

JOURNAL OF CLINICAL MICROBIOLOGY

VOLUME 12 • NUMBER 3 • SEPTEMBER 1980

EDITORIAL BOARD

Henry D. Isenberg, *Editor-in-Chief* (1984)
Long Island Jewish-Hillside Medical Center,
New Hyde Park, N.Y.

Lorraine Friedman, *Editor* (1982)
Tulane University Medical School,
New Orleans, La.

Nathalie J. Schmidt, *Editor* (1985)
California Department of Health,
Berkeley, Calif.

Peter B. Smith, *Editor* (1984)
Center for Disease Control,
Atlanta, Ga.

Donald G. Ahearn (1981)
Libero Ajello (1982)
William L. Albritton (1981)
James R. Allen (1982)
Stephen D. Allen (1981)
Daniel Amsterdam (1980)
Arthur L. Barry (1981)
Barry Beaty (1981)
John F. Bennett (1982)
Victor D. Bokkenhauser (1982)
Edward J. Bottone (1980)
Don J. Brenner (1980)
Sotiros D. Chaparas (1982)
William B. Cherry (1981)
Wallace A. Clyde, Jr. (1982)
B. H. Cooper (1980)
Richard F. D'Amato (1980)
Jules L. Dienstag (1980)
Richard E. Dixon (1981)
Steven D. Douglas (1981)
Walter R. Dowdle (1982)
V. R. Dowell, Jr. (1980)
Bennett L. Elisberg (1982)
Richard W. Emmons (1980)
Richard Facklam (1982)
John C. Feeley (1980)
James D. Fenters (1982)
Sydney M. Finegold (1982)
Maxwell Finland (1980)
Herman Friedman (1981)
Thomas L. Gavan (1980)
Robert C. Good (1982)
Norman L. Goodman (1980)
Morris A. Gordon (1981)

Dieter Gröschel (1980)
Pekka Halonen (1981)
James L. Hardy (1981)
Maurice W. Harmon (1982)
William J. Hausler, Jr. (1981)
Kenneth L. Herrmann (1982)
Harry R. Hill (1980)
Lillian V. Holdeman (1982)
Milton Huppert (1981)
Russell C. Johnson (1982)
S. S. Kalter (1981)
Leo Kaufman (1981)
Douglas S. Kellogg (1981)
George E. Kenny (1982)
Wesley E. Kloos (1982)
George P. Kubica (1982)
Walter J. Loesche (1982)
Laurence R. McCarthy (1980)
Joseph E. McDade (1982)
Jerry R. McGhee (1982)
James D. MacLowry (1980)
Harold Markowitz (1980)
William J. Martin (1980)
Joseph L. Melnick (1982)
William I. Metzger (1980)
Stephen A. Morse (1980)
C. Wayne Moss (1980)
Maurice A. Mufson (1980)
Harold C. Neu (1982)
Joseph V. Osterman (1982)
Arvind A. Padhye (1981)
Barbara G. Painter (1980)
Demosthenes Pappagianis (1980)
M. John Pickett (1982)

Robert H. Purcell (1980)
William E. Rawls (1980)
L. Barth Reller (1980)
Shirley J. Richmond (1982)
Glenn D. Roberts (1980)
Jon E. Rosenblatt (1980)
Arthur F. Rosenthal (1982)
Sally Jo Rubin (1980)
Julius Schachter (1980)
Alexis Shelokov (1982)
Marcelino F. Sierra (1981)
Margarita Silva-Hutner (1980)
Robert M. Smibert II (1981)
James W. Smith (1980)
Leslie Spence (1982)
Vera L. Sutter (1982)
Jason Tanzer (1982)
Patricia E. Taylor (1982)
Welton I. Taylor (1980)
John H. Thompson, Jr. (1980)
Richard C. Tilton (1981)
Alexander von Graevenitz (1980)
I. Kaye Wachsmuth (1981)
Kenneth W. Walls (1980)
Joseph L. Waner (1980)
Lawrence G. Wayne (1980)
Tracy D. Wilkins (1981)
Hazel Wilkinson (1980)
Robert P. Williams (1981)
Marion E. Wilson (1980)
Kwei-Hay Wong (1980)
G. N. Woode (1982)
Robert H. Yolken (1981)

