

LITHIC ANALYSIS

Fall 2013

Tuesday 17:00-19:00

Lisner Archaeology Lab.

Instructor: Dr. David R. Braun
Office: 203 X Building
Phone: (202) 994-6953
Email: David_braun@gwu.edu
Office hours: Tuesdays 1-2 pm

Course Description: A survey of current techniques in the analysis of stone artefacts. Students will learn the basic principles of morphometric description as well as theoretical concepts behind the use of artifacts to reconstruct patterns in the past. There will be a hands-on component that will require out of class time work on projects.

Course Requirements: Students are expected to attend lectures, complete reading assignments, and participate in class discussions when appropriate. Readings will be posted on blackboard or otherwise be available in paper format. THIS IS A READING INTENSIVE COURSE. Occasionally students will be expected to direct discussion in class. One exam will take place during the course. There will also be multiple practical based exercises during the course. These will be conducted during and outside the class period. There will be a final presentation associated with original data collection and analysis. Projects will be conducted during and outside the class period.

Learning Outcomes:

- 1) Students will explore and learn the techniques and theories associated with the analysis of chipped stone.
- 2) Students will investigate specific methodologies used to interpret behavior from stone artifact analysis.
- 3) Students will critically assess some of the past and present debates surrounding the analysis of stone artifacts.
- 4) To further student's professional preparations students will actively engage in the analysis of a subset of stone artifacts to determine the unique nature of these types of datasets.

Assessment: One in class exam will make-up 25% of the final grade. Lab exercises and hand-in assignments will make up 25% of the grade. Class participation and presentations of the readings will make up 20% of your grade. The final 30% of the grade will be based on the presentation of your project at the end of the course. Letter grades will be generally be assigned according to the following scale: **90-100%=A, 86-89%=B+, 80-85%=B, 76-79%=C+, 70-75%=C, 60-69%=D, 59% or below=F.** I reserve the right to adjust this scale down a bit if necessary. Thus, if you have an 89% at the end of the semester, your final letter grade will be at least a B+; however, depending on the class's performance as a whole, this might wind up being an A. In addition, excessive absences may result in failure or final letter grade reduction.

General Policies:

Make-up Exams: Make-up exams will **NOT** be given, except in cases of University conflicts, severe illness/family emergency, or other similar circumstances (documentation required). In

Course Schedule and Topics*

these cases, the make-up must be taken within 1 week of the originally scheduled exam at a mutually convenient time/location.

Cell phones, PDA's, laptop computers, etc.: It is my strong preference that these items **NOT** be used in class. If you have a compelling reason to take notes electronically, please see me to discuss your reasons and I will consider your request. Otherwise, I expect not to see these items out during lectures.

Essay Guidelines

All written assignments must be typed, double spaced, not have excessive margins, be an original, solo-produced work, and must conform in style to the standard employed in American archaeology for bibliographic references. Consult the guide for authors in the journal *American Antiquity*.

Final Project

Students will be expected to conduct an analysis of stone artifacts in order to understand a specific question. These projects should be informed by the literature associated with the readings. A prospectus for the final project should be submitted by October 6th. This project will be associated with a final presentation and paper (8-10 pages) that will be submitted in lieu of a final at the end of the semester.

In Class Presentations

Each student will be responsible for guiding at least one in class discussion based on the reading for that week. Students are expected to produce a written guide for the class discussion and direct discussion. These discussions should be based on readings as well as supplementary readings that the student seeks out during class preparations.

In Class Exercises

Throughout the course of the semester there will be a series of in class exercises that require students to interact with primary data and submit some type of written or graphical exercise. These are expected to be submitted in the class period after the in class exercise unless you are instructed differently.

Extra credit: There will be **no extra credit** assignments.

PowerPoint: For many reasons, my PowerPoint slides will be posted on Blackboard in .pdf format AFTER the lectures. If you miss class you should get notes for the missed lecture from one of your classmates. There will be content in class that you will not be able to get from the readings or the powerpoint presentations. This makes it essential that you attend class.

General Notes:

Students are required to make their own personal lab folder/notebook to record their observations and the data they collect (i.e. handouts, drawings, attributes of different tool types, etc.)

Students will be required to wear safety goggles (eye protection) during flintknapping exercises.

Course Schedule and Topics*

Class attendance is imperative for a course of this nature which is very much “hands on” in terms of instruction.

