History and Philosophy of the Life Sciences

M D Grmek, 10 rue de Savoie, F-75006 Paris, France

B A Fantini, Switzerland, G Corbellini, Italy, J A Gilder, Italy

Editorial Office

Stazione Zoologica "Anton Dohrn", Villa Comunale, I-80121 Naples, Italy

~

HISTORY AND PHILOSOPHY OF THE LIFE SCIENCES is an international journal devoted to the historical development of the life sciences and of their social and epistemological implications. The journal also covers the broader philosophical concerns of biology and medicine. The main interest of the journal is modern western scientific thought, although it also includes any period in history of the life sciences (e.g., classical antiquity, the Middle Ages) and any cultural area, (e.g., Chinese and Indian medicine).

READERSHIP

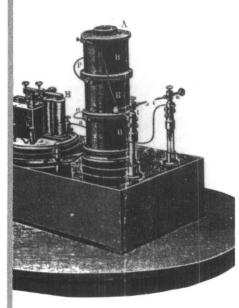
The journal is aimed primarily at professional historians and philosophers, but is also of interest to scientists and teachers.

SUBSCRIPTION INFORMATION

Volume 16 (1994) • 3 per annum • ISSN 0391-9714 Institutional: US\$138 / £82 • Personal: US\$88 / £49

} ≪ -		
۵	Please send me a FREE sample copy of HISTORY AND PHILOSOPHY OF THE LIFE SCIENCES	
	Please send me a complete Journals Catalogue* / Books Catalogue* (*Please delete as appropriate)	
	Please add me to your mailing list	
Nan	ne	
Add	ress	
Tay	lor & Francis Ltd	
	kine Road, Basingstoke, Hampshire RG24 8PR, UK	
Tel:	+44 (0)256 840366 • Fax: +44 (0)256 479438	
Tay	lor & Francis Inc	Taylor & Franc
1900	Frost Road, Suite 101, Bristol, PA 19007-1598, USA	Publishers since 1798
Tel:	+1 800 821 8312 • Fax: +1 215 785 5515	

the life of Science



The Creation of Scientific Effects

Heinrich Hertz and Electric Waves

led Z. Buchwald

In this first detailed scientific biography of Hertz, Buchwald examines Hertz's work on electromagnetic waves within the social and intellectual context of nineteenth-century German physics. By situating Hertz's work within the larger scientific community of his day, Buchwald demonstrates how the tacit knowledge underlying scientific practice can be recovered.

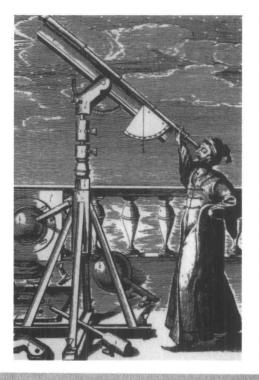
Paper \$32.95/£26.25 496 pages ilius. Cloth edition available

Instruments

Edited by Albert Van Helden and Thomas L. Hankins

These eleven essays show how new scientific instruments have been used historically not only to advance understanding, but also to impress audiences and elevate careers, claim authority, and serve as a bridge between natural science and popular culture. Contributors include Jan Golinski, Bruce J. Hunt, Deborah Warner, Bruce Hevly, Robert W. Smith and Joseph N. Tatarewicz, Thatcher Deane, Simon Schaffer, Timothy Lenoir, and Robert Frank.

Paper \$25.00/£19.95 Cloth edition available Osiris, Volume 9



UK/Europe orders to: 0442-882222 All other orders to: 1-800-621-2736

CAMBRIDGE

Now in paperback

Chance and Design

Reminiscences of Science in Peace and War ALAN HODGKIN

'Hodgkin comes across in this enjoyable book as a genial and humane scientist passionately devoted to his research for its own sake both before and after being awarded his Nobel prize.'

M. F. Perutz, Nature £19.95 net PB 0 521 45603 7 424 pp. 1994

Critical Assembly

A Technical History of Los Alamos During the Oppenheimer Years, 1943–1945

LILLIAN HODDESON, PAUL W. HENRIKSEN, ROGER A. MEADE and CATHERINE L. WESTFALL

'Critical Assembly ... is a true historical record of an epic technical venture. I strongly recommend it.'

