 82673-98-1; **31**, 78940-67-7; **32**, 78940-69-9; **33**, 99902-84-8; **34**, 22532-80-5; **35**, 99922-95-9; **36**, 83642-20-0; **37**, 83642-29-9; **38**, 83642-43-7; **39**, 63646-51-5; **40**, 99922-96-0; **41**, 99902-85-9; **42**, 22532-87-2; **43**, 99902-86-0; **44**, 99585-43-0; **45**, 83642-35-7; **46**, 38710-80-4; **47**, 83649-25-6; **48**, 99902-87-1; **49**, 99902-88-2; **50**, 99902-89-3; **51**, 83642-36-8; **52**, 83642-38-0; **53**, 36089-89-1; **54**, 83642-21-1; **55**, 83642-27-7; **56**, 83642-28-8; **57**, 83642-23-3; **58**, 83642-22-2; **59**, 99902-90-6; **60**, 83642-37-9; **61**, 80622-22-6; **62**, 99902-91-7; **63**, 99902-92-8; **64**, 99902-93-9; **65**, 99902-94-0; **66**, 99902-95-1; **67**, 25935-30-2; **68**, 99902-96-2; **69**, 85330-94-5; **70**, 85330-95-6; **71**, 99902-97-3; **72**, 99902-98-4; **73**, 85331-25-5; **74**, 85331-19-7; **75**, 85331-21-1; *p*-$ClC_6H_4NO_2$, 100-00-5; *p*-ClC_6H_4Cl, 623-03-0; *p*-$MeSO_2C_6H_4Cl$, 98-57-7; *p*-$PhSO_2C_6H_4Cl$, 80-00-2; *p*-$CF_3SO_2C_6H_4Cl$, 383-11-9; *p*-$Cl_2C_6H_4$, 106-46-7; *p*-AcC_6H_4Cl, 99-91-2; *o*-ClC_6H_4CN, 873-32-5; *p*-ClC_6H_4OH, 106-48-9; *p*-AcC_6H_4OH, 99-93-4; PhOH, 108-95-2; *p*-FC_6H_4OH, 371-41-5; *p*-MeC_6H_4OH, 106-44-5; *m*-ClC_6H_4OH, 108-43-0; *o*-ClC_6H_4OH, 95-57-8; *p*-BrC_6H_4OH, 106-41-2; *o*-BrC_6H_4OH, 95-56-7; *p*-$MeOC_6H_4OH$, 150-76-5; *m*-$MeOC_6H_4OH$, 150-19-6; *o*-$MeOC_6H_4OH$, 90-05-1; *p*-HOC_6H_4CN, 767-00-0; *p*-$HOC_6H_4CF_3$, 402-45-9; *m*-$F_3CC_6H_4OH$, 98-17-9; *o*-$F_3CC_6H_4OH$, 444-30-4; *p*-HOC_6H_4COPh, 1137-42-4; *p*-ACC_6H_4OH, 99-93-4; *p*-HOC_6H_4SMe, 1073-72-9; *p*-$HOC_6H_4SO_2Me$, 14763-60-1; *p*-$HOC_6H_4NO_2$, 100-02-7; *p*-HOC_6H_4OH, 123-31-9; *p*-$FC_6H_4SO_2Me$, 455-15-2; *p*-AcC_6H_4F, 403-42-9; 2-chloro-5-cyanopyridine, 33252-28-7; 2-chloro-5-nitrobenzonitrile, 16588-02-6; 1-chloro-2,4-dinitrobenzene, 97-00-7; 1-chloro-2,4-dicyanobenzene, 4387-30-8; 1-chloro-2-carboxy-4-nitrobenzene, 2516-96-3; 1-chloro-2-nitro-4-(methylsulfonyl)-benzene, 97-07-4; 1-chloro-3-cyano-4-nitrobenzene, 34662-31-2; 1-chloro-2-cyano-4-(methylsulfonyl)benzene, 99902-99-5; 1-chloro-2-cyano-4-aminobenzene, 35747-58-1; 1-chloro-2-cyano-4-acetamidobenzene, 53312-85-9; 2,5-dichlorobenzonitrile, 21663-61-6; 2-chloro-5-(methylsulfonyl)aniline, 16328-56-6; 5-chloro-2-(methylsulfonyl)toluene, 10200-36-9; 2-chloro-3-cyanopyridine, 6602-54-6; 2-chloro-4-cyanopyridine, 33252-30-1; 2-chloro-6-cyanopyridine, 33252-29-8; 2-chloro-5-aminopyridine, 5350-93-6; 2-chloro-5-bromopyridine, 53939-30-3; 2-chloro-5-(methylthio)-pyridine, 41288-94-2; 2-chloro-5-(methylsulfinyl)pyridine, 99903-00-1; 2-chloro-5-(methylsulfonyl)pyridine, 99903-01-2; 2-chloro-5-pyridinesulfinic acid, 99903-02-3; 2-chloro-3-(methylsulfonyl)pyridine, 70682-09-6; 2-chloro-4-(methylsulfonyl)pyridine, 99903-03-4; 2-chloro-6-(methylsulfonyl)pyridine, 87512-29-6; 3,4-dichlorophenol, 95-77-2; 2,4-dichlorophenol, 120-83-2; 3,5-dichlorophenol, 591-35-5; 2,6-dichlorophenol, 87-65-0; 2,3-dichlorophenol, 576-24-9; 2,5-dichlorophenol, 583-78-8; 3,4-dimethoxyphenol, 2033-89-8; α-naphthol, 90-15-3; 2-chloro-5-aminobenzonitrile, 35747-58-1; 2-chloro-1,3-benzenedicarbonitrile, 28442-78-6; 2-(3,4-dichlorophenoxy)-5-nitropyridine, 25935-29-9.

