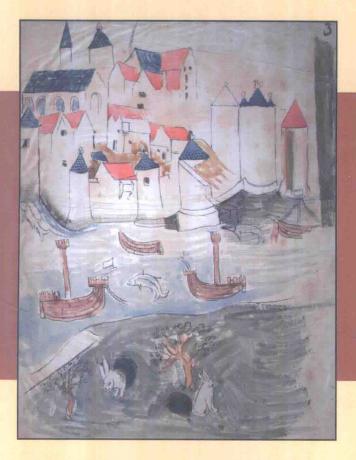
C A M B R I D G E M E D I E V A L T E X T B O O K S



# An Environmental History of Medieval Europe

Richard C. Hoffmann

# AN ENVIRONMENTAL HISTORY OF MEDIEVAL EUROPE

RICHARD C. HOFFMANN

常州大学山书馆藏书章



### CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org Information on this title: www.cambridge.org/9780521700375

© Richard C. Hoffmann 2014

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2014

Printed in the United Kingdom by Clays, St Ives plc

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

Library of Congress Cataloguing in Publication data
Hoffmann, Richard C. (Richard Charles), 1943—
An environmental history of medieval Europe / by Richard C, Hoffmann.
pages cm. – (Cambridge medieval textbooks)
Includes bibliographical references.

ISBN 978-0-521-87696-4 (hardback) – ISBN 978-0-521-70037-5 (paperback)
 Human ecology – Europe – History – To 1500.
 Nature – Effect of human beings on – Europe – History – To 1500.
 Europe – Environmental conditions – History – To 1500.
 Europe – Social conditions – To 1492.
 Civilization, Medieval.
 Title.

GF540.H64 2013 304.2094'0902-dc23 2013035617

ISBN 978-0-521-87696-4 Hardback ISBN 978-0-521-70037-5 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

### An Environmental History of Medieval Europe

How did medieval Europeans use and change their environments, think about the natural world, and try to handle the natural forces affecting their lives? This groundbreaking environmental history examines medieval relationships with the natural world from the perspective of social ecology, viewing human society as a hybrid of the cultural and the natural. Richard Hoffmann's interdisciplinary approach sheds important light on such central topics in medieval history as the decline of Rome, religious doctrine, urbanization and technology, as well as key environmental themes, among them energy use, sustainability, disease and climate change. Revealing the role of natural forces in events previously seen as purely human, the book explores issues including the treatment of animals, the 'tragedy of the commons', agricultural clearances and agrarian economies. By introducing medieval history in the context of social ecology, it brings the natural world into historiography as an agent and object of history itself.

RICHARD C. HOFFMANN is Professor Emeritus and Senior Scholar in the Department of History, York University, Canada. As a pioneer in the environmental history of pre-industrial Europe, he is widely known for his contributions to medieval studies, environmental studies and historic fisheries.

# Cambridge Medieval Textbooks

This is a series of introductions to important topics in medieval history aimed primarily at advanced students and faculty, and is designed to complement the monograph series *Cambridge Studies in Medieval Life and Thought*. It includes both chronological and thematic approaches and addresses both British and European topics.

For a list of titles in the series, see www.cambridge.org/medievaltextbooks

### FIGURES

Frontispiece Nature and culture at Waterford, Ireland, 1372.
From Waterford's Great Charter Roll, Waterford
Treasures Museum, Waterford, Ireland, as
replicated by George Victor Du Noyer RSAI
Album Collection Volume 12 and here reproduced
with the permission of the Royal Society of
Antiquaries of Ireland, Dublin.

o.1 Humans and nature: traditional separation. Redrawn by R. Hoffmann after Marina Fischer-Kowalski and Helga Weisz, 'Society as Hybrid between Material and Symbolic Realms. Toward a Theoretical Framework of Society–Nature Interactions', Advances in Human Ecology, 8 (1999), 215–51.

page 7

O.2 Humans and nature: an interaction model: society as hybrid. Redrawn by R. Hoffmann after Marina Fischer-Kowalski and Helga Weisz, 'Society as Hybrid between Material and Symbolic Realms. Toward a Theoretical Framework of Society–Nature Interactions', Advances in Human Ecology, 8 (1999), 215–51.

