GENERAL LAB RULES
PALEOETHNOBOTANY LABORATORY
UNIVERSITY OF MINNESOTA
1989

Please be neat and keep areas around microscopes clean, as we have to share equipment and space. Wash counter space from time to time to keep work areas and data sheets <u>clean</u>.

Keep the sample you're working on, your sorting box, your data sheets, brushes, tweezers, etc. in your own personal drawer.

When storing unfinished samples, make sure they are well labelled, and covered.

It is best not to turn illuminators off except when you are done for the day, this saves on bulbs and mechanical failures.

Feel free to bring in tapes, or play the ones in the lab. Please don't ever play them loudly (even on week-ends). Do not take any of the resident tapes out of the lab.

Please keep conversations quiet, work may seem mindless, but it is important to pay attention to what you're doing, and try not to disturb or distract others. Be especially mindful on days when there are many workers in the lab.

Please hang up coats, and put book bags under desks, or out of the way. Keep other personal belongings in your drawer. Throw newspapers in the recycling box. Bottles and cans for recycling go under the sink.

At the beginning of each quarter fill out a schedule of the hours you wish to work. It is best to work for more than one hour, but less than 3 at a microscope at one time. A total of <u>four</u> hours a day at the microscope is the allowed maximum. If you need to work for more that three hours at the microscope in one day, sign out and take a break. This is very important, and these rules cannot be broken. Remember to stick to your schedule, and if you cannot come in, please call and let us know.

Everyone working on sorting and ID's must sign in on the sign-in sheet.

Keep time cards up to date, and remember to get Dr. Hastorf's signature and turn them in to Terri V. in Anthropology on time.

Time cards should include time spent sorting, working on identifications, stamping boxes, weighing samples, and manditory lab meetings; they should not include time spent eating lunch, talking on the phone, or optional lab meetings or presentations.

Please fill in only the actual hours you work, remember it takes time to get to and from classes.

There is a hot plate and refridgerator available for everyone to use. Please clean up after yourself, and keep clutter away from microscope stations near the sink.

Please use the telephone sparingly, no long distance calls.

Remember to cover your microscope when you are finished, and to turn out the lights, turn off the humidifier (if it's on), and lock the door if you are the last to leave.

If there are any building problems tell them downstairs in the main office.

Shepherd labs is locked after about 4:30 weekdays and on weekends.

There is no smoking in the lab.

BOLIVIAN MATERIAL FROM DR. ALAN KOLATA'S WILA JAWIRA PROJECT

This includes material from excavations at Lukurmata, and all parts of Tiwanaku. Flotation samples from these sites were taken starting in 1986 (at least), and continue through the present. His excavation and recording stategy centres around an infinitely expandable grid, noted as UNIDADs North and East of a single datum. Each samples can have the following information:

F# = Flot number, unique w/in our lab. Starts at 4000
SITE = site, LKM= Lukurmata, TIW= Tiwanaku,
CUADRA = Can be numbers or letters, is sub-section of site
NIVEL = Level
SPECIMEN # = Bag number which is unique to each site
FECHA = Date excavated, watch out for order of month and date
UNIDAD = Unit (nearly always given as Nxxxx Exxxx)
RASGO = Feature number, sometimes w/description
EXCAVATOR = Initials of head of dig team

Other information to be filled in on our laboratory analysis forms:
FLOTVOL = Volume of sample in litres, found in flot log
COLLTYPE = whether sample is BULK (101) or PINCH (102). Check
           flot log for details. Screen material (1/4") is 201
LFWT = Combined total of Light Fraction, both carbon and remains
PICKWT = Weight of carbon sorted out of the sample
CC = Cultural Context of sample. This is found in the field notes
SCREEN Y/N = Do we have some material from the screen for this
             location?

Filling in forms:
Select a provenience, and check for all samples that were taken.
For each sample there may be a a heavy fraction, if so, it should
be attached to the light fraction bag. Screen material have the
same provenience number, and take care as there can be more than
one for each provenience, or none at all. A data sheet should be
started for the flot and the associated screen. Remember to use a
(sharp) pencil. Check also for a possible "FLOT PESADO" which is
unsorted, <2mm heavy fraction material.

On the flot sample form the following should be filled out by the
sorter:
SITE, CUARDA, NIVEL, SPECIMEN#, FLOT#, UNIDAD, RASGO, FLOTVOL,
COLLTYPE, CC (if you can figure this out), SCREEN Y/N, Sorter's
initials and date sample was started in the correct spot, IE: if
you are doing the LIGHT fraction and /or the HEAVY fraction. On
the back fill in the provenience and flot number again, as well
as the initials of the excavator and the date excavated. Fill in
what percent of the sample was sorted, and if you split any
portion of the sample write in the amount it weighed. EG: LF>2mm
=100%, LF<2mm and >1.18 =50% (1.2g), LF<1.18 and >0.5 =12.5%
(2.1g), and LF<0.5 =1.25% (1.5g). Check off and write in
qualitatitive estimate of amounts of fish scales in the fractions
you have sorted (if we are not currently picking them out). Also
draw rough sketch of any land snails, with an estimate such as
"lots" or "few". Don't bother to count them. Under "comments" add
any other information on the tags.

