



Universiteit
Leiden
The Netherlands

Stone artefact production and exchange among the Northern lesser Antilles
Knippenberg, S.

Citation

Knippenberg, S. (2006, June 6). *Stone artefact production and exchange among the Northern lesser Antilles*. Retrieved from <https://hdl.handle.net/1887/4433>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/4433>

Note: To cite this publication please use the final published version (if applicable).

**STONE ARTEFACT PRODUCTION AND EXCHANGE
AMONG THE NORTHERN LESSER ANTILLES**

Front-cover shows a St. Martin greenstone axe, a St. Martin calci-rudite zemi three pointer stone (both from the Anse à la Gourde site, Guadeloupe) and a Long Island flake core (from the Jumby Bay site, Long Island) set against the background of the Lesser Antilles in one of the grey-green colour hues of the St. Martin greenstone.

Cover: photos by B. Grishaaver and J. Pauptit, and design by M. Oberndorff

Maps and drawings: M. Oberndorff, E. van Driel, and R. Timmermans

Photos: S. Knippenberg unless mentioned otherwise

© S. Knippenberg 2006

ISBN-10 90-9020725-2

ISBN-13 978-90-9020725-4

Printed at DPP, Utrecht

Stone artefact production and exchange among the northern Lesser Antilles

Proefschrift

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van de Rector Magnificus Dr. D.D. Breimer,
hoogleraar in de faculteit der Wiskunde en
Natuurwetenschappen en die der Geneeskunde,
volgens besluit van het College voor Promoties
te verdedigen op dinsdag 6 juni 2006
klokke 16.15 uur

door

Sebastiaan Knippenberg

geboren te Amsterdam in 1970

Promotiecommissie

Promotor: Prof. dr. L.P. Louwe Kooijmans

Co-promotores: dr. C.L. Hofman
dr. A.L. van Gijn

Referent: dr. J.B. Petersen – University of Vermont, USA

Overige leden: Prof. dr. M.E.R.G.N. Jansen
Prof. dr. W.J.M. Roebroeks
Prof. dr. H. Kars – Vrije Universiteit, Amsterdam

To Jim

Contents

Acknowledgements	11
1 Introduction and research Objectives	15
1.1 Short background of the research	15
1.2 Short history of Caribbean archaeology	15
1.3 Socio-political organisation in Caribbean prehistory: current state of affairs	16
1.3.1 <i>Early Ceramic Age societies</i>	16
1.3.2 <i>Late Ceramic Age societies</i>	17
1.4 Socio-political organisation: tribal versus chiefdom societies	21
1.5 Study of exchange: an anthropological perspective	21
1.6 Exchange studies within Caribbean archaeology	24
1.7 Research objectives	25
1.8 Methodology	27
2 Raw material sources and rock characterisation	29
2.1 Introduction	29
2.2 Chert and flint study	29
2.2.1 <i>Introduction</i>	29
2.2.2 <i>Chert nomenclature</i>	30
2.2.3 <i>Cherts in the region</i>	31
2.2.4 <i>Methodology of the characterisation study</i>	33
2.3 Description of sources and related geology	34
2.3.1 <i>Introduction</i>	34
2.3.2 <i>Chert sources</i>	36
2.4 Chemical characterisation	52
2.4.1 <i>Introduction</i>	52
2.4.2 <i>Origin of the trace-elements</i>	52
2.4.3 <i>Weathering</i>	54
2.4.4 <i>Results</i>	54
2.5 Discrimination of sources	71
2.5.1 <i>Discriminant Analysis</i>	71
2.5.2 <i>Results</i>	73
2.6 Source identification of artefacts.	77
2.6.1 <i>Introduction</i>	77
2.6.2 <i>Source assignment</i>	79
2.7 Conclusion	82
2.8 Other raw materials: calci-rudite and greenstone	82
2.8.1 <i>A multicoloured conglomerate: calci-rudite zemi-stone from St. Martin</i>	82
2.8.2 <i>A grey-green mudstone: greenstone from St. Martin</i>	86
2.8.3 <i>Concluding remarks</i>	92
3 Lithic analysis	93
3.1 Methodology	93
3.1.1 <i>Introduction</i>	93
3.1.2 <i>Aims</i>	96
3.1.3 <i>Data analysis</i>	97

