



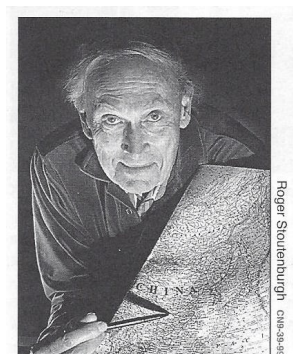
**NEWSLETTER**

**Representing Nassau & Suffolk Counties**

**From the Nuclear Bomb to Neutron Activation for  
Artifact Analysis – The Long Island Connection**

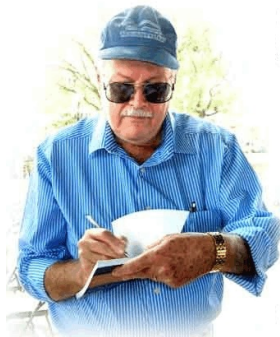
Dr. Garman Harbottle, Scientist Emeritus at Brookhaven National Laboratory, is a research chemist who has won the Seaborg Prize, the equivalent of the Nobel Prize, in chemistry. Harbottle has worked on scores of research projects, such as dating the Vinland Map, many paintings in the Metropolitan Museum, dating limestone statuary from its crust or skin, etc. He has played a germinal role in developing and using the neutron activation process for artifact analysis – a technique that has greatly benefitted the analysis of art works and artifacts, especially for archaeologists.

At the June 5<sup>th</sup> SCAA Annual Meeting, Dr. Harbottle shared the story with the members attending. The “Long Island Connection” derives from his association with the late Dr. Phil Weigand, former chair of the Stony Brook University Anthropology Department, in their shared research on turquoise analysis.



Roger Stoumenburgh ©2010

Garman Harbottle, BNL 2010



Phil Clayton Weigand -  
1937-2011

Weigand approached Harbottle after his talk at SBU on neutron activation, and asked if neutron activation could work on ‘sourcing’ turquoise. Harbottle thought it could, and their collaboration began. Weigand, on his way each summer to the Mexican Guachimontones site he was excavating near Etzatlán (now a World Heritage site with the only round pyramids in the world), would look for outcrops and go in caves to find chunks of turquoise in the Southwest. Celia, his wife and research partner, would wait in the truck, never knowing for sure if he was coming back or not. It was dangerous work.

The British Museum has a large collection of exquisite masks from Mexico paved with turquoise ‘tiles,’ the turquoise presumed to be from the U.S. Southwest. It



Serpent Mask of Quetzalcoatl, now at British Museum

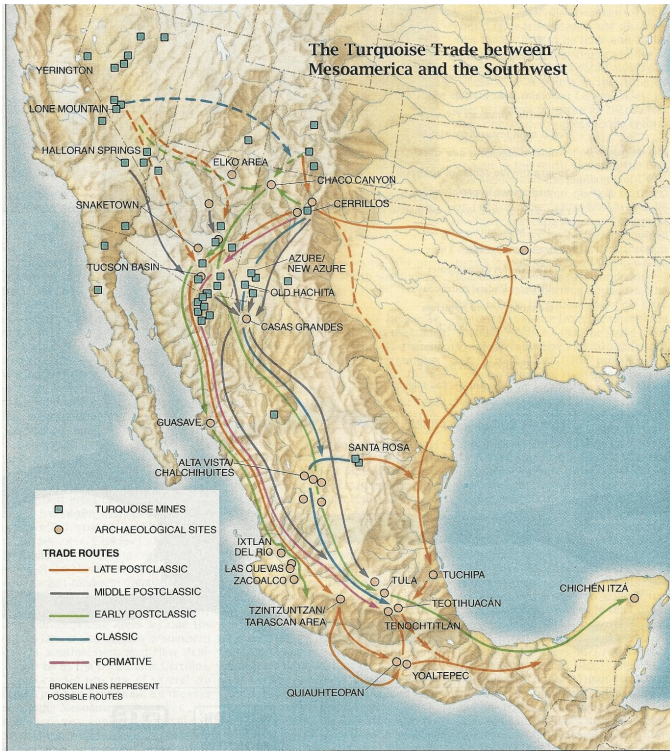
had long been an archaeological theory, but it had not been proved scientifically. Weigand’s southwest turquoise samples were neutron activated by Harbottle at BNL for their source ‘fingerprint.’