Processing flotation samples:

Empty the light fraction into the geologic sieves, replace lid,
and shake carefully. If necessary, carefully loosen roots with
probes. Save plastic bag, or if cut open, the portion with
labels.

Gently shake material from the 2mm screen into a glass dish. It
is best to sort all >2 material in glass in case in is needed for
radiocarbon dating. For this same reason, it should not be
touched with your hands. Material from the bottom sieve can be
sorted in a cardboard box. Make sure to keep a label in each of
the subsamples

If there is alot of small material and dust in a sample you
may also want to use the 1.18mm, 0.5mm and 3.0mm sieves to make
it easier to sort.

NB: Check the section of this document for sorting strategies
(p9-11), especially if you are going to do less that a "complete"
sort.

Sort each fraction twice, systematically.

Remove all carbon fron each fraction, except wood that is <2mm.

Remove all boneand fish scales, whether charred or not (if you are doing a complete sort).

Put all >2 items in a used vial, and all remains in a used box. If you are not working on identifications put all <2mm material into another used vial. If you are working on identifications put different seeds into separate gelitan capsules as you sort. If possible separate unidentifiable seeds from lumps. Keep the capsules in the holder, and avoid contact with your hands as much as possible. When you have finished a sample take all capsules and place them in a clean vial or box, be sure to include a label.

Turn in remains, carbon, bones, empty plastic bag or labels, data sheet(s), and the unsorted heavy fraction and screen bots.

Weighing samples:

After samples are checked and are ready to be put away they must be weighed, and the boxes stamped.

Weight the entire light fraction, including identified material and remains. Subtract the weight of the gelitan capsules, plastic bags, and vials.
Plastic bags = 2.5g
Gelitan capsules = 0.1g
1 Vial = 6.4g
2 Vials = 12.7g
3 Vials = 19.1g
4 Vials = 25.5g
5 Vials = 31.9g
6 Vials = 38.3g

This value is filled in as LF WEIGHT.

Then weigh all the picked material (carbon and bones), fill this in as PICKED WEIGHT.

After weighing remove all capsules with coloured labels from the light fraction, heavy fraction, and the screen bots. In the upper right hand section of the form, use the appropriate stamp to indicate that these materials have been removed, and put them in the boxes with others that have been removed from other samples. Yellow tags are for bones, pink for fish scales, blue for unknown seeds, and orange for artefacts.

Return the material to the box, being careful that the lid fits securely, and that none of the capsules are squished. On the upper right hand corner and one end stamp the provenience, year of excavation, and the flot number.

For Peruvian UMARP samples:
EG: 1-477/2   2=1-1-3-2-5/7
    1986   1983

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# 2553          # 1279
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For Bolivian Wila Jawira samples:
EG: SITE TIW   UNIDAD N788 E5125
    CUADRA AK-E   RASGO 1
    NIVEL 3   FLOT # 4023
    SPECIMEN 15223   YEAR 1989

See the examples on the shelves. Then put each sample in order by
provenience (or by SITE and SPECIMEN # for Bolivian material),
within each of the three box sizes.

            --PLEASE WRITE NEATLY ON DATA SHEETS, REMEMBER
                SOMEONE ELSE WILL HAVE TO READ THEM--

SORTING STRATEGIES FOR ARCHAEBOTANICAL MATERIAL IN THE LAB

Because time and money are always in high demand in the lab there are several different stragies that can be used when sorting and identifying archaeobotanical material in the lab. Other considerations are the goals of the study at hand, the quality of the collection and recovery techniques used to retreive botanical material, and the overall quality of archaeological information available for the interpretation of the materials.

Below are schemes devised especially for flotation samples, where the study of domesticates is the main focus.

Strategy 1: Complete sort

In the best of all possible worlds it is nice to be able to sort out and identify all useful material from a sample. It is especially desirable because a single flot samples is already only a small sample of any given archaeological context, and one wants as complete a picture as possible. In our case, one would sort out, and identify all charred material, except <2mm wood, which is usually unidentifiable. All bones and other animal and artifactual materials are pulled out and given to appropriate specialists.

This type of strategy gives RATIO level data, with exact counts (and/or weights) entered onto the computer. Descriptive statistics such as RELATIVE PERCENTAGES, DENSITIES, UBIQUITIES, and DIVERSITIES can be generated from this type of data.

