Reports and Commentaries

Rano Raraku: A brief overview of six seasons of excavations, three seasons of conservation interventions, and a heritage management program, 2010-2012

Jo Anne Van Tilburg and Cristián Arévalo Pakarati

Introduction

The Easter Island Statue Project (EISP), of which the authors are co-directors, has invested more than three decades in archaeological survey and excavation on Easter Island. This paper summarizes our excavation program in Quarry 2, Rano Raraku Interior, of statues RR-001-156 (Figure 1) and RR-001-157 (Figure 2). From the inception of our project in 1982, our goal has been to create an island-wide monolithic and portable statue (*moai*) inventory and to compile an historical image record comprising a biography of each statue. This inventory is a bedrock of archaeological research but is also indispensible to heritage management (Letellier 2007). To date, we have accounted for 1,300 *moai* including complete (as opposed to intact) statues, heads, torsos, fragments, and shaped blocks (Table 1). The latter are considered to be evidence of human activity in the form of incomplete or abandoned projects elucidating energy investment. The most recent object entered into our collaborative online database (DATASHARE) is a red stone torso submitted by Enrique Tucki M. of the Oficina Provincial, Corporación Nacional Forestal (CONAF).

The EISP excavations summarized here follow completion of our extensive mapping (Van Tilburg et al. 2008a) and are the first legally permitted (CMN ORD 5467-09) and controlled, scientific excavations in Rano Raraku since 1954. Our project is also the first stone conservation and preservation pilot program ever conducted anywhere in Rano Raraku. Previously, all but one of the 22 standing statues in Rano Raraku interior, including those described here, were disturbed or exposed through unscientific and undocumented digging. Furthermore, over 90 statues throughout Rano Raraku interior and exterior were disturbed from 1868 to 1989. While this vandalism is deplorable, our database mitigates at least some of this regrettable damage.

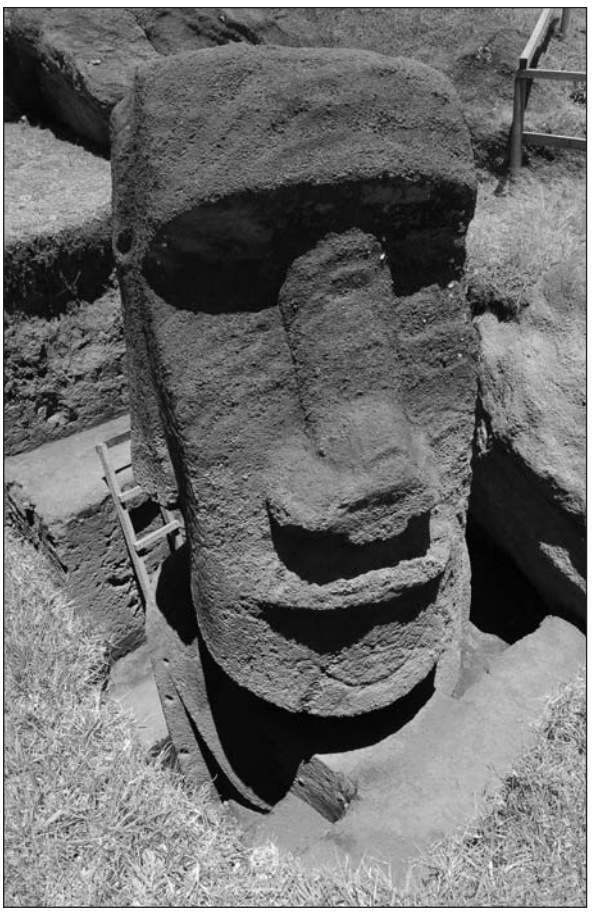

Figure 1. RR-001-156, ventral view. EISP Archives.

Research Perspective: The Rapa Nui "Paracosm"

Our research considers ancient aesthetics from the point of view of cognitive archaeology set within a holistic/contextual framework (Van Tilburg *in press*). We ask two basic questions:

Jo Anne Van Tilburg | The Cotsen Institute of Archaeology at UCLA jvt@ucla.edu
Cristián Arévalo Pakarati | The Easter Island Statue Project cap@eisp.org

Figure 2. RR-001-157, dorsal view. EISP Archives.