Special Needs: If you require special accommodations for learning difficulties or physical disabilities, and you have official university acknowledgement of this condition, please see me as soon as possible to discuss appropriate arrangements. E-mailing/calling *the day of an exam* to notify me of your needs is NOT acceptable.

Week	Class Meeting	Topic	Readings
8/27	1	Introduction to Lithic Analysis In Class Exercise: Make and draw a whole flake.	None
9/3	2	Middle Range Research and Stone Tools	-Binford LR. 1981. Behavioral archaeology and the Pompeii premise. <i>Journal of Anthropological Research</i> 37:195-207. -Binford LR. 1981. <i>Bones: ancient men and modern myths</i> . New York: Academic Press. 320 p. -Gifford-Gonzalez D. 1991. Bones are not enough: analogues, knowledge, and interpretive strategies in zooarchaeology. <i>Journal of Anthropological Archaeology</i> 10(3):215-254. -Shea JJ. 2011. Stone tool analysis and human origins research: Some advice from uncle Screwtape. <i>Evolutionary Anthropology: Issues, News, and Reviews</i> 20(2):48-53. -Braun, D.R., Tactikos, J.C., Ferraro, J.V. & Harris, J.W.K. 2006. Archaeological inference and Oldowan behavior. <i>Journal of Human Evolution</i> 51: 106-108.
9/10	3	NO CLASS DR. BRAUN AT A CONFERENCE IN ITALY	
9/3 to 9/10	4	Fracture Mechanics and Knapping Experiments In Class Exercise: Make 5 whole flakes. Determine the relationship between EPA and flake size. Determine the relationship between Platform area and flake size.	-Andrefsky Chap 2; Andrefsky Chap 1(pgs 7-10); -Dibble HL. 1998. Comment on 'Quantifying Lithic Curation, an Experimental Test of Dibble and Pelcin's Original Flake-Tool Mass Predictor', by Zachary J. Davis and John J. Shea. <i>Journal of Archaeological Science</i> 25(7):611-613. -Dibble HL, Rezek Z. 2009. Introducing a new experimental design for controlled studies of flake formation: results for exterior platform angle, platform depth, angle of blow, velocity, and force. <i>Journal of Archaeological Science</i> 36(9):1945-1954. -Hiscock P, Clarkson C. 2009. The reality of reduction experiments and the GIUR: reply to Eren and Sampson. <i>Journal of Archaeological Science</i>

Course Schedule and Topics*

			<p>36(7):1576-1581.</p> <p>-Cotterell B, Kamminga J. 1992. Mechanics of pre-industrial technology: An introduction to the mechanics of ancient and traditional material culture. Cambridge: Cambridge University Press. 325 p. (Chapter 6)</p>
9/24	5	<p>Typologies</p> <p>In Class Project: Create a Bordian graph for three assemblages. Hand in Bordian graphs by next class period</p>	<p>Andrefsky Chap 4;</p> <p>-Brown JA. 1982. On the structure of artifact typologies. Essays on archeological typology: Evanston, Ill. : Center for American Archeology Press, 1982. p 176-189.</p> <p>-Debenath A, Dibble HL. 1994. Handbook of Paleolithic Typology. Philadelphia: The University Museum, University of Pennsylvania. 202 p. Chap 1;</p> <p>-Ford JA. 1954. The type concept revisited. American Anthropologist 56:42-54.</p> <p>-Spaulding AC. 1953. Statistical techniques for the discovery of artifact types. American Antiquity 18(4):305-313.</p> <p>-Steward JH. 1954. Types of types. American Anthropologist 56:54-57.</p> <p>-Schiffer MB. 1976. Behavioral Archaeology. New York: Academic Press. 222 p.(Chap 3)</p> <p>-Stiles D. 1981. On developed Oldowan and Acheulian: problems in lithic taxonomy. Current Anthropology 22(2):185-188.</p> <p>-Gowlett, J. A. J. (1986). Culture and Conceptualisation: The Oldowan-Acheulian Gradient. <u>Stone Age Prehistory: studies in memory of Charles McBurney</u>. G. N. Bailey and P. Callow. Cambridge, Cambridge University Press: 234-240.</p>
10/1	6	<p>The Bordes-Binford Debate</p> <p>In Class Project: Make a single scraper, a double scraper and Mousterian point. Draw each tool. Calculate reduction using Dibble and Roland's parameter. Which is more reduced?</p>	<p>-Bordes F, de Sonneville-Bordes D. 1970. The significance of variability in Paleolithic assemblages. World Archaeology 2(1):61-73.</p> <p>-Barton CM. 1997. Stone tools, style, and social identity: an evolutionary perspective on the archaeological record. In: Barton CM, Clark GA, editors. Rediscovering Darwin: evolutionary theory and archaeological explanation. 7th ed. Washington: American Anthropological Association. p 141-156.</p> <p>-Sackett JR. 1982. Approaches to Style in Lithic Analysis. Journal of Anthropological Archaeology 1:59-112.</p> <p>-Binford LR. 1973. Interassemblage variability - the Mousterian and the 'functional' argument. In: Renfrew AC, editor. Explanation of Culture Change: Models in Prehistory. London: Duckworth Press. p 227-254.</p> <p>-Dibble HL. 1987. Interpretation of Middle Paleolithic scraper morphology. American Antiquity</p>

