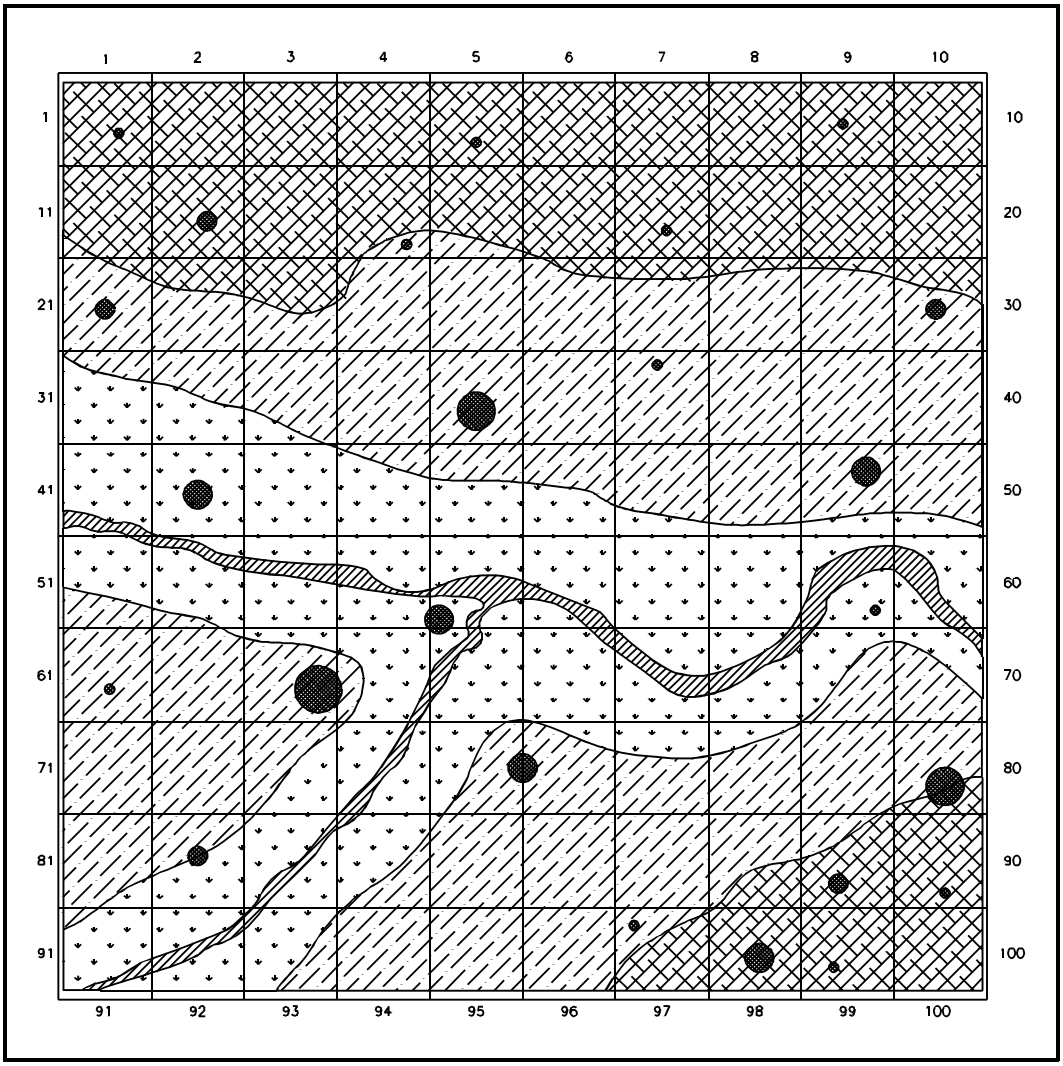
Exercises in Archaeological Methods and Techniques

Partial Curriculum for Anthro 156-103:
Digging Up the Past–Approaches to Archaeology

In-class Exercises



by
Stephen H. Savage and Elizabeth S. Dinsmore

July, 1993
Revised January, 1995
Second Revision September, 1996
Third Revision January, 1998

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Orientation

The undergraduate lecture class "Digging Up the Past–Approaches to Archaeology" is designed to introduce beginning students to the practical aspects of archaeology, the conceptual tools that archaeologists use and the methods of proceeding in a discipline that steers its own particular course between the Humanities, social sciences and natural sciences. Archaeology is a subject that holds great natural appeal for students and we were confident that our use of assigned reading materials, lectures and slides would easily stimulate discussion among the students and encourage them to take other classes in archaeology. We were wrong.

After the first few classes it was clear that students were not interacting well with us, with each other or with the materials. While the subject was of some interest to the students, it seemed that the principles and applied concepts we taught had little meaning unless the students were forced to struggle with them on their own. We decided that to make the most of this course, we would need to give the students a "hands-on" opportunity to work with some of the concepts they learned in the lectures. Daniels and David (1982) provide several good simulated archaeological problems aimed at undergraduates, but we felt that these were a bit too challenging and did not encourage the students to work together. This led us to create our own series of seven in-class exercises which the students would complete by working in small groups during class and writing follow-up reports on their own outside of class.

Since Anthro 156-103 has no pre-requisites, we could not assume that the students would be familiar with any of the methods and techniques of archaeological problem solving. We wanted to cover seven basic topical areas as well as exercise the students' skills in basic problem solving methods. The exercises involve the use of deductive and inductive reasoning, logic, pattern recognition, creativity, the ability to approach a problem from different angles and the interpretation of form, time and space. As is true of most problems, we found that these are all solved best using a cooperative strategy that takes advantage of the different skills which students bring to the classroom. Several of the exercises pose a problem for which there is a "correct" answer; others offer no single

right answer but encourage creativity and different viewpoints to show how archaeology is often not an exact science but an interpretive one.

The topics covered are sampling strategies, designing a field strategy, seriation, stratigraphy, settlement patterns, classification and ceramics analysis. The exercises are all designed to be small group projects. The students break into groups of six to eight people, work together in class and write up the report on their own time. We encouraged the students to keep a lab notebook which they used to keep notes during the group work. Four written reports form the first graded set, and the final three writeups form the second set. Each set of reports counted as one test grade. The labs are integrated with lecture topics, as illustrated in the class syllabus included at the end of this document.

Organization of this Booklet

Each exercise is prefaced by an introductory section which outlines the purpose of the exercise, the setup and materials required, the procedure, and our results and comments on what improvements can be made. Following each introduction is a copy of the assignment (with some revisions) that we used for the exercises. Generally, we made one copy of this assignment sheet for each student in the class and distributed other related materials on the day of the exercise. Our class had about one hundred students, so the "materials" and "setup" sections of each exercise reflect what is required for a class of this size. A reference page of suggested reading assignments concludes this booklet. These works are cited in each introductory section where appropriate.

Exercise #1: Sampling Strategies

Introduction

During our lectures on archaeological fieldwork, we introduced the concepts of "pattern", "variability", "random sample" and "judgmental sample". Assigned readings were drawn from Ragir (1967), Redman (1973) and Fagan (1994:chp. 9) that discussed different sampling strategies. In the exercise the students are to compare the relative efficiency of random vs. judgmental sampling.

Purpose:

- To discover and describe pattern and variability in the distribution of sites across four environmental zones.
- To use both an uninformed "random" sample and an informed "judgmental" sample to accomplish this.
- To evaluate the strengths and weaknesses of both methods.

Materials:

1. one 11"x17" physical/environmental map for each group
2. one 11"x17" site map for each group
3. one 8.5"x11" version of the physical/environmental map for each student (optional)
4. one 8.5"x11" version of the site map for each student (optional)
5. two colored pencils for each group (requires two different colors)
6. one table of random numbers for each group

Setup:

We prepared two maps of an invented 10 km^2 survey area. The first showed only the environmental zones and physical features of the survey area. Environmental zones included mountains, foothills, a floodplain and a river. On this map, we drew a 10 x 10 km grid and labeled the squares #1 - 100. We prepared one 11" x 17" version of this map to give to each group and one 8.5" x 11" version for each student to take home. The second map showed the locations of 25 archaeological sites of three different sizes superimposed on the physical map. Sites were represented as black dots of three different sizes. This map was the "answer key". We prepared this map in both paper sizes as above.

Procedure:

The class was divided into groups of six. Each group received six assignment sheets, one large version of the physical map, two colored pencils and a table of random numbers. As a group, the students decided on a random sampling strategy and, using the random numbers table, selected 20 grid squares to "survey". Their task was to capture patterns and uncover maximum variability in the survey universe. Each group reported its 20 chosen squares to us. We reported back which of these contained sites, the site sizes and the exact site location within the squares (they did not yet have the site map). With one of the colored pencils, they sketched in the sites they had "discovered". Using this information on site size and location, each group then selected 20 additional squares based on the knowledge of pattern and variability they had acquired thus far. Again they reported this set of 20 squares to us and we reported back which additional sites they had found. With the second colored pencil they sketched in these sites. As a group, they were asked to discuss the effectiveness of both random and judgmental strategies in capturing pattern and variability and to characterize these. After this discussion, we passed out the second 11"x17" map (site map) so they could see all the sites in the survey universe, both those they had discovered and those they had missed. In light of this, the groups were asked to re-evaluate their sampling strategies.

Results and Comments:

We found that the students tended to evaluate their samples based primarily on the number and size of sites found. Basically, the more sites found and the bigger the sites found, the more successful they deemed their strategy. Students did not appreciate the value of not finding sites in certain zones and missed the interpretive value of knowing which zones might have been avoided by the prehistoric people. This was a disappointment to us as we had emphasized this in the lecture.

Additionally, we were somewhat disappointed in their failure to grasp the difference between the nature of probabilistic and non-probabilistic samples. Our point was to illustrate that although a judgmental sample is more immediately effective because it is informed, it cannot be used to project generalizations about the universe as a whole as can a random sample. We devoted part of a subsequent lecture to following up these two points and to re-emphasize the basic elements of probability and prediction.

Regarding the site map, the sites we plotted perhaps represented too much redundancy of pattern and not enough variability to be realistic.

We found that the different groups created remarkably different sampling strategies and much of the discussion after class revolved around which of the different groups' strategies was most effective. Many students remarked that they had not really understood the concepts of a sample until they were forced to design one, so we felt that our hands-on curriculum was off to a rough but definitely positive start.

Anthro 156-103 Digging Up the Past: Approaches to Archaeology
In Class Lab #1: Sampling Strategies

Task:

When archaeologists want to survey a large area, often they are forced to limit their study to a portion of the total area. Often, the locations and sizes of the sites in the area are unknown, but other information can be used to devise an intelligent sampling strategy. Two goals of any sampling strategy are to: (1) acquire as much data as possible on the size and location of sites (pattern), and (2) to capture the range of variation in this pattern (variability). If a random sampling methods are used, a third goal is to provide data that will allow the archaeologist to make probabilistic statements about the population of sites based on the sample.

In this exercise, your task, **as a group**, is to devise at least two sampling strategies that you think will meet these goals. The first must use one of the random methods discussed in class, and in your reading assignment. The second must be judgmental. If you have time, you may do a third sample.

The class will be divided into groups of six students. Each group will receive one map divided into 100 grid squares, labeled 1 through 100. In addition, each group will receive a table of random numbers and two colored pencils. You do not know where the sites are located on the map, but they are divided into roughly three sizes:

Small	0 - 100 m diameter
Medium	100 - 200 m diameter
Large	200 - 300 m diameter

In addition to this information, the map shows topographic features (mountains, rivers, etc.), and you have common sense to help you. No sites are located in more than one grid square, and no grid square contains more than one site. There are 25 sites located somewhere on the map.

Procedure:

Please write your group number in the upper right corner of the map, and in your lab notebook. Write the names of the members of your group on the back of the map. Take a few minutes to study the map as a group, then follow these steps (also listed on the map itself):

1. **As a group**, devise a random sampling strategy and select 20 squares to survey. Discuss the strategy with the group, and record the reasons why your group chose this strategy in your lab books.

