



Universiteit
Leiden
The Netherlands

Reconstructing adhesives : an experimental approach to organic palaeolithic technology

Kozowyk, P.R.B.

Citation

Kozowyk, P. R. B. (2020, October 13). *Reconstructing adhesives : an experimental approach to organic palaeolithic technology*. Retrieved from <https://hdl.handle.net/1887/137725>

Version: Publisher's Version

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

Downloaded from: <https://hdl.handle.net/1887/137725>

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

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/137725> holds various files of this Leiden University dissertation.

Author: Kozowyk, P.R.B.

Title: Reconstructing adhesives : an experimental approach to organic palaeolithic technology

Issue Date: 2020-10-13

Reconstructing Adhesives

An Experimental Approach to Organic Palaeolithic Technology

Paul R.B. Kozowyk

Reconstructing Adhesives: An Experimental Approach to Organic Palaeolithic Technology

Paul R.B. Kozowyk

Layout and cover: Paul R.B. Kozowyk

About the cover: Drops of compound (left), resin (middle), and tar (right) adhesives; incomplete due to the impartial archaeological record and a lack of information on material properties. By combining data from experiments some of the gaps can be filled.

Print: Ridderprint | www.ridderprint.nl

An Experimental Approach to Organic
Palaeolithic Technology

Proefschrift

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus prof. mr. C.J.J.M. Stolker
volgens besluit van het College voor Promoties
te verdedigen op 13 oktober 2020
klokke 16:15 uur

door

Paul Robert Barnard Kozowsky
Geboren te Calgary, Alberta
in 1987

Promotoren:

Prof dr. A.L. van Gijn (Universiteit Leiden)
Dr. G.H.J. Langejans (Technische Universiteit Delft)
Prof. dr. M.A. Soressi (Universiteit Leiden)

Promotiecommissie:

Prof. Dr. Joris Dik (Technische Universiteit Delft)
Dr. Amanda Henry (Universiteit Leiden)
Prof. dr. ir. Hans Huisman (Rijksuniversiteit Groningen)
Prof. dr. Pieter ter Keurs (Universiteit Leiden)
Prof. dr. Marlize Lombard (University of Johannesburg)
Prof. dr. Wil Roebroeks (Universiteit Leiden)

The research presented in this dissertation has been generously funded by the Dutch Research School for Archaeology (ARCHON) grant number 022-005-016.

“But the gum, being organic, has vanished like its organic users.”

John Greenway – Down Among the Wild Men

To my parents, for being stuck with me.

Contents

I. INTRODUCTION	7
RESEARCH CONTEXT.....	8
ARCHAEOLOGICAL CONTEXT	12
APPROACH.....	16
AIMS	19
THESIS OUTLINE.....	21
2. BIRCH TAR PRODUCTION	25
ABSTRACT	26
INTRODUCTION.....	27
RESULTS	28
DISCUSSION	36
CONCLUSION.....	39
METHODS.....	40
ACKNOWLEDGEMENTS.....	42
3. ADHESIVE EFFICACY	43
ABSTRACT	44
INTRODUCTION.....	45
MATERIALS AND METHODS.....	46
RESULTS	54
DISCUSSION	62
CONCLUSION.....	67
ACKNOWLEDGMENTS.....	69
4. USE AND RE-USE.....	71
ABSTRACT	72
INTRODUCTION.....	73
MATERIALS AND METHODS.....	75
RESULTS	84
DISCUSSION	91
CONCLUSIONS	94

5. PRESERVATION	97
ABSTRACT	98
INTRODUCTION.....	99
MATERIALS	101
METHODS.....	108
RESULTS	112
DISCUSSION	122
CONCLUSION.....	130
ACKNOWLEDGEMENTS.....	131
6. CONCLUSION.....	133
THE STORY SO FAR.....	133
FUTURE DIRECTIONS.....	137
FINAL REMARKS.....	139
REFERENCES	141
APPENDIX.....	169
CHAPTER 2. SUPPLEMENTARY INFORMATION.....	169
CHAPTER 3. SUPPLEMENTARY INFORMATION.....	188
CHAPTER 4. SUPPLEMENTARY INFORMATION.....	189
APPENDIX REFERENCES	190
SUMMARY	191
SAMENVATTING	193
ACKNOWLEDGEMENTS.....	196
CURRICULUM VITAE.....	198