

terra australis 46

Terra Australis reports the results of archaeological and related research within the south and east of Asia, though mainly Australia, New Guinea and Island Melanesia — lands that remained terra australis incognita to generations of prehistorians. Its subject is the settlement of the diverse environments in this isolated quarter of the globe by peoples who have maintained their discrete and traditional ways of life into the recent recorded or remembered past and at times into the observable present.

List of volumes in Terra Australis

- Volume 1: *Burrill Lake and Currarong: Coastal Sites in Southern New South Wales*. R.J. Lampert (1971)
- Volume 2: *Ol Tumbuna: Archaeological Excavations in the Eastern Central Highlands, Papua New Guinea*. J.P. White (1972)
- Volume 3: *New Guinea Stone Age Trade: The Geography and Ecology of Traffic in the Interior*. I. Hughes (1977)
- Volume 4: *Recent Prehistory in Southeast Papua*. B. Egloff (1979)
- Volume 5: *The Great Kartan Mystery*. R. Lampert (1981)
- Volume 6: *Early Man in North Queensland: Art and Archaeology in the Laura Area*. A. Rosenfeld, D. Horton and J. Winter (1981)
- Volume 7: *The Alligator Rivers: Prehistory and Ecology in Western Arnhem Land*. C. Schrire (1982)
- Volume 8: *Hunter Hill, Hunter Island: Archaeological Investigations of a Prehistoric Tasmanian Site*. S. Bowdler (1984)
- Volume 9: *Coastal South-West Tasmania: The Prehistory of Louisa Bay and Maatsuyker Island*. R. Vanderwal and D. Horton (1984)
- Volume 10: *The Emergence of Mailu*. G. Irwin (1985)
- Volume 11: *Archaeology in Eastern Timor, 1966–67*. I. Glover (1986)
- Volume 12: *Early Tongan Prehistory: The Lapita Period on Tongatapu and its Relationships*. J. Poulsen (1987)
- Volume 13: *Coobool Creek*. P. Brown (1989)
- Volume 14: *30,000 Years of Aboriginal Occupation: Kimberley, North-West Australia*. S. O'Connor (1999)
- Volume 15: *Lapita Interaction*. G. Summerhayes (2000)
- Volume 16: *The Prehistory of Buka: A Stepping Stone Island in the Northern Solomons*. S. Wickler (2001)
- Volume 17: *The Archaeology of Lapita Dispersal in Oceania*. G.R. Clark, A.J. Anderson and T. Vunidilo (2001)
- Volume 18: *An Archaeology of West Polynesian Prehistory*. A. Smith (2002)
- Volume 19: *Phytolith and Starch Research in the Australian-Pacific-Asian Regions: The State of the Art*. D. Hart and L. Wallis (2003)
- Volume 20: *The Sea People: Late-Holocene Maritime Specialisation in the Whitsunday Islands, Central Queensland*. B. Barker (2004)
- Volume 21: *What's Changing: Population Size or Land-Use Patterns? The Archaeology of Upper Mangrove Creek, Sydney Basin*. V. Attenbrow (2004)
- Volume 22: *The Archaeology of the Aru Islands, Eastern Indonesia*. S. O'Connor, M. Spriggs and P. Veth (2005)
- Volume 23: *Pieces of the Vanuatu Puzzle: Archaeology of the North, South and Centre*. S. Bedford (2006)
- Volume 24: *Coastal Themes: An Archaeology of the Southern Curtis Coast, Queensland*. S. Ulm (2006)
- Volume 25: *Lithics in the Land of the Lightning Brothers: The Archaeology of Wardaman Country, Northern Territory*. C. Clarkson (2007)
- Volume 26: *Oceanic Explorations: Lapita and Western Pacific Settlement*. S. Bedford, C. Sand and S. P. Connaughton (2007)
- Volume 27: *Dreamtime Superhighway: Sydney Basin Rock Art and Prehistoric Information Exchange*. J. McDonald (2008)
- Volume 28: *New Directions in Archaeological Science*. A. Fairbairn, S. O'Connor and B. Marwick (2008)
- Volume 29: *Islands of Inquiry: Colonisation, Seafaring and the Archaeology of Maritime Landscapes*. G. Clark, F. Leach and S. O'Connor (2008)
- Volume 30: *Archaeological Science Under a Microscope: Studies in Residue and Ancient DNA Analysis in Honour of Thomas H. Loy*. M. Haslam, G. Robertson, A. Crowther, S. Nugent and L. Kirkwood (2009)
- Volume 31: *The Early Prehistory of Fiji*. G. Clark and A. Anderson (2009)
- Volume 32: *Altered Ecologies: Fire, Climate and Human Influence on Terrestrial Landscapes*. S. Haberle, J. Stevenson and M. Prebble (2010)
- Volume 33: *Man Bac: The Excavation of a Neolithic Site in Northern Vietnam: The Biology*. M. Oxenham, H. Matsumura and N. Kim Dung (2011)
- Volume 34: *Peopled Landscapes: Archaeological and Biogeographic Approaches to Landscapes*. S. Haberle and B. David (2012)
- Volume 35: *Pacific Island Heritage: Archaeology, Identity & Community*. Jolie Liston, Geoffrey Clark and Dwight Alexander (2011)
- Volume 36: *Transcending the Culture–Nature Divide in Cultural Heritage: Views from the Asia-Pacific region*. Sally Brockwell, Sue O'Connor and Denis Byrne (2013)
- Volume 37: *Taking the High Ground: The archaeology of Rapa, a fortified island in remote East Polynesia*. Atholl Anderson and Douglas J. Kennett (2012)
- Volume 38: *Life on the Margins: An Archaeological Investigation of Late Holocene Economic Variability, Blue Mud Bay, Northern Australia*. Patrick Faulkner (2013)
- Volume 39: *Prehistoric Marine Resource Use in the Indo-Pacific Regions*. Rintaro Ono, Alex Morrison and David Addison (eds) (2013)
- Volume 40: *4000 Years of Migration and Cultural Exchange: The Archaeology of the Batanes Islands, Northern Philippines*. Peter Bellwood and Eusebio Dizon (eds) (2013)
- Volume 41: *Degei's Descendants: Spirits, Place and People in Pre-Cession Fiji*. Aubrey Parke. Matthew Spriggs and Deryck Scarr (eds) (2014)
- Volume 42: *Contextualising the Neolithic Occupation of Southern Vietnam: The Role of Ceramics and Potters at An Son*. Carmen Sarjeant (2014)
- Volume 43: *Journeys into the Rainforest: Archaeology of Culture Change and Continuity on the Evelyn Tableland, North Queensland*. Åsa Ferrier (2015)
- Volume 44: *An Archaeology of Early Christianity in Vanuatu: Kastom and Religious Change on Tanna and Erromango, 1839–1920*. James L. Flexner (2016)
- Volume 45: *New Perspectives in Southeast Asian and Pacific Prehistory*. Philip J. Piper, Hirofumi Matsumura and David Bulbeck (eds) (2017)