2. Write down the numbers of the squares you selected in your notebooks, and on a piece of paper to hand in. One person should highlight the chosen squares with one of the colored pencils. Another person should bring the list to the instructor or T.A. You will be given a list of the sites you have found, their sizes, and the approximate location of each within its grid square. Return this to the group, and, with the same colored pencil, plot the sites on the map, using the appropriate scale (each grid is 1,000 meters on a side, so the large sites, for example, have diameters about one-third the length of a square).

3. Discuss any patterns and variability that you see. Using this information, select a judgmental sample of 20 different squares. Record in your notebooks the information about the patterns you

see, and the reasons why you chose the 20 squares you did. Repeat Step 2, using the second colored pencil.

4. Discuss the following with the group:

   a. How effectively did your random sample seem to capture pattern and variability? What can you say about the site universe based on the random sample? Since there are 25 sites on the map, and you took a 20% random sample, you could expect to locate five sites with your random sample. You will not be graded on the basis of the number of sites you find, since this is the result of a random process, so don't worry if you found only two or three, and don't get cocky if you found seven or eight!

   b. How much did the judgmental sample seem to improve your understanding of pattern and variability? What can you say about the site universe based on the judgmental sample? Did your judgmental sample find more, or fewer, sites than your random sample? Why do you think you got this result?

   (Make sure you take notes on your group discussion, since you will write this up!)

5. Send one person to the instructor or the T.A. for a map with all the sites located on it.

6. Now that you know where all the sites are, re-evaluate your samples:

   a. How effectively did your random sample seem to capture pattern and variability?

   b. Did the judgmental sample seem more effective than the random sample (these aren't strictly comparable since you know more by the second sample, but try to estimate).

   c. Would a different sampling strategy have been more effective? Is 20% a big enough sample?

7. Hand in your colored maps.

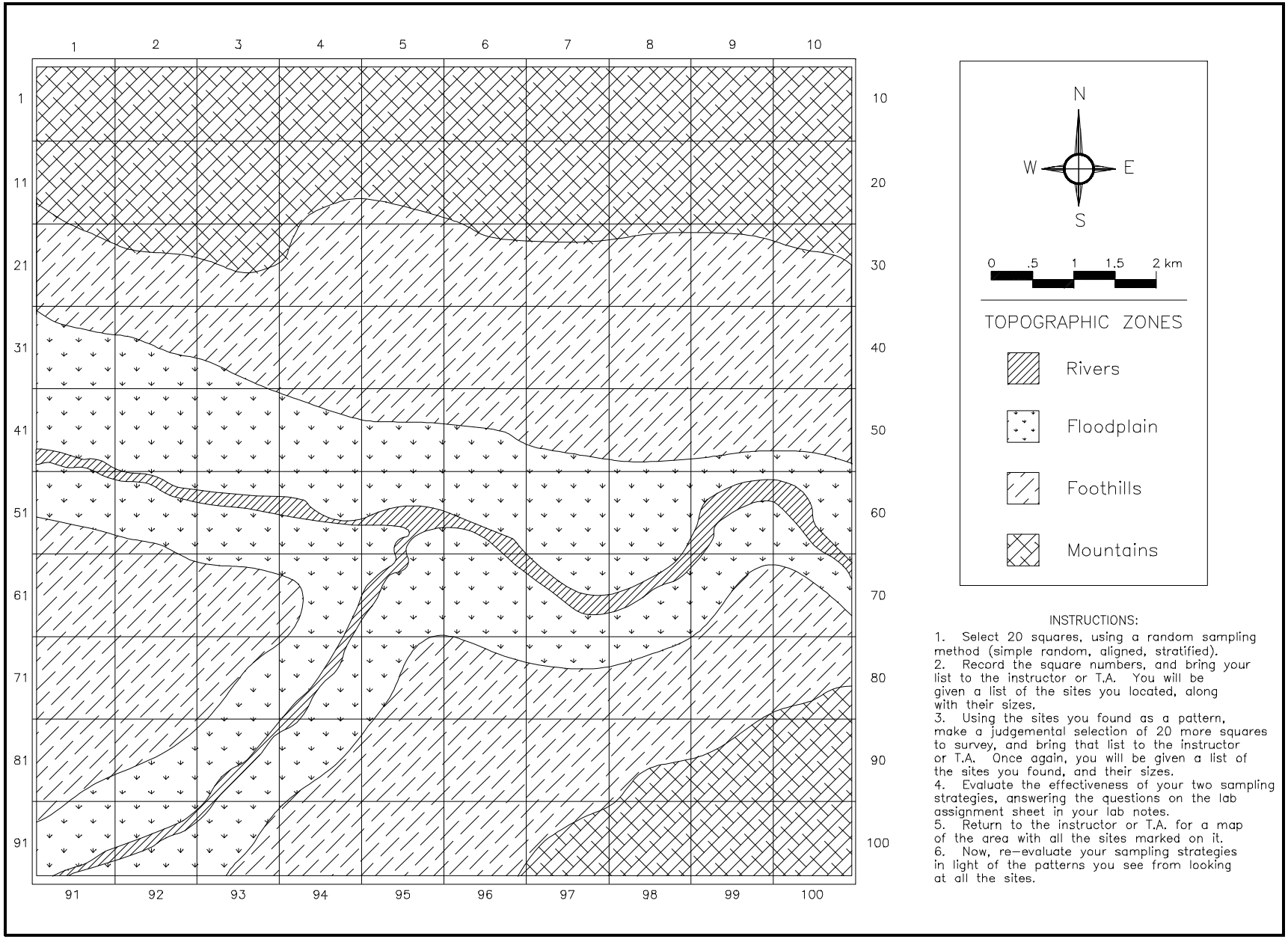
Lab Report:

Reports should be typed, double-spaced and 2-3 pages in length. Since this is a group project, we expect your answers to be similar to the other members of your group. You may discuss the lab outside of class, but please do your own writing. We will compare the reports from the members of your group!

1. Type your name, ID number, "Sampling", and your group number in the upper right corner of the report.

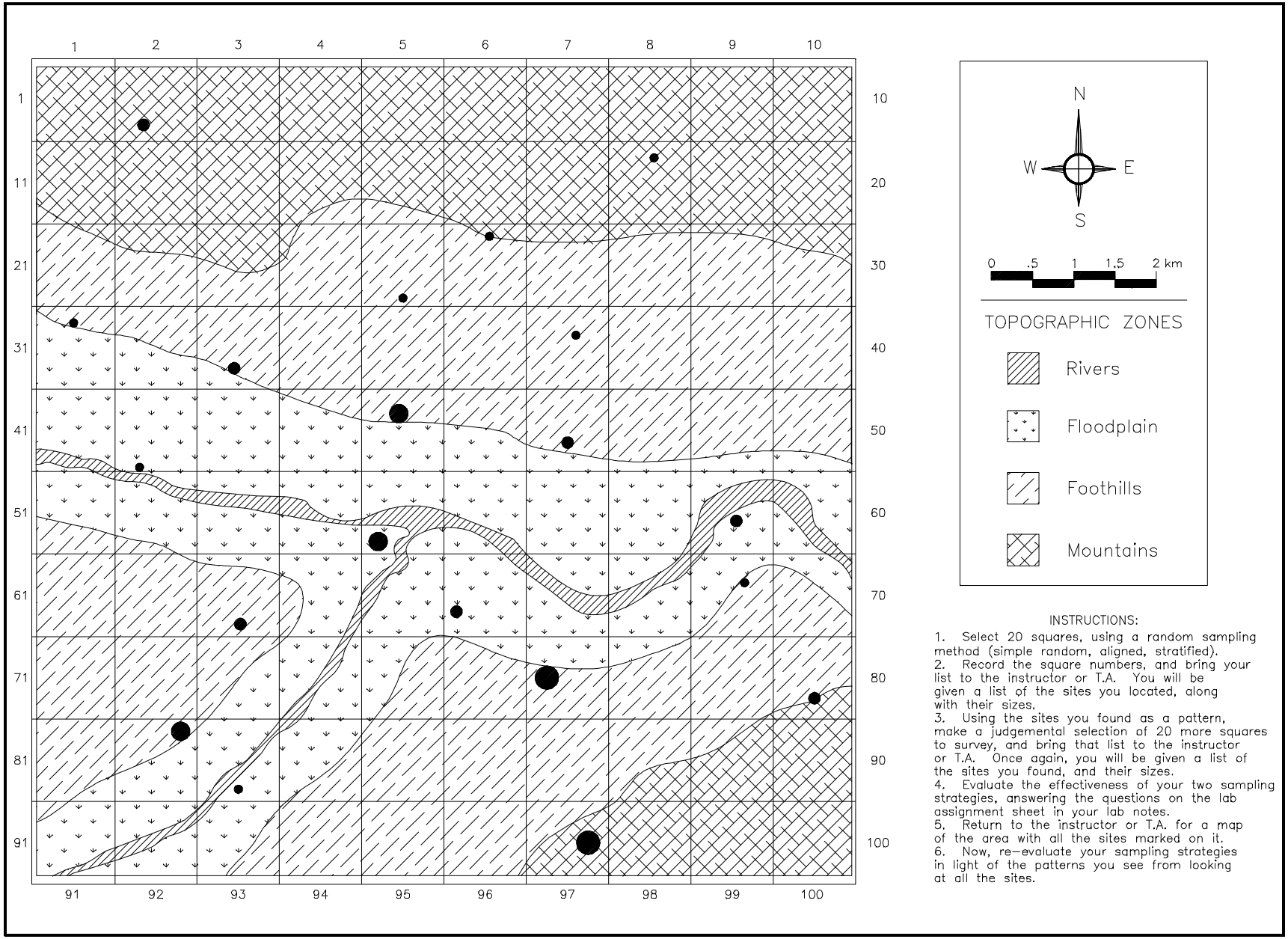
2. List the numbers of the squares chosen for each sample.

3. Please give a written response to Steps 4 and 6 above. Your responses should be based both on your group's discussion and your own observations.



INSTRUCTIONS:

1. Select 20 squares, using a random sampling method (simple random, aligned, stratified).
2. Record the square numbers, and bring your list to the instructor or T.A. You will be given a list of the sites you located, along with their sizes.
3. Using the sites you found as a pattern, make a judgemental selection of 20 more squares to survey, and bring that list to the instructor or T.A. Once again, you will be given a list of the sites you found, and their sizes.
4. Evaluate the effectiveness of your two sampling strategies, answering the questions on the lab assignment sheet in your lab notes.
5. Return to the instructor or T.A. for a map of the area with all the sites marked on it.
6. Now, re-evaluate your sampling strategies in light of the patterns you see from looking at all the sites.



INSTRUCTIONS:

1. Select 20 squares, using a random sampling method (simple random, aligned, stratified).
2. Record the square numbers, and bring your list to the instructor or T.A. You will be given a list of the sites you located, along with their sizes.
3. Using the sites you found as a pattern, make a judgemental selection of 20 more squares to survey, and bring that list to the instructor or T.A. Once again, you will be given a list of the sites you found, and their sizes.
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Exercise #2: Designing a Field Strategy

Introduction

One of the most important concepts we emphasize is that archaeological fieldwork and analysis is problem oriented. Throughout the lab exercises, we continually ask the students to devise important questions, then use the materials provided to hel answer those questions. Here, we are concerned with the process of archaeological fieldwork. We emphasize that archaeolgists should approach fieldwork with a set of guiding questions in mind–questions that will help shape the field strategy and techniques. This lab builds on the knowledge of sampling strategies from the first lab, in that we give the students only 500 person hours to generate the data to be used to answer four different questions about a particular site. In lecture, we re-emphasize Redman's notions of multi-stage fieldwork, and assign Fagan (1994:chp. 10). Much of the lecture preceeding the lab is conducted with slides that illustrate different kinds of field problems and the methods adopted to solve them.

Purpose:

- To devise a set of four relevant research questions about a Classic period Hohokam site in the Phoenix Basin that can be addressed via different archaeological field methods.
- To struggle with time and budget constraints in order to allocate field resources and methods so that all four questions can be answered.
- To devise appropriate field methods, from a list of different field operations, in order to answer the four questions, and to learn how the same field methods can be used to answer several questions at the same time, if the methods are well thought out.