8

0.3 Humans and nature: biophysical structures as ecosystem compartments linked to symbolic culture. Redrawn by R. Hoffmann after Helmut Haberl, Marina Fischer-Kowalski, Fridolin Krausmann, Helga Weisz, and Verena Winiwarter, 'Progress towards Sustainability? What the Conceptual Framework of Material and Energy Flow

|     | Accounting (MEFA) Can Offer', Land Use Policy, 21        |     |
|-----|--|-----|
|     | (2004), 199-213.   | 9   |
| 0.4 | Humans and nature: connecting experience, thought,       |     |
|     | and action. Redrawn by R. Hoffmann after an original     |     |
|     | first published by Marina Fischer-Kowalski and           |     |
|     | Rolf-Peter Sieferle, 'Der sozial-ökologische             |     |
|     | Wirkungszusammenhang', in Helmut Haberl, Ernst           |     |
|     | Kotzmann, and Helga Weisz, eds., Technologische          |     |
|     | Zivilisation und Kolonisierung von Natur (Vienna and     |     |
|     | New York: Springer, 1998), 46.                           | 9   |
| 0.5 |  |     |
|     | Richard C. Hoffmann.                                     | 14  |
| 2.1 | Change in field systems, Vale of the White Horse,        |     |
|     | Berkshire. An aerial photograph from 1969 reproduced     |     |
|     | with permission of the Berkshire Record Office.          | 65  |
| 4.I |  |     |
|     | Redrawn from a portion of the graph in Paolo             |     |
|     | Malanima, 'The energy basis for early modern             |     |
|     | growth, 1650-1820', in Maarten Praak, ed., Early         |     |
|     | Modern Capitalism: Economic and Social Change in         |     |
|     | Europe, 1400–1800 (London: Routledge, 2001),             |     |
|     | 51-68, by Carolyn King of the Cartographic               |     |
|     | Drafting Office, Department of Geography, York           |     |
|     | University.  | 117 |
| 4.2 | A heavy mouldboard plough and draught team as            |     |
|     | represented in: (a) Abbess Herrad of Landsberg (Alsace), |     |
|     | Hortus deliciarum (1176/96); reproduced from a copy at   |     |
|     | Bibliothèque Municipal de Strasbourg of Herrad de        |     |
|     | Landsberg, Hortus deliciarum, texte explicative par      |     |
|     | A. Straub et G. Keller (Strasbourg 1892-9), Planche      |     |
|     | xxx, fol. 112b, with permission of Photos et coll. BNU;  |     |
|     | (b) an early fourteenth-century illuminated manuscript   |     |
|     | of the north German Sachsenspiegel law code;             |     |
|     | reproduced with permission from Oldenburger              |     |
|     | Bilderhandschrift des Sachsenspiegels,                   |     |
|     | Landesbibliothek Oldenburg, Cim 4101, fol. 54v,          |     |
|     | Leihgabe der Niedersächsischen Sparkassenstiftung.       | 12  |
| 4.3 | A 'champion' landscape in southeastern England.          |     |
|     | Reproduced with permission from Tom Williamson,          |     |
|     | Shaping Medieval Landscapes: Settlement, Society,        |     |