3.1.4	<i>The attribute analysis form</i>	102
3.2	Cultural setting of sampled sites	103
3.2.1	<i>Sample of sites</i>	103
3.2.2	<i>Chronology</i>	104
3.2.3	<i>Sampling and bias</i>	109
4	Acquisition and lithic reduction at the source: Long Island	121
4.1	Introduction	121
4.2	Previous archaeological research on Long Island	121
4.3	The 2000-field campaign	123
4.4	Results of the 2000-field campaign	124
4.4.1	<i>Jumby Bay</i>	124
4.4.2	<i>Sugar Mill</i>	136
4.4.3	<i>Buckley Bay</i>	142
4.4.4	<i>“Site 32”</i>	144
4.4.5	<i>Flint scatters in the eastern area of Long Island</i>	147
4.5	Discussion of results	147
5	Stone acquisition and working at habitation sites	151
5.1	Geology and occurrence of rock materials	151
5.2	Stone material use	156
5.2.1	<i>Introduction</i>	156
5.2.2	<i>Early Ceramic A</i>	157
5.2.3	<i>Early Ceramic B</i>	174
5.2.4	<i>Late Ceramic A</i>	193
5.2.5	<i>Late Ceramic B</i>	214
5.3	Discussion	217
5.3.1	<i>Diachronic summary</i>	217
5.3.2	<i>Organization of production</i>	220
5.4	Conclusions	222
6	Production, distribution and exchange	223
6.1	Introduction	223
6.2	Distribution of lithic material	223
6.2.1	<i>Long Island Flint</i>	223
6.2.2	<i>St. Martin greenstone</i>	243
6.2.3	<i>St. Martin calci-rudite</i>	254
6.3	Exchange systems in the northern Lesser Antilles: some concluding remarks	261
7	Inter-island relationships	265
7.1	Summary of the data	265
7.2	Inter-island exchange networks and socio-political organisation	266
7.2.1	<i>Introduction</i>	266
7.2.2	<i>The Early Ceramic Age</i>	267
7.2.3	<i>The Early to Late Ceramic Age transition</i>	268
7.2.4	<i>The Late Ceramic B phase</i>	273
7.3	Concluding remarks	274

CONTENTS

Appendix A	Chert and flint sources	277
Appendix B	Hughes Bay flint scatter, Antigua	293
Appendix C	Geo-chemical analysis and data	295
Appendix D	Attribute analysis of lithic artefacts	303
Appendix E	Mesh size and sample size bias	311
Appendix F	Archaeological sites and related lithic sample	315
References		351
Samenvatting		373
Curriculum Vitae		381

Acknowledgements

In this context I wish to express my gratitude to all those individuals who have assisted me one way or another in the course of the present research. Participating in Caribbean archaeology and studying inter-island exchange networks starts by visiting as many islands as possible and cooperating with many local people, professional as well as avocational archaeologists. The regional scope of the research discussed in this study is well reflected in the large number of people from many different places who assisted my investigations. To stress the importance of “inter-island” contacts in particular and international cooperation in general, I would like to mention all of these individuals and acknowledge their help. I realize, though, that it is a long list.

Let me start by mentioning and thanking my supervisors Professor Leendert P. Louwe Kooijmans, Dr. Corinne L. Hofman, and Dr. Anne Louise van Gijn at Leiden University. Without their critical guidance this project would not have been possible. Furthermore, I wish to acknowledge the Netherlands Organisation for Scientific Research (NWO), The Hague, which made this research possible by allowing me a four-year’s grant. This enabled me to conduct fieldwork at various islands and to study the collections of a number of institutions.

During the past few years I visited the islands of Puerto Rico, Anguilla, St. Martin, St. Eustatius, Antigua, Montserrat, Guadeloupe, La Désirade, Petite Terre, and Martinique. Furthermore, I spent some time at the Carnegie Museum of Natural History, Pittsburgh, USA. Each location introduced something of its own flavour to my research. I spent a wonderful time in Puerto Rico in 1998. Dr. Jeffery B. Walker of the USDA Forest Service in this island deserves special thanks for providing me lodging and a laboratory in one of the research facilities of the USDA Forest Service in El Yunque Forest Reserve. Besides, he critically reviewed my attribute code list, helped me out during my analysis of the Sorcé materials from the island of Vieques and took me to the chert sources of Southwest Puerto Rico. Also, I want to express my gratitude to Reniel Rodríguez Ramos, now a PhD student at the University of Florida, Gainesville, USA, for the many discussions we had on lithic technology, for sharing many of his unpublished data with me and for providing me with the Moca chert samples. Furthermore, I would like to thank Louis Chanlatte Baik and Yvonne Narganes Storde of the University of Puerto Rico, Río Piedras, for allowing me to study the lithic materials from the Sorcé site on Vieques and to analyse some of the flint and chert artefacts geochemically.

