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## Money and government in the Roman Empire

Rome's conquests gave her access to the accumulated metal resources of most of the known world. An abundant gold and silver coinage circulated within her empire as a result. But coinage changes later suggest difficulty in maintaining metal supplies. By studying Roman coin-survivals in a wider context, Dr Duncan-Jones uncovers important facts about the origin of coin-hoards of the Principate. He constructs a new profile of minting, financial policy and monetary circulation, by analysing extensive coin evidence collected for the first time. His findings considerably advance our knowledge of crucial areas of the Roman economy.

This book will be an essential reference work for Roman historians and numismatists and will also be of interest to economic historians.

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RICHARD DUNCAN-JONES

*Fellow of Gonville and Caius College, Cambridge*



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**UNIVERSITY PRESS**

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CAMBRIDGE UNIVERSITY PRESS  
 Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo

Cambridge University Press  
 The Edinburgh Building, Cambridge CB2 2RU, UK

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)  
 Information on this title: [www.cambridge.org/9780521441926](http://www.cambridge.org/9780521441926)

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First published 1994  
 Reprinted 1995  
 First paperback edition 1998

*A catalogue record for this publication is available from the British Library*

*Library of Congress Cataloguing in Publication data*

Duncan-Jones, Richard.  
 Money and government in the Roman empire / Richard Duncan-Jones.  
 p. cm.

Includes bibliographical references and index.

ISBN 0 521 44192 7 (hardback)

1. Coinage—Rome—History. 2. Monetary policy—Rome—History.

3. Money—Rome—History. I. Title.

HG237.D79 1994

332.4'9376—dc20 93—31989 CIP

ISBN-13 978-0-521-44192-6 hardback

ISBN-10 0-521-44192-7 hardback

ISBN-13 978-0-521-64829-5 paperback

ISBN-10 0-521-64829-7 paperback

Transferred to digital printing 2006

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To Julia

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## PREFACE

Although it is so remote in time, the Roman Empire has left a gigantic amount of coin. The amount from relatively modern discoveries must run into millions, even without allowing for finds in earlier centuries which were mostly melted down. Survival on this scale has its own interest, and seems to have a specific explanation, which is discussed in Part II. This book seeks to use coin evidence to study Roman minting policy, monetary organisation, and the monetary economy. For these purposes, co-ordinated analysis of a large amount of data has clear advantages over piecemeal study. Coin hoards of the Principate provide a rich source material whose potentialities as historical evidence are only slowly being exploited, partly because so many hoards remain unpublished. But the material available is now increasing rapidly, thanks partly to discoveries by metal detector, and has grown substantially while this book has been in preparation.

As a preliminary, the early chapters consider the Empire's finances and financial structure. And an initial economic chapter discusses the role of currency, the availability of coin, and monetary inflation. In the main part of the book, the evidence mainly comes from physical survivals of coin. The period examined ends at AD 235, close to the point at which written sources sharply diminish. The invaluable survey by J.-P. Callu takes up from AD 238.<sup>1</sup> Some evidence from the Late Empire is also used, particularly in the discussion of taxation in chapter 4.<sup>2</sup>

The book could have been extended by reproducing evidence more fully, but at the risk of overburdening it with technicality. Incorporating statistical analysis in a general historical work has not always been easy. To reduce the burden on the reader, the early chapters are relatively wide-ranging, and chapter 7 summarises much of the analysis of coin material.

The book is primarily intended as an essay in economic history. But its research has taken me much further into the world of numismatics than I could have foreseen. I have depended heavily on the advice and encouragement

<sup>1</sup> J.-P. Callu, *La politique monétaire des Empereurs romains de 238 à 311* (Rome 1969).

<sup>2</sup> For discussions of money and coinage in the Late Empire, see C.H.V. Sutherland, *The Roman imperial coinage* 6 (London 1967); P. Bruun, *The Roman imperial coinage* 7 (London 1966); J.P.C. Kent, *The Roman imperial coinage* 8 (London 1981); M. Hendy, *Studies in the Byzantine monetary economy c. 300–1450* (Cambridge 1985); G. Depeyrot, *Le Bas-Empire romain: économie et numismatique* (Paris 1987); G. Depeyrot, *Crises et inflation entre antiquité et Moyen Age* (Paris 1991).

of professional numismatists over the past ten or twelve years. Warmest thanks are offered to Monsieur M. Amandry, Dr M.A.S. Blackburn, Dr K. Butcher, Professor T.V. Buttrey, Dr I.A. Carradice, Professor P. Grierson, Dr C.J. Howgego, Dr C.E. King, Professor H.B. Mattingly, Dr R. Reece, Mr T. R. Volk, the late Mr David Walker and, most of all, to Dr A.M. Burnett and Dr R.F. Bland, with both of whom I have had many valuable discussions. Dr Burnett persuaded me to embark on die-studies, and gave generous access to the British Museum photofile. He has since kept me supplied with details of new imperial coin-hoards, including the important Belgian gold hoard. Dr Bland has also been a constant source of bibliographical help. Dr Burnett, Dr Bland, Dr Blackburn, and Mr Volk each at some stage cast an expert eye over sections of the die-dossiers, for which they deserve further warm thanks. Professor Buttrey, Professor Callu, Dr Kunisz, Dr Reece and Mr Walker also kindly gave me copies of numismatic works.