|      | Environment (Macclesfield, Cheshire: Windgather                                |     |
|------|--|-----|
|      | Press, 2003), figure 1.  | 128 |
| 4.4  | 'Ancient countryside' in southeastern England.                                 |     |
|      | Reproduced with permission from Tom Williamson,                                |     |
|      | Shaping Medieval Landscapes: Settlement, Society, Environment                  |     |
|      | (Macclesfield, Cheshire: Windgather Press, 2003), figure 3.                    | 129 |
| 4.5  | Montady, a thirteenth-century drainage project in                              |     |
|      | Languedoc. Photo IGN: Mission 1996 FD 30-34/250                                |     |
|      | cliché no. 578, reproduced with permission of the Institut                     |     |
|      | National de l'Information Géographique et Forestiére, Paris.                   | 139 |
| 5.I  | Sustainability as a dynamic equilibrium of society and                         |     |
|      | nature. Modified and reconfigured by Richard                                   |     |
|      | C. Hoffmann from Marina Fischer-Kowalski and                                   |     |
|      | H. Haberl, 'Tons, Joules, and Money: Modes of                                  |     |
|      | Production and their Sustainability Problems',                                 |     |
|      | Society and Natural Resources, 10 (1997), 61–85.                               | 156 |
| 5.2  | How pre-industrial agricultural systems work and                               |     |
|      | thus should be studied. Modified and reconfigured                              |     |
|      | by Richard C. Hoffmann from Verena Winiwarter                                  |     |
| ¥    | and Christoph Sonnlechner, Der soziale Metabolismus                            |     |
|      | der vorindustriallen Landwirtschaft in Europa, Der                             |     |
|      | Europäische Sonderweg. Ein Projekt der   |     |
|      | Breuninger Stiftung 2 (Stuttgart: Breuninger Stiftung,                         |     |
|      | 2001), figure B2.  | 158 |
| 5.3  | A stereotypical 'medieval manor'. An original                                  |     |
|      | representation by Richard C. Hoffmann of information                           |     |
|      | considered general knowledge in the field of medieval                          |     |
|      | agrarian history, drawn by Carolyn King of the                                 |     |
|      | Cartographic Drafting Office, Department of                                    |     |
| c 1  | Geography, York University.  Ways of managing wood-producing trees. Reproduced | 159 |
| 5.4  | with permission from Oliver Rackham, Trees and                                 |     |
|      | Woodland in the British Landscape, rev. edn. (London:                          |     |
|      | Dent, 1990), figure 2. Reproduced with permission                              |     |
|      | of The Orion Publishing Group.   | 185 |
| 5.5  | The count of Foix hunts the stag in 'parkland', late                           | 103 |
| 2.2  | fourteenth century. Reproduced with permission from                            |     |
|      | Paris Bibliothèque National MS Fr. 616, fol. 68r.                              | 191 |
| 6. I | The evolving design of full-rigged ships, c.1430–1530.                         | × - |
|      | Reproduced with permission of <i>The Mariner's Mirror</i> .                    | 207 |

| 6.2 | Forms of water-wheels. An original representation by        |     |
|-----|---|-----|
|     | Richard C. Hoffmann of general technical knowledge in       |     |
|     | the field of history of technology, drawn by Carolyn King   |     |
|     | of the Cartographic Drafting Office, Department of          |     |
|     | Geography, York University.                                 | 209 |
| 6.3 | Schematic drawing of an undershot water-wheel driving a     |     |
|     | grain mill as represented in Abbess Herrad of Landsberg     |     |
|     | (Alsace), Hortus deliciarum (1176/96). Reproduced from a    |     |
|     | copy at the Bibliothèque Municipal de Strasbourg of         |     |
|     | Herrad de Landsberg, Hortus deliciarum, texte explicative   |     |
|     | par A. Straub et G. Keller (Strasbourg, 1892–9), Planche    |     |
|     | xxx, fol. 112a, with permission of Photos et coll. BNU.     | 210 |
| 6.4 |   |     |
|     | manuscript. Reproduced with permission from                 |     |
|     | Cambridge University Library MS Ee.2.31, fol. 13or.         | 213 |
| 6.5 |   |     |
|     | Updated by Richard C. Hoffmann from Vaclav Smil,            |     |
|     | Energy in World History (Boulder, CO: Westview Press,       |     |
|     | 1994), figure 4.24, in view of Radomir Pleiner, Iron in     |     |
|     | Archaeology: the European Bloomery Smelters (Prague:        |     |
|     | Archeologický Ústav AVCR, 2000), 268–86, and M. C.          |     |
|     | Bailly-Maître and P. Dillmann, 'Mines et métallurgie au     |     |
|     | Moyen Âge. Évolution d'une discipline', in J. Chapelot,     |     |
|     | ed., Trente ans d'archéologie médiévale en France. Un bilan |     |
|     | pour un avenir, ixe congrès international de la Société     |     |
|     | d'archéologie médiévale, Vincennes, 16–18 June 2006         |     |
|     | (Caen: CRAHM, 2010), 227-37, and redrawn by                 |     |
|     | Carolyn King of the Cartographic Drafting Office,           |     |
|     | Department of Geography, York University.                   | 223 |
| 9.1 | Long-term and annual temperatures and precipitation.        |     |
|     | A composite of excerpts from Ulf Büntgen, W. Tegel,         |     |
|     | K. Nicolussi et al., '2500 Years of European Climatic       |     |
|     | Variability and Human Susceptibility', Sciencexpress, 13    |     |
|     | January 2011, 1-4, and Rüdiger Glaser and Dirk Riemann,     |     |
|     | 'A Thousand-Year Record of Temperature Variations for       |     |
|     | Germany and Central Europe Based on Documentary             |     |
|     | Data', Journal of Quaternary Science, 24:5 (2009), 447.     | 319 |
| 9.  | 2 Flood mark for 1342 at Hannoversch Münden.                |     |
|     | Photographs by Richard C. Hoffmann and Bernd                |     |
|     | Herrmann  | 326 |

