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**A FAMSI-SPONSORED CONFERENCE REPORT
The Conference on Ancient Mesoamerican Obsidian Blade Production**



Research Year: 1999

Culture: Maya

Chronology: Pre-Columbian

Location: Conference, Campus of Penn State University

Sites: Kaminaljuyú, Guatemala and Xochicalco, México

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Introduction

In ancient Mesoamerica most cutting tools ranging from simple household knives to surgical scalpels and ceremonial blades were manufactured from a natural volcanic

glass that the prehispanic people called *itztli* and we know as obsidian. A core-blade technology developed in this region that produced razor-sharp prismatic blades that were used in most every prehispanic household. The concentration of natural source deposits of obsidian in only a few highland regions led to the development of a specialized craft industry that produced a ready supply of prismatic blades. The high demand for obsidian blades resulted in obsidian being traded in a variety of forms hundreds of kilometers across Mesoamerica to meet the needs for cutting edge of its thriving populations.



Photo 1. Conference participants posing with the Penn State Nittany Lion. Front row L-R: P. Kelterborn, K. Hirth, J. Flenniken, J. Woods, R. Trachman. Back row L-R: J. Clark, D. Healan, P. Sheets, A. Pastrana, J. Pelegrin, B. Andrew, G. Titmus, J. Trixier. Photo by Jim Woods.

Between May 22-28, 2000 a conference on Mesoamerican Obsidian Pressure Blade Production was held at the Department of Anthropology on the campus of Penn State University. The purpose of this conference was to expand our understanding of the technological processes and sociopolitical forces that shaped the development of this important industry. The reason for focusing on the obsidian pressure blade production was threefold. First, obsidian production was one of the fundamental technological industries of ancient Mesoamerica which impacted virtually all of its prehistoric inhabitants. Second, unlike many other craft technologies, obsidian craft production can be studied archaeologically from production residues that it leaves behind. Third because it can be readily studied, obsidian craft production is often used as a general model for discussing the organization of other craft industries in ancient Mesoamerica which are largely invisible in the archaeological record.

Our general understanding of obsidian production technology and craft organization was established during the 1970's and has come down to us today in largely unmodified form. Unfortunately, research over the past decade has revealed that established and current models of obsidian craft production have been flawed in several ways. First, they underestimated the range of techniques employed in manufacturing obsidian prismatic blades which were fundamental to understanding the production process. Second and more importantly, they oversimplified the effects that natural conditions and social factors had on structuring the obsidian production process. A great deal of the variation in obsidian blade production systems was lost or being ignored through the use of overly general models of technological processes that masked the very production processes that we wanted to study.

As a result we felt that there was a current, critical need for the Conference on Mesoamerican Obsidian Blade Production in order to evaluate our current models of obsidian production, propose modifications that better account for the variation seen in reduction sequences throughout Mesoamerica, and test these modifications using a lithic technology approach and experimental replication. The conference brought together thirteen specialists from Europe, México, and the United States ([Photo 1](#)) ([Table 3](#)) in a 5-day meeting that was funded, in part, by an award from the Foundation for the Advancement of Mesoamerican Studies, Inc. (FAMSI). The conference used an innovative combination of formal presentations, experimental replication, and brainstorming sessions to shape a new understanding of ancient obsidian blade production. I believe that all of the conference participants felt the conference was a resounding success. We all left the conference with a better understanding of both what we know and don't know about Mesoamerican obsidian production. It has helped to expand our individual and collective future research agendas and we hope to meet again in four years to assess where the applications from this year's conference have advanced our understanding of Mesoamerican obsidian blade technology.

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The Conference Goals and Objectives

The Conference on Mesoamerican Obsidian Blade Production had three main goals or objectives that guided the organization of the conference and the topics discussed. These three goals were:

- (1) Evaluate what we know and do not know about the production of obsidian prismatic pressure blades.

(2) Examine cases where existing models do not account for the archaeological remains encountered by past and present investigative projects.

(3) Test new explanations for production processes using direct experimentation and lithic replication.

The first conference objective was to evaluate our present knowledge of obsidian core-blade production systems. We decided we needed information on two different levels. The first was what we knew (or believed we knew) about the actual production of Mesoamerican blades. As a first step in this direction the conference participants prepared papers on their current research in core blade production. These papers were designed to deal with our current understanding of Mesoamerican lithic technology at the substantive, methodological and comparative level. Investigators dealing with the recent or ongoing analysis of archaeological collections presented were asked to identify and discuss technological features that were both commonplace and unique to their materials. Individuals with a strong methodological orientation focused their discussions on the comparative value of different technological foci in analysis. A comparative perspective was developed as the presentations unfolded and specific individuals addressed conceptual difficulties encountered in their research.



