

Introduction to Archaeology:

Asking Questions About the Past
Through Objects, Places, Layers, and Evidence

- Systematic study of human past through material remains
- Focus on objects, sites, stratigraphy, and multiple evidence lines
- Context—where and how found—is as vital as the artifact
- Gain a framework to evaluate claims and engage critically



What Is Archaeology?

Disciplinary Foundations and Core Aims



- Study of past human behavior through material remains



- Distinct from history (written records) and paleontology (fossils)



- Context—location, association, and stratigraphy—gives finds scientific meaning



- Aims to understand human dynamics, social change, and cultural diversity



- Not treasure hunting; a systematic, evidence-based discipline

Field Notebook



Location

Within trench, south sector



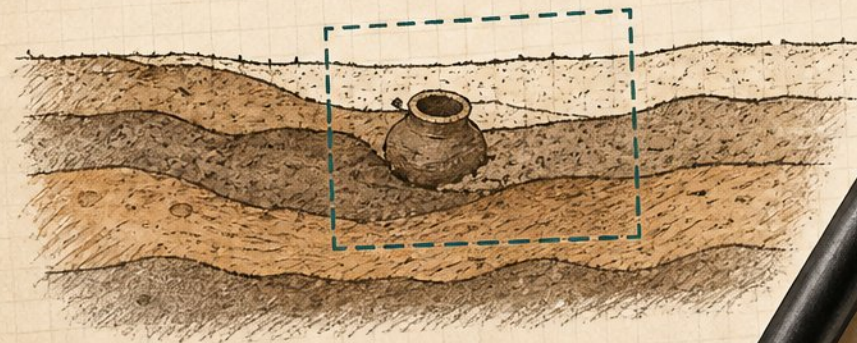
Association

Near hearth feature and stone tools



Stratigraphy

Below topsoil; above sterile subsoil



The Archaeological Record: Artifacts, Ecofacts, and Features



ARTIFACT



Field Tag



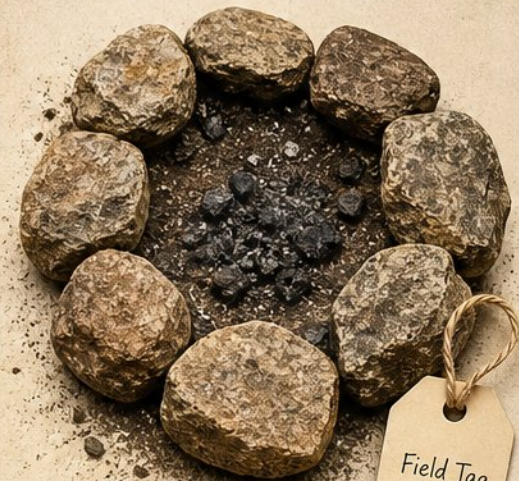
ECOFACT



Field Tag



FEATURE



Field Tag



- **Artifacts:** portable human-made or modified objects like tools and pottery
- **Ecofacts:** natural remains with cultural significance, such as seeds and bones
- **Features:** non-portable constructions including hearths and walls
- **Context** is essential—objects alone cannot reveal full past lifeways