I wish to express special thanks to Professor M.H. Crawford for his help, advice and encouragement over a long period, which included the extended loan of his collection of auction catalogues, and early access to his listings of Imperial coin-hoards. His now classic work on Roman Republican coinage has also provided valuable stimulus, especially in its use of hoard evidence.

I have had stimulating correspondence with Professor E. Lo Cascio, Professor G.F. Carter and Dr W.E. Metcalf. I should like to thank Dr S. Balbi di Caro and Dr Metcalf for providing me with access to numismatic material in Rome and New York on several occasions. Mr W. Scheidel very kindly obtained and transmitted material from the coin photofile in Vienna. I was helped in writing about taxation by comments on an early draft of chapter 4 from Dr K.A. Worp and Dr J.D. Thomas. Dr Bland produced acute criticisms of drafts of three numismatic chapters. I have also received welcome help from Dr S. Banaji, Professor A.J. Graham, Professor J.H. Humphrey, Mr H.R. Hurst and Miss H. White.

Distinguished statistical colleagues contributed the initial diagnosis for the estimates of die-population in chapters 10 and 11, and the essentials of effective estimating techniques, without which these parts of the book could not have been undertaken. Dr A.W.F. Edwards suggested the statistical format for analysing the largest body of coin-data. My greatest thanks go to Mr R.A. Kempton, now Director of the Scottish Agricultural Statistics Service. He identified the statistical configuration of this material, as well as introducing me to unfamiliar techniques and to an advanced computer program for implementing them. He also gave considerable time to discussing my statistical efforts, and provided expert criticism at many stages. Dr P.M.E. Altham has also given kind help with statistical analysis. Naturally, none of those thanked are responsible for the uses to which their advice has been put, and all responsibility for errors and shortcomings remains the author's. By coincidence, two further publications discussing use of the negative binomial

for modelling Roman coin-populations came to hand after this book had gone to press.<sup>3</sup>

Further warm thanks are offered to my College, for allowing me a sabbatical year, providing computer equipment, and above all for creating an intellectual environment in which I could draw on the help of colleagues from other disciplines. Besides Dr Edwards, scientific colleagues at Caius who gave substantive help include Dr P. Robinson, who at an early stage sorted a very large dataset on the University mainframe computer and provided graphics tools; Dr J.G. Robson, who gave me much invaluable help with microcomputers and software; and Dr R.J. Butcher, who explained programming in BASIC. At Caius I have also had the great privilege of discussing numismatic problems with Professor Philip Grierson, who also kindly provided innumerable loans of rare numismatic publications.

Chapters 12 and 13 are later versions of articles, whose technical content has been shortened (Duncan-Jones 1987 and 1989). I have relied for numerical and graphic analysis on excellent computer software in the shape of SYSTAT and SYGRAPH.<sup>4</sup> The statistical modelling in chapter 10 uses the more specialised program MLP, together with short programs by the author which are printed in Appendix 8.<sup>5</sup> The coin illustrations are reproduced by kind permission of the Syndics of the Fitzwilliam Museum and the Trustees of the British Museum.<sup>6</sup>

The book has taken a long time to research and write. I would like to dedicate it to my wife, with heartfelt thanks for the support and encouragement which have made a heavy task very much lighter.

<sup>3</sup> W.W. Esty, G.F. Carter, 'The distribution of the numbers of coins struck by dies' *AJN* 2.3–4 (1991–2). 165–86; A. J. Stam, 'Statistical problems in ancient numismatics' *Statistica Neerlandica* 41 (1987) 151–73.

<sup>4</sup> Leland Wilkinson, SYSTAT & SYGRAPH (Evanston, Ill 1988): SYSTAT, Inc. The diagrams were drawn using SYGRAPH.

<sup>5</sup> G.J.S. Ross, *Maximum Likelihood Program*, Copyright Rothamsted Agricultural Research Station (Rothamsted 1980).

<sup>6</sup> Fitzwilliam Museum: plates 1, 2, 5, 7, 8 and 9; British Museum: plates 3, 4, 6, 10 and 11. Photographs of Fitzwilliam coins were taken by the author, those from the British Museum by Dr R.F. Bland, to whom warmest thanks are given.

## ABBREVIATIONS

Modern publications are cited by short title in the notes and by long title in the Bibliography (p. 269). Coin hoards are cited by name or by catalogue number (index p. 284; numbered hoard-listing, p. 261). Papyrological abbreviations, which mainly occur in chapters 2 and 4, follow standard forms (J.F. Oates, R.S. Bagnall, W.H. Willis, K.A. Worp, *Checklist of editions of Greek papyri and ostraka*<sup>3</sup>, BASP Supplement 4 (1985); or E.G. Turner, *Greek papyri* (Oxford) (1968)). *Année philologique* abbreviations are used for journals.

