GROUNDHOG
CHRONOLOGY TEST LABORATORY

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Abstract

Many new approaches to ancient Near Eastern chronology have escaped critical review because of the difficulty refuting chronological hypotheses. And many scholars have weighed into chronological debates with unsubstantiated chronologies and shallow error rate analyses. However, scholars have yet to come to terms with how to evaluate chronological theories for validity. Groundhog is a "fact-checker" that seeks to establish a means to evaluate chronological hypotheses for validity by creating a computer simulation that can test these hypotheses against every ancient Near Eastern synchronism for internal consistency.

Importance of the Project

It would be intuitive to believe that the increase in available synchronisms would lead to a convergence of scholarly consensus; however, despite the fact that scientific methods have confirmed conventional chronology [Shaw, 12], the low chronology has failed to gather consensus support traction among North American scholars [Pruzsinsky, 21].

Even though there has been an increase in the synchronisms available to modern scholars, the glut of data has counter-intuitively led to a divergence of consensus. The primary reason for this divergence may be because evaluating a chronology for validity would require testing every possible permutation, which is a function of the uncertainty associated with the reign-lengths in the king lists. Thus, having no firm foundation for offering a critique, some chronologists preferring to avoid scholarly engagement of these hypotheses altogether [Hornung, 14-15].

Permutations & Possibilities

The primary barrier to evaluating a chronological hypothesis for validity is testing all the possible of permutations. This product is a function of the ambiguity associated with the reign-lengths in the king lists (n) and can be represented as a formula. From this formula, a rough estimate of the minimum number of permutaions needed to perform these calculations can be calculated.

$$\prod_{i=1}^{n} 2i \geq 2.0 \times 10^{12}$$

Synchronisms as Limiters

The new approaches to chronology, because they at times deprecate historical sources, have led to chronologies with margins of error that are exaggerated. This is the result of a failure to understand how chronology really works. Perhaps, the most important function of the synchronism is its ability to reduce or eliminate error. By treating a chronology as interlocking sliding mechanical units governed by synchronisms as limiters proposed chronological hypotheses can be tested for consistency.

How Groundhog Works

The program takes king lists and precalculates every possible permutation of a chronology as a mechanical unit of encapsulated data. The encapsulated data is then shifted and tested against the aggregated synchronistic events, and inconsistent chronologies are sequestered. Low and high chronologies are calculated from the remaining pool of valid data, and bad chronologies are flagged for further analysis.

Preliminary Results

While results are still emerging, initial experiments have weighed in on several chronological debates. But even so, Groundhog is limited by the amount of computer resources available to it. Nevertheless, Groundhog shows promise as a means to validate chronological hypotheses, and for the first time demonstrating that these hypotheses are testable and can be refuted, which finally opens chronology as a field subject to scientific methodology.

Groundhog Online (URL)

http://www.lagomorph-rampant.com/chronology/index.html

Visit Groundhog Online

More Information & Bibliography

See the web site for athe lateset informantion about the chronological hypotheses being evaluated at the Groundhog lab.

Beckman, G. *Hittite Diplomatic Texts*, 1996.
Hornung, E., et al. *Ancient Egyptian Chronology*, 2006.
Shaw, I. *The Oxford History of Ancient Egypt*, 2003.
Pruzsinsky, R. *Mesopotamean Chronology on the 2nd Millenium B.C.*, 2009.

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