Places and Space: Sites, Landscapes, and Settlement Patterns



- Sites range from vast cities to small hunting camps



- Spatial analysis reveals social hierarchies and economies



- Landscape archaeology studies human-environment interaction

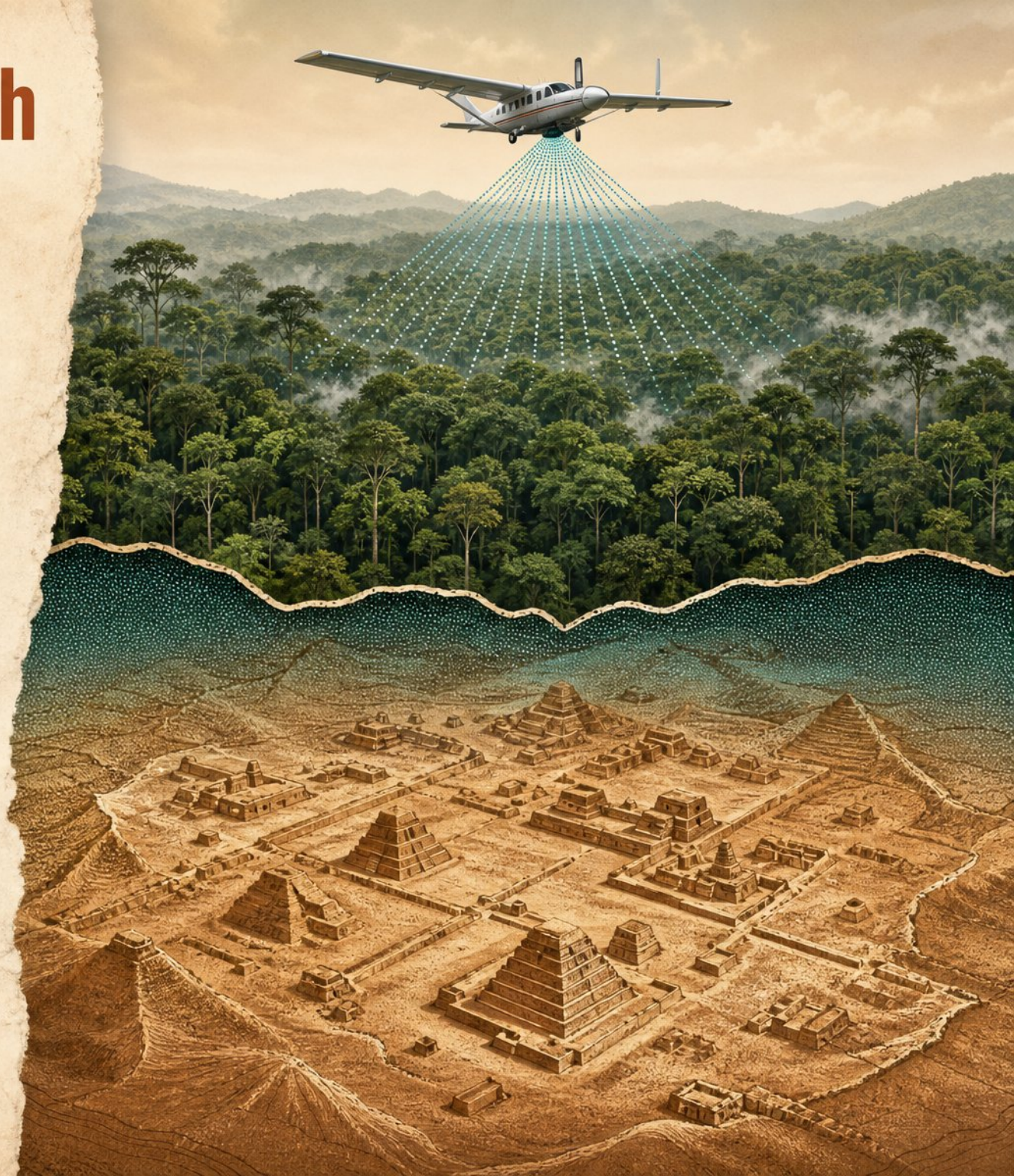


- Non-invasive surveys map sites without excavation



Seeing Beneath the Canopy: LiDAR and the Revolution in Remote Survey

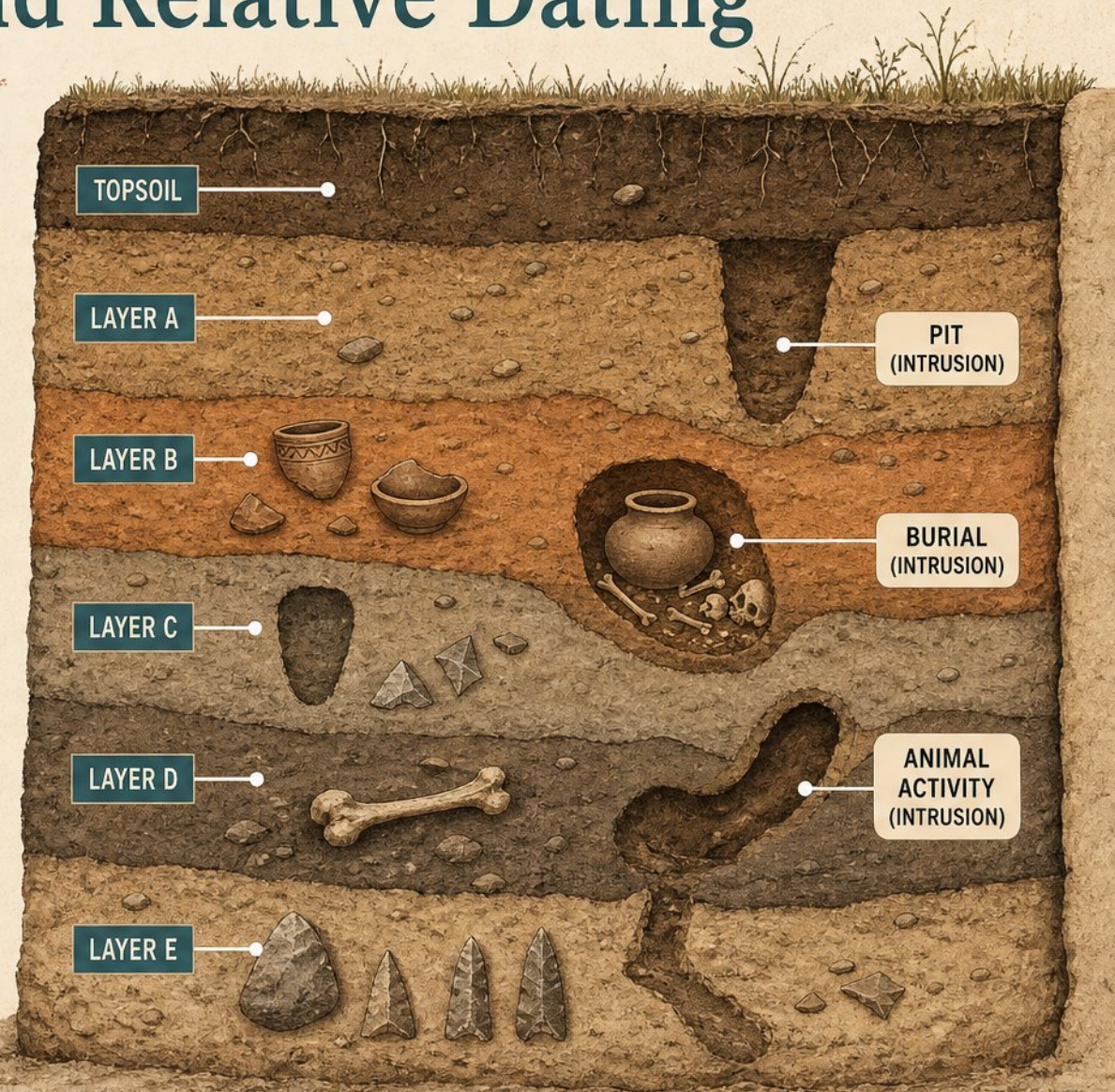
- LiDAR fires laser pulses from aircraft to map terrain through dense vegetation
- Digital canopy removal reveals hidden cities, from Maya metropolises to Silk Road settlements
- The 2024 Valeriana discovery came from a decade-old environmental LiDAR survey found deep in a Google search
- This technology democratizes discovery but raises ethical concerns about Indigenous data sovereignty and looting risks



Layers of Time:

Stratigraphy and Relative Dating

- In undisturbed layers, lower is always older (Law of Superposition)
- Pits, burials, and animal activity can scramble the sequence
- Seriation orders artifacts by tracking gradual style changes
- Primary context = original placement; secondary = moved later



Building Absolute Timelines: Radiocarbon and Other Dating Methods



- Radiocarbon dating measures ^{14}C decay in organics up to ~55,000 years



- Raw ^{14}C ages must be calibrated against known-age samples using standardized curves