Course Schedule and Topics*

			52(1):109-117. -Close AE. 1991. On the validity of middle paleolithic tool types: a test case from the eastern Sahara. <i>Journal of Field Archaeology</i> 18:256-69.
10/8	7	The Curation Concept PROJECT SYNOPSIS DUE -Exercise: Create a curation curve for the scraper assemblage from last weeks exercise. Is the assemblage highly curated or not?	-Binford LR. 1979. Organization and formation processes: looking at curated technologies. <i>Journal of Anthropological Research</i> 35(3):255-273. -Nash S. 1996. Is curation a useful heuristic. In: Odell GA, editor. <i>Stone Tools: Theoretical Insights Into Human Prehistory</i> . New York: Plenum Press. p 81-97. -Shott MJ. 1996. An exegesis of the curation concept. <i>Journal of Anthropological Research</i> 52(3):259-280. -Shott MJ, Sillitoe P. 2004. Modeling use-life distributions in archaeology using new guinea wola ethnographic data. <i>American Antiquity</i> 69(2):339-355. -Binford LR. 2001. Where do research problems come from? <i>American Antiquity</i> 66(4):669-678. -Andrefsky W. 1994. Raw-Material Availability and the Organization of Technology. <i>American Antiquity</i> 59(1):21-34.
10/15	8	Technological Organization In Class Exercise: Using one of the assemblages from the lab calculate Holdaway and Douglass' Cortex Ratio. Remove 50% of the flakes from the assemblage and recalculate the Cortex Ratio. Then remove 10% of the cores and recalculate the Cortex Ratio.	-Bamforth DB. 1990. Settlement, raw material, and lithic procurement in the central Mojave Desert. <i>Journal of Anthropological Archaeology</i> 9(1):70-104. -Milliken S. 1998. The Role of Raw Material Availability in Technological Organization: A Case Study from the south-east Italian Late Paleolithic. In: Milliken S, editor. <i>The Organization of Lithic Technology in Late Glacial and Early Postglacial Europe</i> : BAR. -Wallace IJ, Shea JJ. 2006. Mobility patterns and core technologies in the Middle Paleolithic of the Levant. <i>Journal of archaeological science</i> 33(9):1293-1309. -Kuhn SL. 1994. A formal approach to the design and assembly of mobile toolkits. <i>American Antiquity</i> 59(3):426-442. -Morrow TA. 1996. Bigger is better: Comments on Kuhn's formal approach to mobile tool kits. <i>American Antiquity</i> 61(3):581-590. -Nelson MC. 1991. The study of technological organization. <i>Archaeological Method and Theory</i> 3:57-100. -Holdaway, S., Douglass, M., 2012. A twenty-first century archaeology of stone artifacts, <i>Journal of Archaeological Method and Theory</i> 19, 101-131. -Riel-Salvatore, J., 2010. A niche construction perspective on the middle–upper paleolithic