In 1999, I spent three weeks on Anguilla for the study of lithics from the Barnes Bay, Sandy Ground, and Shoal Bay East sites. Though remote and laidback, I had a great time working on this small island. First of all, I would like to thank Dr. John G. Crock, University of Vermont, USA, for generously allowing me to study these collections, sharing with me data acquired for his PhD research, and for all the help he gave me during my stay. Furthermore, I am indebted to Ijahny Christian, at that time director of the Anguilla Natural Trust, for providing me room to work.

During my various visits to the island of Antigua many individuals have assisted me. First of all, I wish to thank Dr. A. Reg Murphy, the state archaeologist of Antigua and Barbuda, for providing me permission to conduct archaeological fieldwork on Long Island, for pointing out to me the location of some of the local flint and chert sources, and for allowing me to use some of his data. Reg and his wife Nicky deserve special thanks for their great hospitality. Also, I would like to express my gratitude to Desmond V. Nicholson. Unfortunately, he will not see the results of my work, since he passed away recently. Nevertheless, I would like to mention him if only as a way of honouring him for his cheerful assistance during my stays on Antigua. With his death one of the most enthusiastic and joyful people of the Caribbean archaeological community has left us. In addition, I would like to thank the residents of Long Island, Jon and Karen Tate, for being most helpful during my fieldwork and for being excellent hosts to the islet. Also, Mr. Franklin and Mr. Swan, and the employees of the Long Island Resort are acknowledged for their hospitality. Mr. Stubbs deserves thanks for assisting in many ways. Finally, Monique de Rooij, Esther Mietes, Martijn van den Bel, and Tom Hamburg deserve special thanks for being such a great and enthusiastic fieldwork team on Long Island, and for producing so much work during our stay.

I visited Guadeloupe occasionally. At the time it formed the location of a University of Leiden archaeological field school. I would like to thank André Delpuech, the then director of the DRAC and at present curator of the Musée du quai Branly,

ACKNOWLEDGEMENTS

for his support throughout the years and acknowledge him for providing such a great platform for executing large-scale archaeological fieldwork. This thesis has benefited in many ways from the work done on Guadeloupe.

In 2000, I visited Martinique in order to study the Vivé, Diamant, and Anse Trabaud collections. I would like to thank Dr. Benoît Bérard for allowing me to investigate these collections and helping me out during my stay on Martinique. I would like to mention the people of the DRAC for being great hosts.

My last foreign visit was to the Carnegie Museum of Natural History, Pittsburgh. Here the “journey” ended with one of the persons with whom it all started. I am very much indebted to Dr. David R. Watters. He inspired me by his enthusiasm during my first presentation on the subject on Guadeloupe in 1995, and afterwards “kept the fire burning”. Partially by his interest and support this research has attained the present result. Besides, I would like to thank him for allowing me to study the Trants materials from Montserrat and providing such a great assistance during my stay in Pittsburgh. Finally, David and his wife Cathy deserve special thanks for letting me feel so welcome at their home.

Furthermore, I would like to mention and thank some of the people who have been helpful to me from a distance. First of all, I am indebted to Dr. Sandrine Grouard, Muséum National d’Histoire Naturelle, Paris, France, who analysed the animal bone materials from the Long Island habitation sites. I would like to thank also Dr. Christy N. de Mille, University of Calgary, Canada, for sharing with me data from her Antigua research. Professor Samuel M. Wilson, University of Texas at Austin, was so kind as to allow me to analyze the materials from the Hichman’s site on the island of Nevis.