They were able to use Mexican artifacts from the collections of the American Museum of Natural History, brought back from AMNH expeditions to Mexico over many decades and other sources. About 2,500 specimens were then neutron activated for their ‘fingerprints.’ Matches were found which could, for the first time, definitively attribute a Mexican turquoise artifact to the source material in the Southwest. Much of the mined turquoise was taken to Chaco Canyon, which was an entrepot for it by ca. 700 AD and traded by *pochtecas* (royally sanctioned traders) to Mexican expert lapidaries to produce items of personal adornment and ritual objects associated with the principal gods of the Mesoamerican pantheon – now recognized as masterpieces of pre-Columbian America.

The development of neutron activation as a scientific dating technique stemmed from Dr. Robert Oppenheimer, director of the Manhattan Project, which developed the Nuclear bomb. “Always an idea man,” as Harbottle says, he searched for other uses of this new medium. He asked the noted chemists of the day what techniques they were using for dating, and found they were few and limited. So he brought the new information to the attention of Dr. Ed

Sayre (a Southampton native, then at BNL). Harbottle and Sayre, both at BNL, began developing the new technique.

Not all archaeologists were pleased to learn about this, and a lot of controversy ensued, but the publication of the data in *Scientific American*, February 1992, has stood the test of time and is now generally accepted.



Scientific American February 1992

But a trade network requires items circulating back. Exotic bird feathers, copper bells, etc. were long thought to have been the other half of the turquoise trade network. Years later, a team sponsored by Hershey (Crown and Hurst) used High Pressure Liquid Chromatography to detect theobromine, a chocolate residue, in elite beakers at Pueblo Bonito. They postulate that cacao was the other half of the trade network – the “first importation of a mind altering substance into what became the U.S.” says Harbottle.

In trying to decipher what route the cacao beans would traverse, the original idea of hundreds of human mules carrying cacao loads overland was considered; subsequent research indicates that it was probably taken from the cacao groves near the west Mexico coast, transported by boat up the coast to California, and brought overland into the Southwest. The cacao beans normally functioned as money for the trading trips. This evidence underpins the Mesoamerican presence at Chaco through elite-related or ritual chocolate drinking, a view which will engage archaeologists for years to come.

### More “Early Peopling of the Americas” Data from *Mammoth Trumpet*

Alessandro Achilli of the University of Perugia and 17 other scholars from 10 institutions in Italy, Canada, and the U.S. are using the mitochondrial genomes (from females), or

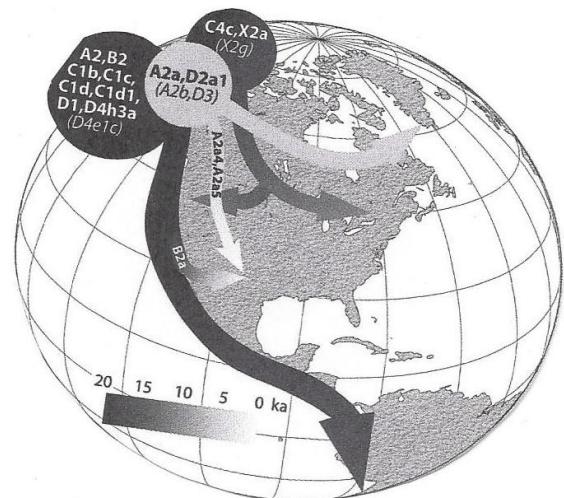
“mito- “genomes,” of indigenous American Indians to trace the routes followed by their ancestors from Asia to North America. This is refining our understanding of the early migrations and challenging the most popular “three-wave model” for the peopling of the Americas as too simplistic.

Geneticists can see the male line of inheritance by studying the DNA Y chromosome, which is not always in concordance with the female mitochondrial DNA. Previous studies of Indian mitochondrial DNA have identified 5 basic haplogroups, or branches on the MtDNA family tree; these have been designated as A, B, C, D, and X – the 5 founding mothers of the first Americans. When did they get here and where did they come from?

All 5 haplogroups are found in northeastern Asia, although X is rare there and is also found in Europe and northeastern North America. Achilli and colleagues estimate that the founders of all the mitogenomes entered America between 15,000 and 18,000 years ago. They used subclades – many times great-grand-daughters who established their own family dynasties and distinctive mitogenomes by accumulating unique mutations.

These mutations occurred at a more or less constant rate, which can be used as a measure of time since they separated. Groups that share distinctive mutations and share common genetic history are called a haplogroup.