Gisella Pollock, *Acting Managing Editor*
Eleanor Tupper, *Production Editor*
1913 I St., NW, Washington, DC 20006

EX OFFICIO

Albert Balows, *President* (1980–1981)
J. Mehsen Joseph, *Secretary*

Frederick C. Neidhardt, *President-Elect* (1980–1981)
Brinton M. Miller, *Treasurer*

The *Journal of Clinical Microbiology* (ISSN 0095-1137), a publication of the American Society for Microbiology, 1913 I St., NW, Washington, DC 20006, is devoted to the dissemination of new knowledge concerning the applied microbiological aspects of human and animal infections and infestations, particularly regarding their etiologic agents, diagnosis, and epidemiology. Papers dealing with antibiotics and antimicrobial agents and chemotherapy, with fundamental aspects of infection and immunity, and with food or dairy microbiology fall within the scope of other ASM publications. Instructions to Authors are published in the January issue each year. The *Journal* is published monthly, and the twelve numbers are divided into two volumes per year. The nonmember subscription price is \$60 per year. The member subscription price is \$16 per year. Single copies are \$6. Correspondence relating to subscriptions, reprints, defective copies, availability of back issues, lost or late proofs, disposition of submitted manuscripts, and general editorial matters should be directed to the ASM Publications Office, 1913 I St., NW, Washington, DC, 20006 (area 202 833-9680).

日本：価格は外貨表示とは関係なく円建。

Second-class postage paid at Washington, DC 20006, and at additional mailing offices.

Made in the United States of America.

Copyright © 1980, American Society for Microbiology.
All Rights Reserved.

The code at the top of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal use, or for personal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per-copy fee through the Copyright Clearance Center, Inc., P.O. Box 765, Schenectady, New York 12301, for copying beyond that permitted by Sections 107 and 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.

Author Index

Altura-Werber, Erna, 332
Anhalt, John P., 375
Arvin, A. M., 367

Baker, Carol J., 442
Bessman, Alice N., 413
Blaser, Martin J., 406, 479

Canawati, Hanna N., 413
Carlson, Barbara L., 301
Cate, Thomas R., 426
Chaskes, Stuart J., 332
Chesnut, Shelby, 329
Cuero, Raúl G., 455

Dalrymple, Joel M., 361
Dasch, Gregory A., 343
Davies, Heather A., 462
de la Rosa Fraile, Manuel, 310
DeSilva, M. I., 472
Doran, Terence I., 421

Edberg, Stephen C., 332
Epstein, Joel B., 475
Evans, Charles A., 355

Falsen, Enevold, 297
Feczko, Joseph, 477
Feeley, John C., 402
Fernandez Gutierrez, Clotilde,
310
Fikes, Bonnie J., 395
Filice, Gregory A., 336
Frank, Arthur L., 426

Gentry, Mary K., 361
Green, Jon A., 433

Haley, Mark S., 301
Hall, Caroline B., 447
Halle, Sidney, 343
Hanna, Lavelle, 409
Helms, Charles M., 326
Hennessy, Joan N., 304
Hierholzer, Walter J., Jr., 326
Holmes, I. H., 314, 320

Hopfer, Roy L., 329
Hughes, Bonnie J., 426
Hunter, Elizabeth F., 402

Johnson, Roy B., Jr., 451
Johnson, William, 326

Kajiser, Bertil, 297
Kaplan, Raymond L., 477
Keshishyan, Hermine, 409
Koropchak, C. M., 367

Landau, William, 477
Larson, Elaine L., 355
Lentsch, Ronald H., 351
Libby, Rosemary, 451
Luechtefeld, Nancy A. W., 406,
479

Macnaughton, Malcolm R., 462
Mattingly, Stephen J., 421
McCarthy, Laurence R., 375
McCormack, William M., 301
McCullough, Alan G., 469
McKinney, Roger M., 395
McLean, B., 314, 320
Milligan, Thomas W., 421
Minnich, Linda, 391
Montgomerie, John Z., 413
Mote, Patricia A., 402

Nealon, Timothy J., 421
Nehls, Lars, 297
Nygren, Börje, 297

Orengo, Antonio, 329
Ourth, Donald D., 439
Overall, James C., Jr., 433

Patterson, Steven, 462
Pearsall, Nancy N., 475
Penner, John L., 304
Puck, Jennifer, 426

