## THE

## JOURNAL

## OF

## SYMBOLIC LOGIC

EDITED BY

Alonzo Church
William Craig

Herbert Enderton
Dagfinn Follesdal
Y. N. Moschovakis

## Managing Editor: Alfons Borgers

## Gonsulting Editors:

Jíkí Bečváḱ
Paul Bernays
Andrzej Blikle
C. C. Chang

Martin Davis
Edward E. Dawson
Verena H. Dyson
Calvin C. Elgot

Frederic B. Fitch
G. Hasenjaeger

Hans Hermes
H. Jerome Keisler

Azriel Lévy
Donald Monk
Gert H. Müller
RózsA Péter.
Michael O. Rabin

Gene F. Rose Barkley Rosser
Arto Salomáa
Kurt Schutte
Dana Scott
Joseph R, Shoenfield J. F. Thomson

Jean van Heijenoort

VOLUME 42 NUMBER 2
JUNE 1977

Published quarterly by the Association for Symbolic Logic Inc. with SUPPORT FROM ICSU AND FROM INSTITUTIONAL AND CORPORATE MEMBERS

Copyright (C) 1977 by the Association for Symbolic Logic, Inc.
Reproduction by photostat, photo-print, microfilm, or like process by permission only

## TABLE OF CONTENTS

Strict- $\Pi_{1}^{1}$ predicates on countable and cofinality $\omega$ transitive sets. By Philip W. Grant ..... 161
An axiomatization for a class of two-cardinal models. By JAMES H. SCHMERL. ..... 174
Definability of measures and ultrafilters. By David Pincus and Robert M. Solovay ..... 179
On deciding the provability of certain fixed point statements. By GEORGE Boolos ..... 191
Some models for intuitionistic finite type arithmetic with fan functional. By A. S. Troelstra ..... 194
On splitting stationary subsets of large cardinals. By JAMES E. BAUMGARTNER, Alan D. Taylor and Stanley Wagon ..... 203
The consistency problem for NF. By M. BofFA. ..... 215
Fragments of first order logic, I: universal Horn logic. By George F. McNulty. ..... 221
The use of Kripke's schema as a reduction principle. By D. van Dalen ..... 238
Sheaves and normal submodels. By Richard Mansfield ..... 241
Theories with models of prescribed cardinalities. By Alan Mekler ..... 251
Minimal models. By RAINER DEISSLER ..... 254
Compactness and transfer for a fragment of $L^{2}$. By M. MAGIDOR and J. Malitz ..... 261
Craig interpolation theorem for intuitionistic logic and extensions, Part III. By Dov M. Gabbay ..... 269
Chang's conjecture and powers of singular cardinals. By MENACHEM MAGIDOR ..... 272
A model theoretic approach to Malcev conditions. By JOHN T. BALDWIN and Joel Berman ..... 277
Definability in well quasi-ordered sets of structures. By Charles K. Landraitis ..... 289
On Moschovakis closure ordinals. By Jon Barwise ..... 292
A lattice of interpretability types of theories. By JAN MYCIELSKI . ..... 297
A new version of Beth semantics for intuitionistic logic. By Dov M. Gabbay. ..... 306
Reviews ..... 309

The Journal of Symbolic Locic is the official organ of the Association for Symbolic Logic Inc., published quarterly, in the months of March, June, September, and December. The Journal also contains the official notices of the Division of Logic, Methodology and Philosophy of Science of the International Union of History and Philosophy of Science.

Membership in the Association is open to any one 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, all members may purchase back issues at $25 \%$ discount.

For nonmembers, subscription to the current volume of the Journal is $\$ 48$ per year. Back volumes may be purchased at $\$ 20$ per volume for volumes $1-17, \$ 25$ per volume for volumes $18-36$, $\$ 45$ for volume $37, \$ 53$ for volume 38 , and $\$ 60$ per volume for volumes 39-41. Back volumes of JSL are also available on 16 mm microfilm and may be mounted on spools or in Eastman or 3M cartridges. Volumes $1-37(1936-1972)$ are mounted on 5 spools and cost $\$ 325.00$ for spools or $\$ 340.00$ for cartridges.

Continued on inside back cover
Second-class postage rates paid at Providence, R.I. and additional offices.