Materials:

1. One 11"x17" site map for each group
2. One 8.5"x11" site map for each student
3. A list of different field methods, and the amount of time each consumes for a given unit of work.

Setup:

We prepared a site map of a ficticious Classic period Hohokam site from the Phoenix Basin. The site includes a small platform mound with adobe walls and associated pits, an "off mound" room compound, three thrash mounds, and other artifact scatters. Some of the site has been attacked by pothunters.

Procedure:

The class is divided into groups of six students, and the large maps are distributed. Each student receives a lab assignment sheet, including the list of field methods available. Students are asked to develop their questions first. (We include a list of sample questions in the lab assignment; students are allowed to use a couple of these, but they must also devise two of their own). Once the questions are developed, the students decide how they will answer each through fieldwork. They are asked to provide a list of their questions, the field methods they chose, and a budget. Then, they are asked to justify their choices. Following the small-group portion of the lab, we re-convene as a class and each group reports on what they achieved.

Results and Comments:

This proved to be a very successful lab, in that students quickly developed questions by scanning the map, and then got down to the problem of how to answer them. In doing this, they soon find that the lessons learned from the sampling lab are quite helpful, as well as Redman's ideas about multi-stage fieldwork. The students quickly began wrestling with issues like trying to decide the best way to figure out how long the site was occupied. We are constantly asked a wide range of very practical questions as we help them figure out different ways to do their fieldwork. In the end, we find that often the different groups come up with similar questions, but answer them in different ways, which gives the class valuable insight into why there cannot be a "cookbook" approach to archaeological fieldwork.

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In-class lab session #2: Designing a Field Strategy

Task: When archaeologists design a field project, they do it by asking a series of questions about one or more sites. The goal of the field research is to conduct data recovery operations in such a way that their questions may be addressed with the artifacts, soil samples, features, and contexts they reveal, and with the field notes they record. With these broad goals in mind, the archaeologist must adapt their field methods and techniques to a particular situation. Since every archaeological site is unique in some way, the field strategy must be flexible. In addition, the archaeologist must operate within time and budget constraints, which means that the entire site cannot be excavated. The archaeologist must use a variety of methods to maximize the data recovered.

In this exercise, your task, **as a group**, is to devise a field strategy to answer a set of four specific questions that your group decides to ask about the site shown on the enclosed map. Then, your group must design a field strategy that will allow you to answer your specific questions. A series of methods are available; they are listed below, along with the amount of time required, and the amount of earth moved, surface area collected, and/or soil profiled or mapped. **Your field team consists of the members of your group, and you have a total allowable time of 500 person-hours to spend at the site. You may spend this time in any way you choose, using the categories below.** If you choose to use a backhoe for trenching, or a small tractor and blade for surface stripping, you are allowed an extra person as a machine operator, but you must allocate one of your crew as a monitor. **Assume that the trash mounds are two meters high.**

Procedure: List the members of your group in your lab notebooks, along with your group number. Take a few minutes to study the map. Look at the different architectural details, observe how they relate to each other and to the other parts of the site. Notice how the observable features are located in relation to the architecture. Observe that part of the site is an elevated mound, with ruins on top, while another part consists of architecture built on flat ground. You may assume that the disturbed areas are the results of recent pothunting activity.

1. **As a group**, discuss some things you would like to know about the site, and make them formal by writing a set of four questions in you notebooks. The field methods you devise must be designed to help you gather the data that will allow you to answer these questions.

   Examples of questions you might consider are: 1) How long was this site occupied? 2) Are the different parts of the site occupied simultaneously, or do they represent different occupational episodes? 3) What is the range of activities that occurred at the site? 4) How are the different walls visible on the map related to each other? 5) Are there different structures/rooms located in the various parts of the site, and do they have different functions? 6) What is the nature of the artifact scatter between the two habitation areas? 7) Is there a difference in status between the people associated with the mound and those associated with the surface compound? **As you can see, there are lots of questions you can ask–you can use some of these, but you must come up with at least one of your own.** The methods you devise may be applied to answer more than one question at a time, but all your questions must be addressed!

2. **For each question you list, devise a set of field methods to gather the data you need to answer the question**. For example, if you want to know how long the site was occupied, one

of the best ways to determine this is to excavate in the trash mounds. You must be sure to do the excavation in such a way that you recover artifacts from the entire depth of the different mounds.

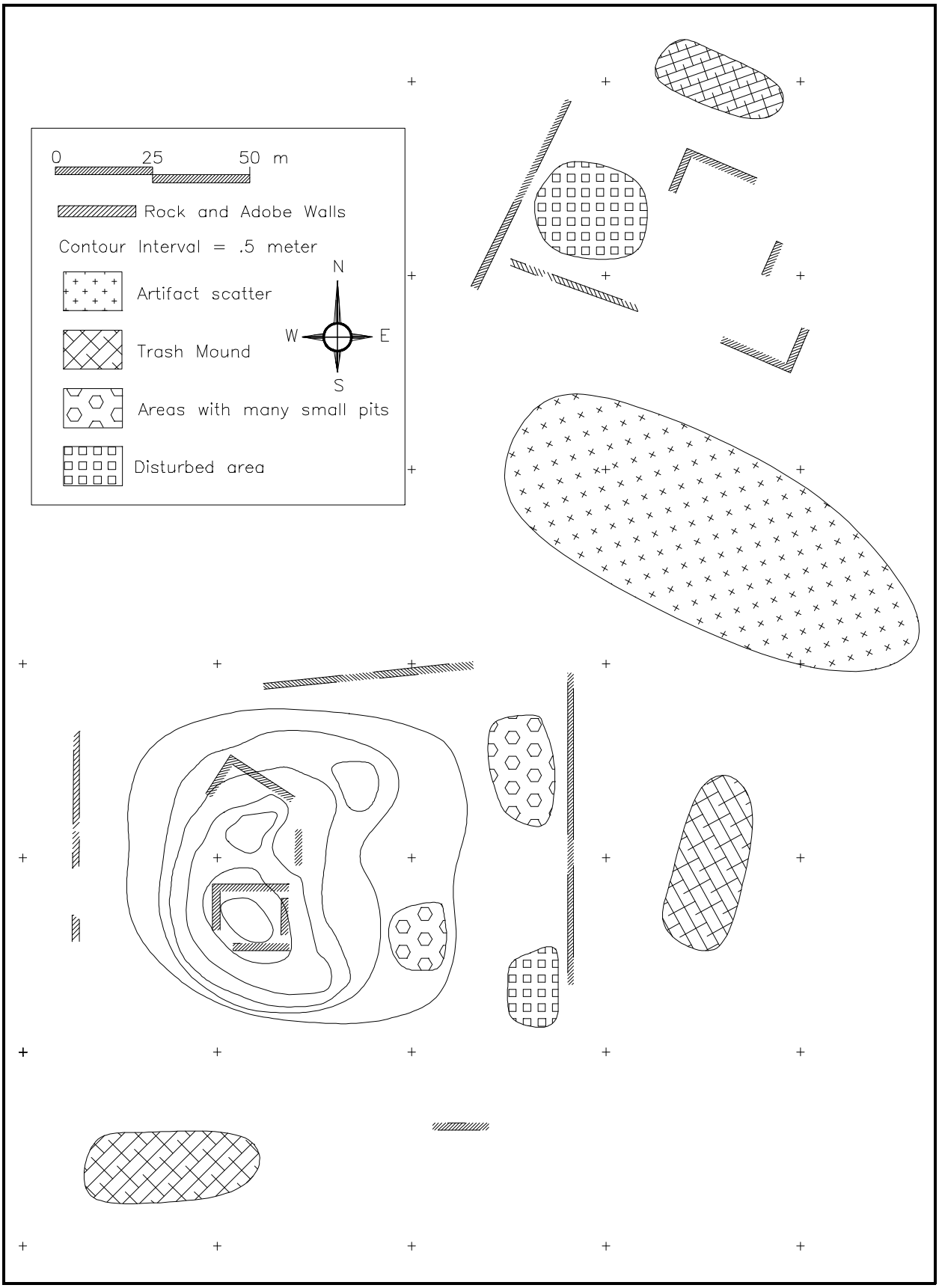
a. **Record in your notebooks each step you intend to use for each question, and explain why you want to use that particular method**. Also, you must specify how much time you plan to devote to each step.

b. **On the map, designate which areas of the site you intend to examine, and how you plan to do it**. (For example, if you want to dig a backhoe trench, draw a line on the map, showing where you plan to put it, how long it will be, and in what direction.) Locate excavation units, and specify how large they will be. If you want to place a set of small test pits in an area, using some sampling technique, describe how you plan to sample (in the case of sampling, you don't have to show the individual units on the map). If you plan to do surface collection, indicate on the map, and in your notes, how large an area you plan to examine, and how you plan to do it (what kind of sample will you take).

3. Create a budget that shows the total amount of time you plan to spend on each different activity, and the total time you spend on the site. Remember, you have 600 person-hours to spend.

Writeup: Your formal writeup of this lab may be a bit longer than the others. You should present your questions and methods in a formal manner. List each question, followed by the methods you chose, and their justification. Include your copy of the map, showing the different areas you plan to examine, and include your budget.

Field Methods Available	
Method	**Expenditure**
Laying out grid system	6 person-hours for each 50 meter block
Surface collection	1 person-hour for each 10 meter square
Hand excavation	.1 cubic meter per person-hour (includes record keeping, you will need two people per excavation unit)
Wall tracing (shovel scraping surface to trace walls)	4 linear meters per person-hour (this is just surface scraping)
Backhoe trenching	4 meters per hour (you must assign a monitor, and should profile trenches after digging them)
Trench profiling	3 meters per person-hour (cleaning and drawing)
Machine stripping	100 square meters per hour (assign a monitor)
Feature excavation	.05 cubic meters per person-hour.
Shovel scraping	10 square meters per hour.
Architectural mapping and drawing	12 linear meters per person-hour (requires two people)


0
25
50 m
Rock and Adobe Walls
Contour Interval = .5 meter
Artifact scatter
Trash Mound
Areas with many small pits
Disturbed area
N
W
E
S

Exercise #3: Seriation

Introduction

Dating sites is a central concern for archaeology. Archaeologists use both absolute and relative dating techniques. Relative dating techniques rely on logic and deductive reasoning to place sites earlier or later in time, relative to one another. The seriation exercise (and the stratigraphy exercise, to follow) were designed to acquaint the students with different techniques of relative dating. We assigned Deetz and Dethlefson (1978), and Fagan (1994:chp 5). The seriation figures in Sharer and Ashmore (1993) were quite helpful. In the preparatory lecture, we introduced both stylistic and frequency seriation as concepts and presented two methods for completing a frequency seriation. The first of these is the "visual" method (after Ford) while the second makes use of a number matrix where the large values are arranged along the principal diagonal.

Purpose:

- To complete a frequency seriation using one of the two methods introduced.
- To arrange eight sites in relative chronological order by means of ordering those sites' pottery assemblages into battleship-shaped curves.

Materials:

1. approximately five pounds of M&M candies
2. one plastic sandwich baggy for each student
3. one paper bag for each group
4. an indelible marker to label the bags
5. graph paper and scissors (optional)

Setup:

The setup requires some time and care. This exercise uses M&M candies as a substitute for pottery assemblages where each color represents a pottery type. This simplifies the exercise by limiting the data to one variable (color) and allows the data to be consumed afterwards. The candy was divided into eight baggies per group as follows:

Savage devised a matrix based on eight sites long by six pottery types wide whereby the "battleship curves" were well-behaved. The sites all had the same number of pottery pieces and there was only one possible correct order for the eight sites. A simple computer program was written to randomly assign M&M colors (G, R, B, Y, T, O) to columns and site labels (A-H) to rows in the matrix. This was repeated 13 times, one for each group. We did this to make sure that no two groups would have the same solution but that the final seriated matrix would be the same for all groups. This makes their reports easier to grade.