I spent considerable time at the Geology Department of the University of Utrecht, investigating the provenance of the flint and chert samples. Being an archaeologist while doing geological research, I was assisted by many people. First of all, I want to express my deepest gratitude to Dr. Johannes J.P. Zijlstra for teaching me the basics of flint and its formation, sharing his ideas, accompanying me to the chert and flint sources on Antigua, supervising my work on the provenance research, and critically reading and commenting on earlier versions of Chapter 2 and Appendix A.

Professor Bernard de Jong was always there to critically evaluate my research progress. In many ways he improved the work I did, for which I am deeply indebted. Furthermore, I would like to thank Helen de Waard who performed the ICPAES analyses and helped me out during the sample preparation procedure, Dr. Paul Mason, who performed LA-ICP-MS analyses on some of the flint samples, Dr. Tony Senior and Dr. Gerrit Klaver, who helped me identifying the minerals in the thin-sections of the St. Martin greenstone, Dr. Cees Woensdrecht and Ir. Bertha Djee Kwee, who were helpful in many practical ways, and Otto Stiekema and Jan Drenth, who prepared many of the thin-sections.

At the home base, the Faculty of Archaeology, Leiden University, many people were helpful to me during different stages of this research. To start with the final stage, I would like to thank Medy Oberendorff for helping me out with the layout of the various maps and for creating the cover of this book. The work of Raf Timmermans and also Erick van Driel is much appreciated. They produced the beautiful artefact drawings which greatly improve the present work. Jan Pauptit and Ben Grishaaver made most of photos of the different artefacts. Dr. Alexander Verpoorte is thanked for critically reading and commenting on an earlier version of Chapter 4 and for sharing his ideas on the Long Island flint source. Dr. Menno L.P. Hoogland deserves thanks for the many discussions we had and for allowing me to study the lithic samples from Saba and Guadeloupe. Yvonne Lammers-Keyzers’ willingness to share her knowledge on stone tool use and use-wear is greatly appreciated. Furthermore, I would like to thank Dr. Aad H. Versteeg for allowing me to analyse the Golden Rock, Godet and Smoke Alley collections from St. Eustatius, and A.J. Daan Isendoorn and Eelco Boomsma for allowing me to study the Anse à l’Eau finds from Guadeloupe. Special thanks are due to Frank Stevens, then MA student at Leiden University and at present employed by RAAP, Amsterdam, who analysed the Morel collection from Guadeloupe and generously allowed me to use his data for my research. The study by Joke and Harald, two BA students, of portions of the lithic sample from Golden Rock, St. Eustatius, is greatly appreciated.

Furthermore, I would like to thank Dr. Dave Hessen, University of Amsterdam, for helping me out with some issues related to the statistical analysis of the geochemical data.

My current employer, Archol BV, most kindly provided computer facilities to me, which allowed me to make and edit the

ACKNOWLEDGEMENTS

various illustrations, and finalize the layout of the book. My colleagues at Archol are thanked for distracting me sometimes from Caribbean archaeology.

Dr. Maaïke de Waal, co-participant in the project, has been a great colleague, with whom I had many professional discussions. She deserves special thanks for reading and commenting on earlier versions of this work and allowing me to study the materials she excavated on La Désirade, and Iles de la Petite Terre in the Guadeloupe region.

My friends Frank, Frits, Hans, Pieter, and Ruben have always been great distractions from my work and their letters written to me while doing archaeological research in the Caribbean are still very much appreciated - thanks guys.

My mother Rineke has always supported me during the different stages of the work, for which I am thankful. My father Hans has been a great stimulus in forming my analytical capabilities. My brother Olivier always critically observed my doings. Olivier, I hope I have convincingly demonstrated that “stone” turtles were not responsible for the transport of rocks among the islands.

I would like to express the deepest gratitude to my girlfriend Mireille Blom for being so patient and for showing me that archaeology is not everything.

I want to dedicate these final lines to the memory of Professor James B. Petersen, University of Vermont, USA, who so tragically was taken from us less than a year ago. Caribbean archaeology has lost one of its finest researchers and one of its nicest individuals. Jim was the referent of this dissertation and has critically read and most thoroughly corrected the entire manuscript, for which I am deeply grateful. Just before his tragic death, I, fortunately, had the chance to see him and hear from him that he very much enjoyed reading the work. Therefore, this dissertation is dedicated to him.