- how did symbols interact with belief in order to capture the creative imagination, encourage cooperative social action, and promote sustainable production sufficient to achieve megalithic construction?
- what was the pulse of community change over time in a limited natural environment, and how did artistry, as reflected in sculpture, contribute to or mitigate that change?

We discern an overall continuity in material selection and object situation and an association of statue numbers, sizes, styles, embellishments and technological innovations with variant terrain and two ethnographically known geographical/political regions. These consistently articulated, regional distribution patterns are also present in the special use areas of 'Orongo and Rano Raraku. We hypothesize, therefore, an interaction of locality with universality. That is, the *moai* was the universal ideal objectifying a narrative of differential status but also embodying multiple, particular stories that localized shared history.

Conservation Initiative

Collaborators on the Conservation Initiative of our project are Dr. Christian Fischer of UCLA's Cotsen Institute of Archaeology and Mónica Bahamondez P., Director of the Centro Nacional de Conservación y Restauración in Santiago, Chile. Their report, which is forthcoming, describes a pilot project based on extensive, previous research and characterization of Rano Raraku tuff (cf. Bahamondez P. 1990; Bahamondez P. & Valenzuela 2005; Van Tilburg et al. 2008b; Wendler et al. 1996).

Their protocol includes environmental monitoring and treatment expected to stabilize the statues at their current state of deterioration and to mitigate the detrimental effects of an adverse climatic environment. Sensors were installed to record soil moisture and temperature, surface temperature of statues, and sunlight exposure, as well as a weather station to monitor the site's microclimate (wind, temperature, and humidity). Data are downloaded bi-weekly and collection will last for the 5-year duration of our project.

Lake Mapping

Another pilot program completed this year was the mapping of Rano Raraku lake using side scan sonar to amplify and clarify changes in topographical parameters and locate any evidence of submerged quarries at the lake edge. This work, which builds upon earlier studies (cf. Flenley et al. 1991; Mieth & Bork 2010), will make further use of our environmental data. Mapping was accomplished with Dr. Shelley Wachsmann, Nautical Archaeology Program, Texas A&M University and Jeffrey Morris, Underwater Scientist, AsulMar Research.

Excavations

The target statues for this project (RR-001-156 and RR-001-157) were, so far as we know, first disturbed by the Mana Expedition to Easter Island in 1914-15 (Routledge 1919: Figures 70-71). Other intrusions by the Franco-Belgian Expedition (1935) and the Norwegian Archaeological Expedition (1954-55) followed. None of these activities reached the base of either target statue and no scientific reports were produced by anyone involved.

The target statues are of high archaeological value due to complex dorsal petroglyphs, previously partially exposed but never documented. These carvings are formally different from those on the dorsal side of

EISP DATASHARE sculptural objects totals

		Quarry Zone	Museum	Survey Sections	Total count
DATASHARE counts (contains Object ID)	moai head	65	32	137	234
	moai torso	12	7	207	226
	moai fragment	23	1	213	237
	shaped block	66	0	4	70
	moai complete	296	12	225	533
Georeference counts (contains GPS point)	moai head	64	0	55	119
	moai torso	10	0	84	94
	moai fragment	23	0	91	114
	shaped block	60	0	3	63
	moai complete	291	1	168	460
Research DB (contains major metric)	moai head	33	21	74	128
	moai torso	8	6	133	147
	moai fragment	11	1	80	92
	shaped block	50	0	1	51
	moai complete	177	11	197	385

		Ahu moai	Intermediate (transport)	Intermediate Quarry Zones 1 and 2	Intermediate Survey Sections	Intermediate Associated with ahu
Complete moai	DATASHARE count	154	118	56	54	8
	Georeference count	103	104	56	48	0
	Research DB count	128	103	48	48	7

Table 1. EISP DATASHARE sculptural objects totals.

BM-MOM-001, a statue in the British Museum (Van Tilburg 2006). We accomplished laser scanning of the British Museum statue but our proposal to do the same with the target statues was rejected by the Consejo de Monumentos Nacionales, Isla de Pascua. We accomplished documentation of the petroglyphs through digital photography, metrics, and scale drawings (Figure 3).