The previous “three-wave model” of migration from Siberia did not use the entire mitogenome, so was limited. Achilli and team focused on two haplogroups, A2a and B2a, which had peculiar geographic distributions. The A2 group is found all across the Americas, but the A2a group occur only in Siberia, Alaska, and the American Southwest. The B2 group is common throughout the Americas, but B2a is found only in North America south of Alaska. A2a is largely in Athapascan groups, including the Navajo and Apache. B2a is widespread throughout the region, including Mexico, but not Central America.



Mammoth Trumpet, Vol. 29, No. 4

The B2a group arose about 11,000-13,000 years ago, is not found in Siberia or Central America, so is relatively late, indicating that it evolved in North America. It is found in the

Pacific Northwest, the Southwest, and Mexico, indicating it originated in the Pacific coastal regions as local descendants of the ancestral B2 mitogenome, probably along a coastal migration route.

Haplogroup A2a arose 4,000-7,000 years ago probably originated in one or more enclaves in Alaska or the northwest of Canada, or possibly Siberia. Sub-branches A2a2 and A2a3 are linked to the beginnings of Paleo-Eskimo populations ca. 4000 years ago, expanding from Siberia to Greenland.

Less than 1,000 years ago sub-branches A2a4 and A2a5 migrated south to become ancestors of the Ache and Navajo, possibly along the eastern edge of the Rocky Mountains or the Pacific coastal route. Achilli, Torroni, and colleagues have determined that the vast majority of genetic variation comes from the initial wave of migration from Beringia, which appears to have followed the coastal route.

They also have evidence for a second, concomitant or slightly delayed, wave of migration that appears to have followed an inland route, marked by haplogroups X2a and C4c, through the ice-free corridor at about the same time. These later arriving Paleoamericans are restricted to northern North America and had major genetic influence on a number of populations, including both Na-Dene and non-NaDene speakers, such as Algonquian speakers, now living in Alaska, Canada and the northern U.S. – possibly the ancestors of the Long Island Algonquian speakers.

### New and Noteworthy

#### Oldest Globe to Show the Americas Discovered

The globe was likely crafted in Florence, Italy, around 1504 from the lower halves of two ostrich eggs, one of which shows vague details of the Americas, probably from early explorers like Columbus and Vespucci. Belgian researcher S. Missinne used carbon dating, computer tomography, ink assessment, as well as geographical, cartographic, and



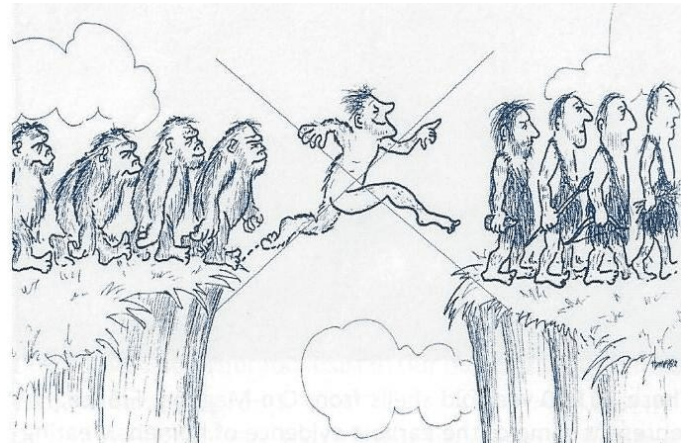
The Portulan Journal

historical analysis to determine its date and possible link to Leonardo da Vinci's workshop. It is felt it was used to cast the famous 1510 copper Lenox globe at the New York Public Library, believed to be the oldest showing the Americas. Its discovery and analysis was published in the journal *The Portulan*.

#### **Early American Cartographies**, Martin Bruckner, ed.

Maps were at the heart of cultural life in the Americas from before colonization to the formation of modern nation-states. Andrew Newman of Stony Brook University is one of the 13 contributors. \$60. Omohundro Institute of Early American History and Culture, Williamsburg, VA.

**Anthronotes**, Vol. 31, No. 1, Spring 2010, is the fascinating examination of "What Does It Mean to be Human? A Behavioral Perspective," by Alison S. Brooks. It also recounts the ever-changing research behind the total revision of the Smithsonian Institution's National Museum of Natural History's Hall of Human Origins. Another article by Brooks, "New Perspectives on the Evolution of Bipedalism," presents the latest research in that field.



"Rapid appearance of modern-looking people in Europe was not a great leap forward." Robert Humphrey  
*AnthroNotes*, Vol 31., No. 1, Spring 2010.

To receive *AnthroNotes* by email: [anthrooutreach@si.edu](mailto:anthrooutreach@si.edu). *Anthropology Explored*, 2<sup>nd</sup> edition is the best of Smithsonian *AnthroNotes*; available from [randomhouse.com](http://randomhouse.com), \$21.95 paper.