Once this was done, we simply followed the program output to divide the candy into the different bags, with 13 sets, eight baggies per set. Each of the baggies is marked with a site letter A through H and placed in a paper bag with the set number written on it. We provided graph paper and scissors for those who wanted to try Ford's method of sketching frequencies on paper, cutting them into strips and sorting the strips into curves.

Procedure:

We divided the students into groups of eight and gave each group a paper bag containing eight baggies of candy. Each student took a baggy. Each student represented a "site" and his/her candy represented the "pottery assemblage" at that site. Students were asked to order themselves (the sites) by means of seriating their assemblages and to produce a frequency matrix as their solution. We gave them one hint: there was an 8 in the lower right corner of the solution matrix so they would know where to begin.

Results and Comments:

It was very interesting to watch the students negotiate between the visual and the numbers method. When we set up the exercise, we found that each of us preferred a different method and decided that each method requires very different skills. The groups that elected to use the numbers method saw the principal advantage as that of avoiding the candy altogether and directly producing the solution matrix. Those who elected the visual method did so because the popularity curves were easier to comprehend when represented as a pattern of colored curves on the table. The graph paper method was not popular and in retrospect, could be eliminated. In the end, all the groups arrived at the correct seriation. One group had trouble because we made an error in filling their baggies; another group suffered when one student ate her candy before the exercise was finished.

One problem we observed was that the students did not understand how to interpret the contemporaneity of sites. Many thought that to be contemporary, two sites had to have all the colors in common, rather than just one color. This was perhaps our fault, as we did not make it clear that a site assemblage does not represent a "flat" moment in time but rather a span. If we had mentioned that each site had a 10 year occupation, this would have allowed ample time for overlap and we feel the students would have perceived contemporaneity more clearly.

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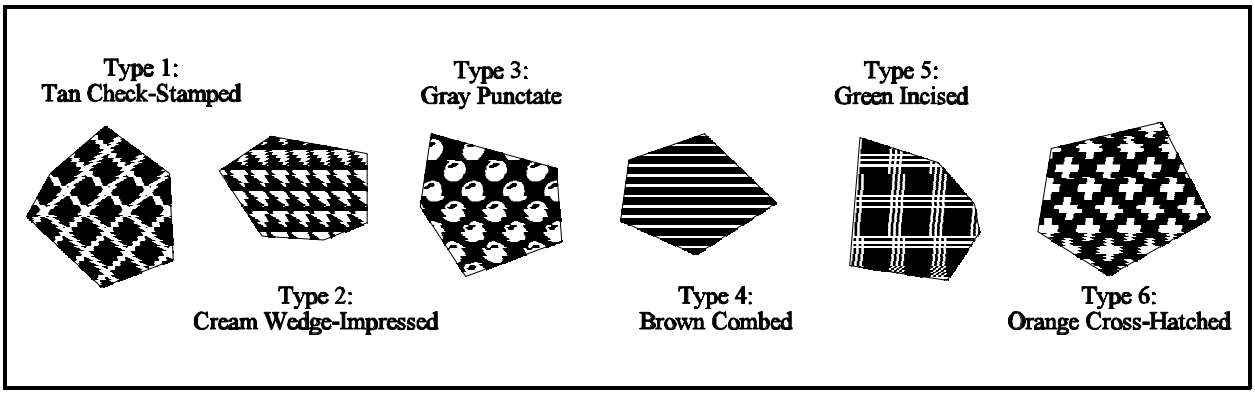
In-class lab session #3: Seriation

Procedure: In this lab, you will learn to create a seriation by arranging eight sites into the proper order, based on the number of sherds of different types you have at each site. Assume that your group has conducted an archaeological survey and found eight sites. The large envelope your group receives has a "Group Number" written on it, and each large envelope contains eight smaller envelopes. Each smaller envelope represents an archaeological site from your surface collection, and is designated by a letter symbol, A-H. The site letter is written on each envelope of sherds, and each envelope contains fifteen sherds. Give member of your group one of the smaller envelopes; if there are fewer than eight members of your group, some members will get two envelopes. **Before you do anything else, record your group number and site letter(s) in your notebook. Count each color of "pottery" in your site envelopes and record these numbers. If the Group Number and Site Letter (from the large and small envelopes) is not written on the back of each of your "sherds," take time now to record it there. That way, if you get your sherds mixed up later, you can sort the sites back out again.**

The different colors of "sherds" represent different pottery types. There are six different colors and surface decorations, as shown below:



Remember that not everyone will have all six types. If you use the **number matrix method**, write down each student's counts, by type. Make sure to write them down in the same order. If you choose to use the **visual sorting method**, each person should arrange their sherds in a single line. For example:

number method:

type #	1	2	3	4	5	6
# pieces	3	3	1	5	1	2

visual method:

1 1 1 2 2 2 3 4 4 4 4 4 5 6 6

Task: Your task is to seriate the eight sites using the numbers of each pottery type to guide you. If you choose to do the visual sorting method, you may proceed in one of two ways. **For either method, you will need to report the matrix of frequencies that is your solution showing sites as rows and types as columns. See assumptions and hints, next page.**

D. Note any observations about your progress including any problems you encountered and your general method of solving the puzzle. These observations should be included in your final report.

II. Lab Report (outside class)

A. Lab reports should be typed, double spaced, and one to two pages in length.

B. Put your name, ID number, group number, and site letter in the upper right corner of the first page.

C. Report your group's solution matrix, using a table format like that shown below. Sherd types should be listed across the top, and site letters on the side.

D. Answer the following questions with complete sentences:

1. How did your group solve the seriation puzzle? What problems did you have?
2. Which types were most useful in solving the puzzle? Which types were least helpful? Why?
3. Which sites could be contemporary, i.e. overlap somewhat in time? Which sites could not be contemporary?

		Ceramic Types						
		Earliest Type					Latest Type	
		Green	White	Brown	Gray	Tan	Orange	
	A	**14**	12	9	0	0	0	Earliest Site
	E	11	**13**	10	3	0	0	
S	G	10	10	**12**	4	0	0	
I	C	8	10	6	**11**	0	1	
T	B	8	9	3	9	3	3	
E	F	8	8	3	8	**10**	4	
S	D	0	0	3	7	8	13	
	H	0	0	0	5	6	**19**	Latest Site

Assumptions:

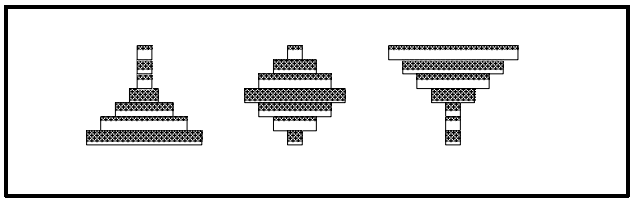
I. There are only six possible pottery types at each site. If a site does not have a particular type, it is because it was not occupied at the time that type was in use.

II. The occupations proceed from earliest to latest in a linear fashion. Two sites may overlap in time, but are never totally contemporary.

III. No site was occupied, abandoned and re-occupied.

IV. The popularity of artifact types tends to wax and wane through time. That is, each type appears first in small proportions, then increases in numbers to its maximum popularity, then decreases as it is replaced by another type. Therefore, the popularity of a type may be schematically represented by one of these three battleship curves (in the real world it's a bit more complicated).

Curve 1: Curve 2: Curve 3:



Curve 1 represents the situation of a pottery type at the end of your site sequence; you have the beginning of the "battleship," but not the end. Curve 2 represents an entire ceramic type's lifespan, where it gains in popularity and then goes out of style. Curve 3 represents a type at the beginning of your sequence, meaning that it was already in full production when your first site was occupied.

Hints:

I. The latest type in the series has a value of 8 on the most recent site, corresponding to the lower right corner of the matrix (where the 19 is in the solution table, above).

II. The numerical matrix you end up with should *resemble* the example above. **Note that the high numbers tend to concentrate along the diagonal from upper left to lower right. Note also that the numbers in your solution matrix will be different!**

Exercise #4: Stratigraphy

Introduction

"Reading" stratigraphy is the second of two relative dating techniques we wanted to introduce. The purpose of this lab is to give the students experience in reading stratigraphy to discover features associated in time and to reconstruct a relative chronological order of these features. The preparatory lectures introduced the Law of Superposition and discussed the differences between horizontal and vertical stratigraphy. The reading assigned was Harris (1975, 1979) and Rowe (1961). The lab section is preceeded by a lecture done entirely on the blackboard, illustrating different aspects of stratigraphy.

Purpose:

- To use deductive logic to associate each of six house clusters with its appropriate trash pit feature.
- To reconstruct a relative order of these houses and associated trash pits.

Materials:

1. one 11"x17" site map for each group
2. one 8.5"x11" copy of the site map for each student

Setup:

This lab is a revision of a take-home assignment used by Redman in ASB 222. That assignment used a plan of a Hohokam village, with different house clusters and trash mounds, asking the students to pair the features. We took Redman's plan of the Hohokam village and re-drew it in AutoCad. At the same time, we introduced some deliberate ambiguities which could only be solved by examining profiles. We altered the trash mounds to become trash pits. Then, we drew trench lines in two places on the map and created two vertical profiles which corresponded to these section lines. A series of questions was asked that were similar to those on Redman's original handout, but could only be answered by reading both the horizontal overlap of the house clusters in conjunction with the profiles.

Procedure:

The students were divided into groups of six. We gave each group one 11" x 17" map to work on in class and handed out 8.5" x 11" copies after class for the students to take home. The students

were asked to arrange house clusters one through six into relative order and to match a trash pit to each cluster.

Results and Comments:

When the students first examined the map, they thought we had given them an unreasonable and impossible assignment. We suggested that they begin by figuring out which house clusters could not match certain trash deposits, so they began by this process of elimination. Once they were started, they caught on rather quickly, and most groups came up with the right solution.

In the written reports, there was some ambiguity regarding question 3 which asks if any other house cluster could possibly be contemporary with cluster 4. Some students correctly realized that the only possibly contemporary cluster was cluster 1, but that it was covered by part of the trash pit associated with cluster 4, so 1 had to be earlier. Some students did not grasp this, even though they had worked out the appropriate order and relationships among the house clusters and trash features. Other students did not realize that features which start at the same level are relatively contemporary. They looked at the bottom of pits that were covered by the same soil layer and assumed that the deepest was earliest. As before, the students' problem-solving skills seemed to rise to the challenge but their interpretive skills were a bit weak.

Anthro 156-103 Digging Up the Past--Approaches to Archaeology
In-class Exercise #4: Stratigraphy

Stratigraphy refers to the patterned layers of soil, rock and any archaeological features at a site. "Reading" stratigraphy is to evaluate these superimposed layers in order to interpret the relative order of soils, rocks and artifacts. Deposited layers develop from both natural and cultural processes. We can infer the sequence of occupation at a site by examining the superposition of features on a horizontal map of a site (a bird's eye view) and by looking at vertical profiles of excavated units.

Procedure: Each group is given a map of a site. The map includes a top plan and profiles of test trenches running from a to a' and b to b' on the map. The trenches are straight, narrow test units that intersect a number of features so that you can see the vertical relationships between them. There are six main depositional strata at the site, and the surface of each stratum corresponds to one occupation.

The horizontal map needs some explanation. As each stratum was excavated, all the exposed features were plotted on the site map. Thus, the plan view is a composite of all the features found at the site. All the features from all six levels are shown on the same map even though they were never all exposed at once. Features above other features are drawn as overlapping in order to suggest superposition. Compare features in the plan view to those in the profiles to get an idea how superposition works.

Task: Work as a group and determine the sequence of occupations at the site. Identify which trash pits go with which house cluster. You do not need to report the occupation periods of the canals or the temple, but they will help you reconstruct the house and trash pit sequence.

Assumptions:

1. Each house cluster contains six houses shown as rounded rectangles. Each cluster used one and only one trash pit. No trash pit was shared by more than one house cluster. Each house cluster was built and used for only one occupation phase.

2. Two or more house clusters (and their associated trash pits) may be contemporary, if the data suggest it.

3. There was no clearing or leveling of surface features. That is, the top of each feature corresponds to the surface of the ground that was exposed at the time the feature was in use.