Quarry Two: Historic Intrusion Levels

Statue RR-001-156 was 1.32m above ground prior to excavation and 6.60m total height. Statue RR-001-157 was 3.17m above ground and 7.16m total height. Sections depicting the existing grade to 3m depth were augmented by historic photographs and metrics to produce a series of digital composites providing an overview of historic levels. This allowed us to correctly estimate soil level changes from 1914 to the present and to calculate accumulation rates at about 1cm per year for 80 years, and suggested where we might discern previous intrusions in the stratigraphy. Deposition levels suggest the statues were upright in place for ca. 500 years.

Screening of Deposits

We removed and screened overburden at the back of Quarry 2 (Figure 4) on a sorting board. We also excavated a directly associated *umu pae* and an adjacent *hare paenga* foundation. Backdirt from each individual excavation was isolated. Deposits in squares more distant from the statue were removed with square head shovels and trowels. Smaller tools were frequently required.

Archaeological Collections

The Excavation Finds Log assigned a pre-printed number to each field object collected, and materials classifications

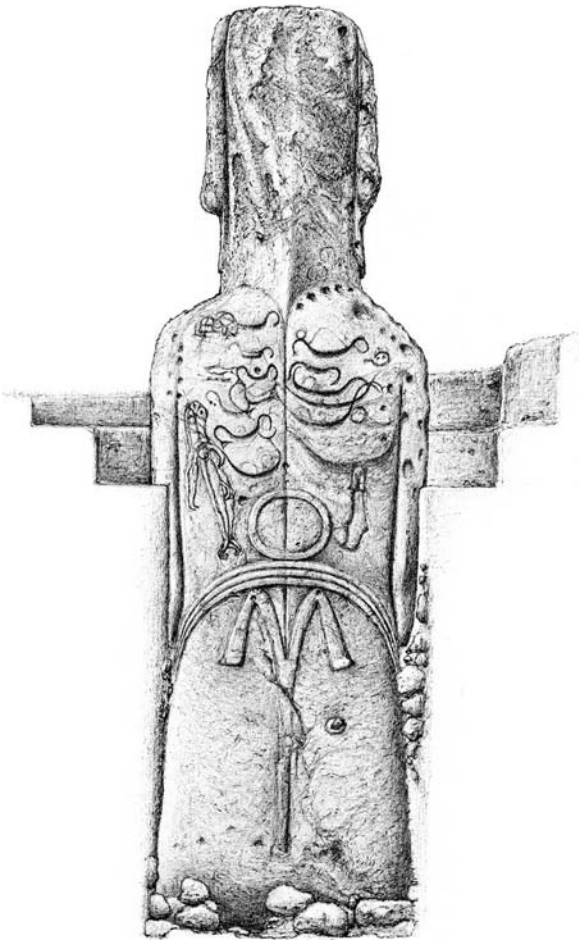

Figure 3. RR-001-157, scale drawing of petrogyphs on dorsal side, EISP Archives.

were established for level bag collections (Figures 5 & 6). All *toki*, of which 504 were collected, were measured in a standard manner and individually photographed. An X-ray florescence (XRF) study employing about 189 of the implements was initiated for comparison with a sample of data collected on 30 basalt quarries. Several examples of an interesting object that may be a scribing tool were found in association with both statues. They are either basalt or obsidian and consist of a rough and varying shape with a single, sharp and flaked point. Their fortuitous shapes recall the varied shapes and flaking techniques used to make *mata'a.* One basalt *mata'a* was recovered, as was 800g of red pigment.

Carbon and Human Bone Collection

Samples of both carbon and bone were identified at nearly all levels by both digging and screening, and were collected with gloves and/or metal tweezers and stored in archival safe plastic vials. The dates of the most recent fires in the interior of Rano Raraku are recorded in the EISP archives by reference to historic photographs. Routledge (RGS/WKR) reported carbon "just below the surface," at the "5 inch level at 4 feet" from the back of one of our target statues, as well as "at the 18 inch level" and at what she says are 2, 3, and 4 feet levels (Van Tilburg 2003). We found quantities of carbon throughout previously excavated levels. Below her 4 foot level, the carbon was in unexcavated levels.