Photo 2. An informal discussion and brainstorming session.

Perhaps the aspect of the conference that most excited the participants was the ability to see different replication techniques in use. Much experimental replication goes on behind the scenes of actual investigation and, although very important, is not by itself a featured aspect of lithic research. This was an opportunity for everybody to see the techniques researchers used in their replicative experiments. Since the conference participants were selected on the basis of their diversity and high level of mastery of different techniques it was a unique opportunity for everyone to gain a better understanding of the ability and practical limits of different techniques in actual use.

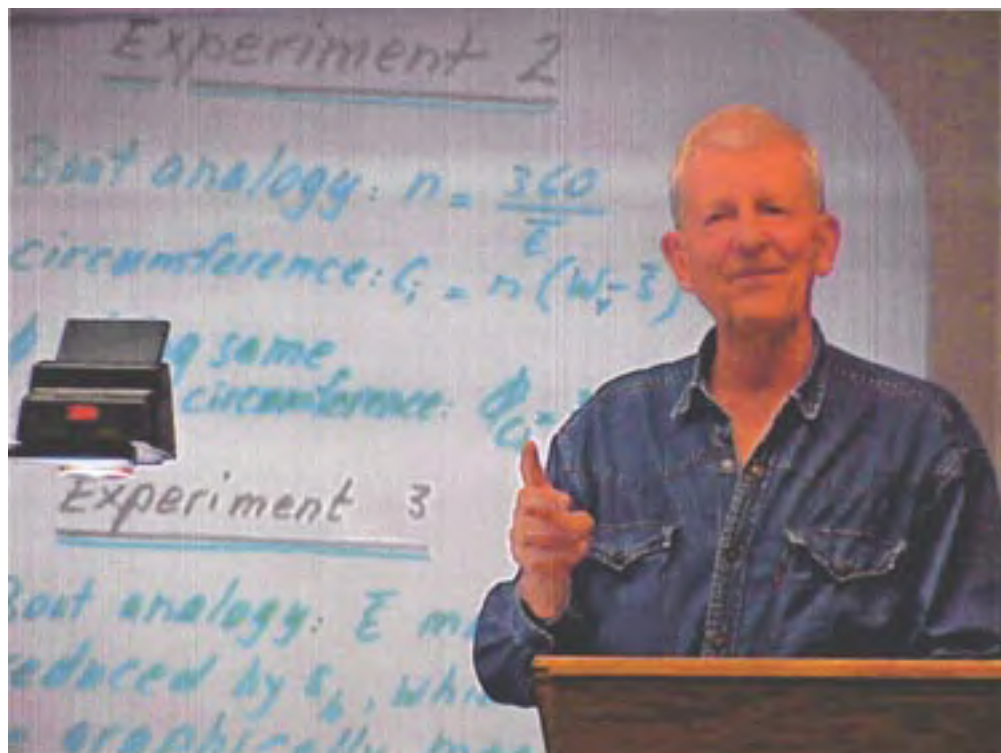




Photo 3a. & Photo 3b. Formal paper presentations (2 photos).

The second conference objective was to examine actual archaeological collections to see if our current models of production processes account for the variation that we see. Two archaeological assemblages were selected for examination by members of the conference. These were collections from Kaminaljuyú, Guatemala and Xochicalco, México. They were selected for examination and discussion because they have technological aspects that do not conform to the existing model of obsidian prismatic blade production.

The third conference objective was to build new explanatory models for those aspects of prismatic blade technology that did not fit the existing production model. The point of departure for this discussion were aspects of the Kaminaljuyú and Xochicalco collections that did not fit existing explanatory models. The process for constructing an alternative explanation for production sequences involved three steps. First, a new process, manufacturing technique, or interrelationship between several techniques was proposed. Second, the process or manufacturing technique was replicated along the lines proposed by conference participants. In some cases this involved the participation of multiple participants in the same process or multiple individuals attempting the same

technique. Third and finally, the plausibility of the alternative explanation was judged by the results of the experimental replication.

