- Binford’s pyramid
  - technological, social and ideological systems
- The archaeological record
  - minimal units
    - artifacts
    - features
    - burials
    - ecofacts
  - composite units
    - sites
    - regions
- Units not rigid categories
- Scale of the record
- Data universe
- Sample units
  - non-arbitrary
  - arbitrary
- Population
- Non-probabilistic sampling
- Probabilistic sampling
  - sample frame
  - sample size/fraction
  - 100% sampling
  - simple random sampling
  - systematic sampling
  - stratified sampling
- The “archaeological record”
  - What constitutes the archaeological record?
  - What are the minimal “bits” of data archaeologists use?
  - How do archaeologists organized and manipulate those minimal bits into larger data sets with which to understand past human behavior?

- Early broad critique of archaeology as NOT anthropology…
  - “No one ever excavated a kinship system”
- True:
  - archaeologists are forced to work with the physical remains of past behavior
- False:
  - archaeologists cannot study past kinship systems
levels are connected and mutually influencing; non-material aspects of past can be reflected in material remains

decreasing material visibility

Lewis R. Binford

■ Binford’s fundamental realizations…
■ archaeological record is incomplete!!!!
  ■ there is a material record of our lecture today, but not all aspects of it have been preserved

■ cracked and broken mirror with missing pieces
  ■ how to determine what pieces are missing?
  ■ how to determine how the cracks distort the picture?
  ■ how to determine what’s in the reflection?

■ two issues…
  ■ sampling (discuss today)
  ■ site formation processes (discuss next class)

■ What constitutes the archaeological record?
■ Six principal components of the archaeological record

<table>
<thead>
<tr>
<th>Minimal</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artifact</td>
<td>Site</td>
</tr>
<tr>
<td>Feature</td>
<td>Region</td>
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<tr>
<td>Burial</td>
<td></td>
</tr>
<tr>
<td>Ecofact</td>
<td></td>
</tr>
</tbody>
</table>
- Artifact = portable object whose form is modified in whole, or in part by human activity
  ![Artifact images](image1.jpg)

- Feature = non-portable object modified in whole or in part by human activity; cannot be removed without being altered or destroyed
  ![Feature images](image2.jpg)

- Burial = special category of feature containing human (or animal remains) and sometimes associated artifacts
  - closest thing to a “time capsule” there is…
    ![Burial images](image3.jpg)

- Ecofacts = (a)biotic remains relevant to explaining human activity
  - may or may not be modified by human activity
  - floral ecofacts = seeds, pollen
  - faunal ecofacts = animal bones
  - soils and sediments (e.g., anthrosol)
    ![Ecofacts images](image4.jpg)

Buckland Anglo-Saxon cemetery, Dover, Kent
AD 475-750
Sites = Spatial clusters of artifacts, features and/or ecofacts (in all combinations)
- often classified by function
  - habitation; cemeteries; kill sites; ports; trading centers; quarry, workshop or resource extraction site
- defining site boundaries a major issue

Region = a spatially-temporally bounded area containing two or more archaeological sites
- geographic = well-defined geographic features
- ecological = well-defined ecological community characteristics
- cultural region = well-defined cultural features

Components of the archaeological record are not “rigid” units
- mostly about definition…
- artifacts, features, burials, ecofacts may be composite
  - artifacts may be made up of different materials
  - features may include artifacts and debris from different sources
  - burials may contain many different artifacts
  - skeletal remains are composed of many different bones and faunal assemblages of bones from many different animals or species
- sites and regions may be quite simple
  - a site may consist of a scatter of only one type of artifact…
  - a region may contain only one type of site…

today’s first deep theoretical statement
choice of unit has to be appropriate to question!!!

Gathering Archaeological Data
- Data Universe = ALL of the potential archaeological data contained within a bounded area of study
  - includes both KNOWN and UNKOWN data
  - usually bounded in SPACE and TIME
  - minimum data universe is usually a site (but could be a feature or artifact too…)
    - investigation includes all of the known and unknown data found within the boundaries of a site

Note: Archaeologists usually describe their “specialty” according to their data universe
Gathering Archaeological Data

- Sample Unit
  - a subdivision of the data universe
  - an actual unit of investigation
  - time and money available!

Sites investigated along roads in Tibet

Areas of investigation (shaded gray) determined by walls of the rooms in the pueblo

Qinghai Lake Basin, Tibet

- non-arbitrary sample unit defined by the boundaries of the basin

Excavation of a mammoth fossil using 2x2 m arbitrary units

Why are the units arbitrary?
Gathering Archaeological Data

- Population
  - the combined set of all sampled units
  - includes only known archaeological data
  - but used to make inferences about known AND unknown data in the data universe

Are sample units representative of the data universe?

Only 42 of 92 rooms investigated.

Can we use data from the 42 rooms, to infer what was going on in the other 50 rooms?

How do we “know” that our data from the 42 rooms accurately represent what is happening in all rooms?

Making sure that archaeological data are representative

- Total Data Gathering (100% sample)
  - clearly represented if you go out and gather it all…
  - Aside from time and money, why might we not want to gather 100% of the data?

Non-Probabilistic (e.g., Systematic Sampling)

- Using a non-random criterion to determine which units are investigated (e.g., equal spacing of samples)

Probabilistic (e.g., Simple Random Sampling)

- Using randomization procedures to determine which units are investigated; removes bias in sample
- Simple Random = each unit has equal \( p \) of being selected

Stratified Sampling

- combination of Systematic and Random Sampling
Sampling in action…
- What is the ratio of women to men in this class?

Systematic sampling in action
- what problems might arise with systematic sampling?
- human behavior too regular?

Simple random sampling in action
- what problems might arise with random sampling?
- data universe too large? need to account for known variation?

Stratified sampling in action
- combines the best of both systematic and random sampling

What does the best job?
- depends on what your question is…

results of simple random sampling
- True M:F ratio on day sampling was done (100% sample)
  - 17M:46F or .3696
  - there are approximately 3 females for every 1 male
- M:F ratio determined by simple random sample of thirty sampled units (numbers)
  - 6M:17F or .352941
  - the sample shows approximately 3 females for every one male

Readings for Week 2
- TODAY:
  - A&S Chapter 4

- Thursday:
  - Continue A&S Chapter 4; Waters on Website