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.
\[ \text{Barring disturbance, that stratum must have been deposited in 1864 or later.} \]
\[ \text{Maybe much later; the coin could have still been in circulation in 1920, when someone happened to drop it, or it could have been a prized antique that someone lost in 2002.} \]
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 antiques
    - 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!