The Conference: What Was Accomplished

[Table 1](#) provides an overview of how time was allocated during the conference to different goals and objectives. Morning and afternoon sessions were dedicated to formal presentations, examination of collections, and experimentation. Nightly sessions were reserved for informal discussion of old and new topics, brainstorming problems, and summarizing or evaluating the results of the day.

The first full day of the conference (Tuesday, 5/23) was spent in formal presentations which are summarized in [Table 2](#). The presentations provided: (1) a historical view of the present obsidian production model (Sheets, Clark), (2) technological discussion of Mesoamerican core-blade industries (Pastrana, Healan, Andrews, Woods, Trachman), (3) a comparison to pressure blade reduction technologies in the Old World (Pelegrin), and (4) a methodological discussion of the advantages of controlled laboratory knapping (Kelterborn). These presentations provided a wealth of information on variation in core-blade production systems in Mesoamerica that were used as a backdrop for discussion throughout the remainder of the conference. A video was shown of large blade level production from the Old World.

The second day of the conference (Wednesday, 5/24) had several agendas. The first was to present a summary of the lithic technology employed in the production of obsidian prismatic blades at Kaminaljuyú, Guatemala. Formal presentations by Sanders and Hirth ([Table 2](#).) set the cultural context of the site and summarized the aspects of the Kaminaljuyú technology that do not fit the current production models. Subsequent to these presentations conference participants examined type collections of Kaminaljuyú obsidian to discuss whether current models cover all the attributes observed in the collection. It was felt that two alternative technologies could have been employed: the use of indirect percussion to shape large blades, and/or the use of lever assisted pressure to remove large blades as had been employed in the Old World.

The possibility that Indirect Percussion was used in removing large, well formed prismatic blades became one focus for direct experimentation during the length of the conference. A series of cores were reduced using different types of punch tools to attempt to duplicate the large blade attributes found on the Kaminaljuyú collections. These experiments began Wednesday morning (Session 24/2) and occupied some conference participants well into Friday afternoon.



Photo 4. Group demonstration of Indirect Percussion by Jacques Pelegrin.



Photo 5. Examination and discussion of archaeological collections.



Photo 6a.and b. Examination and discussion of archaeological collections.

Some time was also spent on Wednesday in demonstrating different types of blade production. Pelegrin demonstrated indirect percussion using punches as well as several types of pressure blade removal using the chest crutch. Pastrana demonstrated large blade removal using an angled chest crutch technique. Titmus, Woods, and Clark demonstrated the production of Mesoamerican style pressure blades using the foot-held Aztec technique. The evening discussion session was focused on the comparative use of these or different techniques in the production of obsidian prismatic blades in Mesoamerica.

The third day of the conference (Thursday, 5/25) was intended to broaden the discussion of Mesoamerican pressure blade technology by examining archaeological assemblages from the site of Xochicalco, México. Research here had suggested that a unique, hand-held reduction strategy was employed to work with very small obsidian cores. Two formal presentations by Hirth provided an overview of the cultural context of the site and summarized the aspects of Xochicalco's lithic technology that do not fit the current production models. Subsequent to these presentations conference participants again examined type collections from Xochicalco to evaluate whether current models cover all the attributes observed in the collection.

The possibility that a hand-held reduction technology was used in removing blades from small pressure cores became one focus for direct experimentation during the length of the conference. A series of cores were reduced by J. Flenniken using hand-held techniques that attempted to duplicate the small blade attributes found in the Xochicalco collections. Experimentation and discussion continued into the afternoon, at which time the conference participants sponsored a public flint knapping demonstration for University students and members of the Central Pennsylvania community interested in prehistoric archaeology.

The fourth day of the conference (Friday, 5/26) was intended to broaden the discussion of how pecking and grinding technology was employed in the manufacture of Mesoamerican pressure blades. Discussion focused around the value of pecking and grinding platform preparation techniques in blade reduction. Unfortunately because of the time involved in preparing pecked and ground platforms we could not expand our experiments to include this dimension of the discussion. Experimentation started during the two previous days continued on throughout Friday. In the afternoon experimentation was broadened to include replicating several different styles of pressure flaking techniques. We discovered during the conference that individuals used several different techniques that produced flake patterns like those found on bifaces manufactured in Mesoamerica that we felt were important to document. The evening discussion session was spent in discussing techniques of estimating core diameters and debating whether qualitative assessments of craftsman skill were possible.



Photo 7. Jacques Pelegrin experimenting with Indirect Punch Percussion to produce large prismatic blades.



Photo 8. Jacques Pelegrin demonstrating pressure blade removal using a chest crutch technique.