(18) While Me_2SO was not included in control wells, final Me_2SO concentrations in test wells never exceeded 0.1% of total volume. Earlier tests (data not shown) indicated that no deleterious effects on host cells or viruses would occur at this level.

Book Reviews

Multidimensional Pharmacochemistry—Design of Safer Drugs. By Peter P. Mager. Academic Press, New York. 1984. xiv + 418 pp. $89.00.

Unlike the now familiar multiple regression approach to QSAR, multidimensional pharmacochemistry attempts to simultaneously correlate all of the diverse biological effects of a given series of drugs with their associated physical properties. It should thus be possible not only to allow for the interactions between biological properties (metabolism, transport, binding, etc.) but also to design compounds with an ideal combination of high activity, low toxicity, and optimum pharmacokinetic properties.

Mager has published over 100 papers in this field, particularly as it relates to biorhythmic and other time- and dose-dependent phenomena. In the course of that work he and his colleagues have developed a unified series of programs devoted to the multivariate analysis of drug action, which Mager refers to as the "MASCA model of pharmacochemistry". The main components of the MASCA model are a range of statistical programs for the analysis of multivariate bioassays, together with multivariate QSAR analysis of these data in terms of their associated physicochemical properties. The description of these components makes up the bulk of the book, with the remainder being devoted to two short chapters describing Mager's personal and sometimes unorthodox views on the subject of physicochemical parameters and biochemical/pharmacological design.

The main value of the book will be to provide Mager's fellow scientists in the west with an overview of the work going on in his laboratory. There is little discussion of the relative merits

of Mager's work and that in other laboratories, and the book will consequently be of less value to the nonspecialist.

Professor of Medicinal Chemistry **Peter Andrews**
Victorian College of Pharmacy Ltd
Victoria, Australia, 3052

Progress in Drug Research. Volume 27. Edited by Ernst Jucker. Birkhäuser Verlag, Boston. 1983. 426 pp. 17 × 24.5 cm. ISBN 3-7643-1365-X. SFr 180.

This volume consists of five reviews of topics of interest to those involved in drug research. Each of these reviews is well written and thoroughly referenced. In keeping with previous volumes, the chemistry, pharamcology, and clinical applications of the various classes of compounds under discussion are adequately covered.