This strategy is the most labor intensive, and can be a waste of time when you sort past the point of diminishing returns, ie, you get the exact same values by sorting entire sample that you would by making estimates based on some fraction of the whole (50%, 25%, etc).

Strategy 2: Sample splitting

In this strategy time is saved by splitting (by weight) some or all of the sample. It is usually done at one of the smaller fractions separated by the geologic sieves, eg, 100% of the material that is >2mm is sorted, while 50% of all material <2mm is sorted and all counts of the identified specimens are doubled. The decision to split a sample should be based on the following guidelines. The average amount of time spent on a sample is about 2 1/2 hours, including sorting and identifying light and heavy fractions, as well as material recovered from the sieves in the field. The two main factors that should be considered are both the volume of the sample, and the density of the seeds. The desired amount of material to sort from each size fraction of the sample is enough to fill one of the sorting trays (in a thin layer, as when ready for sorting). If a brief scan of even this amount appears to contain hundreds of seeds, it should be split again. A rule of thumb that has proven effective for the 1986 Pancán (Peru) material was never to let the sorted portion fall below 1.0g or 12.5% (3 times though the sample splitter). In

these samples it was found that this was approximately the point of diminishing returns for very dense samples such as those from burnt stores of crops, where seeds and tuber densities per 6-liter of soil averaged in the thousands. That is, if at least these 12.5% or 1.0g of each size fraction was sorted the estimates of total densities and taxa diversity were found to be insignificantly different than if the whole sample had be sorted. It should be noted on the form which fractions were split, what percentage was sorted, and the weight of the material prior to sorting. Of course, special circumstances may occur, and less may be sorted without losing accuracy.

Trials with a 0.3mm geologic sieve show that very, very few seeds will pass through this mesh size. Another time saving measure in dusty samples is not to sort the material that is less than 0.3mm. If bones and fish scales are too numerous, they can be left in remains and notes of their occurence and/or abundance can be put on the data sheet. If very small lumps are overabundant one can leave those <1.18mm (with no distinctive characteristics, such as a surface) in the remains.

As with the complete sort, one gets RATIO level data, and can generate RELATIVE PERCENTAGES, DENSITIES, UBIQUITIES, and DIVERSITITIES. Because actual counts are estimated this type of data can be used in comparison with that of Strategy 1 with no conversion.

This method is a good time saver, especially for samples that are quite homogenious. Drawbacks are that diversity may be lost, and rare species are either missed or overrepresented.

Strategy 3: Scanning with estimates and removal of special taxa

In this scheme only domesticates are removed from the remains. The samples are scanned and the weedy species are recorded as "common", "occasional", or "rare" (corresponding to values of 3, 2 and 1, respectively). Each of these categories is based on a visual estimate of the number of each different taxon. Counts corresponding to each category should be determined so that all workers are making the same estimates.

This will result in ORDINAL level data, and UBIQUITIES and DIVERSITIES are possible, as are some other nonparametric statistics such as Spearman's Rho.

Remember the size of the pre-flot soil sample must be taken into consideration, and that this should only be done when samples were originally similar in size. If any sorter is unfamiliar with any taxon it too must be removed for identification. For this reason this strategy is less time-efficient with beginning sorters. Simple routines on the computer can be used to assign data form strategies 1 and 2 to the same format as these, eg "if Verbena=1 then Verbena=1; if Verbena >1 and <5 then Verbena=2; if Verbena >5 then Verbena=3.

Strategy 4: Scanning

In this scheme no specimens are removed from the sample. Instead, a complete scan is made of the sample, and the presence of taxa is marked off the data sheet.

This results in NOMINAL level data, from which can be used to generate UBIQUTIES and DIVERSITIES, and any scheme that only requires presence/absence data.

The computer can again be used to assign data to presence/absence level very simply (usually as 1 and 0), eg, if Verbena >0 then Verbena =1, etc. This routine is the fastest, and can be useful when only a rough sketch is needed from the dataset, often as a preliminary method to further detailed work. The drawbacks can be the loss of quantitative data, and requires all workers to know all taxa.