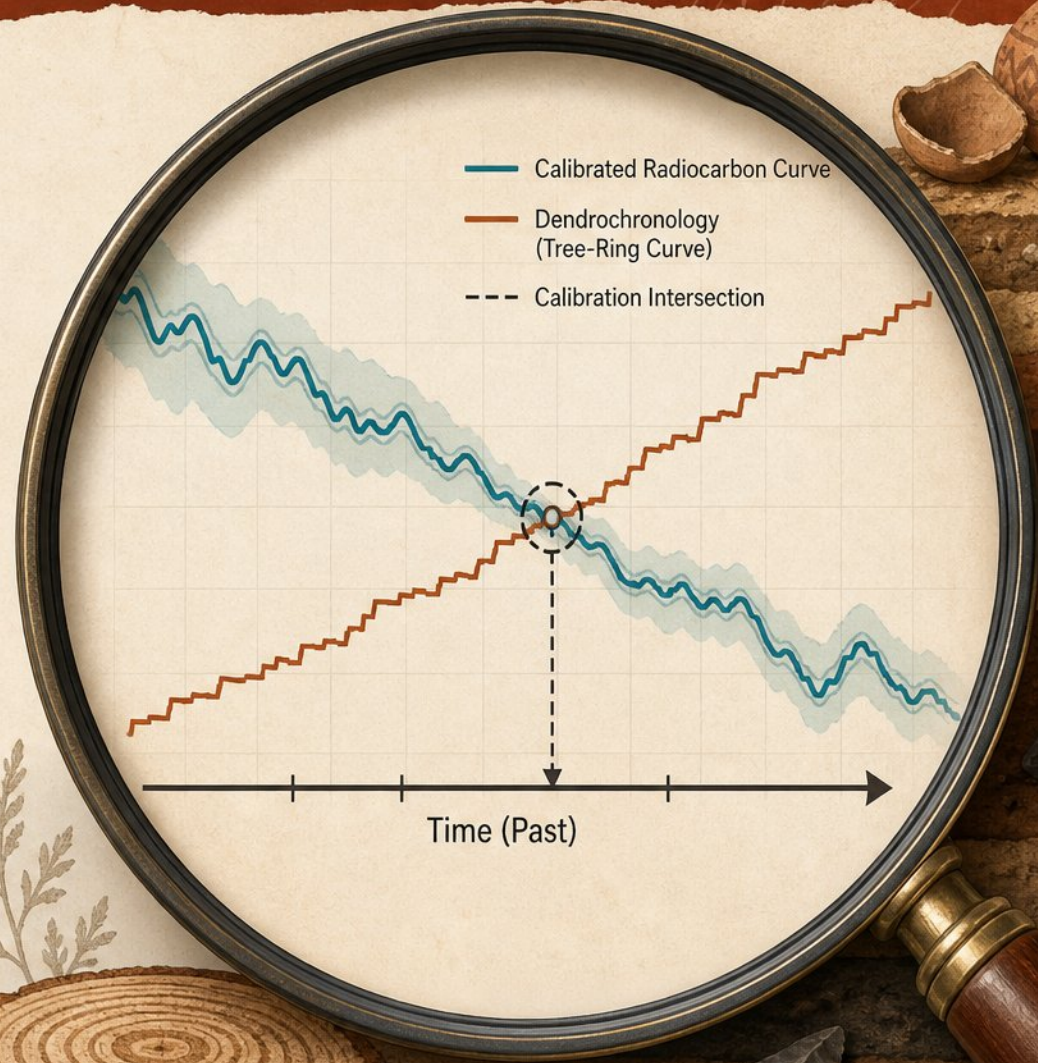
- IntCal20 (terrestrial), Marine20, SHCal20, and Norcoast25 provide regional calibration



- Dendrochronology offers annual precision; thermoluminescence and K-Ar extend range



- Multiple dating techniques cross-validate results for robust site chronologies



From Evidence to Interpretation: The Logic of Archaeological Reasoning



- Cyclical process: design, survey, analysis, interpretation



- Middle-range theory links static remains to past behaviors



- Analogical reasoning compares ancient to observed practices



- Single artifacts gain meaning through context and stratigraphy



Case Study: The Maya City of Minanbé—Integrating Multiple Lines of Evidence



AERIAL LiDAR HILLSHADE OF MINANBÉ



DECAPITATION STELA FROM MINANBÉ

- ◆ Intact Late Classic Maya city in Calakmul Biosphere Reserve, discovered 2026
- ◆ First identified via aerial LiDAR, then verified by machete ground survey
- ◆ Pyramid temple, 14 dated stelae and altars reveal peak around AD 849
- ◆ Decapitation stela and damaged altar suggest political incursion before collapse

Where Archaeology Happens Today: Fieldwork, Labs, and Digital Tools



- Structured fieldwork with precise recording and community consultation



- Lab analysis: GIS modeling, isotope and residue studies



- 3D digital reconstruction of artifacts and sites



- FAIR principles combat the digital curation crisis



- Linked Open Data integrates global archaeological archives



Ethics in Archaeology: Data Sovereignty, Community Collaboration, and Informed Consent