Routledge's unpublished notes (WKR/RGS4/9; Van Tilburg 2003) report at least one burial located "at the level of the bas-relief ring design" for RR-001-156. She described the remains as follows:

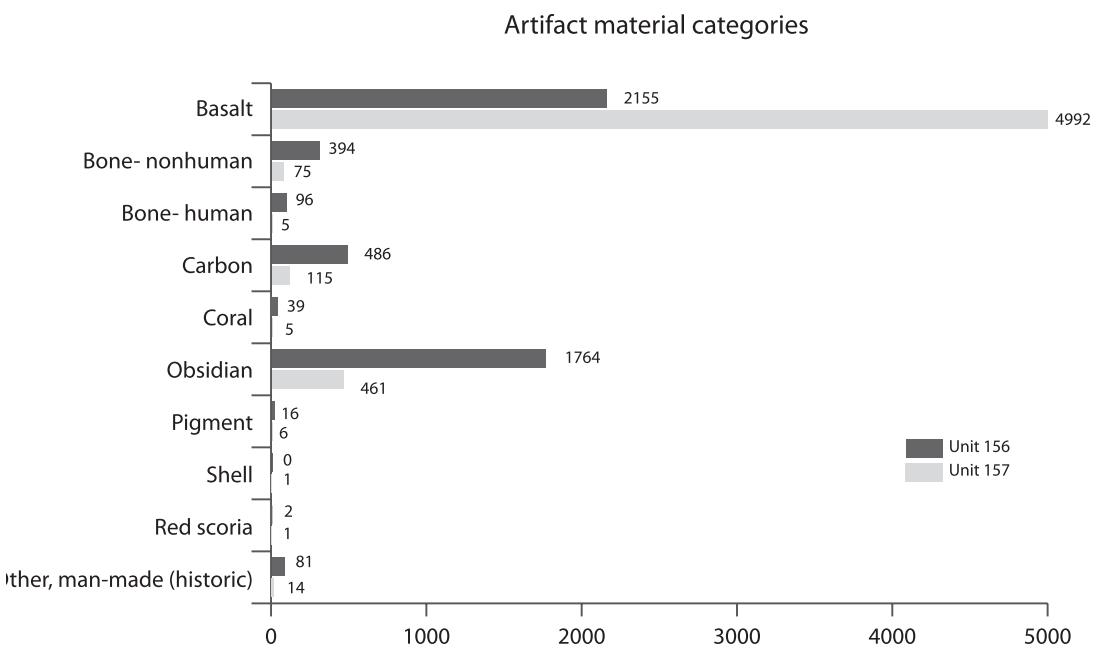

Figure 4. Artifact collections by materials category and statue (unit), EISP Archives.