CULTURAL CONTEXT CODES FOR USE WITH 1986-1989 WILA JAWIRA
MATERIAL:

Surface and sub-surface modern disturbance:
000 General surface collection
010 Humus root zone, do NOT combine in analysis
020 Plowed surface collection
021 Plowed surface-shovel scraped
030 Fallow/harvested surface collection
031 Fallow/harvested surface-shovel scraped
040 Natural/wild surface collection
050 Plough zone
060 Excavated surface collection
070 Modern wall or rock pile
080 Humus root zone, okay to combine in analysis w/level below
090 Modern burned area
091 Modern animal burial

Wall:
100 Possible wall
110 Rock wall, unmortared
120 Pirka wall
121 Outside supportive lip
122 Inside supportive lip
125 Rock wall, single course wide
126 Fill/mortar from wall
130 Dressed stone wall
140 Rock wallfall
141 Adobe wallfall
150 Wallfall, do NOT combine in analysis
160 Wall trench fill
161 Wall trench
162 Wall plaster, slumped off
163 Wall plaster facing
170 Retaining wallfall
180 Wallfall, okay to combine in analysis w/level below
190 Adobe/ mudwall
191 Stone foundation of adobe wall
192 Adobe and rock wall

Midden; culturally deposited:

200 Low density midden
201 Low density midden-primary deposition
202 Low density midden-secondary deposition
210 Medium density midden
211 Medium density midden-primary
212 Medium density midden-secondary
220 High density midden
221 High density midden-primary
222 High density midden-secondary
230 Low density midden with ash
231 Low density midden with ash-primary
232 Low density midden with ash-secondary

240 Medium density midden with ash
241 Medium density midden with ash-primary
242 Medium density midden with ash-secondary
250 High density midden with ash
251 High density midden with ash-primary
252 High density midden with ash-secondary
260 Plough zone derived from midden
270 Midden interspersed w/natural deposition
280 Midden interspersed w/wall slump
291 Cut below midden deposit
298 Midden-details unspecified
299 Midden-stratified

Cultural Surfaces; "use" surfaces and their deposits:

300 Surface, not clearly compact
301 Surface inside structure
302 Surface outside structure
310 Occupation zone, matrix deposited during use
311 Occupation zone, matrix deposited during use-inside
312 Occupation zone, matrix deposited during use-outside
313 Dense occupation zone
314 Occupation zone w/disturbed, burnt "jacal"
320 Activity area
321 Metal processing area
322 Food processing area
323 Ceramic production area
324 Storage area-burnt in situ
330 Floor contact (material on floor surface)
340 "Crusty", compact surface
341 Cut associated w/compact surface
342 Compact surface inside structure (true floor)
343 Compact surface outside structure
344 Clay foor inside structure
350 Paved floor
351 Paved floor inside structure
352 Paved surface outside structure
360 Rock subfloor/ cobble drain construction
370 Occupation zone with roof or wallfall
380 Plough zone derived from occupation zone
390 Possible occupation zone

Features; culturally deposited:
400 General
410 Pit fill
412 Pit fill-midden
413 Pit fill-gravel
414 Pit fill-natural matrix w/artifacts
415 Pit fill-ash
416 Pit fill-clay
417 Pit with camelid bones
418 Pit with cuy bones
420 Hearth (in situ burned area w/well defined limits
421 Hearth cut

422 Ephemeral in situ burned area (not assocaited w/clear cut)
423 Hearth-stone and adobe lined
424 Burned area of floor-inside
425 Oven
430 Subfloor drainage canal
440 Stairway
450 Other firing feature
451 Burned clay concentration-NOT in situ
460 Ash deposit (not a clear lens or pit)
470 Posthole fill
471 Cut of posthole
480 Stone fill (cultural) purpose unclear
490 Possible feature
498 Fill from inside of ceramic vessel
499 Fill from bell-shaped pit

Burials:
500 Burial in subfloor-primary
510 Burial in subfloor-secondary
520 Burial in midden-primary
530 Burial in midden-secondary
540 Burial in patio-primary
550 Burial in patio-secondary
560 Burial in wallfall
580 Animal Burial
591 Cut below burial
592 Burial in natural matrix w/artifacts
593 Burial in capped, collared cist tomb
594 Burial in belled-pit tomb
598 Burial, details unspecified

Fill; purposefully deposited, but that contains artifacts
unrelated to location:

600 Human dumped natural matrix w/artifacts
601 Rapid-water deposited matrix w/artfacts
602 Long-term erosion-deposited matrix w/artfacts
603 Decomposing bedrock w/artifacts
610 Midden used as fill
620 Cultural fill
621 Cut below fill
622 House construction fill inside house
623 House construction fill under house
624 Rocky fill (purposeful)
625 Gravel fill (purposeful)
650 Naturally deposited soil, sterile
670 Culturally deposited matrix w/few artifacts
690 Possible fill
699 Gravel fill as foundation of raised field

Lenses; thin deposits (cultural deposits, natural deposits or reworking of cultural deposits):

700 Ash lens, grey-white ash
710 Gravel lens
720 Charred lens-black
730 Natural matrix lens, water deposited
740 Organic stain

No good evidence for interpretation of depositional history:

900 Undifferentiated soil
910 Undifferentiated rock
920 Locus unexcavated
999 Mixed locus or information lost or incorrect-check notes
    before analysing