4. Only one occupation post-dates the Love Canal system.

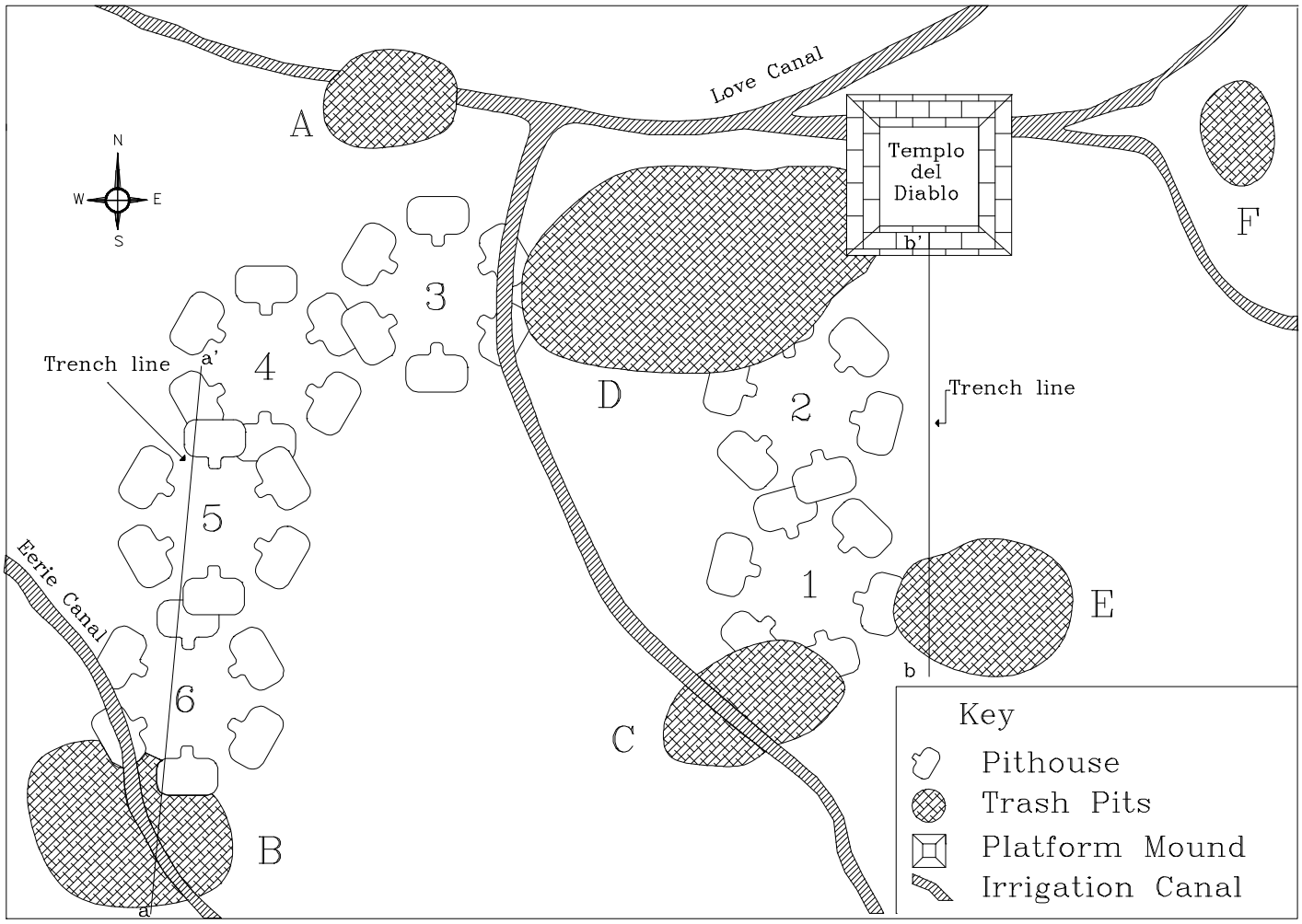
Questions for Report:

1. Match each house cluster with its corresponding trash pit, and explain why you made the assignments the way you did. Report this sequence beginning with the latest stratum:

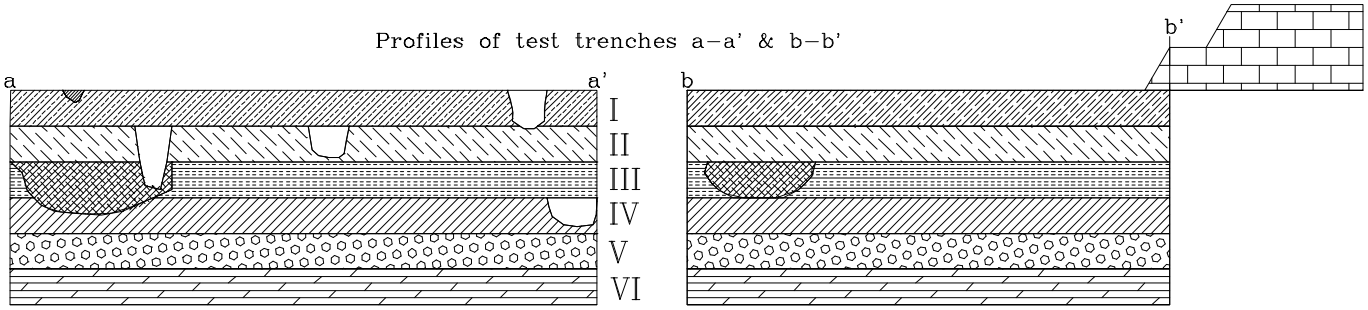
   Stratum I: 7: G
   Stratum II: 8, 10: H, K
   …etc.

2. Which house cluster could be contemporary with the temple? Why?

3. Can any other house cluster be contemporary with cluster 4? If so, why?



Profiles of test trenches a–a' & b–b'



Exercise #5: Settlement Pattern Analysis

Introduction

This lab illustrates the concepts of settlement pattern and settlement system which were introduced in the preparatory lecture. In several lectures leading up to the exercise, we discussed scope and scale in settlement patterns and some of the determinants of settlement pattern. The assigned readings included the Clarke (1979), Falconer and Savage (1995), Fagan (1994:chp. 15), Flannery (1976), and Trigger (1968). We used the Middle Archaic seasonal round from the American southeast as an example of a mobile hunter-gatherer system. We also introduced a complex, sedentary system and the tool of rank-size analysis. One lecture was devoted to intra-site analysis and used the Mask site to examine different activity areas within a site.

Purpose:

- To use material remains from sites and the distribution of sites across a landscape to infer human behavior.
- To interpret and report settlement systems as the seasonal movements of people and the use of particular sites.
- To interpret the settlement system of complex society in a statistical way using rank-size analysis.

Materials:

1. two 11"x17" site maps for each group
2. one 8.5"x11" site map for each student
3. two colored pencils per group (requires two different colors)
4. one sheet of graph paper per group

Setup:

Two different settlement patterns were drawn over the same basic physical map we used for exercise #1. One set of sites represents a mobile hunter-gatherer strategy and the other a sedentary agricultural strategy. The sites for each system are not labeled as such but are mixed anonymously on the map. Using AutoCad, we made a new layer for the base map which included 24 sites of various sizes. The sites were shown on the map as hatched circles in five different size classes. In addition, as part of the assignment sheet (below) we prepared a table with information about each site. The

information included the exact size of each site, the artifacts found at the site as well as any pertinent architectural or landscape features important to the site function.

Procedure:

We divided the class into groups of six and handed out the large maps, assignment sheets and pencils. At the end of the lab session we passed out small copies for each student. Each group of six students divided itself into two subgroups of three, one for each of the two settlement systems. Their task was to review the artifacts at each site and the site location on the map to decide if each site is part of a hunter-gatherer or complex agricultural system. Further, they were asked to reconstruct how people used those sites, during what season and for what purpose. Because of the detail in our descriptions, we asked each subgroup to work on only one system. Each subgroup chose the sites they thought belonged to their system and colored these sites in on the base map. We then had the sub-groups discuss the settlement pattern they discovered. The subgroup working on the hunter/gatherer system discussed how it compared to the Middle Archaic seasonal round and the agricultural system subgroup performed a rank-size analysis on their sites. Finally, the two subgroups shared their information and compared results.

Results and Comments:

Almost all the groups sorted the sites successfully into hunter-gatherer and agricultural systems. Most students did a good job comparing the prehistoric system to the model discussed in class, but conversely, most students had difficulty doing the rank-size analysis. We had to coach them quite a bit to get started, but in the end most groups produced a believable curve.

We were particularly pleased with some of the behavioral interpretations we got for the different sites. The sites had been set up in a rather complicated way. For example, some game kill sites contained only a few flint chips and a few bones while others had more of the carcass left. Many students correctly determined that this was related to the effects of removing parts of an animal carcass from a kill site to a butcher site and finally to a camp site.

Many students were confused about the rank-size analysis and wanted to perform this on the hunter-gatherer sites. We should have spent more time discussing this in the lecture, emphasizing its application to highly *hierarchical* settlement systems and the various interpretations offered for different curves.

Anthro 156-103 -- Digging Up the Past: Approaches to Archaeology
In-class Exercise #5: Settlement Patterns and Settlement Systems

Purpose: The purpose of this lab assignment is to study a series of archaeological sites and the artifacts and features associated with them in order to interpret the nature of the settlement system(s).

Assumptions:

You have conducted an archaeological survey of the entire region and have found all the sites; you have done no excavation. The table below provides a list of all the sites found, along with their locations, sizes, and items found on the surface. There are no multi-component sites: each site belongs to only one settlement system.

Procedure:

1. Divide your group in half. There are two different settlement systems represented on the map. One is a hunter/gatherer system (prehistoric), and the other is a complex agricultural system (historic). Decide which half of your group will work on the hunter/gatherer system and which half will work on the complex society system. Each subgroup will receive a large copy of the same map and one colored pencil.

2. Each subgroup should review the information on the table below and use it to decide which sites on the map belong to the settlement system you've chosen. Each subgroup should color in (on both maps) the sites it selected with one of the colored pencils.

3. Each subgroup should describe and discuss the settlement pattern for its system. Make sure you answer the following questions: 1. What does it look like? 2. What is the nature of the pattern and variability in your system? In addition, perform either 3a or 3b, according to the system you have chosen.

   a. **Hunter/gatherer (prehistoric) system**: Discuss how you think this settlement system operated as compared to the Middle Archaic seasonal round presented in class. Study the site information and try to reconstruct residential and logistic mobility patterns, based on artifact occurrences, locations of sites, sizes of sites, and topographic/ecological information. **Keep notes on this material, so you can report it in your lab reports.**

   b. **Complex society (historic) system**: Perform a rank-size analysis on the sites. Sort them by decreasing size; the largest is rank 1, the next largest is rank 2, and so on. Use the Rank-Size Rule [size (n) = size (1) / rank (n)] to get the expected sizes of each site. Use a calculator to find the log of each size and rank, and plot the graph on the graph paper supplied. Decide whether the distribution is "primate", "convex", or follows the rank-size rule (this is called a log-normal distribution). Discuss possible explanations for the shape of the rank-size plot. **Keep notes on this material, so you can report it in your lab reports.**

4. With your entire group, discuss the results each subgroup found. Describe the pattern and variability in each settlement system. Was there any disagreement about which sites belonged in each system, and if so, why? Explain to each other how you chose the sites for each system. Discuss the relationships you see between sites in the separate systems (e.g. where are materials extracted and where are they processed or used? How does this suggest the entire system may have functioned?) **Be sure to keep notes on what the o her half of your group did, so you can discuss it in your lab reports.**

5. After the small maps are passed out, copy whatever information you have put on the two group maps to your individual map.

Lab Report - Outside Class

1. Lab reports should be typed, double-spaced, and one to two pages in length (plus your map and rank-size plot). Put your name, student ID #, group number, "Settlement Lab" and either "H/G" or "Complex" in the top right corner of the first page.

