surface/subsurface relationship
- representativeness: disturbance
- subsurface testing (remote sensing)
- non-intrusive v. intrusive

goals of excavation
- provenience & association; primary context
- matrix: x, y, z dimensions
- synchronic & diachronic control
- single v. multi-component sites

stratification
- law of superposition & depositional sequence
- stratum, strata, stratigraphy
- Harris matrix
- correlation & master sequences

representativeness
- surface materials tend to be more disturbed than sub-surface materials
  - more extreme mechanical/physical processes (e.g., water flow)
  - more extreme chemical forces (e.g., temperature variation)
  - more extreme biotic processes at surface (e.g., trampling)

interpretations of behavior from surface materials can be substantially in error...
- spatially, because predepositional processes have moved physical remains from their
- compositionally, because only the most durable materials (e.g., stone tools) survive for long periods of time at the surface

strategies of excavation
- total coverage v. sample
- research problem
- penetrating excavations
  - focus on z-dimension
  - sondage, test pit
- clearing excavations
  - area excavations & baulks
  - test pits to establish stratigraphy
- trenching
  - combination of penetrating & clearing

synchronic & diachronic control
- cultural stratigraphy
  - anthropogenic, natural layer, cultural level, overburden, sterile, arbitrary levels

maintaining control: x, y and z

surface/sub-surface relationship
- what leads archaeological materials to be visible at the surface?
  - they were never buried
  - they were buried, but have been exhumed
  - sub-surface materials are linked to clear surficial traces

surface materials provide greater spatial perspective than sub-surface materials, but often lack good temporal control

it is important to know therefore how surface materials relate to subsurface materials….

comparing surface & sub-surface remains
- do they coincide spatially?
  - i.e., do remains at the surface mark locations where remains are below the surface?
    - maybe yes, maybe no…

- do they coincide compositionally?
  - i.e., does the range of materials observed at the surface provides an indication of the range of materials found below the surface?
    - frequently no…
■ detecting sub-surface materials
  ■ non-intrusive techniques
    ■ magnetometer
      ■ detects how subsurface remains alter the strength of the Earth’s magnetic field
    ■ resistivity and conductivity of electrical waves
      ■ responsive to major changes in water content of soils
      ■ archaeological features (e.g., compacted soils, plaster floors, stone walls) tend to change water content

■ intrusive techniques
  ■ small-scale exploratory
  ■ coring and augering
  ■ medium-scale exploratory
    ■ sondages (“sounding pits”)
  ■ medium-scale data collection
    ■ test-pits; usually 1 x 1m “telephone booths”; at most 2 x 2m units

■ detecting sub-surface materials
  ■ coring and augering
    ■ examine the sequence and depth of strata
    ■ identify presence of anthropogenic deposits (e.g., highly organic soils); small artifacts

GPR: detecting changes in sediment texture below the surface

Resolution is key!

“ground truthing”
detecting sub-surface materials
- sondage and test pits
- used to assess the complexity of sub-surface deposits or provide a larger sample of materials

goals of excavation
- locate physical remains in primary context
  - ...sub-surface remains may be less disturbed
- provenience (x, y, z coordinates)
- associations between different physical remains
  - ... more types of remains & associations more enlightening

Provenience: x,y-dimensions v. z-dimension
- fundamental differences

Provenience: x,y-dimensions v. z-dimension
- fundamental differences

today’s first deep theoretical statement
- **single component vs. multi-component site**
  - **single component**
    - x, y and z dimensions contain only one coherent occupation
      - artifact-feature-ecofact associations correspond to a single integrated system at single point in time
      - e.g., the hunting camp of a single hunter-gatherer family
  - **multi component site (synchronic meaning)**
    - x, y dimension contains more than one coherent occupation; there is more than one set of artifact-feature-ecofact associations corresponding to different systems operating at the same point in time
      - e.g., multiple households in a village; multiple villages in a region

- **multi-component (diachronic meaning)**
  - z dimension contains more than one coherent occupation; multiple artifact-feature-ecofact associations represented at different points in time
  - repeated occupation of a location by mobile foragers, agriculturalists, industrialists

- **Stratigraphy/Stratification** = a sequence of sedimentary layers whose order from bottom to top reflects the law of superposition

- Law of Superposition = the order of strata from bottom to top represents the temporal order of their deposition from oldest to youngest
  - does not answer question of primary/secondary context

stratigraphy at tell Madaba, Jordan

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Stratigraphy at tell Madaba, Jordan

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The Ideal Stratigraphic Sequence

'Layer-cake' stratigraphy

Youngest →

Oldest →

- terminology
  - stratum = (singular) a layer of sediment
  - strata = (plural) more than one layer of sediment

- stratification = the condition of being arranged in a sequence of strata

- stratigraphy = a theory or model describing the organization of strata and, frequently, the processes of deposition

Complex Archaeological Stratigraphy
discontinuity and disturbance are the rule

- how do you know the strata seen in one excavation area are the same as that in another?  
  - cannot excavate the whole site
  - but want a “master” stratigraphic sequence that ties together all of the excavations

aerial photograph of a small Roman village, Heybridge, Essex, site approximately 1km long
- **stratigraphic correlation**
  - depth of strata
  - color of sediments
  - texture of sediments
  - thickness of sediments
  - contacts above and below
  - distance between excavations
    - the greater the distance…
    - …more difficult it is to correlate
  - contents (artifacts/ecofacts)
    - dangerously circular…
    - need to correlate strata based criteria independent of what you want to study/compare

- **strategies of excavation**
  - total coverage v. sample coverage
    - depends on spatial extent (x, y) &/OR depth (z)
  - problem oriented research
    - sampling design must correspond to your research problem
      - interested in spatial aspects of behavior, not going to dig a deep pit that only gives you a view of the z-dimension
      - interested in temporal patterns of evolution, not going to open up a large area that gives you x- and y-dimensions only

- **penetrating excavations (z-dimension)**
  - limited spatial extent, concentration is on excavation depth

- **clearing excavations (x- and y-dimensions)**
  - extensive spatial extent, limited depth
  - establish depth and general stratigraphy first

**Crepeele, Manitoba, ca. 3500 BP**
clearing excavations (x- and y-dimensions)
  - excavation balks
  - record “local” features; correlated complex deposits

getting x, y and z dimensions (a little of each)
  - trenching

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cultural, natural and arbitrary layers/levels
  - anthropogenic layer = a sedimentary unit that was formed primarily as a result of human behavior
    - e.g., agricultural terrace, midden, plaster floor, wall
  - natural layer = ... non-human depositional processes
    - e.g., alluvial gravels, lake beach, sand dune
  - cultural level = sediments that contain archaeological materials
    - distribution of archaeological remains in z-dimension should be discrete from overlying and underlying cultural levels
    - may OR may not correspond to natural layers
Discrete Cultural Levels or Level?

Cultural level may not correspond to natural layers

Overburden and Sterile Layers

- layer = a sedimentary unit deposited by a common process
- arbitrary level = an excavation unit of set thickness
- layer = a sedimentary unit deposited by a common process
- arbitrary level = an excavation unit of set thickness

- using arbitrary levels to control x, y and z in thick natural layers

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**Readings**

- TODAY:
  - A&S Chapters 7

- Next Class:
  - A&S Chapters 9