The first monograph "Further developments in research on the chemistry and pharmacology of synthetic quinuclidine derivatives" is an extension of an article published by the same authors in 1969. It deals with the chemistry and structure–activity relationship of a wide variety of quinuclidine derivatives. The physicochemical properties and biological activity of substituted quinuclidylcarbinols are discussed as a new class of useful antihistaminic agents. The monograph "Ketoconazole, a new step in the management of fungal disease" focuses briefly on the various types of antimycotic agents followed by a detailed discussion of the imidazole derivative ketoconazole. It is a relatively short monograph of limited interest. "The benzimidazole anthelmintics—chemistry and biological activity" concentrates on the various 2,5(6)-disubstituted benzimidazoles and their mode of action in the treatment of various forms of helminth diseases. This article is by no means exhaustive and does not include the voluminous work which has been carried out in several laboratories on the chemical and biological aspects of substituted benzimidazoles. It is a lengthy article with over 650 references cited through mid-1982 and includes the patent literature. A well-written discussion of the structures and reactions for the preparation of the various derivatives is presented and makes this monograph a valuable reference to those searching for better drugs in the treatment of helminth infestations. The review "Nitroimidazoles as chemotherapeutic agents" covers the chemistry of the nitroimidazoles and their use in various parasitic and anaerobic bacterial infections. Considerable emphasis is placed on the synthesis, reactions, and physicochemical properties of a variety of nitroimidazole derivatives. Adequate presentation of the properties of metronidazole and other 1-substituted 5-nitroimidazole analogues and which are currently under clinical investigation is included. This is a well-documented coverage of the literature for this class of compounds and a valuable review of the subject. The final review "Fifteen years of structural modifications in the field of antifungal monocyclic 1-substituted 1*H*-azoles" covers patent documents and papers dealing with the chemistry, analysis, and microbiocidal and pesticidal properties of such compounds. It demonstrates the enormous development in the field of antifungal 1-substituted azoles and the extensive work in industry. It is by no means exhaustive nor detailed in its presentation of the wide variety of substituents and other types of biological activity associated with this class of compounds. It comprises about one-third of the space in this volume with over 800 references cited through mid-1982.

This is another valuable volume in this respectable series. The adequate presentation of the chemistry utilizing clear error-free structures and schemes coupled with a discussion of the pharmacology and clinical applications of the various classes of compounds presented make this volume a complete, valuable, and easy to peruse quick reference to all those involved in drug research. The subject index of this volume is quite adequate. The cumulative subject index included for volumes 1–27 can be useful and contribute to the desired goal of the editor to make this series a work of reference. However, it may be of greater value and use to present a complete comprehensive subject and author index for the entire volumes in this series.

Department of Chemistry **Simon H. Kuttab**
Birzeit University
Birzeit, West Bank, Via Israel

Natural Products Chemistry 1984. A Collection of Invited Section and Colloquium Lectures Presented at the 14th IUPAC International Symposium on the Chemistry of Natural Products, Poznan, Poland, 9–14 July 1984. Edited by R. I. Zalewski and J. J. Skolik. Polish Academy of Sciences, Poznan, Poland. xvii + 686 pp. 17 × 24.5 cm. ISBN 0-444-42457-1. Elsevier [Amsterdam, Oxford, New York, Tokyo] 1985. $142.50.

This book presents many of the section and colloquium lectures given at the 14th International Symposium on the Chemistry of Natural Products, held under the auspices of IUPAC and the Polish Academy of Sciences in Poznan, Poland in the summer of 1984. Approximately 175 contributors from all over the world contributed papers in many of the classic fields of natural products chemistry and in many of the newest areas. The sections on the structures and properties of natural products deals with a number of new studies in classic fields such as alkaloids, terpenoids, and steroids, but with some very interesting new compounds and structural types described. The section on the synthesis and transformations of natural products contains a timely emphasis on the synthesis of nucleic acid fragments. Organic crystal chemistry and enzyme and nucleic acid modeling offer a transition into the area of biopolymers and the topic of genetic engineering. Here the topic of nitrogen fixation occupies an appropriate central position in the discussions. The papers presented in this collection will be of interest individually to specialists; this reviewer, reading the book during the summer between the end of one academic year and the beginning of another, feels that it offers a very appropriate summary of the status of some of the more important fields of natural products chemistry today.