- CARE Principles center Indigenous data sovereignty



- Obtain informed consent for LiDAR and 3D digitization



- Avoid digital colonialism through collaboration



- The Mensabak Project models ongoing community consent



- Embed CARE and FAIR from planning through curation



Archaeology and AI: New Frontiers, New Responsibilities



- LLMs and generative AI build knowledge graphs and digital reconstructions



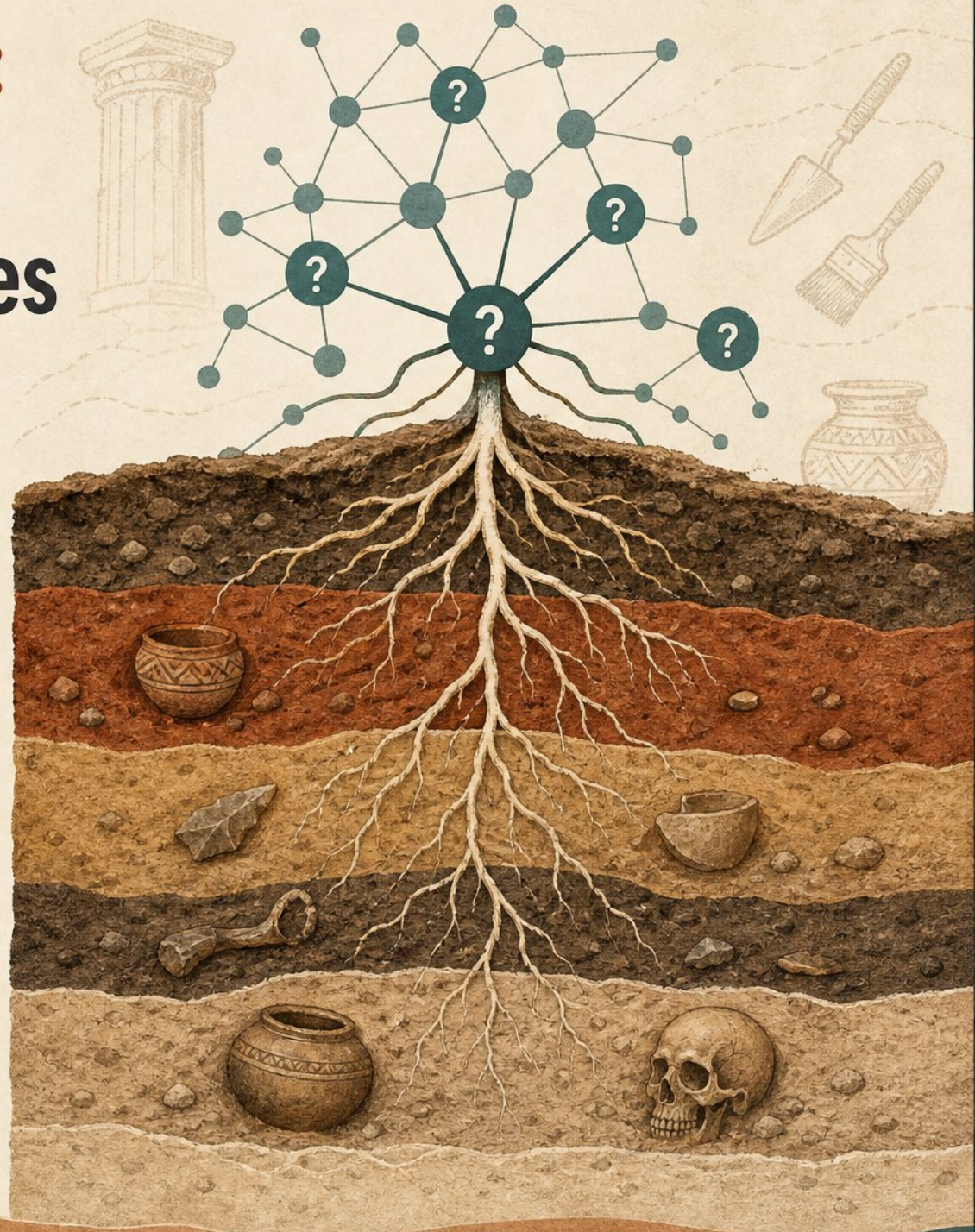
- Risks: bias amplification, commercial lock-in, opaque algorithms