Photo 9. Jacques Pelegrin demonstrating short pressure blade removal using a short chest crutch technique.



Photo 10. Alejandro Pastrana demonstrating large pressure blade removal using a chest crutch technique.



Photo 11. Gene Titmus demonstrating the Aztec foot-held pressure blade reduction (2 photos).



Photo 12. John Clark demonstrating the Aztec foot-held pressure blade reduction.

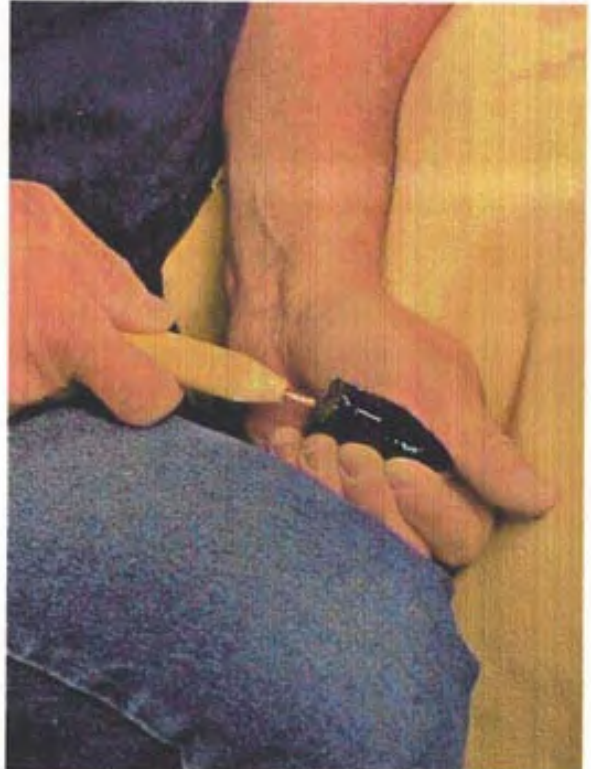


Photo 13. Jeff Flenniken demonstrating hand-held pressure blade reduction on small cores (2 photos).

The fifth and final day (Saturday, 5/27) was spent in reviewing and summarizing what was accomplished at the conference. Our discussion focused on two themes: (1) what new insights were achieved in technological issues, and (2) how this information could be applied to interpretations of the archaeological record. Finally, we discussed whether the results of the conference were significant enough to warrant a publication of the results. It was decided that it was and we discussed what the contributions of each participant would be.

Results and Conclusions

The conclusion of the invited participants was that the conference was a success. It discussed and critically evaluated the suitability of current obsidian production models and sought a new synthesis of the factors structuring obsidian blade production across ancient Mesoamerica. The conclusion reached was that pressure blades were not manufactured following a single production sequence. Instead, examination of the archaeological assemblages from Kaminaljuyú and Xochicalco revealed considerable variability in the techniques employed to manufacture prismatic blades. Obsidian

craftsmen across Mesoamerica produced pressure blades using multiple manufacturing techniques organized into different production sequences. In reflection it is perhaps more amazing, not that multiple techniques would be employed, but that they resulted in relatively standardized prismatic blades across the length and breadth of Mesoamerica. Current and future research and publications of the participants will reflect this conclusion. We will be careful not to imply that technology was a constant across this vast area.

The conference facilitated discussion, debate, comparison of archaeological collections, and direct experimentation. The process was very productive. We came to a general agreement that almost certainly, in places where obsidian was scarce, that a hand-held pressure technique was employed to maximize the removal of blades from small cores. Experimentation at the conference demonstrated that not only was the technique possible, but that the blades it produced were virtually indistinguishable from those recovered from archaeological contexts. The results of our experiments with indirect percussion were less conclusive. The large size blades recovered from Kaminaljuyú remain a mystery. Indirect percussion remains a possibility although more research is necessary to understand if and how it may have been employed. Alternative possibilities include the use of levers in pressure blade production or a modified version of the Aztec foot-held technique.



Photo 14. The public flint knapping demonstration.