**The Center for Digital Antiquity** exists to bring archaeological data into the process of digitization for enhanced storage and accessibility by all scholars, government organizations, and especially for doctoral dissertations data. Through the use of digital data repositories, authors can preserve their primary data in perpetuity and make it widely available. This is a technique to move beyond the simple publishing of data.

Digital Antiquity and Arizona State University Libraries have submitted a project proposal to the The Knight Foundation – Digging Up Data: Teaching and Learning with Digital Repositories like the Digital Archaeological Record – to answer the question – how do we help teachers and students learn to find and use the information stored online

in digital repositories, using libraries as a platform to build more knowledgeable communities? To support this quest, go to –  
<https://newschallenge.org/challenge/libraries/submission/s/digging-up-data-teaching-and-learning-with-digital-repositories-like-the-digital-archaeology-record-tdar-http-tdar-org#>.

**Northeast Historical Archaeology: Special Issue Foodways on the Menu: Understanding the Lives of Households and Communities through the Interpretation of Meals and Food-Related Practices,** Karen Bescherer Metheny, editor. Vol. 42, 2013. 13 articles on free African American family foodways, to colonial foodways, to use of redware, to Harvard College Buttery consumerism, to nineteenth century cookbooks, and much more.



**Meetings**

**October 18** - Archaeological Society of Connecticut Fall Meeting, Wesleyan University, Middletown, CT.

**October 30 - November 2** - Eastern States Archaeological Federation (ESAF) Annual Meeting, Solomons, MD.

**November 6-9** – Council for Northeast Historical Archaeology (CNEHA) Annual Conference, Long Branch, NJ

**January 6-11, 2015** – Society for Historical Archaeology (SHA) Annual Meeting, Seattle, WA

**Long Island in the American Revolution: The Seat of Action – Symposium , November 15, 9:45 - 3:00**  
 The Long Island Museum, Stony Brook, NY

A new exhibit, “Long Island at War: Battle Front and Home Front” may be viewed. Admission: \$12., \$10 seniors.  
 Contact – Lisa Unander, 631-751-0066 ext. 212 or email [unander@longislandmuseum.org](mailto:unander@longislandmuseum.org).

**Publications of the Suffolk County Archaeological Association**

*Readings in Long Island Archaeology & Ethnohistory*  
 All volumes are \$40. + \$5. Shipping, except Vol. III, 2d ed., which is \$75. + \$8. Shipping, both plus 8.625% sales tax in N.Y. State for individuals. Vol. I, Vol. IV, & VI are out of print.

- I *Early Paper in Long Island Archaeology*
- II *The Coastal Archaeology Reader*
- III *History & Archaeology of the Montauk, 2d ed.*
- IV *Languages & Lore of the Long Island Indians*
- V *The Second Coastal Archaeology Reader*
- VI *The Shinnecock Indians: A Culture History*
- VII *The Historical Archaeology of L.I.: Part 1 - The Sites*
- VIII *The Native Forts of L.I. Sound*
- DVD - *The Sugar Connection: Holland, Barbados, Shelter Island*  
 - 2 hrs. \$50. + \$4.31 tax + \$6. Shipping = \$60.31

- Student Series** (Including shipping)
- Booklet: *A Way of Life: Prehistoric Natives of L.I.* \$6.
  - Study Pictures: *Coastal Native Americans* 8.
  - Wall Chart: *Native Technology (26x39"-3 colors)* 14.
  - Map: *Native Long Island (26x39"-3 colors)* 14.

**MEMBERSHIP APPLICATION**

Membership in SCAA includes 3 Newsletters per year and a 10% reduction in workshop and publication costs. All contributions are tax deductible.

Student (to 18)	\$15.	Individual	\$25.
Family	35.	Sustaining	50.
Contributing	100.	Patron	100.
Life Member	400.		

Date:.....

Name:.....

Address:.....

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Phone No. ....

Willing to volunteer? .....

Occupation: .....

Send check to: Suffolk County Archaeological Association,  
 P.O. Box 1542, Stony Brook, NY 11790 - Tel: 631-929-8725

Programs of the S.C. Archaeological Association are funded in part by public monies from the New York State Council on the Arts - Decentralization, the Suffolk County Office of Cultural Affairs, The Phillips Foundation, The Gerry Charitable Trust, JP Morgan Chase, Gardiner Foundation, Harriet Gamper, Stanley Wisniewski, and County and State Legislators.

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