Qadri, S. M. Hussain, 472

Ray, C. George, 391
Reller, L. Barth, 406, 479
Remington, Jack S., 336
Renner, Edward D., 326

Sapico, Francisco L., 413
Sasseville, Karen R., 395
Schnabel, Kenneth C., 447
Schoenknecht, Fritz D., 375
Schubert, Charles M., 402
Sherris, John C., 375
Singer, Jacques M., 332
Sliva, Holly S., 445
Smalley, David L., 439
Sommers, Herbert M., 395
Sonza, S., 314
Spencer, H. J., 375
Steinhoff, Mark C., 447
Straus, David C., 421
Strom, Mark S., 355
Svedhem, Åke, 297

Thomas, Brenda J., 462
Thornsberry, Clyde, 375
Tisei, Nancy A., 301
Truelove, Edmond L., 475

Vega Aleman, Dolores, 310
Viner, John P., 326

Wagner, F. William, Jr., 413
Wagner, Joseph E., 351
Wang, Wen-Lan L., 406, 479
Washington, John A., II, 375, 445
Webb, Bette J., 442
Wenglar, Mark, 329
Wilkinson, Hazel W., 395
Wintermeyer, Laverne A., 326
Witte, Joyce L., 413
Wolf, James S., 395

Yeager, Anne S., 336
Yeh, Tze-Jou, 433
Yungbluth, Margaret M., 395

Zubairi, Sabiha, 472

ANNOUNCING
THIRD INTERNATIONAL SYMPOSIUM
ON
RAPID METHODS AND AUTOMATION
IN MICROBIOLOGY*

26-30 MAY 1981
WASHINGTON, D.C.

TOPICAL AREAS WILL INCLUDE

- clinical, medical, and public health microbiology
- industrial microbiology
- environmental microbiology
- food microbiology
- quality control
- microbiological technology in developing nations

SHORT PAPERS ARE INVITED AND MUST BE
SUBMITTED ON OFFICIAL ABSTRACT FORMS
BY 31 DECEMBER 1980 to ASM HEADQUARTERS,
1913 "EYE" ST., WASHINGTON, D.C. 20006.

For further information write:

Dr. Richard C. Tilton, Chairman
ISRMA Planning Committee
University of Connecticut Health Center
Department of Laboratory Medicine
263 Farmington Avenue
Farmington, Connecticut 06032

** Sponsored by the American Society for Microbiology*

ORDER YOUR COPY TODAY

CHAIRPERSON

Department of Microbiology

The Medical College of Pennsylvania is seeking an individual with an outstanding record of achievement in research and demonstrated abilities in teaching and administration to chair the Department of Microbiology. Department has a range of scientific interest and activities in medical and graduate education. Nominations or applications with curriculum vitae and names of three or more references should be submitted to:

DR. GEORGE ROTHBLAT, Chairman,
Microbiology Search Committee
Dept. of Physiology/Biochemistry

MEDICAL COLLEGE OF PENNSYLVANIA

3300 Henry Avenue
Philadelphia, Pa. 19129

An Equal Opportunity Employer, M/F

Current Chemotherapy and Infectious Disease

In 2 volumes, 1,797 pages.
\$75.00 (\$30.00 to ASM Members).

Editors:

John D. Nelson and Carlo Grassi

American Society for Microbiology
1913 I Street, NW
Washington, DC 20006

INDEX TO ADVERTISERS

	Page
* Ames Division Miles	6, 7
* Analytab Products	Cover 2
* BBL Microbiology Systems	15
* Becton-Dickinson	19
* Clinical Sciences, Inc.	Cover 4
* Difco Laboratories	20
* Flow Laboratories	12, 13
Gibco Diagnostics	16
* Marion Scientific Corp.	17
Meridian Diagnostics	10
Micro-Media Systems	Cover 3
* Pfizer Diagnostics	9, 11
Verlag Chemie International	9
 * Sustaining Member, American Society for Microbiology.	

Advertising in this journal is limited to products and services believed to be of interest to the readers. However, ASM does not test nor examine advertised products nor claims related thereto. Therefore, ASM endorsement or approval of advertised products should not be inferred.