- Publishing and data labor systems struggle to adapt



- Responsible use demands open infrastructure and community ethics



Public Archaeology and Citizen Science: Everyone Can Contribute



- Volunteers identify sites from home using LiDAR and aerial imagery



- Analyze pottery and transcribe field notes to speed up research



- Community test-pit digs build local stewardship and professional data

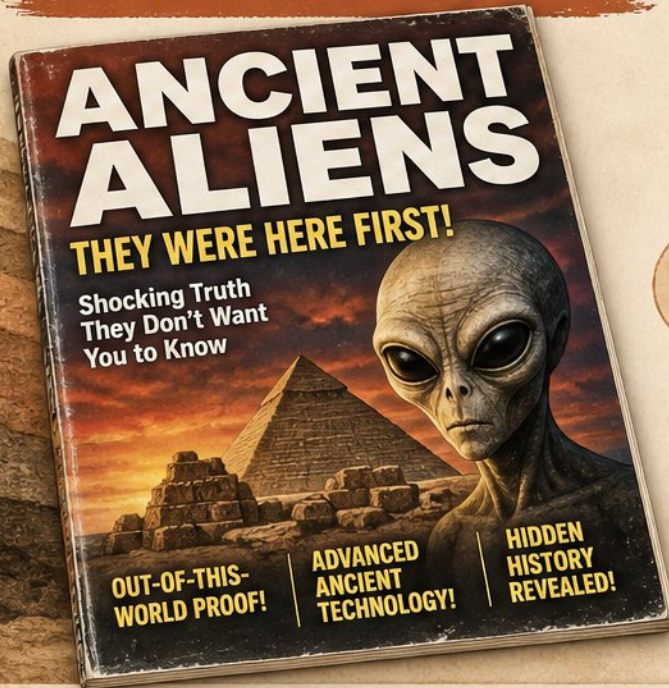


- Democratizes discovery, increases protection, and shares heritage ownership



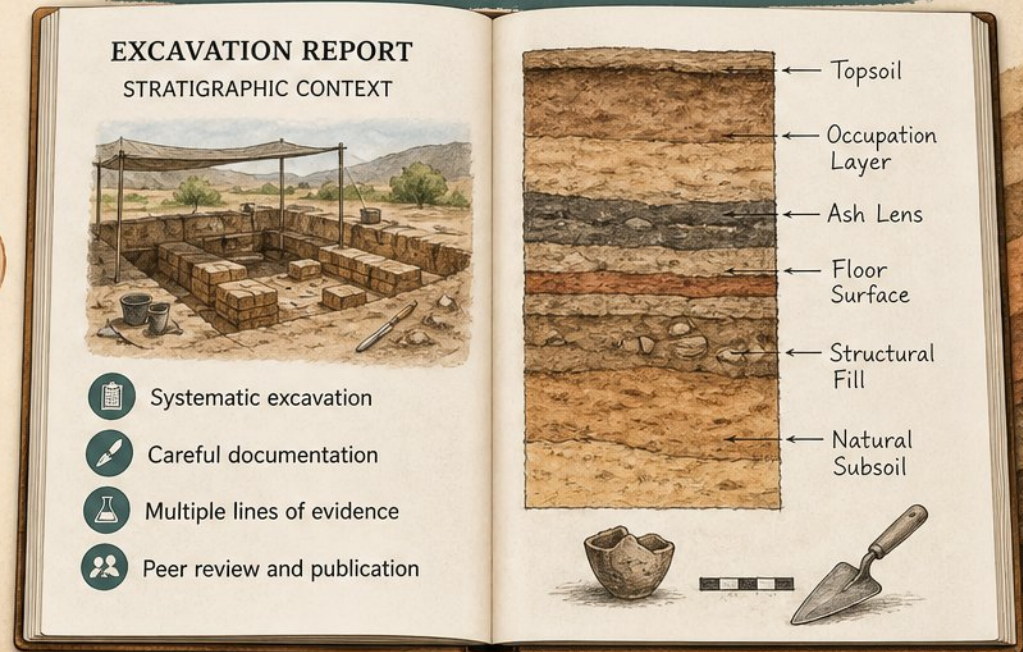
Recognizing Pseudoarchaeology: When Claims Lack Material Evidence

SENSATIONAL CLAIMS



VS

EVIDENCE-BASED ARCHAEOLOGY



– Speculative claims presented as fact without evidence



– Red flags: cherry-picking, no peer review, unfalsifiable claims



– Real archaeology demands multiple independent evidence lines



– Acknowledging uncertainty builds critical thinking and literacy



Asking Your Own Questions:

A Practical Framework for Engaging with the Past



Summary and Next Steps in Archaeological Literacy



- Weaving objects, places, layers, and dates into questions about the past



- LiDAR, AI, and digital curation advance discovery ethically



- Explore DigVentures, GlobalXplorer, and open-access databases



- Citizen science projects let everyone contribute to real research



- Archaeological literacy means critically evaluating claims about the past



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