GREECE & ROME New Surveys in the Classics No. 29

GREEK SCIENCE

BY T. E. RIHLL



PUBLISHED FOR THE CLASSICAL ASSOCIATION OXFORD UNIVERSITY PRESS

1999

The Classical Association is the largest classical organization in Great Britain. It has a world-wide membership, and unites the interests of all who value the study of the languages, literature and civilizations of Ancient Greece and Rome. For further information contact Clare Roberts, The Classical Association, Institute of Classical Studies, Senate House, Malet Street, London, WC1E 7HU.



Regular subscribers to *Greece & Rome* receive a free copy of each number in this series. Additional copies may be obtained from Oxford University Press.

Cover illustration: 'a Greek astronomer': lapis lazuli gem, no. 656, in M. Henig, Classical Gems in the Fitzwilliam. Photograph by R. Wilkins.

Greece & Rome

NEW SURVEYS IN THE CLASSICS No. 29

RECEPTEREDERECEREDERECEREDERECERE

GREEK SCIENCE

BY

T. E. RIHLL

Published for the Classical Association OXFORD UNIVERSITY PRESS 1999

OXFORD

UNIVERSITY PRESS

Great Clarendon Street, Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford and furthers the University's aim of excellence in research, scholarship, and education by publishing worldwide in

Oxford New York

Athens Auckland Bangkok Bogotá Bombay Buenos Aires Calcutta Cape Town Chennai Dar es Salaam Delhi Florence Hong Kong Istanbul Karachi Kuala Lumpur Madrid Melbourne Mexico City Mumbai Naírobi Paris São Paulo Singapore Taipei Tokyo Toronto Warsaw with associated companies in Berlin Ibadan

Oxford is a registered trade mark of Oxford University Press in the UK and in cetain other countries

> ISSN 0017-3835 ISBN 019-922395-5

© Oxford University Press 1999

The moral rights of the author have been asserted

Database right Oxford University Press (maker)

First published 1999

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of Oxford University Press, or as expressly permitted by law, or under terms agreed with the appropriate reprographics rights organizations. Enquiries concerning reproduction outside the scope of the above should be sent to the Rights Department, Oxford University Press, at the address above

You must not circulate this book in any other binding or cover and you must impose the same conditions on any acquirer

> Typeset by Joshua Associates Ltd., Oxford Printed in Great Britain on acid-free paper by by Bell and Bain Ltd., Glasgow

CONTENTS

Note on Names and Citations		viii
Acknowledgements		ix
Note to the Scientifically Faint-hearted Reader		x
Ι	The Nature of Greek Science	1
II	Physics	24
III	Mathematics	39
IV	Astronomy	62
· V	Geography	82
VI	Biology and Medicine	106
	Epilogue	137
	Bibliography	139
	About the Author	154
	Index of Names, Subjects, and Passages	155
	ILLUSTRATIONS	
Figure 3.1	Greek alphabetic numerals	52
Figure 3.2	Pythagoras' theorem	57
Figure 3.3	Proof tree for part of Pythagoras' theorem	58
Figure 4.1	The celestial north pole in 400 B.C.	67
Figure 4.2	Aristarchus Proposition 7: On the distance of the sun from earth	75
Figure 5.1	The Mediterranean Sea according to ancient map- makers	97
Figure 6.1	Ancient whaling gear as described by Oppian	113