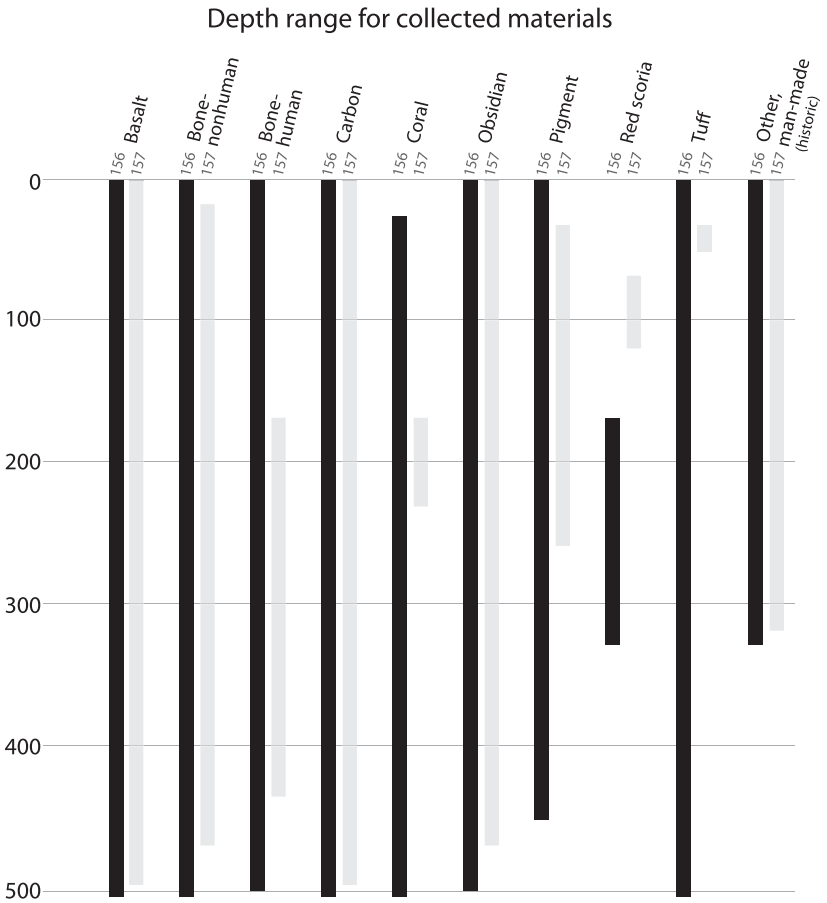

Figure 5. Artifact materials collections by depth and statue (unit), EISP Archives.

> "skeleton of which long bones, base of skull and patella were identified. Position: head to the right of the statue and long bones to left of statue."

In the process of attempted removal, the bones were damaged and then, presumably, returned to the excavation. However, we recovered a large fragment of either a patella or skull during our first field season in one of the carving canals of Quarry 2, located behind RR-001-157. It is probable that Routledge, or someone with her, cast some bones aside rather than replacing them in her excavation.

Features

The most interesting features associated with both statues were revealed at and under their bases and in bedrock between the two statues, an area previously unexamined. A large and deep posthole with abrasion marks, along with rope guides, was cut into the bedrock (Figure 7). Presumably used to lift statues upright, these features appear to have been used for statues removed prior to those excavated.

Backfill

In April 2012, both statues were backfilled with separately stored dirt from each discrete excavation. The first layer of fill consists in both cases of large stones and rubble, followed by a layer of smaller stones and then the compacted backdirt. The environmental monitoring equipment remains in place. Laboratory analyses of samples are underway. Further excavations are planned in the same area.

Acknowledgments

Our primary funding agency was the Archaeological Institute of America Site Preservation Committee. Digital survey equipment and data analysis support were provided in 2002-3 by Dr. Peter Boniface, California Polytechnic University, Pomona, and by Trimble, Inc. in 2004-7. Laser scanning equipment and London field personnel were provided in 2007 by Zoller + Frölich GmbH. Travel funds for Mónica Bahamondez P. to Los Angeles were provided in 2007 by the Cotsen Institute of Archaeology at UCLA; other funding was

