Charles Phelps Taft Research Center
at the University of Cincinnati
Graduate Enrichment Award

All required materials must be included in a single document, uploaded to the electronic submissions system, no later than 5PM on the published day of the deadline. Departmental review is required for this program, as well as a letter of support. Applicants should submit their application with enough time to receive departmental review prior to the close of the deadline. Taft does not accept an obligation to review applications that have not received intradepartmental review by the close of the deadline.

I. General Information

a. Name: Name: XXXX
b. M#: MXXXXXXXX
c. Department:
d. Position: Student
e. Project title: Dating the Demise of Hopewell Culture
f. Time Period: Spring Semester
g. Travel Location (if applicable): N/A
h. Travel Dates (if applicable): N/A
i. Probable Results of a Grant (such as publications, working papers, and presentations): 2020 SAA Annual Meeting Poster Presentation, Master's Thesis, Peer-reviewed Professional Journal Publication

II. Budget

a. Transportation: N/A
b. Direct Research Costs: Radiocarbon dating $2,650 ($595 x 1 charcoal sample + $685 x 3 bone samples)
c. Per Diem: N/A
d. Total Amount Requested from Taft: $2,500
e. Have you already or will you in the future apply for other grants for this project, including departmental support?
Yes. I will apply to the GSGA for the $150 cost overrun for radiocarbon age determinations.

Justification

Quantity and Sample Composition	**Description**	**Cost**
1 - Wood Charcoal	Accelerator Mass Spectrometry Radiocarbon Age Determination	$595 x 1 = $595
3 - Bone Collagen		$685 x 3 = $2,055
Total Cost		$2,650
Total Funds Requested		$2,500

Radiocarbon dating costs are based on a direct quote received from Jonathan Brochard, Account Manager, Beta Analytics Inc., an ISO 17025 accredited laboratory.

Work Schedule

Semester	**Year**	**Work**
Spring	2020	Submission of radiocarbon dates from the Jennison-Guard site to Beta Analytic Inc.
Spring	2020	Obtain the result of radiocarbon dates and compare them with those obtained from other Hopewell sites in the Ohio River valley. Present the results at the Annual Meeting of the Society for American Archaeology, Austin, Texas.
Spring-Summer	2020	Complete the writing of my M.A. thesis and submit it to my Thesis Committee.
Fall	2020	Complete all the editorial revisions provided by my Thesis Committee and submit a manuscript to a professional journal.

III. **Taft Grant History**

Please list your grant history with Taft for the last 5 years, in reverse chronological order, including project title, grant type, grant date, and amount of award, as well as project development subsequent to the grant, e.g. publication.

2019. $500 Taft Graduate Travel Award.

III. Project Narrative

Hopewell is an Ancestral Algonquian Native American culture that existed in the Ohio River valley during the Middle Woodland Cultural period (~100 BCE to CE 500). Archaeologically, it is identified by distinctive iconography, hilltop enclosures, earthworks and burial mounds, complex mortuary features, flaked-stone, ground-stone, ceramic artifacts, and exotic raw materials, which have been recovered more than 1,000 km from their raw material source areas. These artifacts suggest that the Hopewell maintained an elaborate procurement and logistical exchange network, which spanned from present-day Florida to Canada and included preciosities such as obsidian, copper, marine shells, and mica. They are also indicative of craft specialization, symbolic expression, and complexity. This period of cultural fluorescence abruptly came to an end sometime ~CE 500 CE. The precise time and cause of the demise of Hopewell remains one of the greatest archaeological mysteries in Ohio Valley archaeology.

Archaeologically, Hopewell is internationally recognized for the extensive and elaborate geometric and zoomorphic earthworks, many of which are still visible in the Ohio River valley today. The size and complexity of the earthworks are unprecedented in World prehistory due to the geographic scale, geometrical design, geographic distribution, and integration of astronomical alignments. This type of architecture denotes a complex social organization with a high level of integration between geographically dispersed cultural groups.

Theories on the origin of these complex earthworks and the demise of the culture, which created them have been postulated since the initial European colonization of this region. In the absence of any means of determining their antiquity, early scholars went to great lengths to study and map as many of the earthworks as possible. Today, surviving Hopewell archaeological sites are threatened from urban-sprawl, sand and gravel mining, and large-scale farming.

One of the most important Hopewell archaeological sites in the Ohio River valley is Jennison-Guard (12D29s). It is situated on the Ohio River flood plain near its confluence with the Great Miami River in Lawrenceburg, Indiana. Previous excavations were conducted at the site between 1984-1987 as part of the University of Cincinnati's Summer Archaeological Field School. As part of my M.A. thesis field research, I excavated a portion of the site to determine the precise timing and potential cause of its abandonment. Given that Jennison-Guard is a quintessential Hopewell site and it is well preserved, the site provided an unprecedented opportunity to obtain a

precise age and perhaps cause for the demise of the Hopewell in the Ohio River valley.

I discovered that sediments obtained from my excavations at the Jennison-Guard site contain evidence for a cosmic comet airburst event. Scanning Electron Microscopy of the sediments revealed a plethora of micro-meteorites and micro-tektites, which resulted from a high elevation explosion. Additionally, geochemical analyses of the sediments revealed they had an unusually high concentration of elemental platinum and iridium. While platinum could be the result of a catastrophic volcano, the presence of iridium suggests it is more likely the result of a cosmic airburst event. Iridium does not naturally occur in terrestrial sediments, but is common in meteorite, asteroid, and comet impact sites.

One such cosmic air burst site is known as Tunguska. It was documented in Siberia in 1908. The Tunguska event was measured at ~15 megatons, which is 1,000 x more powerful than "Little Boy," the first nuclear weapon detonated during World War II. The Tunguska event decimated over 2,000 square kilometers of forest, and luckily was very far from any metropolitan area. An air burst of this caliber would have had a catastrophic impact on the Hopewell culture.

In order to determine the precise time of the Hopewell cosmic impact event at the Jennison-Guard site, I need to obtain accurate and precise radiocarbon dates for the sediments, which contain micro-meteorites, micro-tektites, and the elements platinum and iridium. Multiple radiocarbon dates are needed to show when the Jennison-Guard site was occupied by the Hopewell and the exact timing of the cosmic airburst event, which may have led to the demise of this complex culture in the Ohio River valley.

If awarded, the Charles Phelps Taft Graduate Enrichment Grant will provide me with the much-needed funding needed to obtain the radiocarbon dates for the Hopewell occupation of the Jennison-Guard site and the occurrence of a catastrophic cosmic airburst event. These radiocarbon ages are crucial to the completion of my M.A. thesis in anthropology.