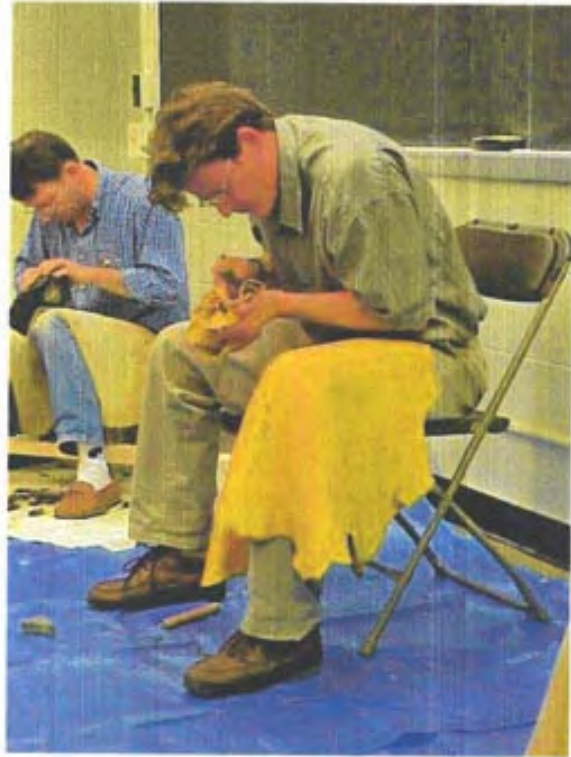


Photo 15a and b. Moments of Experimentation (collage of 4 photos).



Photo 16. Discussion of the publication.



Photo 17. Moments of debate and reflection.

A general consensus emerged during the conference that we needed a new perspective for the causes of technological variability encountered in core-blade production. Throughout the conference we discussed how different factors could affect the technology employed. These included distance to obsidian sources, variable transportation constraints and a myriad of social and political conditions that could affect the structure and intensity of interregional exchange. Although there was no consensus among conference participants on the relative strength of these variables, we did agree that distance to obsidian sources was a constant that had an ever present influence on shaping the type of technology employed in different regions.

Not surprisingly, the author of this report like the other conference participants, emerged with more new questions to be answered than there were old questions answered. It is perhaps in this regard that the conference was most productive. We all left the conference with new ideas and opinions about the structure of Mesoamerican core-blade production industries. I believe that the conference successfully met its objectives and has helped to define a new set of questions which will stimulate investigations of Mesoamerican core-blade technology into the coming decade.

List of Photographs by Jim Woods

[Photo 1](#). Conference participants posing with the Penn State Nittany Lion. Front row L-R: P. Kelterborn, K. Hirth, J. Flenniken, J. Woods, R. Trachman. Back row L-R: J. Clark, D. Healan, P. Sheets, A. Pastrana, J. Pelegrin, B. Andrew, G. Titmus, J. Trixier. Photo by Jim Woods.

[Photo 2](#). An informal discussion and brainstorming session.

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[Photo 17](#). Moments of debate and reflection.

[Photo 18](#). A conference still life.

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Date		Monday May 22	Tuesday May 23	Wednesday May 24	Thursday May 25	Friday May 26	Saturday May 27
Time		Arrivals	Where are we now?	Technology close to quarry sources	Technology far away from quarry sources	Reserve and final experimentation	Reserve and summaries
0700-0800	Breakfast						
0830-1000	Session 1		23/1 Conference opening Formal Presentations 1: KH, PS, JC	24/1 Kaminaljuyú: WS, KH Introduction and Special Presentations	25/1 KH, BA, JF Xochicalco: Introduction and Special Presentations	26/1 Brainstorm Session 3: Pecking & Grinding Technologies	27/1 Conclusions Archaeology and future tasks
1000-1030	Break						
1030-1200	Session 2		23/2 Formal Presentations 2: JP, PK	24/2 Experimentation 1: Indirect Percussion and Aztec pressure	25/2 Experimentation 2: Hand-held removal, JF Pecking & Grinding	26/2 Experimentation Status Reports	27/2 Conclusions Technology and future tasks
1200-1400	Lunch Break						
1400-1600	Session 3		23/3 Formal Presentations 3: AP, DH, BA	24/3 Experimentation 1: continued	25/3 Experimentation 2: continued	26/3 Experimentation 3: Projectile points from macro blades	27/3 Formal Closure & Excursion
1600-1630	Break						
1630-1830	Session 4		23/4 Organization Short Contributions General Discussion	24/4 Experimentation 1: continued Pelegrin Stick	25/4 Public Flint Knapping Demonstration	26/4 Discussion and Organization of Publication	27/4 Farewell Dinner
1830-2000	Dinner						
2000-2200	Session 5	Welcome Meeting at Hotel	23/5 Brainstorm Session 1: Cores from Flores Cores from Dos Hombres Guessing core diameters	24/5 Brainstorm Session 2: Direct? Indirect? Aztec? Or is there an Unknown?	25/5 Reception at the Hirth's 1900h	26/5 Brainstorm Session 4: Skill indicators and Other Problems	27/5 Socializing or Rest
2200	night cap						
	These sessions will be public.						

