

MODERN LOGIC

International Journal for the History of Mathematical Logic,
Set Theory, and Foundations of Mathematics

Vol. 7, no. 2

(April 1997)

*Mathematical logic . . . is the modern form of logic developed
in the last hundred years.* — Rudolf Carnap (1954)



Modern Logic Publishing, Ames, Iowa, USA

ISSN 1047-5982

MODERN LOGIC

International Journal of the History of Mathematical Logic,
Set Theory, and Foundations of Mathematics

EDITORIAL BOARD

EDITOR: Irving H. ANELLIS (Modern Logic Publishing, 2408½ W. Lincoln Way (Upper Level), Ames, IA 50014-7217, USA; email: ModernLog@aol.com; IrvAnellis@aol.com) (English, Russian / General Logic and Foundations, Proof Theory, 20.-cent., Logic in the USSR; 03Bxx, 03Fxx)

CO-EDITOR: Thomas L. DRUCKER (Modern Logic Publishing, 304 South Hanover Street, Carlisle, PA 17013-3938, USA; fax: 717-258-0515) (English, French / Categorical Logic, Model Theory and Nonstandard Models; 03G30, 18B25, 03Cxx, 03Hxx)

GENERAL OFFICE MANAGER & GRAPHIC ARTIST: Shannon S. Wright

ASSOCIATE EDITORS:

Francine F. ABELES (Department of Mathematics and Computer Science, Kean College SCNJ, Union, N.J. 07083, USA; email: fabeles@turbo.kean.edu) (Reviews Editor)

Alexei G. BARABASHEV (Department of Philosophy and Methodology of Science, Room 451, Humanities Bldg. No. 1, Center for Social Sciences and Humanitarian Studies, Moscow University, Moscow, 119899 Russia; email: alexei@bar.srcc.msu.su; fax: 7 (095) 939-5338) (Russian, English / Sociology, Pedagogy, Methodology and Philosophy of Logic, Philosophy of History of Foundations of Mathematics, Future Prospectives; 00A25, 01A67, 01A80, 03A05, 98-03)

Valentine A. BAZHANOV (Departmenmt of Philosophy, Ulyanovsk Branch of Moscow University, P.O. Box 1602, Ulyanovsk 63, 432063, Russia; email: bazhan@bazh.univ.simbirsk.su; WWW page url: <http://www.bmsu.simbirsk.su/koi8/Bmsu/personsazhanov.html> (bazhanov, godel OR peirce OR loguniv.html); fax: 7 (8422) 313000) (Russian, English / Paraconsistent Logics, Modal Logics, Multiple-valued Logics, 19.-20. century Logic in Russia & USSR; 03B45, 03B50)

Leon HARKEROAD (1111 Hector Street, Ithaca, N.Y. 14850, USA; email: leon@cs.cornell.edu) (English, French, German, Hungarian / Recursion Theory, Fuzzy Sets; 03Dxx, 03E72, 04A72)

Roman MURAWSKI (Instytut Matematyki, UAM, ul. Matejki 48/49, PL-60-769 Poznań, Poland; email: rmur@math.amu.edu.pl) (Polish, Russian, German, English, French / 19.-20. century Logic in Poland, Hilbert's Program, Metamathematics, and Theories of Arithmetic, First- and Second-order Arithmetic and Fragments, Nonstandard Models of Peano Arithmetic; 03C62, 03F30, 03F35, 03H15)

Volker PECKHAUS (Institut für Philosophie der Universität Erlangen-Nürnberg, Bismarckstraße 1, D-91054 Erlangen, Germany; email: vrpeckha@phil.uni-erlangen.de; URL: <http://www.phil.uni-erlangen.de/~p1phil/lstii.html>) (German, English / Algebraic Logic; 03Gxx)

Gellius N. POVAROV (Department of Cybernetics, Moscow State Institute for Engineering Physics, Kashirskoe Shosse, Bldg. 31, Moscow University, Moscow, 115409, Russia; fax: 7 (095) 324-2111) (Russian, English, German, French, Spanish, Italian, Portuguese, Dutch, Hungarian / Programming Logic, Relay Circuits, Finite Automata; 03B70, 068N17, 68Qxx, 94C10)

Wim RUITENBURG (Department of Mathematics, Statistics & Computer Science, Marquette University, P.O. Box 1881, Milwaukee, WI 53201-1881, USA; email: wimr@mscs.mu.edu) (English, Dutch, German, French / Constructive Logic and Mathematics, Intuitionism, Topos Theory, Constructive Algebra; 03F50, 03F55, 03F65; 03G30)

John C. SIMMS (Department of Mathematics, Statistics & Computer Science, Marquette University, P.O. Box 1881, Milwaukee, WI 53201-1881, USA; email: johns@mscs.mu.edu; URL: <http://mscs.mu.edu/~johns>) (English, German, French / Set Theory; 03Exx, 04-xx)

ADVISORY BOARD: Evandro AGAZZI, *ex officio* (Genoa), Boris V. BIRYUKOV (Moscow), Alejandro R. GARCIA DIEGO (Mexico City), Nathan HOUSER (Indianapolis), Peter MILNE (Edinburgh), Christian THIEL (Erlangen), Frank WILSON (Lewisburg)

MODERN LOGIC

**International Journal for the History of Mathematical Logic, Set Theory,
and Foundations of Mathematics**

**Revue International d'Histoire de Logique Mathématique, Théorie des
Ensembles et des Fondements des Mathématiques**

**Internationale Zeitschrift für Geschichte der mathematischen Logik,
Mengenlehre und Grundlagen der Mathematik**

**Международный Журнал по Истории Математической Логики,
Теории Множеств и Оснований Математики**

**Rivista Internazionale di Storia della Logica Matematica, Teoria degli
Insiemi e Fondamenti di Matematica**

**Revista internacional de história de la lógica matemática, teoría de conjuntos
y fundamentos de las matemáticas**

**Volume 7, no. 2
(April 1997)**

**Modern Logic Publishing
(SAN 298-1777)**

**Irving H. Anellis, Executive Editor & Publisher
2408 1/2 W. Lincoln Way (Upper Level)
Ames, Iowa 50014 -7217, USA
tel.: 515 / 292-1819
email: ModernLog@aol.com**

**Typesetting by the Department of Mathematics, Statistics and Computer
Science of Marquette University**

MODERN LOGIC

International Journal for the History of Mathematical Logic,
Set Theory, and Foundations of Mathematics

Subscriptions. Requests for information concerning subscriptions should be sent to: Order & Subscription Department, Modern Logic Publishing, Box 1128 Welch Avenue Station, Ames, IA 50014-1128, USA. Individuals residing in countries which do not have convertible currency may inquire about Barter Exchange Subscriptions. Institutional subscribers may contact their journals subscription service. Subscriptions: Individuals – US\$44 per volume (add US\$20 per volume for air mail delivery outside the United States); Libraries/institutions: US\$110 per volume.

Published by Modern Logic Publishing, Dr. Irving H. Anellis, Executive Editor & Publisher; Shannon S. Wright, General Office Manager & Graphic Artist: 2408 1/2 W. Lincoln Way (Upper Level), Ames, IA 50014–7217, USA.

WWW URL page: <http://www.ed.ac.uk/~pmilne/ml/home.html>.

© Modern Logic Publishing, 1997

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system without the express permission in writing of the publisher. *Modern Logic* is registered with the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Massachusetts 01923, USA. The publisher hereby authorizes registered users of the CCC to duplicate materials contained in *Modern Logic* by paying copy fees directly to the CCC.

vol. 7, no. 2
(April 1997)

 Printed on recycled paper

ISSN 1047-5982