Hans A. Bethe, Physics World

£45.00 net HB 0 521 44132 3 528 pp. 1993

The Milky Way Galaxy and Statistical Cosmology, 1890–1924

ERICH ROBERT PAUL

This book describes the nature of the Milky Way Galaxy during the early years of the twentieth century, and how those ideas influenced our present understanding of the Universe.

£30.00 net HB 0 521 35363 7 278 pp. 1994

The Shorter Science and Civilisation in China: 4

An abridgement by Colin A. Ronan of Joseph Needham's original text

COLIN A. RONAN

This book fills a gap in our knowledge of the history of mechanical inventions and mechanical engineering. The text is eminently readable and should appeal to all readers interested in Chinese studies and the history of technology.

£40.00 net HB 0 521 32995 7 350 pp. 1994 £19.95 net PB 0 521 33873 5

Now in paperback

Constructing the Subject

Historical Origins of Psychological Research
KURT DANZIGER

'Danzinger's Constructing the Subject is the most striking achievement in historical research within psychology since the publication of Edwin G. Boring's History of Experimental Psychology in 1929.' American Scientist £12.95 net PB 0 521 46785 3 272 pp. 1994 Cambridge Studies in the History of Psychology 1

For further information write to Giulia Williams at the address opposite or email us on science@cup.cam.ac.uk.

Please call 0223-325970 to order any Cambridge book on your credit card.

Crowds, Psychology and Politics, 1871–1899

JAAP VAN GINNEKEN

'Van Ginneken has written the most thorough study available in any language of the origins and character of European 'crowd psychology' ... This is a concise, lively, thoughtful, accurate, and endlessly informative history ...'

Contemporary Psychology £35.00 net HB 0 521 40418 5 336 pp. 1992

£35.00 net HB 0 521 40418 5 336 pp. 1993 Cambridge Studies in the History of Psychology

Now in paperback

Science in Russia and the Soviet Union

A Short History LOREN R. GRAHAM

'... is a splendid work, a breathtaking synthesis that is at once erudite and accessible, illuminating and a pleasure to read ... A rich and rewarding book.'

Daniel J. Kevles, California Institute of Technology £14.95 net PB 0 521 28789 8 375 pp. 1994 Cambridge History of Science

Planets, Stars, and Orbs

The Medieval Cosmology, 1200–1687 EDWARD GRANT

Planets, Stars, and Orbs describes medieval conceptions of the cosmos as understood by scholastic theologians and natural philosophers in the universities of western Europe from the 13th to the 17th centuries.

£45.00 net HB 0 521 43344 4 842 pp. 1994

Power from Wind

A History of Windmill Technology RICHARD L. HILLS

This is the first general treatment of windpower in English, covering the unpredictable nature of wind and focusing on the technical evolution and industrial application of windpower.

£45.00 net HB 0 521 41398 2 334 pp. 1994

Science and the Practice of Medicine in the Nineteenth Century

W. F. BYNUM

In this wide-ranging survey, W. F. Bynum examines the parallel development of biomedical sciences, clinical practice and preventive medicine in 19th century Europe and North America.

£40.00 net HB 0 521 25109 5 288 pp. 1994 £12.95 net PB 0 521 27205 X Cambridge History of Science



The Edinburgh Building, Cambridge CB2 2RU, UK

DOCTORS AND ETHICS THE EARLIER HISTORICAL SETTING OF PROFESSIONAL ETHICS

Edited by Andrew Wear Johanna Geyer-Kordesch and Roger French

Amsterdam/Atlanta, GA 1993. 303 pp. (Clio Medica 24)

ISBN: 90-5183-553-1 Bound Hfl. 140,-/US-\$ 82.- ISBN: 90-5183-581-7 Paper Hfl. 45,-/US-\$ 26.-

Medical ethics has been a constant adjunct of Western medicine from its origins in Greek times. Although the Hippocratic Oath has been intensely studied, until recently there has been very little historical work on medical ethics between the Oath and Thomas Percival's Medical Ethics of 1803, which is commonly thought of as the first treatise on modern medical ethics. This volume brings together original research which throws new light on how standards of behaviour for medical practitioners were articulated in the different religious, political and social as well as medical contexts from the classical period until the nineteenth century. Its ten essays will place the early history of medical ethics into the framework of the new social and intellectual history of medicine that has been developed in the last ten years.



