"Radiocarbon Dating in Archaeology: Triangulation and Traceability" by Alison Wylie

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Section 1: The Quest for an Absolute Chronology

- Archaeological data are "tragically local" and can be easily detached from their original contexts.
- **Historical Methods:**
  - **19th Century Methods:** Development of techniques for temporal structuring of stratigraphy.
  - **Three Age System:** Cultural sequencing by Thomsen, Nilsson, and Worsaae drew upon geological principles.
  - **Stylistic Seriations:** Extending chronological sequences through the ordered succession of artifacts.
  - Tying chronologies to historical records and physical chronologies (e.g., dendrochronology, varve dating).
- **Introduction of Radiocarbon Dating:**
  - Based on the stable decay rate of radioactive carbon isotopes (^{14}C).
  - Aimed to create chronological frameworks independent of sample context and broader variations.
  - Initial ambition aligned with Latour's notion of "mobile immutable" data.

Section 2: Capturing Radiogenic Data

- Within a decade, it became clear that technical and practical scaffolding was required for applying 14C dating in archaeology effectively.
- **Challenge 1: Minimizing Contamination:**
  - Establishing field practices tailored for sample recovery and handling to avoid contamination.
- **Challenge 2: Method Refinement:**
  - Development of laboratory protocols for reliable measurement of 14C.
  - Recognition of influences from electromagnetic impurities, radon contamination, ambient radiation among others.
  - Accuracy and precision standards evolved progressively towards end-of 20th century.

Section 3: Calibration: Refinement and Conversion

- The second revolution involved calibration addressing:
  - Non-uniform atmospheric ratio of ^{14}C to ^{12}C and ^{13}C over time and space.
  - The differential absorption of ^{14}C by different organisms.
  - Establishing standards was intricate:
    - Correction for "industrial" and "bomb" effects.
    - Comprehensive calibration programs developed, employing extensive background knowledge from various scientific domains.
- Formation and refinement of calibration datasets important for transforming laboratory measures of ^{14}C to calendar years.

Section 4: Traceability and Triangulation

- Bayesian chrono-modelling has catalyzed a third major transformation ("Third Radiocarbon Revolution").
- Emphasis on combining radiogenic data with archaeological specifics.
- Methods of "traceability" and "triangulation" reinforce accuracy:
  - **Traceability:** Ensures retrieval and observational data maintain context throughout data creation.
  - **Triangulation:** Cross-referencing with other datasets to verify and correct anomalies; utilizing a variety of information sources.

Section 5: Robustness Reasoning About Temporal Data

- Robustness reasoning employed to ground temporal claims precisely and counteract confounding effects.
- Application of robustness ensures data reliability—dependent on the context, conceptual rigor, and empirical validation.
- **Woodward's & Norton's Theories:** Essential consideration of empirical, domain-specific assumptions specific to archaeology.

Conclusion

- Extensive, iterative processes underpin the transformation of organic artifacts into usable chronological markers.
- Coordination amongst different scientific domains to reinforce robustness and reliability.
- Establishing the credibility of interpretations in alignment with the evolving nature of archaeologically relevant temporal data and broader empirical and methodological advancements.