The abbreviations for a few frequently cited works are shown below.

<i>AE</i>	<i>Année épigraphique</i>
<i>ANRW</i>	H. Temporini, W. Hase (edd.) <i>Aufstieg und Niedergang der römischen Welt</i>
<i>ASR</i>	A.S. Robertson <i>An inventory of Romano-British coin hoards</i> (forthcoming)
Barbieri	G. Barbieri 'Liberalitas', in E. de Ruggiero <i>Dizionario epigrafico di antichità romane</i> (1895–)
Blanchet	A. Blanchet <i>Les trésors de monnaies romaines et les invasions germaniques en Gaule</i> (1900)
<i>BMCRE</i>	H. Mattingly, R.A.G. Carson (edd.) <i>Coins of the Roman Empire in the British Museum</i> (1923–62)
Bolin	S. Bolin <i>State and currency in the Roman Empire to 300 AD</i> (1958)
Carradice	I.A. Carradice <i>Coinage and finances in the reign of Domitian AD 81–96</i> (1983)
<i>CH</i>	<i>Coin hoards</i>
<i>Chalfont</i>	R.F. Bland <i>The Chalfont hoard and other hoards</i> (1992) ( <i>CHRB</i> 9)
<i>CHRB</i>	<i>Coin hoards from Roman Britain</i>
<i>CIL</i>	<i>Corpus Inscriptionum Latinarum</i>
Cohen	H. Cohen <i>Description historique des monnaies frappées sous l'empire romain</i> <sup>2</sup> (1880–1908)
<i>CTMAF</i>	X. Loriot, D. Nony (edd.) <i>Corpus des trésors monétaires antiques de la France</i> (1982–)
Dembski	G. Dembski 'Die antiken Münzschatzfunde aus Österreich' <i>NZ</i> 91 (1977) 3–64
<i>Dig.</i>	<i>Digesta Iustiniani</i>
<i>ESAR</i>	T. Frank (ed.) <i>Economic survey of ancient Rome</i> (1933–40)
<i>FMRD</i>	<i>Die Fundmünzen der römischen Zeit in Deutschland</i> (1960–)
<i>FMRÖ</i>	<i>Die Fundmünzen der römischen Zeit in Österreich</i> (1970–)



## ABBREVIATIONS

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- Gerov B. Gerov 'Die Einfälle der Nordvölker in den Ostbalkanraum im Lichte der Münzschatzfunde', *ANRW* 2.6 (1977) 110–81
- HA* *Historia Augusta*
- HS Sesterces
- IGRR* *Inscriptiones Graecae ad res Romanas pertinentes* (1901–27)
- ILS* H. Dessau *Inscriptiones Latinae Selectae*
- Johnson A.C. Johnson *Roman Egypt* (1936) (*ESAR* 2)
- Kienast D. Kienast *Römische Kaisertabelle: Grundzüge einer römischen Kaiserchronologie* (1990)
- Kunisz A. Kunisz 'Udział złotego pieniądza w cyrkulacji na terytorium Egiptu w I–III w n.e.', *Wiadomosci Numizmatyczne* 27 (1983) 121–65
- Mihailescu V. Mihailescu-Birlibă *La monnaie romaine chez les Daces orientaux* (1980)
- Milne J.G. Milne *Catalogue of Alexandrian coins* (1933)
- Mirnik I.A. Mirnik *Coin hoards in Yugoslavia* (1981)
- MLP* G.J.S. Ross *Maximum Likelihood Program* (1980)
- MSR* F. Hulstsch (ed.) *Metrologicorum scriptorum reliquiae*
- Normanby* R. Bland, A. Burnett *The Normanby hoard* (1988) (*CHRB* 8)
- OGIS* W. Dittenberger *Orientalis Graeci Inscriptiones Selectae*
- Protase 1 D. Protase *Problema continuitatii in Dacia in lumina arheologici si numismaticii* (1966)
- Protase 2 D. Protase *Autohtonii in Dacia: I Dacia Romana* (1980)
- RE* Pauly-Wissowa-Kroll *Real-Encyclopädie der Klassischen Altertumswissenschaft* (1894–)
- Regling K. Regling 'Der Schatz römischer Goldmünzen von Diarbekir (Mardin)', *Blätter für Münzfreunde* 66 (1931) 353–81
- RG* *Res Gestae Divi Augusti*
- RIC* H. Mattingly, E.A. Sydenham and others *The Roman imperial coinage* (1923–)
- RIC I<sup>2</sup>* C.H.V. Sutherland *The Roman imperial coinage I<sup>2</sup>* (1984)
- Sel. Pap.* A.S. Hunt, C.C. Edgar *Select papyri* (1932)
- Strack P.L. Strack *Untersuchungen zur römischen Reichsprägung des 2. Jahrhunderts* (1931–7)
- Thirion M. Thirion *Le trésor de Liberchies* (1972)
- Walker D.R. Walker *The metrology of the Roman silver coinage* (1976–8)