USA/Canada: Editions Rodopi, 233 Peachtree Street, N.E., Suite 404, Atlanta, GA 30303-1504, Telephone (404) 523-1964, Call toll-free 1-800-225-3998 (U.S. only), Fax (404) 522-7116

And Others: Editions Rodopi B.V., Keizersgracht 302-304, 1016 EX Amsterdam, The Netherlands. Telephone ++ (0) 20 622 75 07, Fax ++ (0) 20 638 09 48

Journal for General Philosophy of Science

Zeitschrift für allgemeine Wissenschaftstheorie

Editors Lutz Geldsetzer, Gert König

The Journal for General Philosophy of Science/Zeitschrift für allgemeine Wissenschaftstheorie is a forum for the discussion of a variety of attitudes concerning the philosophy of science. It has as its subject matter the philosophical, especially methodological, ontological, epistemological, anthropological, and ethical foundations of the individual sciences. Particular emphasis is laid on bringing both the natural, the cultural, and the technical sciences into a philosophical context, within which the historical presuppositions and conditions of the current problems of the philosophy of science are also included in the discussion. The Journal for General Philosophy of Science/Zeitschrift für allgemeine Wissenschaftstheorie has already been in existence for over two decades. It has been successful in its attempt to serve as a forum that bridges the gap between the different sciences, especially the natural, cultural, and social sciences. One of its purposes is to discuss and contrast the common as well as the different specific methodological and philosophical foundations of the individual sciences, taking into account all currently relevant positions of the philosophy of science.

In recent years considerable insight has been gained into the problems of current philosophy of science by considering the historical dimension of the sciences. This is why more intensive efforts will be made in the future towards the integration of historical and systematic considerations. The journal contains:

- articles
- discussions
- reports on the state of the philosophy of science in individual countries
- a bibliography of the major journals in the field of the history and philosophy of science.

The journal is of interest to philosophers, especially philosophers of science, as well as to scholars from the field of the natural, cultural, social and technical sciences who are interested in becoming aware of the philosophical implications of their disciplines and in being stimulated by the transfer of methods, leading ideas, concepts and theories from other fields.

Journal for General Philosophy of Science is indexed/abstracted in INSPEC, Philosopher's Index, Information Philosophie.

Subscription Information

ISSN 0925-4560

1994, Volume 25 (2 issues) Subscription rate: Dfl. 263.00/US\$137.00 incl. postage and handling

P.O. Box 322, 3300 AH Dordrecht, The Netherlands P.O. Box 358, Accord Station, Hingham, MA 02018-0358, U.S.A.



Journal Highlight

KLUWER ACADEMIC PUBLISHERS



SOCIAL STUDIES OF SCIENCE

Edited by **David Edge**, University of Edinburgh

'Social Studies of Science remains the premier academic journal in a rapidly growing field. It continues to set standards of excellence in both ideas and their expression, due in no small part to the enormous commitment of the editors.'

Professor Ron Johnston

Recent Contents

Scientists and the Legacy of World War II: The Case of Operations Research (OR) M Fortun and S S Schweber

Scientific Elites and the Making of US Policy for Climate Change Research, 1957-74

David M Hart and David G Victor

Sounding the Global Alarm: Environmental Issues in the US National News
Allan Mazur and Jinling Lee

Rhetorics of Hope and Fear in the Great Embryo Debate Michael Mulkav

Scientific Standards and Institutional Interests: Carcinogenic Risk Assessment of Benoxaprofen in the UK and US John Abraham

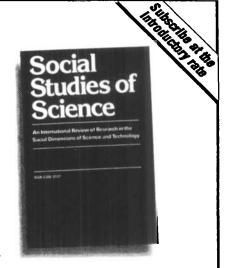
Engineering Knowledge: The Construction of Knowledge in Artificial Intelligence Diana E Forsythe

Some Social Constructions Sergio Sismondo

ISSN: (0306-3127)

Published quarterly in February, May, August and November

Don't forget, we guarantee that if you are dissatisfied with your journal in any way, we will refund the cost of your subscription.



