

Introduction to Archaeology: Notes 6
Stratigraphy and site formation
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- The most basic question about an archaeological site
 - why is this stuff here, and arranged the way it is?
 - why is it buried, or not buried?
 - if you visit a village where people are living, you can watch them build houses, cook food, sweep the floor, throw out the trash, etc.
 - you can see how things get where they are, and why
 - but archaeologists can't simply observe how their sites were formed
 - yet we have to have an idea of how a site was formed before we can interpret what happened there
 - is the site a place where people lived, with all the artifacts right where they left them?
 - or is it a bunch of stuff that accumulated at the foot of a hill, eroded down from the vanished village site at the top?
 - say we find a burial next to the wall of a house
 - could the burial be of someone who lived in the house?
 - or was the burial already old and forgotten when the house happened to be built near it?
 - or was the house long abandoned and covered over when someone happened to dig a grave near it?
 - if we are wrong about how the stuff got into its current arrangement, we could make serious errors about the past events we are trying to reconstruct
- **Site formation**
 - the human behavior and natural processes that created an archaeological site
 - **deposition**: by water, wind, people dumping garbage, etc.
 - **erosion**: by water, wind, people digging or leveling, etc.
 - **disturbance**: by rodents, roots, people digging, etc.
- Kinds of deposits
 - **alluvial**: deposited by water
 - **eolian**: deposited by wind
 - **colluvial**: deposited by gravity, moving material downhill without significantly being carried by water
- **Strata** (singular: **stratum**)
 - layers of rock, soil, archaeological deposits.
- **Stratigraphy**
 - study of strata and their relationships
 - the arrangement of strata in a site
 - “the stratigraphy at the Ring Site was complex”
 - “draw a profile showing the stratigraphy”
- **Steno's law**, also called the **Law of superposition**
 - In a sequence of undisturbed layers of rock or sediment,

- under normal circumstances,
- each layer was deposited before the ones above,
- and after the ones below.
- MANY things can disturb this simple layer-cake model
- A particularly misleading kind of disturbance:
 - **reverse stratigraphy**
 - people scrape or dig up a layercake of strata from one place and pile it in another
 - the top of the original layers is collected first, so it forms the bottom of the new pile
 - the bottom of the original set of layers ends up at the top of the new pile
- strata are often hard to see
 - they may take a lot of skill to define
 - often really interpretations, not just given as clear evidence
 - example: hearth in profile in early ceramic sector at El Algodonal
 - where is the top of the hearth?
 - is the ashy layer (see it?) above the hearth burned material from it, indicating the ground surface at the time, or just a coincidence of a later layer that happens to contain ash?
 - is there a horizontal line separating strata just below the hearth, or not?
 - if you get it wrong, your results might be nonsense, and you might not even know it
 - the undetected pit in the profile sample from the Ring Site
 - a deep site
 - samples taken from a **profile** (vertical side of an excavated area)
 - assumed to represent a series of horizontal layers
 - elaborate analysis done
 - on a later visit, it became clear that there was a huge pit in the profile
 - it just had not been visible before, due to different lighting conditions, soil humidity, or whatever
 - the samples were all from the fill of this pit, not a sequence of layers from different moments in time
 - the analysis had to be thrown out – but at least they discovered this before publishing the meaningless results!
- Artifacts in a given stratum must have been deposited along with the soil of that stratum
 - so if we keep the artifacts from each stratum together, and separate from other strata, we should have batches of artifacts that were used in a series of periods of time
 - by looking carefully at the shape of strata, we can tell which strata came before or after others, and before or after features like walls, floors, etc.
 - so we can associate the artifacts with the architecture
- notice that sometimes we can't see all the lines that must divide the strata
 - in the Pecos Pueblo example, the tops of the burial pit fills are not shown
 - this could make a big difference in the order of the burials, and their relationship to the other strata
 - but sometimes we may simply not be able to tell