2. Describe the settlement **patterns** your group discovered. Describe how you think each system operated. Make sure you indicate on your map which are which, and include the map with your lab report. Describe each settlement **system**. What pattern and variability is there **within** the two different systems and **between** the two systems with respect to their distribution in different topographic/ecological zones? What clues in the site descriptions did your group use to select sites for the two systems? Were there any disagreements? Discuss the relationships among the different sites in the settlement patterns. (This should be a formal presentation of the discussion you had in your group for step 4 above. You may collaborate outside class on this as long as each person does his or her own writing.)

3. Make a rank-size plot for the complex society system. Make a graph of the expected and observed rank-size results from the settlement system (you can make a graph in Excel or Supercalc or do it by hand). Remember to graph the log of the site ranks and sizes. Put the log of the ranks on the X-axis, and the log of the sizes on the Y-axis. The graph should look something like the one below. Hypothesize about why the graph turned out the way it did. Use the rank-size rule **[size (n) = size (1) / rank (n)]** to get the expected sizes for each site.

Table 1. Description of Sites Located in Survey.

Square #	Size (m^2)	Finds, Features, Description
1	100	Open air site, deer vertebra and cranium, flint flakes (debitage).
5	1,000	Rectangular stone foundation; broken pottery, horse shoe, pump handle, hoe blade, well.
9	1,750	Overhanging cliff face, spring[1]; deer limb bones and mandibles, hearths, stone and bone tools.
12	4,000	Open air site, spring; grinding stones, nut shells, hearths, deer bones, stone and bone tools, flint flakes.
14	1,500	Open air site with oak and hickory trees; basket fragments, broken shell bracelet.
17	1,000	Rock shelter facing south, spring; hearth, deer limb bones and mandibles, stone and bone tools.
21	5,000	Several stone foundations, domestic pottery, plow parts, forge.
30	3,600	Open air site, spring; hearths, grinding stones, nut shells, deer bones, stone and bone tools, shell jewelry, flint flakes.
35	30,000	Large grain storage and milling (these must be windmills, since there's no water power), pottery kilns, many stone foundations, iron smelting, sherds, large public areas, administrative facilities, cut stone monumental architecture.
37	2,000	Rectangular stone foundation; broken pottery, plowshare, hoe blade, well.
42	17,000	Numerous stone foundations, abundant potsherds, heaps of shellfish, open air market, centralized storage facilities, shellfish processing facilities.
49	8,000	Many stone foundations, wells, and cisterns; numerous potsherds, central market and administrative facilities, nearby grain storage, wagon wheels, iron implements.
55	20,000	Many stone circular foundations with hearths, fish remains, shell midden, bird remains, baskets, seeds, turtle shell rattles, fish weir, stone and bone tools, bone fish hooks, shell jewelry and debris, flint flakes.
59	2,000	Rectangular foundations of three buildings, potsherds, metal fish hooks, shell heaps.
61	250	Open air site, deer vertebra and cranium, flint flakes.
63	100,000	Many stone foundations, some quite large, abundant pottery, kilns, grain storage and distribution, platform mound of large, rectangular cut stones, iron foundry.

Table 1. Description of Sites Located in Survey.		
Square #	**Size (m^2)**	**Finds, Features, Description**
75/6	10,000	Numerous stone foundations, wells, and cisterns; numerous potsherds, open area in center of site, administrative facilities, nearby grain storage, iron tools, plow parts.
80	22,000	Many stone foundations, domestic pottery, iron ingots, smelter and forges, slag heaps, some grain storage, administrative facilities, public architecture.
82	3,000	Several stone foundations, domestic pottery, plow parts, wells, small silos.
89	4,750	Open air site, spring; grinding stones, nut shells, hearths, deer bones, stone and bone tools, flint flakes.
90	100	Open air site, deer vertebra and cranium, flint flakes.
97	50	Open air site, broken projectile point, flint flakes.
98	13,000	Stone quarry, with chisel marks on sides, numerous large blocks partially cut, foundations, iron tools (broken), domestic pottery, spring.
99	1,800	Stone quarry, large, irregular chunks and flakes of rock, evidence of burning near the rock face, hearths, deer bones, unfinished stone tools.
[1]In the descriptions, "spring" refers to a water source, not a season.		

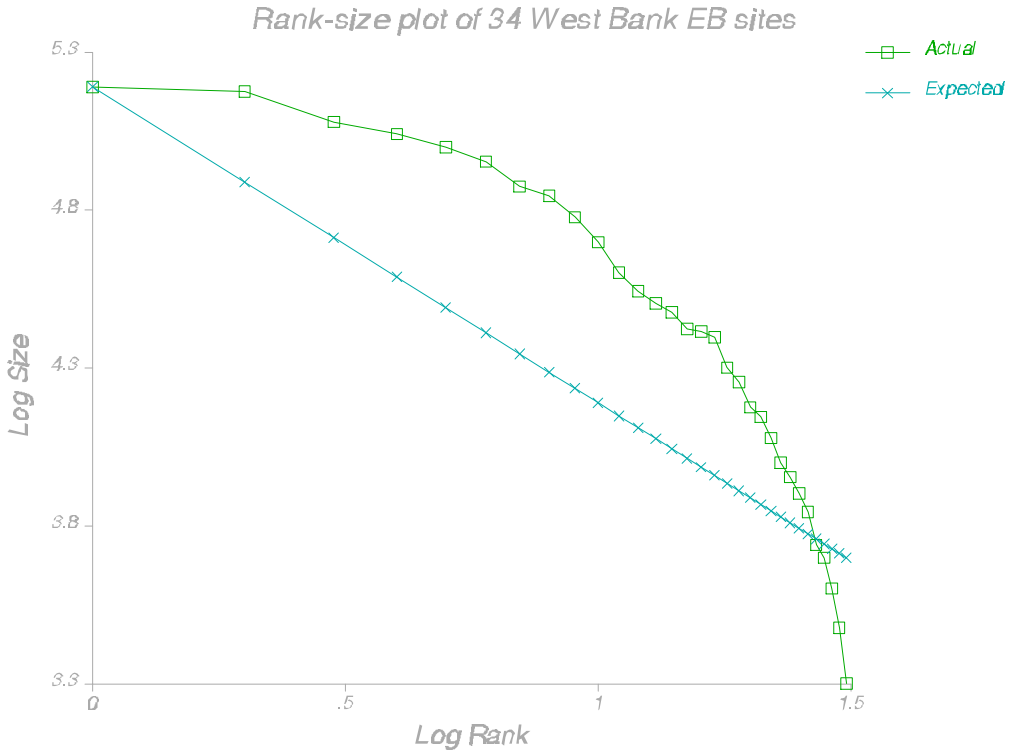
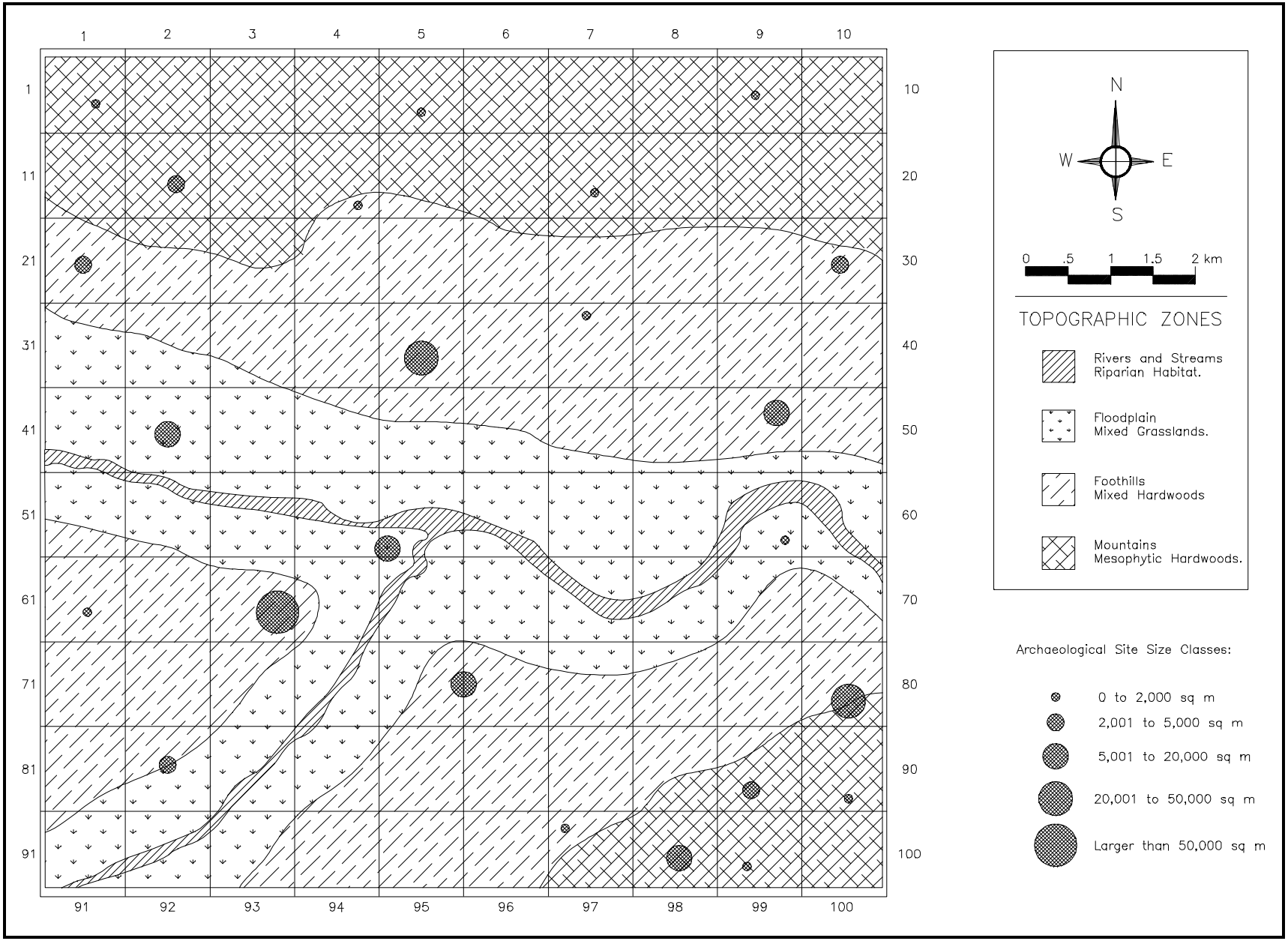


Figure 8. This is an example of a rank-size plot produced with SuperCalc. The X-axis shows the log(Rank) and the Y-axis shows the log(Size). The observed sites show a convex pattern.


1 2 3 4 5 6 7 8 9 10
1 11 21 31 41 51 61 71 81 91
10 20 30 40 50 60 70 80 90 100
91 92 93 94 95 96 97 98 99 100
N
W
E
S
0 .5 1 1.5 2 km
TOPOGRAPHIC ZONES
Rivers and Streams
Riparian Habitat.
Floodplain
Mixed Grasslands.
Foothills
Mixed Hardwoods
Mountains
Mesophytic Hardwoods.
Archaeological Site Size Classes:
0 to 2,000 sq m
2,001 to 5,000 sq m
5,001 to 20,000 sq m
20,001 to 50,000 sq m
Larger than 50,000 sq m

Exercise #6: Classification/Typology

Introduction

As part of our discussion of the analysis of form, we use this lab exercise to have the students create an artifact typology out of common hardware and office items. Our lecture material focused on the characteristics of typologies in general and introduced both taxonomic and paradigmatic typologies. The students were asked to read Fagan (1994:chp. 11) and Wobst (1977) so that we could discuss ideas about the function of style in material culture. We emphasized the relativity of classification systems and that to evaluate a classification one must know the research problem.

Purpose:

- To devise at least two classifications of the same artifacts and derive types from this classification.
- To apply each classification to an appropriate research problem.