Order Form
SAGE Publications 6 Bonhill Street, London EC2A 4PU, UK Tel: +44 (0)71-374 0645 US Orders to:
SAGE Publications, PO Box 5096, Thousand Oaks, CA 91359, USA
☐ Yesl I want to enter my new subscription to Social Studies of Science at the introductory rate ☐ Individual Rate at £28(£36*)/ \$47(\$59*) "Usual 1994 rate
☐ Institutional Rate at £115 / \$184
Name
Address
Daytime Tel:
☐I enclose a cheque (made payable to Sage Publications)
☐ Please charge my credit card ☐ Mastercard ☐ Visa ☐ American Express ☐ Diner's Club ☐ Eurocard
Card Number
Expiry Date / .
Signature
Date / / . 3640

SEND FOR A FREE SAMPLE COPY OF ...

STUDIES IN HISTORY AND PHILOSOPHY OF SCIENCE

Joint Editors: Nicholas Jardine and Andrew Cunningham, Department of History and Philosophy of Science, University of Cambridge, Cambridge CB2 3RH, UK

Senior Consulting Editor: Gerd Buchdahl, Department of History and Philosophy of Science, University of Cambridge, Cambridge, UK

(00401)

Subscription Rate 1994: Volume 25 (6 issues) £ 230.00 (US\$355.00) ISSN 0039-3681

Audience: Historians and Philosophers of Science, Mathematicians, Physicists, Natural Scientists.

AIMS AND SCOPE

"... no journal other than Studies accepts articles across the full range of interests in interdisciplinary history and philosophy of science. Historians of science... would thus be well advised to scan its contents on a regular basis." Rachel Laudan in Isis, Volume 81, Number 2, 1990.

a regular basis. Rachel Laudan in Isis, Volume 81, Number 2, 1990.

Studies in History and Philosophy of Science is essential reading for students and teachers concerned with the historical, social and intellectual contexts of the sciences and with their methodology and epistemology. The journal particularly encourages studies which integrate philosophical, historical and sociological considerations. Its orientation is international, with contributions from a wide range of cultural perspectives. Papers published are of the highest scholarly quality. Since the journal's inception it has proved an invaluable source both for reflective scientists and for workers in the history, philosophy and sociology of science. In 1993 Studies launched a new section entitled Studies in History and Philosophy of Modern Physics edited by Michael Redhead and Peter Galison. This section covers the history, philosophy and sociology of physics from the mid nineteenth century to the present.

A Selection of Papers

- I. HACKING (Canada), 'Style' for historians and philosophers.
- D. BERTOLONI MELI (UK), Public claims, private worries: Newton's *Principia* and Leibniz's theory of planetary motion.
- J.R. MAIA NETO (USA), Feyerabend's scepticism.
- J.Z. BUCHWALD (Canada), Kinds and the wave theory of light.
- H.-J. RHEINBERGER (Germany), Experiment, difference and writing: the laboratory production of transfer RNA.
- M.E. MALONE (USA), Kuhn reconstructed: incommensurability without relativism.
- K. HENTSCHEL (Germany), Einstein's attitude towards experiments: testing relativity theory 1907-1927.
- P. THAGARD (Canada), Societies of minds: science as distributed computing.
- M. BEN-CHAIM (Israel), The empiric experience and the practice of autonomy.