Course Schedule and Topics*

			<p>transition in Italy, <i>Journal of Archaeological Method and Theory</i> 17, 323-355.</p> <p>-Douglass, M.J., Holdaway, S.J., Fanning, P.C. & Shiner, J.I. 2008. An assessment and archaeological application of cortex measurement in lithic assemblages. <i>American Antiquity</i> 513-526.</p>
10/22	9	<p>Reduction Sequence and Chaîne Operatoire</p> <p>In Class Exercise: Find a core from the lab and draw a diacritic model of the core using the techniques described in Inizan et al. and Tostevin</p>	<p>-Shott MJ. 2003. Chaîne opératoire and reduction sequence. <i>Lithic Technology</i> 28(2):95-105.</p> <p>-Clarkson C, Hiscock P. 2011. Estimating original flake mass from 3D scans of platform area. <i>Journal of Archaeological Science</i> 38(5):1062-1068.</p> <p>-Conard NJ, Soressi M, Parkington JE, Wurz S, Yates R. 2004. A unified lithic taxonomy based on patterns of core reduction. <i>South African Archaeological Bulletin</i> 59(179):12-16.</p> <p>-Braun DR, Tactikos JC, Ferraro JV, Arnow SL, Harris JWK. 2008. Oldowan reduction sequences: methodological considerations. <i>Journal of Archaeological Science</i> 35:2153-2163.</p> <p>-Tostevin GB. 2011. Levels of theory and social practice in the reduction sequence and Chaîne Operatoire methods of Lithic Analysis. <i>PaleoAnthropology</i> 2011:351-375.</p> <p>Inizan, M.-L., Reduron-Ballinger, M., Roche, H., Tixier, J., 1999. <i>Technology and Terminology of Knapped Stone</i>, CREP, Nanterre.</p> <p>-Van Peer P, Bar-Yosef O. 2009. The Chaîne Operatoire Approach in Middle Paleolithic Archaeology. <i>Current Anthropology</i> 50(1):103-131.</p> <p>-Simek JF. 1987. Spatial order and behavioural change in the French paleolithic. <i>Antiquity</i> 61:25-40.</p>
10/29	10	<p>Stone Tools and Evolution</p>	<p>Bettinger RL, Eerkens JW. 1999. Point typologies, cultural transmission, and the spread of bow-and-arrow technology in the Prehistoric Great Basin. <i>American Antiquity</i> 64:231-242.</p> <p>-Bettinger RL. 1997. Evolutionary implications of metrical variation in Great Basin projectile points. In: Barton CM, Clark GA, editors. <i>Rediscovering Darwin: evolutionary theory and archaeological explanation</i>. 7th ed. Washington: American Anthropological Association. p 177-191.</p> <p>-Fitzhugh B. 2001. Risk and invention in human technological evolution. <i>Journal of Anthropological Archaeology</i> 20(2):125-167.</p> <p>-Ugan A, Bright J, Rogers AR. 2003. When is technology worth the trouble? <i>Journal of Archaeological Science</i> 30(10):1315-1329.</p> <p>-Lycett SJ, Norton CJ. 2010. A demographic model for Palaeolithic technological evolution: The case of East Asia and the Movius Line. <i>Quaternary International</i> 211(1-2):55-65.</p>