terra australis 46

**Ten Thousand Years of Cultivation
at Kuk Swamp in the Highlands
of Papua New Guinea**

Edited by Jack Golson, Tim Denham, Philip Hughes,
Pamela Swadling and John Muke



Australian
National
University

P R E S S



Published by ANU Press
The Australian National University
Acton ACT 2601 Australia
Email: anupress@anu.edu.au
This title is also available online at press.anu.edu.au

National Library of Australia Cataloguing-in-Publication entry

Title: Ten thousand years of cultivation at Kuk Swamp in the highlands of Papua New Guinea / editors: Jack Golson, Tim Denham, Philip Hughes, Pamela Swadling, John Muke.

ISBN: 9781760461157 (paperback) 9781760461164 (ebook)

Series: Terra Australis ; 46.

Subjects: Agriculture, Prehistoric--Papua New Guinea--Kuk.
Anthropology--Papua New Guinea--Kuk.
Wetland archaeology.

Other Creators/Contributors:

Golson, Jack editor.
Denham, Tim, editor.
Hughes, Philip, editor.
Swadling, Pamela, editor.
Muke, John, editor.

Copyright of the text remains with the authors, 2017. This book is copyright in all countries subscribing to the Berne convention. Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright Act, no part may be reproduced by any process without written permission. Inquiries should be made to the publisher.