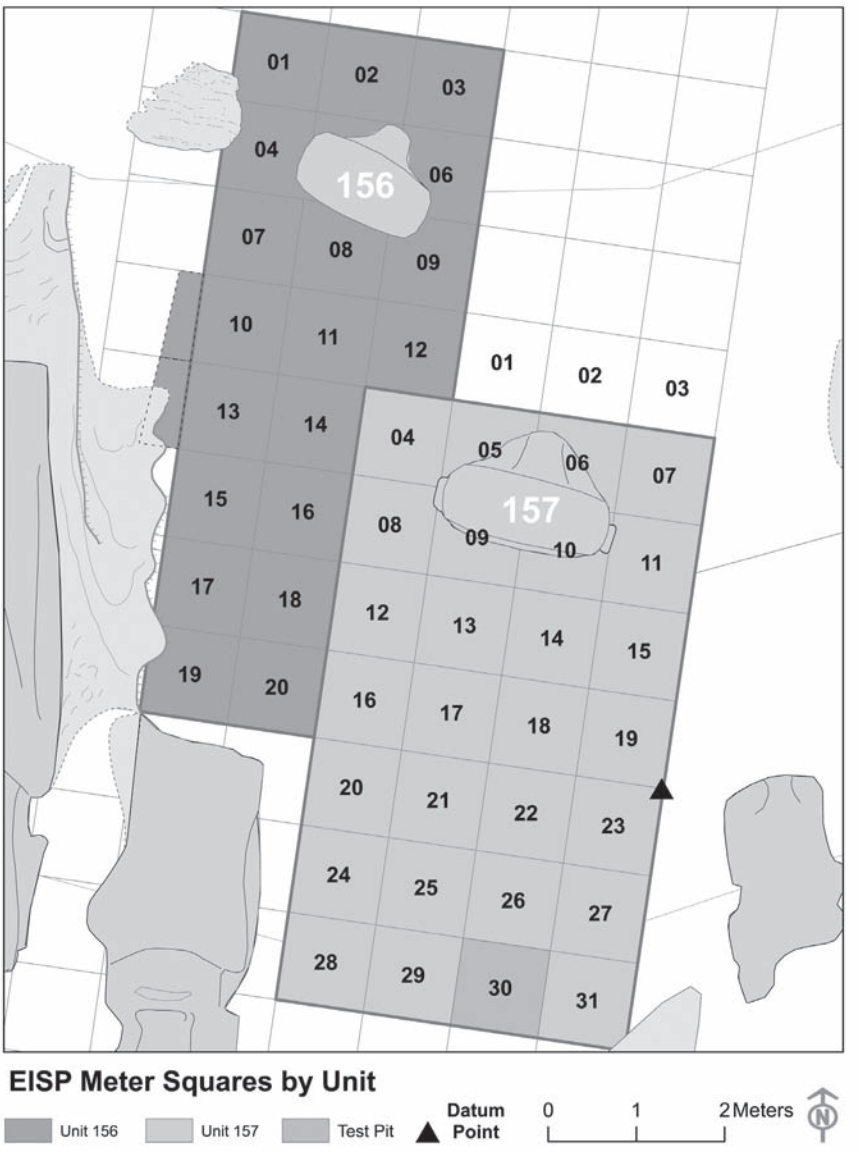

Figure 6. Survey grid, Quarry 2, EISP Archives.

provided by the Centro Nacional de Conservación y Restauración and Dirección de Bibliotecas Archivos y Museos (Dibam). Digital processing and scanning of large-scale maps and drawings was provided by VTBS, Inc. Travel and accommodation costs for field teams were provided in 2007 by Archaeological Tours, Inc.

Excavation participants include: Season I: Johannes Van Tilburg, Alice Hom, Patricio Rodrigo Madariaga Paoa, Carlos Rapu Rapu, Benjamin Mihaore Pakarati González; Season II: Kim Ahn Hoang, Patricio Rodrigo Madariaga Paoa, Darío Icka Paoa, Benjamin Mihaore Pakarati González, Baiheri Tuki Haoa, Ana Pakarati Icka, Rosa Lucia Ika Paoa, Tokerau Pakarati Icka, Hotu Pakarati Icka; Season III: Darío Icka Paoa, Rosa Lucia Icka Paoa, Anastasia Ika Paoa, and Baiheri Tuki Haoa. Student Participants include Isaías Hey Gonzáles, Joaquin Soler Hotu, Rafael Paoa Rapu, Tiktehatu Astete Paoa, Felipé Rubio Munita; Season IV: Baihere Tuki Haoa, Tarita Maitai Riroroko Rapu, Melisanda Pakarati, Margarita Pakarati, Nicholas Fredes Hey, Martin Hey González Atahanga Icka Pakarati, Rosa Icka Paoa, Anastasia Ika Paoa, Season V: Rosa Lucia Icka Paoa, Anastasia Ika Paoa, Baiheri Tuki Haoa, Alicia Hey, Ana Pakarati Icka, Patricio Madariaga Paoa; Season IV: Baiheri Tuki Haoa, Patricio Madariaga Paoa; Rano Raraku Lake Mapping: Shelly Wachsmann, Ph.D., Jeffrey Morris, Susan Morris, Patricio Rodrigo Madariaga Paoa and Baiheri Tuki Haoa. EISP staff, in addition to the authors, who participated: Alice Hom, Kim Ahn Hoang, Deidre Whitmore and Eric Branda.