Course Schedule and Topics*

			<p>-Lycett SJ, Cramon-Taubadel N, Gowlett JAJ. 2010. A comparative 3D geometric morphometric analysis of Victoria West cores: implications for the origins of Levallois technology. <i>Journal of Archaeological Science</i> 37(5):1110-1117.</p> <p>-Powell A, Shennan S, Thomas MG. 2009. Late pleistocene demography and the appearance of modern human behavior. <i>Science</i> 324(5932):1298.</p> <p>-Mesoudi A, O'Brien MJ. 2008. The cultural transmission of great basin projectile-point technology I: An experimental simulation. <i>American Antiquity</i> 73:3-28.</p> <p>-Kuhn SL. 2004. Evolutionary perspectives on technology and technological change. <i>World Archaeology</i> 36(4):561-570.</p> <p>Bettinger, R. L. (2009). <i>Macroevolutionary Theory and Archaeology: Is There a Big Picture? Macroevolution in Human Prehistory</i>, Springer: 275-295.</p>
11/5		NO CLASS DR. BRAUN IN SOUTH AFRICA	
11/12	11	<p>Projectiles or Not</p> <p>In Class Exercise: Make a projectile, spear a pig rib (no...really). Identify DIFs and Fracture wings. If possible calculate the speed of the projectile using the methodology described by Hutchings (Also see Iovita 2013).</p>	<p>-Shea JJ. 2006. The origins of lithic projectile point technology: evidence from Africa, the Levant, and Europe. <i>Journal of Archaeological Science</i> 33(6):823-846.</p> <p>-Shea JJ, Davis Z, Brown K. 2001. Experimental tests of Middle Palaeolithic spear points using a calibrated crossbow. <i>Journal of Archaeological Science</i> 28(8):807-816.</p> <p>-Shea JJ. 1997. Middle Paleolithic Spear Point Technology. In: Knecht H, editor. <i>Projectile Technology</i>. New York: Plenum Press. p 79-106.</p> <p>-Holdaway S. 1989. Were There Hafted Projectile Points in the Mousterian? <i>Journal of Field Archaeology</i> 16:79-85.</p> <p>-Solecki RL. 1992. More on hafted projectile points in the Mousterian. <i>Journal of Field Archaeology</i> 19(2):207-212.</p> <p>-Lombard M. 2005. Evidence of hunting and hafting during the Middle Stone Age at Sibidu Cave, KwaZulu-Natal, South Africa: a multianalytical approach. <i>Journal of Human Evolution</i> 48(3):279-300.</p> <p>-Villa, P., Soressi, M., Henshilwood, C.S., Mourre, V., 2009. The Still Bay points of Blombos Cave (South Africa), <i>J. Archaeol. Sci.</i> 36, 441-460.</p> <p>-Wilkins, J., Schoville, B.J., Brown, K.S., Chazan, M., 2012. Evidence for Early Hafted Hunting Technology, <i>Science</i> 338, 942-946.</p> <p>-Villa, P., Boscato, P., Rinaldo, F., Ronchitelli, A., 2009. Stone tools for the hunt: points with impact scars from a Middle Paleolithic site in southern</p>

Course Schedule and Topics*

			<p>Italy, J. Archaeol. Sci. 36, 850-859.</p> <p>-Hutchings, W.K., 2011. Measuring use-related fracture velocity in lithic armatures to identify spears, javelins, darts, and arrows, J. Archaeol. Sci. 38, 1737-1746.</p>
11/19	12	<p>Microscopic Approaches to Stone Tool Analysis</p> <p>In Class Test</p>	<p>-Cahen D, Keeley LH, Van Noten FL. 1979. Stone tools, toolkits, and human behavior in prehistory. Current Anthropology 20(4):661-683.</p> <p>-Bamforth DB, Burns GR, Woodman C. 1990. Ambiguous use traces and blind test results: new data. Journal of Archaeological Science 17:413-430.</p> <p>-Bamforth DB. 1988. Investigating microwear polishes with blind tests: the Institute results in context. Journal of archaeological science 15:11-23.</p> <p>-Newcomer MH, Grace R, Unger-Hamilton R. 1988. Microwear methodology: a reply to Moss, Hurcombe and Bamforth. Journal of Archaeological Science 15:25-33.</p> <p>-Shea JJ. 1992. Lithic microwear analysis in archaeology. Evolutionary Anthropology: New York.</p> <p>-Evans AA, Donahue RE. 2008. Laser scanning confocal microscopy: a potential technique for the study of lithic microwear. Journal of Archaeological Science 35(8):2223-2230.</p> <p>-Stevens, N.E., Harro, D.R., Hicklin, A., 2010. Practical quantitative lithic use-wear analysis using multiple classifiers, J. Archaeol. Sci. 37, 2671-2678.</p>
11/26	13	<p>Cognition and Stone Tools</p> <p>Class Project Presentations</p>	<p>-Wynn T, Tierson F. 1990. Regional comparison of the shapes of later Acheulean handaxes. American Anthropologist 92(1):73-84.</p> <p>-McPherron SP. 2000. Handaxes as a measure of the mental capabilities of early hominids. Journal of Archaeological Science 27(8):655-663.</p> <p>-Davidson I, Noble W. 1993. Tools, Language and Cognition in Human Evolution. In: Gibson K, Ingold T, editors. Tools, Language and Cognition in Human Evolution. Cambridge: Cambridge University Press. p 363-388.</p> <p>-Stout D, Chaminade T. 2009. Making Tools and Making Sense: Complex, Intentional Behaviour in Human Evolution. Cambridge Archaeological Journal 19(1):85-96.</p> <p>-Nonaka T, Bril B, Rein R. 2010. How do stone knappers predict and control the outcome of flaking? Implications for understanding early stone tool technology. Journal of Human Evolution.</p>

* While the topical portion of the schedule is subject to modification, the dates of exams will **NOT** change.