Department of Chemistry **Philip W. LeQuesne**
Northeastern University
Boston, Massachusetts 02115

Monoclonal Antibodies in Cancer. Edited by Steward Sell and Ralph Reisfeld. The Humana Press Inc., New Jersey. 1985. xviii + 428 pp. 15.5 × 23.5 cm. ISBN 0-8960 3-068-7. $69.50.

The monoclonal antibody technique introduced by Kohler and Milstein in 1975 has offered investigators in many fields a biological probe of exquisite specificity. This text reflects the impact of technology on cancer detection and management in both experimental and clinical circumstances. In chapters 1–17, the reader is presented with inclusive reviews on monoclonal antibodies to carcinoembryonic, alphafetoprotein, human chorionic gonadotropin, major histocompatibility complex, leukemic, melanoma, lung, breast, prostrate, pancreatic, renal, and nervous system tumor markers. Each chapter avoids detailed presentations and discussions of experimental data while highlighting significant advances over the past years.

The advent of monoclonals, as reflected in each of the chapters, has led to the development of a plethora of in vitro assays for cancer and to the introduction of additional means of therapy such as radio and drug targeting of cancer cells. A number of assays have been commercialized and are offering some assistance to the clinician in cancer management.

A theme prevalent throughout this text is that "single" cancer antigens now are recognized as having numerous varied antigenic epitopes, each of which is capable of being recognized by a single monoclonal antibody. As a result, investigators are intensively involved in sorting relevant from irrevelant and cancer-specific from cancer-related epitopes. Thus, instead of a major early breakthrough, monoclonals exposed a level of complexity that still eludes widespread and routine clinical usefulness.

Most of the chapters are filled with optimism and much hope for these reagents. Those familiar with this field will see the text as presenting a balanced and realistic overview of monoclonal antibodies and cancer, while those hoping to see the field already involved with some major advances in cancer treatment will be disappointed.

I recommend this book highly to those interested in either becoming introduced to the subject or to those looking to be

involved in some aspect of cancer research and requiring a comprehensive update in the field.

College of Pharmacy and Allied Health Professions **James J. Gozzo**
Northeastern University
Boston, Massachusetts 02115

Analytical Profiles of Drug Substances. Volume 14. Edited by K. Florey. Academic Press, New York. 1985. ix + 621 pp. 15.5 × 22 cm. ISBN 0-12-260814-3. $46.50.

The usefulness of this series of compilations to anyone involved with the synthesis, properties, detection, or assay of compendium drugs has been well established. This 14th volume includes profiles for chlorthalidone, imipramine hydrochloride, cisplatin, tripelennamine hydrochloride, xylometazoline hydrochloride, mefloquine hydrochloride, iopoanoic acid, lidocaine and its hydrochloride, benperidol, terpin hydrate, atropine, isoproterenol, warfarin, naloxone hydrochloride, diflunisal, and baclophen. Supplements to previously published profiles of acetaminophen (Volume 3) and halothane (Volumes 1 and 2) as well as a cumulative index are included.

As in previous volumes, even the casual reader will note a number of errors in grammar, syntax, spelling, and punctuation. These are accepted, no doubt, as a trade-off for the advantage of having manuscripts submitted in a form ready for direct reproduction that do not lend themselves readily to emendation by the senior editorial staff. Such errors, however, will do little to reduce the value of the vast amount of useful data given in these reviews.

Staff

Targets for the Design of Antiviral Agents. Edited by E. De Clercq and R. T. Walker. Plenum Press, New York. 1984. xii + 378 pp. 17 × 26 cm. ISBN 0-306-41618-2. $57.50.

This book contains the review lectures given at the joint NATO Advanced Study Institute and FEBS Advanced Study Course held at Les Arcs, France, from June 19 to July 2, 1983. The editors have assembled reviews by authorities in virology and viral chemotherapy. The publication is divided into two main parts. The first contains review lectures that cover potential targets within various viral classes for design of antiviral agents. The second part focuses on antiviral agents that are presently in clinical use or under study as candidate drugs.