Materials:

1. assorted hardware
2. one paper bag for each group

Setup:

We found affordable small hardware at our local K-Mart store and selected an assortment of nails, thumbtacks, upholstery tacks, carpet tacks, refrigerator magnets, picture hangers and cup hooks. We wanted the students to wrestle with five different variables: shape, size, function, material and color. In order to make this lab a challenge, we deliberately selected items that cross-cut these variables so that many different classifications could be made using the same artifacts. The hardware was divided into smaller bags, one for each groups of six students.

Procedure:

The students were divided into groups of six and each group was given a bag of mixed hardware and the lab assignment sheets. The assignment required the students to create two different taxonomic classifications using all of the pieces of hardware. Each group noted the variable states they observed and decided how to order these variables in relative importance for their two classifications. The artifacts were sorted and each group drew a tree diagram to represent the classification. We asked them to indicate the "types" in their classification by drawing an asterisk and noting the number of

pieces next to the type label. Finally, the students framed research questions which could be addressed using their classifications.

Results and Comments:

This lab assignment proved to be the most difficult of the seven. None of the groups was able to complete two whole classifications and we had to extend the exercise into the subsequent class period. Students were surprisingly quarrelsome over what was the "correct" or "natural" typology. This was due to a failure to understand that there is no single best classification scheme but that a good scheme is one which produces types that help address specific research problems. Despite our emphasis on this in the preparatory lecture, we were apparently not clear enough and we need to think of a new way to make the point. Perhaps it would be worthwhile to provide several sample schemes and corresponding research questions so the students could study this method before actually attempting the exercise.

After condicting this lab with several different groups of students, we decided to re-write it, including several potential research questions as samples. The students were then asked to develop their own research questions first, based on some aspect of human behavior, rather than questions related directly to the hardware collection. Once this was done, the students constructed their typologies with the questions in mind. In the past, because they were writing the questions *after* they worked out the classification, most of the groups framed rather superficial questions that related to the artifacts themselves rather than to the behavior that might be revealed by the artifacts. For example, "What are the different colors?" was not a valid "research question," but we saw it several times!

Antother difficulty with this lab is the choice of hardware we created. We found it difficult to frame meaningful questions about the behavioral domain which could be addressed with these artifacts. It seems that a group of potsherds would be considerably more effective. The students could more easily frame good questions, and there would probably be somewhat less ambiguity in the typologies themselves. It might be valuable to break this lab into two, using the hardware to create one typology (which will drive home the point that the typology is to be judged in terms of how well it answers the research question); then, a second typology could be created using potsherds and better research questions.

Finally, students were determined to use all five variables as points of division in their classification trees. They did not see the value of using only one or two variables, that is, in making a simple three-type classification, such as that for ceramics, based on temper (see tree below on

assignment sheet). We had suggested this possibility on the assignment sheet, but students were either too rushed to read carefully or did not fully understand how the tree was to be used.

As we suspected, the more one knows about hardware and the commercial names for the pieces, the more difficult it is to see alternate classification schemes.

Anthro 156-103 -- Digging Up the Past: Approaches to Archaeology
In-class Exercise #6: Classification/Typology

Objective: Classification is the method we use to group things into meaningful units, or classes, ultimately deriving "types" we can use for comparative purposes. The types we create are not right or wrong in an absolute sense but are appropriate or inappropriate for specific research questions. In this lab you are to develop questions related to human behavior which can be answered by classifying a set of artifacts. Then, you will develop artifact classification schemes and draw taxonomic "trees."

Procedure: Each group of six students receives a bag of nails, tacks, magnets, and other small pieces of hardware. Dump them out onto the table. Note the different variable states of size, color, function, shape, material and others.

Task: Your task as a group is to devise at least two questions related to human behavior that can be addressed by making different classifications of the artifacts. Then, sort the pieces into groups that resemble a classification tree (see next page for an example). **You must include all the pieces in both your classifications.** Consider two important things during this process: 1. the relative importance of the different variables, and 2. at what point in the division you want to create a type. See the "Guidelines" on the next page for a discussion of these points.

Sample Research Questions: Research questions often seek to characterize variability in human behavior, and may be phrased as "What is the range of activities at this site?" or "How many different kinds of tools can be used for the same task?" How does the society that made these artifacts use form, decoration, and function? How important is decorative variation to the people who use these artifacts? For the first two questions, a typology which uses function as its primary division would be most appropriate. For the second question, a typology which uses artifact shape as its primary division might be better. For the third, a division based more directly on color might be appropriate.

Dimensions of Variability: Each taxonomic tree which you create must use at least three different dimensions of variability. The available dimensions include size, shape, material, color, and function. Remember, the first dimension you use is considered the most important, followed by the second, then the third. If your particular research question requires more than three dimensions, go ahead and use as many others as you require.

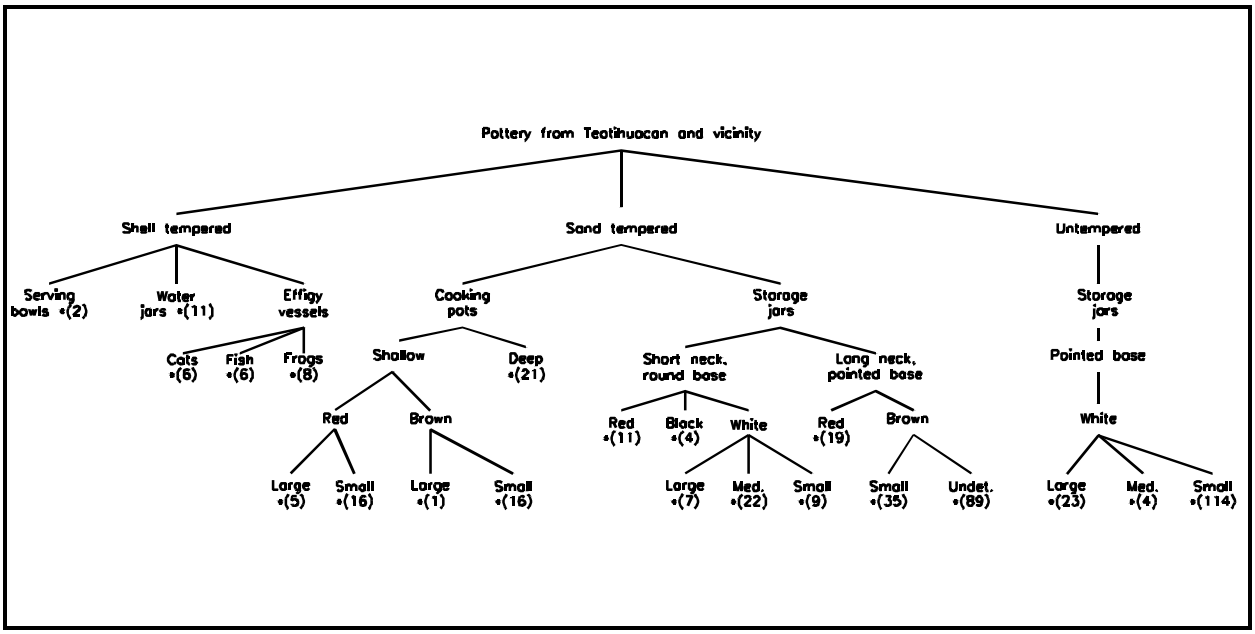
Written Report:

1. Draw a "tree" for both classification schemes, using the example on the next page as a guide. You may do this by hand or with a drawing program. For *each group at each level*, write the attribute used to differentiate that group (e.g. "long neck" or "red"). Place an asterisk next to each *type* and enclose the count of those items in parentheses. This will help us see what you consider the types to be.

2. On 1-2 typed, double-spaced pages:

   A. Include your name, I.D. #, and Group Number
   B. Write your groups' research question for each classification.
   C. For each classification, explain as thoroughly as possible why the classification you devised is the most appropriate to address your research question.

D. Include the taxonomic tree you created for each research question. Remember to indicate which dimension is considered at each level of the tree, and indicate the artifact types you created by placing an asterisk beside them. Include the total number of each type.



Guidelines for constructing a taxonomic classification:

A. The types in the tree shown above are the ends of the branches. Thus, the type on the far left is "Shell-tempered serving bowls", while that on the far right is "Untempered, small, white, pointed base storage jars".

B. If the artifacts in a group do not vary beyond a certain level, you don't need to carry the branch any further. If the artifacts do not vary at one level, but do at the next, you should draw a straight line down through the one level to the next, as the "Untempered" branch of the tree shows. The "Shell-tempered serving bowls" all have the same shape, color, and size, so these attributes are not important to their classification. The "Untempered" types all have the same function (storage jars), bases (pointed), and color (white), but they come in three different sizes.

C. The order of the variables, shown on the left side of the diagram, depends on how important you think each is to your classification. The variable at the top is the most important, i.e., the basic division, and the one at the bottom is the least important. Please note that the variables in your classification only have to reflect the variability you think is important to your research question. Thus, you may wish to stop sub-dividing at some level. For example, if you were exploring how different tempering agents affect the utility of vessels, you might want to develop types that only differentiate between material and function. If this were the case, the diagram shown above would stop at the second, or "function", level.

D. The asterisk indicates a type and the number in parentheses indicates the number of specimens of that type.

Exercise #7: Ceramic Analysis

Introduction

The ceramics analysis lab is designed to give students experience handling and analyzing ceramic sherds. We assigned the first chapter in Rice (1987:3-26), and Fagan (1994:chp. 12) and discussed different aspects of ceramic design in class including manufacturing technique, clay, tempering agents, shape and decoration. Most of this was done with an emphasis on historic ceramics with a range of firing temperatures. We introduced the use of a rim diameter chart to estimate vessel size and MNI and how to visualize the shape of the vessel from a rim sherd profile. We discussed some aspects of ceramic production and use, but our emphasis was on the materials themselves.

Purpose:

- To give practical experience studying everyday objects of pottery using analytic techniques.
- To exercise powers of imagination in reconstructing vessel form and use.

Materials:

1. 40 - 50 pottery and ceramic vessels of assorted types
2. one paper bag for each group
3. one rim diameter chart for each group
4. data forms, of three types, for each student (see below)
5. fine point permanent pens

Setup:

From a local thrift store we selected a large box of assorted dishes, mugs, flower pots and unidentified craft items. We looked for different shapes, clays, decoration and manufacturing techniques. A nice assortment cost about $4.50. The vessels were broken and the sherds were distributed fairly evenly into fifteen paper bags. Each bag had about thirty sherds. The bags were labeled 1 - 15.

We made up three different data entry forms and a rim diameter chart. The rim diameter chart included radius lines at 18 degree intervals so the students could estimate rim percentages to within 5% for calculating Minimum Number of Individuals (vessels). The data forms were designed to record data on 1) vessel form and shape, 2) materials, paste and forming methods and 3) decoration.

Procedure:

We divided the class into groups of six and gave each group one bag of sherds, one marker and two each of the three forms. Each group dumped their sherds out on a table (or the floor) and numbered them with their bag number, a dash, and a number for the sherd (e.g. 3-1, 3-2 etc.). The sherds are numbered so the students can keep track of all the properties for a single sherd across the three different forms. Each group of six students then paired off with each pair taking one of the forms. Two students studied form and shape, two studied materials and forming techniques, and two studied decoration. All observations about each sherd were written on the appropriate line on their form. When all three sub-groups had looked at all the sherds, they had a spreadsheet with 18 columns and 30 rows. The field for inferred vessel use is found on each form because we thought it would be interesting to see how the students inferred vessel use based on the different variables they were assigned. The group rejoined and discussed the observed pattern and variability in their collection. We asked the students to interpret the use and probable location of different vessels within a house.

Results and Comments:

The exercise required more time than we had planned, so we devoted the next class period to finishing up, and many students commented that this was the most fun of all the six exercises. The students were enthusiastic to handle the sherds and to wrestle with what to call particular decorative styles, how to characterize porosity, how to distinguish between Ironstone, stoneware and terra cotta, and between wide shallow bowls and deep plates. Most of the time, they correctly figured out what they were looking at, but some odd shapes had been thrown in and these caused some confusion. This was satisfying as it resembled a real archaeological analysis!