| 10.1 | Gaining mechanical advantage, 1556. From Georgius       |     |
|------|---|-----|
|      | Agricola [Georg Bauer], De re metallica, 1556, German   |     |
|      | edn. Vom Bergkwerck (Basel: Froben, 1557). Photo:       |     |
|      | akg-images.   | 360 |
| 10.2 | Drawing iron wire with water power, 1540. From          |     |
|      | Vannoccio Biringuccio, De la pirotechnia (Venetia: Per  |     |
|      | Venturino Rossinello ad instantia di Curtio Nauo,       |     |
|      | 1540), 31.F.12, p. 140v © The Fitzwilliam Museum,       |     |
|      | Cambridge.  | 362 |
| 10.3 | Water power and mechanical control, 1556. From          |     |
|      | Georgius Agricola [Georg Bauer], De re metallica, 1556, |     |
|      | German edn. Vom Bergkwerck (Basel: Froben, 1557). Photo |     |
|      | akg-images.   | 363 |
| 10.4 | The European world commercial network of the            |     |
|      | sixteenth century. Original diagram by Richard          |     |
|      | C. Hoffmann.  | 366 |
|      |   |     |

# MAPS

| I.I | Europe's land forms and principal geographic regions. Based on Norman J. G. Pounds, <i>An Historical Geography of Europe 450 BC–AD 1330</i> (Cambridge: Cambridge University Press, 1973), map 1.1, as revised by Richard C. Hoffmann and redrawn by Carolyn King of the Cartographic Drafting Office, Department of Geography, York |    |
|-----|--|----|
|     | University. page   | 24 |
| 2.1 | Europe after Rome: linguistic cultures and peoples in the seventh century. Original compilation from diverse sources by Richard C. Hoffmann, drawn by Carolyn King of the Cartographic Drafting Office, Department of Geography,   |    |
|     | York University.   | 59 |
| 2.2 | Early medieval Frisia. Original compilation from diverse sources by Richard C. Hoffmann, drawn by Carolyn King of the Cartographic Drafting Office, Department of  |    |
| 2.3 | Geography, York University.  Early medieval Venetia and environs. Original compilation from diverse sources by Richard C. Hoffmann, drawn by Carolyn King of the Cartographic Drafting Office,   | 71 |
| 2.4 | Department of Geography, York University.  The Carolingian hegemony. Original compilation by Richard C. Hoffmann of information familiar to medieval historians, drawn by Carolyn King of the Cartographic Drafting Office, Department of Geography, York  | 76 |
|     | University.  | 78 |