The introductory lecture by W. H. Prusoff et al. gives an overview of possible targets for viral chemotherapy. Specific considerations for the design of antiherpes virus agents is discussed by F. Rapp and B. Wigdahl. B. D. Korant, K. Lonberg-Holm, and P. LaCalla summarize the medical significance, virology, and chemotherapy of picornaviruses and togaviruses. Potential targets in negative-strand RNA are surveyed by D. H. L. Bishop, while J. J. Skehel and D. C. Wiley discuss targets for the design of agents against orthomyxoviruses. The present status of some unconventional viral diseases is reviewed by P. Brown. J. S. Oxford reviews the antiinfluenza virus activity of amantadine and rimantadine and summarizes recent work on new derivatives. The antiviral activity of 2-(α-hydroxybenzyl)benzimidazole is discussed by H. J. Eggers. D. A. J. Tyrrell's paper gives a brief overview of rhinoviruses and the present status of antirhinovirus chemotherapy. Pyrimidine nucleosides with antiviral activity are reviewed by E. De Clercq. J. C. Drach writes about the purine nucleoside analogues of primary interest as antiviral agents. P. F. Torrence et al. discuss strategies for the design of oligonucleotides as potential antiviral agents, and the rationale for the design of oligopeptides as specific antiviral agents is discussed by P. W. Choppin, C. D. Richardson, and A. Scheid. The role of DNA polymerase as a target for antiviral and antitumor agent design is surveyed by P. Chandra et al. In the last lecture G. J. Galasso gives a brief overview of the present status of several antiviral agents and speculates on future prospects for antiviral development.

The book is a collection of individual papers; thus, the style is not uniform, and there are occasional typographical errors. The volume contains a satisfactory subject index, and most of the lectures are extensively referenced with citations as current as the date of the course, 1983. This volume should be a valuable resource for viral chemotherapists interested in gaining insight into potential targets for antiviral drug design.

Wellcome Research Laboratories **James L. Kelley**
Burroughs Wellcome Co.
Research Triangle Park, NC 27709

Polypeptide Hormone Receptors. Volume 4. Receptors and Ligands in Intercellular Communication. Edited by Barry I. Posner. Marcel Dekker, New York. 1985. xviii + 599 pp. 16 × 23.5 cm. ISBN 0-8247-7110-9. $95.00.

Polypeptide Hormone Receptors is a worthwhile text that is interesting to read on current research in endocrinology up to its time of preparation. Some of the chapters cover pretty well a specific aspect of insulin receptor research or another hormone receptor system. Out of 15 chapters, four are about insulin. These include its receptor interactions, biochemistry of the receptor by N. J. Heinrich and M. P. Czech, in vivo insulin receptor studies by J. J. M. Bergeron and B. I. Posner, and studies of antibodies to insulin receptors by C. R. Kahn, M. Kasuga, and G. L. King. Recent advances in the understanding of molecular function of peptide receptors are covered by chapters on receptor-mediated uptake of hormones by B. I. Posner, M. N. Khan, and J. J. M. Bergeron and the mobile receptor hypothesis by S. Jacobs and P. Cuatrecasas. The current understanding of the basis of endocrine disorders is described in "Receptor-Associated Diseases" by J. A. Scarlett and J. M. Olefsky. The remaining chapters deal with particular hormone receptors such as those of LRH, glucagon, gonadotropin, prolactin, and the gastrointestinal hormones, etc. B. Desbuquois does a credible job in his reviews of glucagon receptors and adenyl cyclase and the gastrointestinal receptors. It is unfortunate that the recent exciting discoveries about bombesin receptors and cholecystokinin inhibitors were too late to be included. This area which comprises the neuropeptides is moving rapidly. Another introduction to an exciting field is M. D. Hollenberg and G. D. Armstrong's description of the function of epidermal growth factor. To the credit of the editing, much possible overlap of material has been avoided. This book is useful for specialists because it covers many areas of hormone research well.