Indexed/Abstracted in: Curr Cont Arts & Hum Cit Ind, ASSIA, Biosis Data, Curr Cont/Soc & Beh Sci, Math R, Res Alert, Sociol Abstr, Curr Cont Soc Sci Cit Indx



Pergamon is an imprist of Elsevier Science. Sterling price quoted applies worldwide except in The Americas. US dollar price quoted applies in The Americas only. Prices include postage and insurance. Customers resident in the EC will be charged VAT (or the equivalent) at their own country's rate, unless a VAT (or equivalent) registration number in supplied. Pergamon's VAT registration number in the UK is: UB 490 6384 25 000.

Please send me a FREE SAMPLE COP	Y of STUDIES IN HISTORY AND PHILOSOPHY OF SCIENCE	(00401)
Name	Position	
Organisation	Department	
Address		
	Post/Zip Code	

Return to:

Elsevier Science Ltd, PO Box 800, Kidlington, Oxford OX5 1DX, UK Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, USA

IHA4



VICTORIAN STUDIES

Indiana University Press

601 N. Morton Bloomington, IN 47404

Phone: 812-855-9449 Fax: 812-855-7931

Journals@ Indiana.Edu

Email:

SUBSCRIPTIONS

(4 issues) Individual: \$25.00 Institution: \$40.00 Foreign surface post \$12.50

SINGLE ISSUES Individual: \$14.70 Institution: \$21.75

Victorian Studies, edited by
Donald Gray, is devoted to the study of
English culture of the Victorian period.
It regularly includes interdisciplinary
essays concerning comparative
literature, social and political
philosophy, and the histories of
education, philosophy, fine arts,
economics, law, and science.

RECENT ARTICLES

NANCY PAXTON: Mobilizing Chivalry: Rape in British Novels About the Indian Uprising of 1857

JUDITH HALBERSTAM: Technologies of Monstrosity: Bram Stoker's Dracula

JAMES BUZARD: Victorian Women and the Implications of Empire

REGENIA GAGNIER: On the Instability of Human Wants: Economic and Aesthetic Man

LESLEY HIGGINS: Jowett and Pater: Trafficking in Platonic Wares

MARGARET HOMANS: "To the Queen's Private Apartments": Royal Family Portraiture and the Construction of Victoria's Sovereign Obedience

THE BRITISH SOCIETY FOR THE HISTORY OF SCIENCE

Membership of the Society, which normally includes a subscription to *The British Journal for the History of Science*, is open to all persons approved by the Council of the Society and elected at an ordinary meeting. The annual subscription for the membership year 1994 is £22.00 (\$45.00) or £11.00 (\$25.00) for associate membership, which includes students at centres of higher education. There is an Introductory Offer for ordinary members who pay £17.00 (\$35.00) for the first year. Applications for membership should be made on a form which is available from the Society's Executive Secretary at the address below. Other sterling rates may apply to overseas members.

Meetings: The Society mounts an ambitious programme of meetings. The pattern is flexible, but includes a three-day summer meeting, usually held at a different British University or Polytechnic each year. About four other meetings, lasting for between one and three days, are held during the year, sometimes devoted to a clearly defined theme or an important anniversary, and often arranged in conjunction with other scholarly societies.

The British Journal for the History of Science is the official organ of the Society. All correspondence on the contents of the Journal should be addressed to the Editor, Dr Janet Browne, The Wellcome Institute for the History of Medicine, 183 Euston Road, London, NW1 2BE, England. Books for review should be sent to the Reviews Editor, Dr John Henry, Science Studies Unit, University of Edinburgh, 21 Buccleuch Place, Edinburgh EH8 9LN.

Advertising: Contact the Journals Advertising Manager, Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU.

