

THE  
JOURNAL  
OF  
SYMBOLIC LOGIC

EDITED BY

WILLIAM CRAIG

KIT FINE

YIANNIS MOSCHOVAKIS

HERBERT ENDERTON

DAGFINN FØLLESDAL

ANIL NERODE

WILFRID HODGES

*Managing Editor:* ALFONS BORGERS

*Consulting Editors:*

PETER ACZEL

JIRÍ BEČVÁŘ

JOAN BRESNAN

M. J. CRESSWELL

MARTIN D. DAVIS

SOLOMON FEFERMAN

FREDERIC B. FITCH

DAVID KAPLAN

SAUL A. KRIPKE

MICHAEL MAKKAJ

RUTH BARCAN MARCUS

DONALD A. MARTIN

J. DONALD MONK

GERT H. MÜLLER

CHARLES D. PARSONS

GABRIEL SABBAGH

GERALD SACKS

ARTO SALOMAA

DANA S. SCOTT

JOSEPH R. SHOENFIELD

RICHARD A. SHORE

BAS VAN FRAASSEN

VOLUME 45 • NUMBER 4 • DECEMBER 1980

ISSN 0022-4812

PUBLISHED QUARTERLY BY THE ASSOCIATION FOR SYMBOLIC LOGIC, INC. WITH  
SUPPORT FROM ICSU AND FROM INSTITUTIONAL AND CORPORATE MEMBERS

---

*Copyright © 1980 by the Association for Symbolic Logic, Inc.  
Reproduction by photostat, photo-print, microfilm, or like process by permission only*

## TABLE OF CONTENTS

Editorial note.....	641
Index of contributed papers.....	643
Index of abstracts.....	669
Index of reviews by subjects.....	707
List of officers and members of the Association for Symbolic Logic.....	805
Notices.....	835

---

THE JOURNAL OF SYMBOLIC LOGIC is published quarterly, in the months of March, June, September, and December. The JOURNAL is the official organ of the Association for Symbolic Logic, Inc., an international organization for furthering research in symbolic logic and exchange of ideas among mathematicians, philosophers, and others interested in this field.

Individual membership in the Association is open to anyone interested in its work. Annual dues for students are \$9.00. Dues for other individual members are \$18.00 per year. Dues include subscription to the current volume of the JOURNAL. For their personal use, members may purchase back volumes at 25% discount.

Institutional membership in the Association is available to any academic institution or department. Annual dues are \$120.00. Membership privileges include choices of current subscriptions, of back volumes, and of student memberships; a detailed description is available from the Association. Information on corporate membership is also available from the Association.

For nonmembers, the current annual subscription price is \$48.00 for a volume in paper form, and \$64.00 for a combination of paper and microform (microfiche or microfilm). Microfiche of each issue is sent by fast mail before the camera copy is sent to the printer. Microfilm copy of a volume is sent at the end of the year. It is available in 16mm positive or negative form, and may be ordered on spools or in Kodak or 3M cartridges.

Back volumes of the JOURNAL are available in paper form, on microfilm, and (beginning with Volume 44) on microfiche. Prices per volume in paper form are as follows: \$20.00 for Volumes 1–17, \$25.00 for Volumes 18–36, \$45.00 for Volume 37, \$53.00 for Volume 38, \$60.00 for Volumes 39–41, and \$72.00 for Volume 42 and later volumes. *A Bibliography of Symbolic Logic* by Alonzo Church (from Volumes 1 and 3) may be purchased separately; the price is \$9.00 for members or \$12.00 for nonmembers. Prices for back volumes on microfilm or microfiche may be obtained by writing to the Association.

Applications for membership in the Association, requests for information, notices of change of address, and all business correspondence should be sent to *The Association for Symbolic Logic, P. O. Box 6248, Providence, RI 02940*. Dues and subscriptions to the JOURNAL should be sent to *The Association for Symbolic Logic, P. O. Box 1571, Annex Station, Providence, RI 02901*; all orders must be accompanied by payment.

Notices and announcements for publication in the JOURNAL should be sent to the Secretary of the Association, *Louise Hay, Department of Mathematics, University of Illinois at Chicago Circle, Chicago, IL 60680*.

Books for review in the JOURNAL should be sent to *William Craig or Herbert Enderton, The Journal of Symbolic Logic, U. C. L. A., Los Angeles, CA 90024*.

Articles being submitted for publication in the JOURNAL should be sent in duplicate to one of the following editors: *Kit Fine, Department of Philosophy, University of Michigan, Ann Arbor, MI 48109*; or *Dagfinn Føllesdal, Department of Philosophy, University of Oslo, Blindern, Oslo 3, Norway*; or *Wilfrid*

*Continued on inside back cover*

Second-class postage rates paid at Providence, RI, and additional offices