- better to be honest about that than to make a poorly founded decision and then base conclusions on something that might be wrong...
- in excavation, we generally try to take the strata out in the reverse order than they were laid down
 - otherwise, they may run under others that have not been removed yet, becoming impossible to dig
 - so simply digging successfully requires figuring out the stratigraphy as you go – a constant 3D puzzle to be working on
- **natural levels, or stratigraphic levels**
 - are units of excavated soil that correspond to strata of soil
 - most modern excavations proceed by stratigraphic levels
 - versus **arbitrary levels**
 - which are simply horizontal slices of the site at intervals, such as every 10 cm.
 - unless the strata are pretty horizontal, arbitrary levels will mix artifacts from different strata and time periods
 - the lowest arbitrary levels will usually be generally older than the highest ones
 - but they will be mixed
 - any patterns over time will be blurred by mixing the lower material together, the middle material together, and the upper material together
- why would anyone ever use arbitrary levels?
 - sometimes you just can't see any strata to follow; arbitrary levels are better than no levels at all
 - sometimes you have to dig very fast or very large amounts; again, arbitrary levels are better than nothing if they allow you to get a gross idea of what is going on in the time allotted
 - sometimes we subdivide thick visible strata into narrower slices by arbitrary levels, because we can't see any divisions within it,
 - we may still suspect that the stratum accumulated over a long period of time
 - so the arbitrary subdivisions within it may let us see some change over time from the lower arbitrary levels to the upper ones; this control is better than none
- but most modern archaeologists feel obliged to explain why they use arbitrary levels, if they ever do
- interpreting artifacts in strata
 - must have been made before they were deposited
 - that is, artifacts are no more recent than the stratum
 - but may be older
 - exception to the rule: artifacts may be younger than the stratum if they were introduced into the stratum by disturbance, like falling down a rodent hole
- **terminus post quem:** (TPQ) “time after which” something happened
 - example: a stratum contains a coin dated 1864.
 - Barring disturbance, that stratum must have been deposited in 1864 *or later*.
 - Maybe much later; the coin could have still been in circulation in 1920, when someone happened to drop it, or it could have been a prized antique that someone lost in 2002.

- TPQs are not too hard to find, since deposition must always happen after an artifact is made
- **terminus ante quem:** (TAQ) “time before which” something happened
 - these are much harder to come by
 - because datable artifacts might have hung around for a long time before getting deposited into a stratum
 - so you can’t be sure that something below them is older than the artifact
 - in our previous example, you cannot know that the stratum below the 1864 coin is older than 1864.
 - if the coin was dropped in 1920, the stratum below might have been deposited in 1919, not 1863.
 - **marker beds** are good terminus ante quem
 - like the volcanic ash from an eruption in February 1600 in southern Peru
 - anything under an intact layer of this ash is older than February 1600.
- **Soil horizons**
 - not depositional layers
 - changes that happen to sediments in place when exposed to rain or other water and plant and animal activity
 - **A horizon:** topmost layer, dark, organic-rich humus
 - **B horizon:** lighter color, little organic material, contains more clay, which is moved downward from the A horizon by water
 - **C horizon:** cracked and broken rocky material formed from bedrock by weathering processes
 - **bedrock:** mostly solid
- Site formation processes: cultural ones
 - Formation processes “in the **systemic context**”
 - processes that result from the action of the cultural system in which the artifacts were originally embedded
 - Cultural depositional processes
 - discard
 - loss
 - subsurface storage, caching
 - ritual interment: offerings, burials
 - construction or leveling fill
 - **Reclamation processes**
 - reusing materials like wood posts, cane from walls, etc.
 - **Cultural disturbance**
 - digging garbage holes or latrines, digging for fill, etc.
 - **Reuse processes**
 - artifacts go through stages of reuse
 - a pot is used to cook in
 - it breaks
 - some of the sherds are made into scrapers for hides, others into spindle whorls

- sometimes very old sherds might be reused
 - **curation**: keeping old stuff around after its typical life
 - or fancy sherds from a rich person's garbage might be used as scrapers by a poor person
- Site formation processes: natural ones
 - Formation processes “in the **archaeological context**”
 - processes that result from the action of natural processes on the remains after they have left the cultural system and have become part of the archaeological remains of the society
 - **archaeological context**: a stratum, the fill of a pit, etc.
 - **Floralturbation**
 - plant roots move things from one layer to another
 - blur, mix, or churn layers
 - **Faunalturbation**
 - rodents, lizards, etc. burrow and move artifacts around
 - **Cryoturbation**
 - freeze-thaw cycles push objects up, prevent larger ones from moving back down
 - **Argilliturbation**
 - wet-dry cycles in clay-rich soils do much the same
 - **Graviturbation**
 - stuff slides downhill, gets moved around and mixed up in the process
- all of these mix artifacts from different strata together somewhat
 - blurring our view of sets of artifacts from distinct time periods with each stratum
 - these processes contribute to the notion that “strata are leaky”: artifacts “leak” from one stratum to another
- so in order to avoid making mistaken inferences about the past, we have to
 - recognize when these processes might have occurred, so we don't base conclusions on sets of artifacts created by natural forces, rather than cultural ones
 - recognize cases where they probably did not occur, since those will give us our best data
 - unfortunately, sometimes the only known sites that can answer certain questions do suffer from these problems
 - so we have to recognize and allow for them
- fortunately, there are many sites where these processes are not a serious problem
 - another good thing about the desert of Peru!