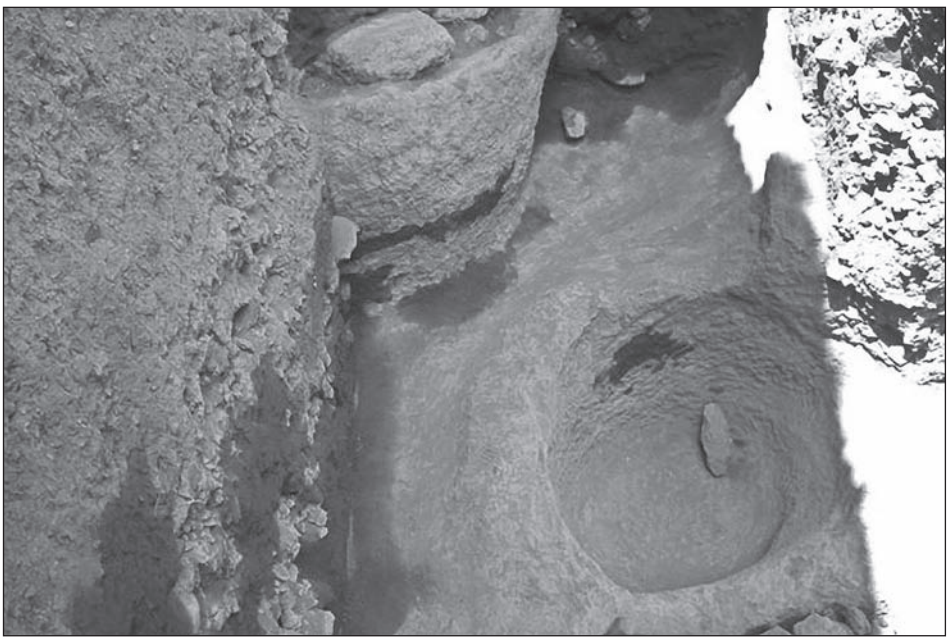

Figure 7. RR-001-156, bedrock post hole and rope guide; *toki* in situ, EISP Archives.

References

Bahamondez Prieto, M. 1990. Acciónes de conservación sobre los moai de Isla de Pascua: Su evaluación en laboratorio. In *Lavas and Volcanic Tuffs.* A. Elena Charola (ed.):89-99. Santiago: CONAF, WMF and ICCROM.

Bahamondez Prieto, M. & P. Valenzuela. 2005. Diagnostico del estado de conservación de la estatuaria Pascuense. Report on file. Santiago: Centro Nacional de Conservación y Restauración.

Flenley, J.R., A.S. King, J. Jackson, C. Chew, J.T. Teller, & M.E. Prentice. 1991. The Late Quaternary vegetational and climatic history of Easter Island. *Journal of Quarternary Science* 6(2):85-115.

Letellier, R. 2007. *Recording, Documentation, and Information Management for the Conservation of Heritage Places: Guiding Principles*. Volume 1. Los Angeles: Getty Conservation Institute.

Mieth, A. & H.-R. Bork. 2010. Humans, climate or introduced rats - which is to blame for the woodland destruction on prehistoric Rapa Nui (Easter Island)? *Journal of Archaeological Science* 37(2):417-426.

Routledge, K.S. 1919. *The Mystery of Easter Island*. London: Sifton, Praed, Ltd.

Van Tilburg, J. 2003. *Among Stone Giants: The Life of Katherine Routledge and Her Remarkable Voyage to Easter Island*. New York: Scribner's.

——2006. *Remote Possibilities: Hoa Hakananai'a and HMS Topaze on Easter Island*. Research Paper 158. London: British Museum Press.

——*in press*. Statues and Monumental Art. In *Archaeology of Art, Encyclopedia of Global Archaeology*. Danae Fiore (Section ed.). Boston: Springer Press.

Van Tilburg, J., C. Arévalo P., & A. Hom. 2008a. Mapping Features. In *Illustrated Examples: Recording Documentation and Information Management for the Conservation of Cultural Heritage Places*. R. Eppich (ed.):40-45. Los Angeles: Getty Conservation Institute.

Van Tilburg, J., A.L. Kaeppler, M. Weisler, C. Cristino, & A. Spitzer. 2008b. Petrographic analysis of thin–sections of samples from two monolithic statues (moai), Rapa Nui (Easter Island). *Journal of the Polynesian Society* 117:3.

Wendler, E., A.E. Charola, & B. Fitzner. 1996. Easter Island Tuff: Laboratory Studies for its Consolidation. In *Proceedings of the 8th International Congress on Deterioration and Conservation of Stone*. J. Riederer (ed.):1159-1170. Berlin.