试读结束, 需要全本PDF请购买 www.ertongbook.com

| 4.I | Woodland in tenth-century northwestern Europe. Copyright Richard C. Hoffmann, reproduced              |     |
|-----|---|-----|
| 4.2 | with permission of ABC-Clio, Santa Barbara, California. (a) Settlement and clearances around Wrocław: | 120 |
| ,   | c.1150—1250   | 131 |
|     | (b) Settlement and clearances around Wrocław: settlements   |     |
|     | with German law by 1300   |     |
|     | Copyright Richard C. Hoffmann, reproduced with  |     |
|     | permission of the University of Pennsylvania Press,   |     |
|     | Philadelphia, Pennsylvania.   | 132 |
| 4.3 | Planned landscape of twelfth-century settlement around  | 132 |
| 4.5 | Villafranca de Verona. Excerpted from Istituto  |     |
|     | Geografico Militare, Carta d'Italia – scala 1:50,000 – NL32,  |     |
|     |   |     |
|     | 9, Sheet #144 – Villafranca de Verona.  | 135 |
| 4.4 | Medieval drainage and settlement in the Dutch   |     |
|     | Rijnland. Copyright William H. TeBrake. Reproduced  |     |
|     | with permission.  | 137 |
| 4.5 | Agricultural systems in northwestern Europe, c.1300.  |     |
|     | Copyright Richard C. Hoffmann, reproduced with  |     |
|     | permission of Princeton University Press, Princeton, New  |     |
|     | Jersey.   | 143 |
| 6.1 | Principal regions of medieval mining and metal-working.   |     |
|     | Original compilation from diverse sources by  |     |
|     | Richard C. Hoffmann, drawn by Carolyn King of the   |     |
|     | Cartographic Drafting Office, Department of   |     |
|     | Geography, York University.   | 217 |
| 6.2 | Europe's larger medieval cities, c.1300. Original compilation   |     |
|     | from diverse sources by Richard C. Hoffmann, drawn by   |     |
|     | Carolyn King of the Cartographic Drafting Office,   |     |
|     | Department of Geography, York University.   | 228 |
| 8.1 | The first epidemic of 'Black Death' in Europe, 1347-52.   |     |
|     | Based on Elisabeth Carpentier, 'Autour de la Peste Noire',  |     |
|     | Annales ESC, 17 (1962), 1062, as revised and updated by   |     |
|     | R. Hoffmann in view of Ole J. Benedictow, The Black   |     |
|     | Death 1346–1353: the Complete History (Woodbridge, Suffolk  |     |
|     | Boydell, 2004) and other original scholarship, and redrawn  |     |
|     | by Carolyn King of the Cartographic Drafting Office,  |     |
|     | Department of Geography Vork University   | 200 |

### PREFACE

Some might judge foolhardy the very notion of approaching medieval European history as if nature mattered. Yet the historiographic space between J. Donald Hughes's Pan's Travail: Environmental Problems of the Ancient Greeks and Romans (1994), and John Richards's The Unending Frontier: an Environmental History of the Early Modern World (2003) calls for at least a temporary span cobbled together by one familiar with the hazards of practising and teaching medieval and environmental history alike. The construction grew from original research and writing in these fields, but equally from trying to assimilate books, articles, conference papers, and conversations of colleagues in many disciplines into topics for discussion in graduate and senior seminars and eventually into lectures for undergraduates in History at York University, Toronto. Performances of able students at all levels showed what more could be made of these materials and the struggles of others indicated where approaches had to be rethought. Thus reconsidered and revised, the lectures became the core of this textbook, the substance of which was completed in September 2012.

The book is perhaps wishfully directed at two audiences, students of the Middle Ages and students of environmental history from both historical and palaeoscientific backgrounds. It therefore surely says some things one set of readers may find too elementary and another set still too alien, only to incite reversed opinions elsewhere. Patience can be a difficult virtue for readers and author alike, but an interdisciplinary enterprise must bring diverse expertise into a shared space where all can contribute. The book explores topics that are defined by general medieval history – the decline of Rome, the role

xvi Preface

of religious doctrine, the problem of the fourteenth century - by economic and social research with clear ecological implications agricultural clearances and agrarian economics, tenurial rights, technology, urbanization - and by environmental studies - social metabolism, climate change, sustainability, the 'tragedy of the commons', biodiversity, the roots of today's environmental crisis. Evidence and findings rest on administrative, legal, religious, and literary texts; on artistic, practical, and discarded material objects; and on biological, geological, pedological, atmospheric, genetic, and chemical data sets. Coverage aspires to be inclusive, summoning up examples from various lands of western Christendom and, where appropriate, observing differences as closely as commonalities. Space and ignorance, however, thwart this ambition, leaving ample opportunity for more expert scholars and scientists to correct errors, omissions, and misconceptions. I anticipate the better-informed will take issue with assertions here made and within a brief span in academic time undertake to replace this initial assemblage of medieval environmental tales with more definitive syntheses and elegant recognition of diversities.