Other publications: BSHS Monograph Series is designed to allow the publication of monographic studies in the history of science quickly and cheaply. All correspondence on the subject of monographs, and any new suggestions for titles, should be sent to the Series Editor, Dr P. Weindling, Wellcome Unit for the History of Medicine, 45–47 Banbury Road, Oxford OX2 6PE, England. Monographs are available to members at a special price, post-free from the Society's Executive Secretary. Non-members may obtain them through bookshops, or post-free from the Executive Secretary. Titles are as follows:

- 2. The Letters of Georges Cuvier: A Summary Calendar. Ed. by Dorinda Outram. 1980. £4.50/\$10.00 (£3.50/\$8.00 to members).
- 3. Rationality and Ritual: The Windscale Inquiry and Nuclear Decisions in Britain. By Brian Wynne. 1982. £7.00/\$15.00 (£5.00/\$11.00 to members).
- 4. The Royal Society and Its Fellows 1660–1700: The Morphology of an Early Scientific Institution. By Michael Hunter. Second edition 1994. £10.00/\$19.00 (£8.00/\$15.00 to members).
- 5. Francis Bacon's Natural Philosophy: A New Source. A Transcription of Manuscript Hardwick 72A with Translation and Commentary. By Graham Rees, assisted by Christopher Upton. 1984. £7.90/\$17.00 (£5.60/\$12.00 to members).
- 6. Archives of the British Chemical Industry, 1750-1914: A Handlist. By Peter J. T. Morris and Colin A. Russell. Contributing editor John Graham Smith. 1988. £14.50/\$31.00 (£9.00/\$19.00 to members).
- 7. Index to the Scientific Correspondence of John William Dawson. By Susan Sheets-Pyenson. 1992. £20.00/\$44.00 (£12.00/\$26.00 to members).
- 8. Science and Nature: Essays in the History of the Environmental Sciences. Ed. by Michael Shortland. 1993. £10.00/\$19.00 (£8.00/\$15.00 to members).

Each year, the Society publishes a *List of Theses in History of Science* in British universities. This is available free to members, and at £3.00 (\$6.00) to non-members on request to the Executive Secretary. Standing orders are accepted from members or non-members who wish to receive the list regularly.

The Society's *Newsletter*, an informal publication edited by Dr Frank A. J. L. James, RICHST, The Royal Institution, 21 Albemarle Street, London W1X 4BS, appears in January, May and September each year. It is free to members, £6.00 (\$12.00) for institutions and non-members. The Society's Education Section also has a regular Newsletter, *Education Forum*, edited by Dr Isobel Falconer, Lumbo Farmhouse, St Andrews, Fife KY16 8NS.

Administrative business of the Society is handled by The Executive Secretary, Wing-Commander G. Bennett, 31 High Street, Stanford in the Vale, Faringdon, Oxfordshire SN7 8LH. The Society is registered in England as a Limited Company (No. 562208) and is a Registered Charity (No. 258854).

Copying: This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Organizations in the USA who are also registered with the CCC may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to CCC of the per-copy fee of \$5.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0007-0874/94 \$5.00+.00.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only.

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions.

For all other use, permission should be sought from Cambridge or the American branch of Cambridge University Press.

Back volumes are obtainable as follows: Volumes 1–23: Wing-Commander G. Bennett, 31 High Street, Stanford in the Vale, Faringdon, Oxon SN7 8LH. For volume 24 onwards, apply to Cambridge University Press.

The British Journal for the History of Science

BJHS

Volume 27 Part 3 No. 94

September 1994

- 247 'The emergency which has arrived': the problematic history of nineteenth-century British algebra a programmatic outline MENACHEM FISCH
- 277 The making of a British theoretical physicist E. C. Stoner's early career
 GEOFFREY CANTOR
- 291 Knowledge is power: Hugo de Vries on science, heredity and social progress
 BERT THEUNISSEN
- 313 Fleeming Jenkin and The Origin of Species: a reassessment SUSAN W. MORRIS

Essay reviews

- 345 Whose scientific internationalism?
 PAUL K. HOCH
- 351 The moving forces of history DAVID BLOOR
- 357 Wanted: new word FRANK GREENAWAY
- 361 Re-presenting Faraday DAVID GOODING
- 365 Book reviews
- 381 Books received

BSHS
THE BRITISH
SOCIETY FOR
THE HISTORY
OF SCIENCE

Published for

The British Society for the History of Science

by Cambridge University Press

CAMBRIDGEUNIVERSITY PRESS



10.1017/S0007087400032167 Published online by Cambridge University Press