Peptide Technologies Corporation **Martha Knight**
Washington, D.C. 20017

Recent Advances in the Chemistry of β-Lactam Antibiotics. Edited by A. G. Brown and S. M Roberts. Royal Society of Chemistry, London. 1985. 391 pp. 15 × 21 cm. ISBN 0-85186-955-6. $48.00.

This photooffset volume is an outgrowth of the Third International Symposium on Recent Advances in The Chemistry of β-Lactam Antibiotics held July 2–4, 1984, in Cambridge, England, under the sponsorship of The Royal Society of Chemistry, Fine Chemicals and Medicinals Group. Like its two predecessor volumes, it contains a smorgasbord of short essays dealing with various contemporary aspects of this intensely active field of natural products chemistry. The volume has appeared promptly after the conference, and the authoritative chapters contain citations up to the literature of 1984. Thus, it avoids, in so far as humanly possible, the problem of becoming rapidly dated, and the editors are to be congratulated. The volume describes research projects carried out in the laboratories of the various authors so the accounts are authoritative, though partisan, and there is no attempt to give comprehensive coverage of the field.

As when faced with any buffet, individuals will find some selections particularly to their taste and reject others, but the quality of this book is high and medicinal chemists will be sour on antibiotics indeed if they do not find much of interest in this small volume. The book is not only quite readable, but the price is realistic by contemporary standards. Antibiotic chemists will want their own copy, and no library serving medicinal chemists should be without this series.

The book begins with a review of the chemistry and biology of newer cephalosporins with emphasis on C-6 aminothiazolo-oximino amides by C. E. Newall of Galxo; M. I. Page et al. of the Polytechnic, Queensgate, Huddlesfield, discuss ejection of C-3 substituents subsequent to β-lactam bond scission and also discuss preparation of cyclobutanone bioisosteres; R. J. Ponsford et al. of Beecham discuss C-7 methoxy, thiomethyl, and formamido penicillins; J. D. Hood et al. of Beecham describe the methoxylation of penicillins and cephalosporins by a cell-free Streptomycete-derived enzyme preparation; J. E. Baldwin of Oxford describes recent results in the biosynthesis of penicillins; B. G. Christensen et al. of Merck discuss analogues of thienamycin that are relatively stable chemically and enzymatically; B. C. Ross et al. of Hoechst-England discuss the 2-oxypenems; J. H. Bateson et al. of Beecham describe cycloaddition reactions of some olivanic acid derivatives; S. Uyeo of Shionogi discusses synthesis and evaluation of asparenomycin analogues; J. Brennan et al. describe photolysis of 2-pyridones to mono-β-lactams; Y. Fukagawa et al. Sanraku-Ocean deal with the OA-6129 carbapenems and with penem biosynthesis; R. J. Stoodley of The University, Newcastle, discusses the synthesis of isopenams and bioisosteric analogues; D. I. John of King's College, London, describes 6-diazopenicillanates as synthons for the preparation of 6-mono- and 6-disubstituted analogues; G. Lowe and S. Swain of Oxford discuss cyclopropanone bioisosteres of β-lactams; I. Sterling et al. of Beecham deal with clavulanic acid chemistry and metabolism; R. G. Micetich et al. of Alberta, S. Yamabe of Kobe College, and N. Ishida et al. of Taiho discuss YTR-830 and related β-lactamase inhibitors; P. G. Sammes et al. of The University, Leeds, deal with synthetic β-lactamase inhibitors; A. K. Ganguly et al. of Schering describe synthetic penems now in clinical trial; S. G. Waley et al. of Oxford discuss the molecular mode of action of the three types of β-lactamases; C. M. Cimarusti et al. of Squibb discuss chiral synthesis of mono-β-lactams; M. J. Miller et al. of Notre Dame describe their new β-lactam synthesis from *N*-hydroxy-2-azetidinones; Gil Hite et al. discuss X-ray structures of a β-lactam sensitive bifunctional D-alanylcarboxypeptidase transpeptidase and its β-lactam binding site. The volume closes with short accounts of projects presented in the form of posters at the meeting.

Department of Medicinal Chemistry **Lester A. Mitscher**
University of Kansas
Lawrence, Kansas 66045