That what follows bears any historical weight or analytical substance is in no small measure due to the generous information, ideas, and criticisms of Ellen Arnold, Cristina Arrigoni Martelli, Steven Bednarski, Connie Berman, Steve Carpenter, Tom Cohen, Petra van Dam, Dagomar Degroot, Anton Ervynck, Piotr Górecki, Barbara Hanawalt, Bernd Herrmann, Stuart Jenks, Suzanne Jenks, Richard Keyser, Lisa Kiser, Tim Newfield, Kathy Pearson, Christie Peters, Tom Prinsen, Alasdair Ross, Linnéa S. Rowlatt, Martin Schmidt, Bradley Skopyk, Paolo Squatriti, Peter Szabo, Vickie Szabo, Richard Unger, Andrew Watson, and others I blush to have neglected. Elements of the published book were possible with help from Terence Barry, Peter Durrant, Della Hooke, Tim LeGoff, Rosa Orlandini, Oliver Rackham, Rosemary Ryan, William TeBrake, and Iain Wallace. Carolyn King has again turned my inchoate sketches and ideas into effective original maps and diagrams. At Cambridge University Press, Michael Watson initiated our discussions and sold to his colleagues my approach to the topic, Elizabeth Friend-Smith patiently shepherded author and manuscript through its drafts, and Chloe Dawson helped resolve many practical problems. I am grateful to all.

Preface xvii

That I think of myself as an environmental historian is due to the example and suasion of my late colleague Elinor Melville, who remains deeply missed. That I even pretend to think as an environmental historian I owe to the example, instruction, and unfailing collegial support of Verena Winiwarter. My appreciation of the simultaneous strength and fragility of natural forces and the need for humility in approaching them was taught by time in and on waters great and small and by sharing the ways of a gardener, Ellen, who has for nearly a half-century mostly managed to keep my feet on the ground.

What is mistaken in this book is my own doing. I hope others will take up the questions it tries to raise, mend its faults, and enrich our understanding with their own better-founded answers to the dynamic interactions of medieval Europeans and their natural world.

King City, Ontario



Frontispiece: Nature and culture at Waterford, Ireland, 1372

## CONTENTS

| Lis | t of figures pag   | e viii |  |
|-----|--|--------|--|
| Lis | t of maps  | xiii   |  |
| Pre | face   | XV     |  |
|     |  |        |  |
| Int | troduction: thinking about medieval Europeans in thei            | r      |  |
| 1   | natural world  |        |  |
| 1   | Long no wilderness   | 21     |  |
|     | Natural dynamics in Holocene Europe                              | 22     |  |
|     | Cultural adaptations and impacts up to the Roman Climatic        |        |  |
|     | Optimum  | 29     |  |
|     | Environmental precedents and legacy of classical Mediterranean   |        |  |
|     | civilization   | 33     |  |
|     | 'Barbarian' adaptations: the Iron Age in northern Europe         | 43     |  |
| 2   | Intersecting instabilities: culture and nature at                |        |  |
|     | medieval beginnings, c.400-900                                   | 51     |  |
|     | Environmental relations in the decline of classical civilization | 52     |  |
|     | The discontinuities of late antiquity, c.350-750                 | 57     |  |
|     | The pressure of a different climate                              | 67     |  |
|     | Anomalous adaptations for anomalous times and ecosystems:        |        |  |
|     | Frisia and the origins of Venice                                 | 71     |  |
|     | The Carolingian age: window on a work in progress                | 78     |  |
| 3   | Humankind and God's Creation in medieval minds                   | 85     |  |
|     | The White thesis, its critics and adherents                      | 87     |  |
|     | The limits to basic medieval Christianization                    | 91     |  |
|     | A hostile material world   | 94     |  |
|     |  |        |  |