**Table 2:
Formal Presentations at the Penn State Obsidian Blade Conference**

Tuesday, May 23rd	
Payson Sheets	The Behavioral Model in Prismatic Blade Manufacture: A Historical Perspective
John Clark	Changes and Progress in Obsidian Modeling: What We Have Learned Since the Pachuca Conference
Jacques Pelegrin	Long Pressure Blades in the Old World: A Comparative Perspective
Peter Kelterborn	Fundamentals, Perspectives, and Limitations of Lab Knapping: Are We Missing Something
Alejandro Pastrana	Mining and Quarry Production in the Sierras de las Navajas, México
Dan Healan	The Ucareo Production Sequence: From Quarry to Workshop
Brad Andrews	An Overview of the Lithic Technology of Teotihuacán, México
James Woods	Technology and Core Production from Floras, Guatemala
Rissa Trachman	Core Segmentation using Pecked and Scored Initiations at DOS Hombres, Guatemala
Wednesday, May 24th	
William Sanders	Excavations at Kaminaljuyú, Guatemala: 1969-1971
Kenneth Hirth	Technological Features of the Kaminaljuyú Production Sequence: Characteristics and Problems in Prismatic Blade Production
Thursday, May 25th	
Kenneth Hirth	Excavations at Xochicalco
K. Hirth <i>et al.</i>	The Xochicalco Production Sequence: Characteristics and Problems in Prismatic Blade Production
J. Flenniken	Experimenting with a Hand-Held Method For Producing Obsidian Prismatic Blades

**Table 3:
The Conference Participants**

Conference Steering Committee: K. Hirth (Host), J. Flenniken, P. Kelterborn, J. Pelegrin	
Brad Andrews (Penn State)	Archaeologist and lithic technologist studying skill and production efficiency of obsidian prismatic blade manufacture at Xochicalco and Teotihuacán.
John Clark (BYU)	The leading figure in Mesoamerican prismatic blade technology with over 20 years of research concerning prehispanic production and experimental replication. Dr. Clark's replication experiments established that Mesoamerican prismatic blades were manufactured using a seated technique.
Jeffrey Flenniken (Lithic Analysts Inc.)	One of the leading figures in lithic technology and cross-cultural research on pressure blade manufacture. Currently working on replicating small blade production on pecked and ground cores using hand-held techniques.
Dan Healan (Tulane University)	Mesoamerican archaeologist and lithic technologist with a unique understanding of both domestic and non-domestic production areas throughout Central México.
Kenneth Hirth (Penn State)	Archaeologist and lithic technologist. Director of the Xochicalco Lithic Project, and Curator of the Kaminaljuyú Lithics collection. Conference Host
Peter Kelterborn (Meilen, Switzerland)	Engineer and expert on fracture mechanics. He is the world's leading expert on replicating and measuring the morphological and technological factors involved in pressure blade manufacture.
Jacques Pelegrin (Centre National de Recherche Scientifique, France)	One of the world's most skilled lithic analysts and replicators. Widely recognized as the leading authority on Upper Paleolithic lithic technology, indirect percussion and other punch techniques.
Alejandro Pastrana (INAH, México)	The leading Latin American archaeologist and lithic technologist with extensive knowledge of the variation in obsidian prismatic blade production throughout Mesoamerica.
Payson Sheets (Colorado)	Mesoamerican archaeologist whose ground breaking work in 1975 provided the initial interpretive framework for obsidian blade production.
Gene Titmus (Jerome, Idaho)	The world's leading craftsmen in replicating Mesoamerican obsidian pressure blades and is indispensable for the topics addressed in the conference.
Jacques Tixier (Centre National de Recherche Scientifique, France)	World renowned scholar on indirect percussion lithic technology who with Francois Bordes pioneered incorporating experimental replication in archaeological research.
Rissa Trachman (U. of Texas)	Mesoamerican archaeologist and lithic technologist. Graduate Assistant for the conference.
James Woods (Herrett Museum)	Lithic technologist and Director of the Herrett Museum which contains one of the most comprehensive comparative collections of archaeological and ethnographic lithic materials in North America.