In retrospect, the MNI field on the form/shape chart was of little use, but mostly because of the sherds themselves. We did not buy a lot of any one pattern and shape of vessel, so the MNI was almost always 1. If more sherds or a smaller variety of sherds had been used, the MNI designation could have been a more meaningful field. We would also ask the students to elaborate on the social context of food preparation and consumption on the site based on the ceramic data they collected. Some of the lab reports came quite close to doing this and we feel that if the students had been encouraged more in this direction they would have produced creative and interesting responses.

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In-Class Lab #7: Ceramic Analysis

Objective: As we have seen, archaeologists rely heavily on ceramic artifacts to infer such things as site chronology, the nature and length of site occupation and the nature of economic production and exchange in a society. Before any of these issues can be addressed, however, archaeologists spend a great deal of time describing and analyzing the ceramics they find. This lab will introduce you to some of the commonly used analytical methods.

Procedure - In class:

A. Each group of six students receives a bag of sherds, a black marker, one rim diameter chart and two copies each of three different data forms. Copy the bag number in your notebook.

B. Dump the sherds on the table. Divide the sherds into three roughly equal-sized piles. Some of the glazes have sharp edges, so **BE CAREFUL NOT TO CUT YOUR FINGERS!**

C. Divide your group into three groups of two people each. Give one pile of sherds and both copies of one of the data forms to each group. Two people will study form/shape, two will study materials/forming methods and two will study decoration. The specific instructions are listed below for each set of attributes under study. For each sherd, answer the questions below that are asked of your set of variables, recording your responses on the data forms. Match the sherd number with the row number on the form so that all the attributes of any sherd can be found.

Form/Shape

a. What part of the vessel does the sherd represent: rim, body, base, handle, spout?
b. For all rim sherds, estimate rim diameter using the rim chart.
c. For sherds you think come from the same kind of vessel, estimate the minimum number of vessels using the radius lines on the rim chart.
d. What is the overall vessel shape? Use descriptive terms: flat, globular, cylindrical, etc.
e. Infer the vessel's use.

Materials/Forming Techniques

a. Color of the paste.
b. Apparent porosity/degree of glass formation **DO NOT CUT YOUR TONGUE!**
c. Coarseness of particles (coarse, medium, or fine)
d. Ware type
e. Forming methods (coiled, thrown, slip cast)
f. Wall thickness
g. Infer the vessel's use.

Decoration

a. Underglaze, overglaze, or no glaze?
b. Decorated or not?
c. Colors used in decoration.
d. Method of applying decoration (dipped, painted, transfer print, etc.)
e. Style of decoration (naturalistic, abstract, geometric, etc.)
f. Infer the vessel's use

D. When all three groups have finished with their first pile, exchange the piles and describe the next pile. Do the same for the third pile. Everyone in the group should examine each sherd in the bag, but you only need to record data for one set of questions.

E. When you finish with your part of the analysis, spend ten minutes with all six people discussing the questions listed below. Write these up for your lab report and include your data chart.

Written Report:

A. Hand in a clean copy of your chart.

B. On a 1-2 typed, double-spaced pages, discuss the following:

1. Briefly characterize the patterns and variability you observed. For example, does there seem to be more variability in materials, form, or decoration? Are there certain attribute states that co-occur with others (i.e. patterns), such as a particular vessel shape with a particular decoration?

2. Based on your impressions of how these vessels were used, make some general statements about where certain types may have been found at the site. For example, are certain types more likely to be found in a storage room, kitchen, barn, or dining room?

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Ceramics Analysis Laboratory
Form/Shape Analysis Sheet

Sherd #	Vessel Part	Rim Diam.	M.N.I. (Rims)	Overall vessel shape (describe each)	Inferred Vessel Use
1					
2					
3					
4					
5					
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11					
12					
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14					
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30					

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Ceramics Analysis Laboratory
Paste / Forming Methods Sheet

Sherd #	Paste Color	Porosity	Particle Size	Forming Methods	Ware Type	Wall Thickness	Inferred Vessel Use
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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26							
27							
28							
29							
30							

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Ceramics Analysis Laboratory
Decoration Sheet

Sherd #	Glaze (O,U,N)	Decorated (Y,N)	Colors, # Colors	Application Method	Decoration Description	Inferred Vessel Use
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
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1978 Death's Head, Cherub, Urn and Willow. In *Historical Archaeology: A Guide to Substantive and Theoretical Contributions*, edited by Robert L. Schuyler, pp. 83-90. Baywood Publishing, Farmingdale, New York.

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1976 Research Strategy and Formative Mesoamerica. In *The Early Mesoamerican Village*, edited by Kent V. Flannery, pp. 1-12. Academic Press, New York.

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1962 *A Quantitative Method for Deriving Cultural Chronology*. Pan American Union, Technical Manual 1. Organization of American States, New York.

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1989 *Archaeology*, Second edition. Holt, Rinehart, Winston, New York.

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Digging Up the Past: Approaches to Archaeology (Anthro 156-103)
Spring Semester 1995
M - W, Enderis Hall Room 189
Class Syllabus

Instructor: Stephen Savage
Office: Bolton Hall, Room 237
Office Hours: M, W 10:30 - 11:15 AM or by appointment
Office Phone: 229-4335

Textbook (required):

Fagan, Brian M.
1989 *In the Beginning: An Introduction to Archaeology*, Eighth edition. Harper Collins: New York.

Price, Doug and Gitte Gebauer
1990 *Adventures in Fugawiland: A Computer Simulation in Archaeology*. Mayfield, Mountain View, California.

Additional Articles are required from time to time, and are available on reserve in the Meir Library. A bibliography of these readings is provided here so you can look up the originals if you need to.

Course Goals and Scope:

This course will introduce you to the methods, techniques, and theoretical approaches used in modern American archaeology. The course will be taught "from the ground up", in the sense that no previous experience with archaeology, or previous anthropology course work, is assumed. The course will be taught through lecture, laboratory sessions, and slide presentations. Archaeological research is organized around three principle dimensions, space, time, and form. After a brief introduction to the history of archaeology as a discipline, we will begin a series of lectures and laboratory sessions designed to familiarize you with how archaeologists manipulate these three dimensions in order to find out about the past. In addition to the two lectures per week, you must register for one of the three discussion sessions listed in the syllabus. The laboratory projects, reviews, and tests will be done in the discussion sessions.

Grading:

There will be two tests–each will comprise about 20 percent of your class grade. In addition, seven small-group laboratory projects will be conducted during the discussion sessions. Each has different kinds of archaeological materials and problems. Each lab will be preceded by a lecture that will provide you with the information you need to do the tasks assigned in the labs, and will be followed by a discussion of your results. You will be responsible for keeping lab notes, in which you will need to record information about how your group performed each lab task assigned, and the answers to any questions asked on the lab assignment sheets. Twice during the semester you will have to write up your lab notes into brief reports (**2-4 TYPED, DOUBLE SPACED PAGES PER LAB**

ASSIGNMENT. Attendance at the lab sessions is mandatory, since they involve group discussion and analysis. The report from the *Adventures in Fugawiland* simulation counts as the final lab report. Each set of lab writeups will count as 25% of your semester grade. The final 10 percent of your grade will be determined by your attendance and participation in class and in the discussion/lab sessions. Archaeology is a team effort.

Anthro 156-103, Digging Up the Past: Approaches to Archaeology SCHEDULE OF DISCUSSION TOPICS AND READING ASSIGNMENTS		
Date	**Topic for Discussion**	**Assignment**
Jan 18	Course Introduction. Introduction to the goals, dimensions, and unit concepts of archaeology.	
Jan 23	A brief history of Americanist archaeology.	Fagan, Chapter 1:pages 1-23; Chapter 2
Jan 25	The relationship of archaeology to science; the scientific method as it relates to archaeology.	Fagan, Chapter 3:pages 52-53; South 1977:31-46
Jan 30	The goals of archaeology: Discover culture histories, Reconstruct past lifeways, Explain cultural processes. The dimensions of archaeology: Time, Space, Form.	Fagan, Chapter 1:pages 24-28 Spaulding 1960
Feb 1	Archaeology as anthropology. What is culture? Cultural Evolution and Cultural Materialism.	Fagan, Chapter 4:pages 61-67
Feb 3	How do archaeologists find out about the past, or, what is the relationship between archaeology and human behavior?	Fagan, Chapter 3:pages 54-60, Fagan, Chapter 14
Feb 6	The nature of the archaeological record–artifacts, features, sites, regions, and the relationships between them–archaeological data.	Fagan, Chapter 4:pages 68-80; Willey and Phillips 1958:pages 11-43
Feb 8	Site formation processes. The systemic versus the archaeological context, types of deposits and the behavior that creates them.	Fagan, Chapter 7 Schiffer 1977:pages 13-35
Feb 13	Archaeological sampling and survey. **Lab #1–Sampling Strategies and Archaeological Survey–in Discussion Session.**	Fagan, Chapter 9 Ragir 1967
Feb 15	Techniques of archaeological excavation.	Fagan, Chapter 10:pages 190-203; Redman 1973
Feb 20	Controlling provenience on archaeological excavations. **Lab #2–Designing a field strategy–in Discussion Session**.	Fagan, Chapter 10:pages 204-222
Feb 22	Time, the first dimension of archaeology. Absolute dating techniques–Dendrochronology, obsidian hydration,	Fagan, Chapter 6:pages 118-122
Feb 27	Relative chronological controls–the concept of seriation. **Lab #3–Seriation–in Discussion Session**.	Fagan, Chapter 5 Deetz and Dethlefson 1978
Mar 1	^{14}Carbon, Ka-Ar, Archaeomagnetic, and Thermoluminescence dating.	Fagan, Chapter 6:pages 106-117 and 122-128.
Mar 6	Relative chronological control–Reading horizontal and vertical stratigraphy. **Lab #4–Stratigraphy–in Discussion Session**.	Harris 1975, 1979; Rowe 1961
Mar 8	The second archaeological dimension–Space. Scope and Scale in spatial analysis.	Fagan, Chapter 15 Flannery 1976:1-12
Mar 20	Intra-site spatial analysis. **First four lab write-ups due in Discussion Session this week!**	Flannery 1976:49-89
Mar 22	Settlement patterns and settlement systems.	Trigger 1968; Clark 1979
Mar 27	Rank-size analysis. **Lab #5–Settlement pattern analysis–in Discussion Session**.	Falconer and Savage 1995

Anthro 156-103, Digging Up the Past: Approaches to Archaeology SCHEDULE OF DISCUSSION TOPICS AND READING ASSIGNMENTS		
Date	**Topic for Discussion**	**Assignment**
Mar 29	The third archaeological dimension–form. Archaeological materials analysis–bone.	Fagan, Chapter 12:pages 274-276; Chapter 13:pages 283-300 Rathbun 1988
Apr 3	Archaeological classification. **Lab #6–Making an archaeological typology–in Discussion Session**.	Fagan, Chapter 11 Wobst 1977
Apr 5	Archaeological materials analysis–Ceramics.	Fagan, Chapter 12:pages 259-266; Rice 1987:3-26
Apr 10	Historical Archaeology–The Carolina Artifact Pattern. **Lab #7–Ceramic analysis–in Discussion Session**.	South 1977:83-138
Apr 12	Archaeological materials analysis–Lithics.	Fagan, Chapter 12:pages 245-259 Crabtree 1972:1-17
Apr 17	Introduction to Fugawiland Project. **Last three lab writeups due in Discussion Session this week!**	Price and Gebauer, Chapters 1-5
Apr 19	Reconstructing trade networks–Underwater Archaeology (Film)	Fagan, Chapter 16:pages 380-389 Renfrew 1975
Apr 24	Mortuary Analysis–A case study from Predynastic Egypt.	Chapman and Randsborg 1981:1-25
Apr 26	Historical archaeology in cemeteries.	McGuire 1988:435-480
May 1	Plantation Archaeology–Film: "The Strength of these Arms."	Ferguson 1991
May 3	Cultural Resource Management and Environmental Law. **Fugawiland writeup due in Discussion Session this week!**	Fagan, Chapter 19

Bibliography of Additional Readings

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