

University of California-Berkeley: Paleoethnobotany Laboratory Report #49

From: Proyecto Arqueológico Taraco
1999 Excavaciones en Chiripa, Bolivia

Archaeobotany - *William T. Whitehead and Rene Ayon*

In the Field

Water flotation, to collect a systematic sub-sample of fragile charred plants, micro-faunal bones, and other small artifact types, was implemented at Chiripa as an integral part of our research. Our standard excavation methodology included the collection of at least one standard sized soil sample from every locus that would be processed in water to extract out the artifacts. Field excavators were instructed to sample each locus by collecting one 10 liter "bulk" flot sample, and in certain contexts, like use-surfaces or middens, we also collected a second 10 liter "scatter", or average soil sample (Lennstrom and Hastorf 1992). In addition, across certain surfaces, many bulk soil samples were taken, usually one sample every 50 centimeters. A "bulk" soil sample is a single 10 liter block of soil, with a recorded x, y, z provenience. A "scatter" sample is a collection of soil distributed from throughout the locus matrix to create an average view of what was deposited within the soil. These two strategies are implemented together to provide a fuller view of the artifactual material from a specific locations.

These procedures require that the excavator label each bulk soil flotation sample with a unique point provenience number and note this on the locus form. A tyvek tag with the provenience information was filled out and placed in the interior of the flot sample bag, and the bag tied with a second round, white labeled tag. In small loci, especially from the mound excavations, the entire soil matrix from certain loci was floated to provide enough charred plant material to do an appropriate paleoethnobotanical analysis. Table 1 displays the total number of samples that were floated. Small archive soil samples were also taken with each flotation sample. The excavators were instructed to take small samples from the center of each flot and to deposit them in small plastic bags. These samples were double bagged and labeled with the appropriate information. Some of the samples were then sent to U.C. Berkeley for pollen analysis, which will be examined by undergraduate student, Rene Ayon, for his senior thesis.

The Flotation System

The mechanized water flotation system used at Chiripa is a modified SMAP setup (Watson 1976), with several additional processing techniques to increase the speed and amount of charred plant material recovered from each flot sample. This machine was built in 1989 for the Wila Jawira project by Christine Hastorf. We gratefully acknowledge the permission to use this machine by Alan Kolata. This flotation machine consists of a 50 gallon oil drum, 1.5 inch pipes, support bars, and an inner bucket with a .5 mm stainless steel mesh at its bottom and a pour spout on the topside. A shower head mounted in the 50 gallon drum is attached to pipes to bring fresh water into the oil drum and gently circulate it through the bottom of the inner bucket mesh. This motion loosens the soil, allows the finer silts and clays to sink to the bottom of the oil drum, and permits the lighter than water material within the soil to float to the surface. Charred plant remains have a lighter specific gravity than water and thus they tend to float if unattached to soil. The floating charred plant material pours out of the oil drum and into a light fraction catching bucket. This is suspended from the oil drum spout where it catches all material coming out of the inner flotation bucket spout. This bucket is lined with a fine .34 mm mesh cloth.

The flotation team in 1998 was William Whitehead, Rene Ayon, Franz Choque, and Emeterio Choquehuanca. The flotation machine was operated by at least two individuals every day, and by three during training. At the beginning of a flotation day 18-24 samples were selected for processing, given a unique flotation number, and all provenience information for each soil sample was recorded in the flotation log. The 1998 season flotation numbers began with 12,000 and proceeded sequentially. A total of 354 samples were floated. The flotation samples, the flotation machine, and all accessories were taken to the flotation area, an open fresh water pond, replenished by spring water. The flotation machine was set up and the soil samples were arranged by their flotation number. Each bag of soil was transferred to a clean bucket, measured for volume, and all the information was recorded into a log book. The flotation samples were then pre-soaked with fresh water in the buckets for at least 20 minutes, usually the time it took to process the previous soil sample.

Every day one to four samples were selected at random to receive a vial of 50 charred modern poppy seeds. These poppy seeds were added to the soil and recorded in the flotation log. This procedure is done to test the efficiency of flotation by introducing a foreign seed of known count, which can be counted and a percentage of flot efficiency calculated (Wagner 1982).

Floating began with one floater gradually pouring the soil sample into the inner bucket that was nestled inside the oil drum filled with flowing water. The other attendant would spray the soil gently with water to minimize splashing and too speed up transfer. The bucket was then sprayed clean and set aside for the

next float sample. The water level and water flow was also monitored by the second floater to insure no charred plant material was being lost out of the catching bucket by overflow or splashing. The person who transferred the soil then began agitating the inner bucket up and down to increase soil movement and clay loss through the bottom screen of the inner bucket. Meanwhile the second floater sprayed the charred plant material in the catching bucket to keep the fine meshed cloth clean of any silts that may cause the loss of any botanical materials..

When no more charred plant material could be seen on the water surface, a fish-tank filter siphon was used to suck up all remaining charred plant material that was floating in the water but not on the surface (Gumerman and Umento 1978). This was done by holding the siphon tube six inches above the bottom of the inner flotation bucket, draining the water into the charred plant material catching bucket. When no more charred plant material could be seen in the transfer tube, siphoning was stopped. At this point the water pressure was turned off to let any thing left over to float to the surface. Once this was done, the water was then turned on to full force and let run for several minutes to aid any heavier items remaining in the water. A flotation sample was completed when no more charred plant material could be seen after a tea strainer was drawn through the water. The light fraction fabric was then removed from the charred plant material catching bucket and tied up to dry with the original labeled tag. The heavy fraction was transferred from the inner float bucket to a large cloth laid on the ground with its samples tyvek tag placed with the sample. These heavy fraction samples were left in the sun to dry until the end of the day.

In the Laboratory

Once dry, the light fractions were transferred to clean plastic bags with the original sample tag and further labeled on the outside of the bag with a sticky label. These have been exported to the University of California-Berkeley to be analyzed, with permission from DINAAR. The dry heavy fractions were sorted in the on-site laboratory to remove cultural and ecological artifacts by a rotating crew of Chiripaño workers, supervised by one of the before mentioned flotation crew. Each heavy fraction was sieved through a series of geological sieves with meshes of 4mm, 2mm, and .5mm., with the remaining fraction caught in a pan. All fractions were sorted for bones, fish scales, charred plant material, lithics, metals, and all other artifacts. Ceramics were removed only from the 4mm fraction and burned earth and adobe was removed from the 4 and the 2mm sieves. Artifact and ecofact finds from all fractions were combined by type and placed in labeled plastic bags. These artifact bags were labeled with the provenience information from the tyvek tag that accompanied the heavy fractions. Each artifact type from each flotation heavy fraction was recorded in our heavy fraction log. The artifacts were given to the appropriate artifact specialists on site. Bags with charred plant material from the heavy fractions were attached to the outside of their corresponding light fraction bag.

The results from this year's 1998 flotation will be prepared over the next year as part of William Whitehead's dissertation work, Rene Ayon's undergraduate senior thesis, and Christine Hastorf's continuing research on the paleoethnobotany of the Formative at Chiripa.

Bibliografía

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