Terra Australis Editorial Board: Sue O'Connor, Jack Golson, Simon Haberle, Sally Brockwell, Geoffrey Clark.

Cover design and layout by ANU Press. Cover photograph by Philip Hughes.

This edition © 2017 ANU Press

Contents

| | |
|---|------|
| List of Figures | vii |
| List of Tables | xvii |
| Prologue | xix |
| Tim Denham | |
| Acknowledgements | xxi |
| Jack Golson | |
| 1. An Introduction to the Investigations at Kuk Swamp | 1 |
| Jack Golson | |
| Part One: Agriculture in a World, Regional and Local Setting | |
| 2. Early Agriculture in World Perspective | 29 |
| Peter Bellwood | |
| 3. Domesticatory Relationships in the New Guinea Highlands | 39 |
| Tim Denham | |
| 4. Environment and Food Production in Papua New Guinea | 51 |
| R. Michael Bourke | |
| 5. The Wetland Field Systems of the New Guinea Highlands | 65 |
| Chris Ballard | |
| Part Two: Kuk Swamp and its Store of Evidence | |
| 6. Kuk Swamp | 87 |
| Philip Hughes, Tim Denham and Jack Golson | |
| 7. Volcanic Ash at Kuk | 117 |
| Russell Blong, Thomas Wagner and Jack Golson | |
| 8. Tibito Tephra, <i>Taim Tudak</i> and the Impact of Thin Tephra Falls | 133 |
| Russell Blong | |
| 9. Palaeoecology | 145 |
| Simon G. Haberle, Carol Lentfer and Tim Denham | |
| 10. The Archaeobotany of Kuk | 163 |
| Carol Lentfer and Tim Denham | |
| Part Three: People in the Swamp and on its Margins | |
| 11. Phase 1: The Case for 10,000-Year-Old Agriculture at Kuk | 187 |
| Tim Denham, Jack Golson and Philip Hughes | |
| 12. Phase 2: Mounded Cultivation During the Mid Holocene | 201 |
| Tim Denham, Jack Golson and Philip Hughes | |
| 13. Phase 3: The Emergence of Ditches | 221 |
| Tim Denham, Jack Golson and Philip Hughes | |

| | | |
|-----|--|-----|
| 14. | Phase 4: Major Disposal Channels, Slot-Like Ditches and Grid-Patterned Fields | 239 |
| | Tim Bayliss-Smith, Jack Golson and Philip Hughes | |
| 15. | Phase 5: Retreating Forests, Flat-Bottomed Ditches and Raised Fields | 269 |
| | Tim Bayliss-Smith, Jack Golson and Philip Hughes | |
| 16. | Phase 6: Impact of the Sweet Potato on Swamp Landuse, Pig Rearing and Exchange Relations | 297 |
| | Tim Bayliss-Smith, Jack Golson and Philip Hughes | |
| 17. | Houses in and out of the Swamp | 325 |
| | Jack Golson | |

Part Four: Artefacts of Wood and Stone

| | | |
|-----|--|-----|
| 18. | The Kuk Artefacts, an Introduction | 353 |
| | Jack Golson | |
| 19. | Artefacts of Wood | 359 |
| | Jack Golson | |
| 20. | Kuk Stone Artefacts: Technology, Usewear and Residues | 373 |
| | Richard Fullagar with Jack Golson | |
| 21. | Stone Sources and Petrology of Kuk Swamp Artefacts | 403 |
| | Marjorie Sullivan, John Burton, David Ellis, Jack Golson and Philip Hughes | |

Part Five: The Traditional Owners

| | | |
|-----|---|-----|
| 22. | Hagen Settlement Histories: Dispersals and Consolidations | 425 |
| | Andrew Strathern and Pamela J. Stewart | |
| 23. | Kuk Phase 7, 1969–1990, the Kuk Research Station: A Colonial Interlude | 437 |
| | Paul Gorecki | |
| 24. | Kuk 1991 to 1998, the Station Abandoned and the Land Resumed: Archaeological Implications | 449 |
| | Jack Golson and John Muke | |
| 25. | Kuk Phase 8: Heritage Issues to 2008 | 457 |
| | John Muke and Tim Denham | |
| | Bibliography | 469 |
| | Contributors | 511 |