

PaleoAmerica

A journal of early human migration and dispersal

ISSN: 2055-5563 (Print) 2055-5571 (Online) Journal homepage: <http://www.tandfonline.com/loi/ypal20>

A Reevaluation of PaleoAmerican Artifacts from Jaywamachay Rockshelter, Ayacucho Valley, Peru

Juan Yataco Capcha & Hugo G. Nami

To cite this article: Juan Yataco Capcha & Hugo G. Nami (2016): A Reevaluation of PaleoAmerican Artifacts from Jaywamachay Rockshelter, Ayacucho Valley, Peru, *PaleoAmerica*, DOI: [10.1080/20555563.2016.1199198](https://doi.org/10.1080/20555563.2016.1199198)

To link to this article: <http://dx.doi.org/10.1080/20555563.2016.1199198>



Published online: 22 Sep 2016.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

RESEARCH BRIEF

A Reevaluation of PaleoAmerican Artifacts from Jaywamachay Rockshelter, Ayacucho Valley, Peru

Juan Yataco Capcha

Museo de Arqueología y Antropología, Universidad Nacional Mayor de San Marcos, Peru

Hugo G. Nami

CONICET-IGIBA, and FCEN, UBA, Argentina

As part of the “Botanical Archaeological Project Ayacucho-Huanta” in central Peru, excavations at Jaywamachay rockshelter were performed in 1969–1970. To reevaluate the rockshelter’s oldest human occupations, remains from its lower levels (layers J2 and J3) are currently under study. Based on new radiocarbon dates and technological/morphological observations made of tools, we confirm that Jaywamachay is one of the few dated sites with evidence of hunter–gatherers using fishtail points in highland Peru during the Pleistocene-Holocene transition.

Keywords fishtail point, bone tools, Pleistocene-Holocene transition, Peru

In 1969–1972, a significant number of sites were discovered by the interdisciplinary “Botanical Archaeological Project Ayacucho-Huanta” in central Peru (MacNeish 1969, 1971, 1976, 1978; MacNeish et al. 1970, 1980a). As a part of this undertaking, excavations at Jaywamachay rockshelter (13°18′55.96″S, 74°21′15.60″W, 3350 m.a.s.l) were performed in 1969–1970 (García Cook 1981, 57–79; MacNeish et al. 1983, 189–218). This site is located on the low side of a mountain, 200 m from the Cachi River bridge, Department of Ayacucho, Province of Huamanga (Figure 1a–b). As seen in Figure 1c, a large surface was excavated by Mexican archaeologist A. García Cook, identifying an archaeological sequence spanning the terminal Pleistocene to middle Holocene periods (García Cook 1981, 65–79, figure 3–10). Stratigraphically, 19 strata were exposed. From top to bottom, they were labeled with letters A to N (Figure 1d). Based on the finds coming from twelve layers (H, I, J, J1, J2, J3, K, K1, L, L1, M, and N), the lowest archaeological human occupations in the site were identified as belonging to the *El Puente* phase (García Cook 1981, 79; MacNeish et al. 1983, 190–202).

Archaeological finds collected in Jaywamachay are currently curated in the Museum of Archaeology, San Marcos University, Lima. To reevaluate and deepen the knowledge of the oldest human occupations of the site, remains exhumed in its lower levels are currently under study. As a part of this investigation, this paper presents technological and morphological observations performed on a few tools coming from layers J2 and J3 (Figure 1d).

From a chronological and archaeological viewpoint, the J2 and J3 materials reflect vestiges of hunter–gatherers that lived in Jaywamachay during the Pleistocene-Holocene transition. Two conventional ¹⁴C dates have been obtained from charcoal samples recovered in these strata. Lacking calibration curves at the time, they were reported as calendar years BC (García Cook 1981, 77; MacNeish 1981, 212, 227). However, the original dates were published in the Andean Radiocarbon database available on the web (Ziólkowski et al. 1994, 332–333). We corrected them with the Oxcal 4.2.4 calibration program (Bronk Ramsey and Lee 2013) employing the ShCal13 curve for the Southern Hemisphere (Hogg et al. 2013). Following are the results: J2 is 9890 ± 310 ¹⁴C yr BP (I-5683), or 12,424–10,496 cal yr BP (two sigma); J3 is 10,280 ± 170 ¹⁴C yr BP (I-5699), or 12,548–11,325 cal yr BP.

Correspondence to: Juan Yataco Capcha. Email: capchajuan@gmail.com

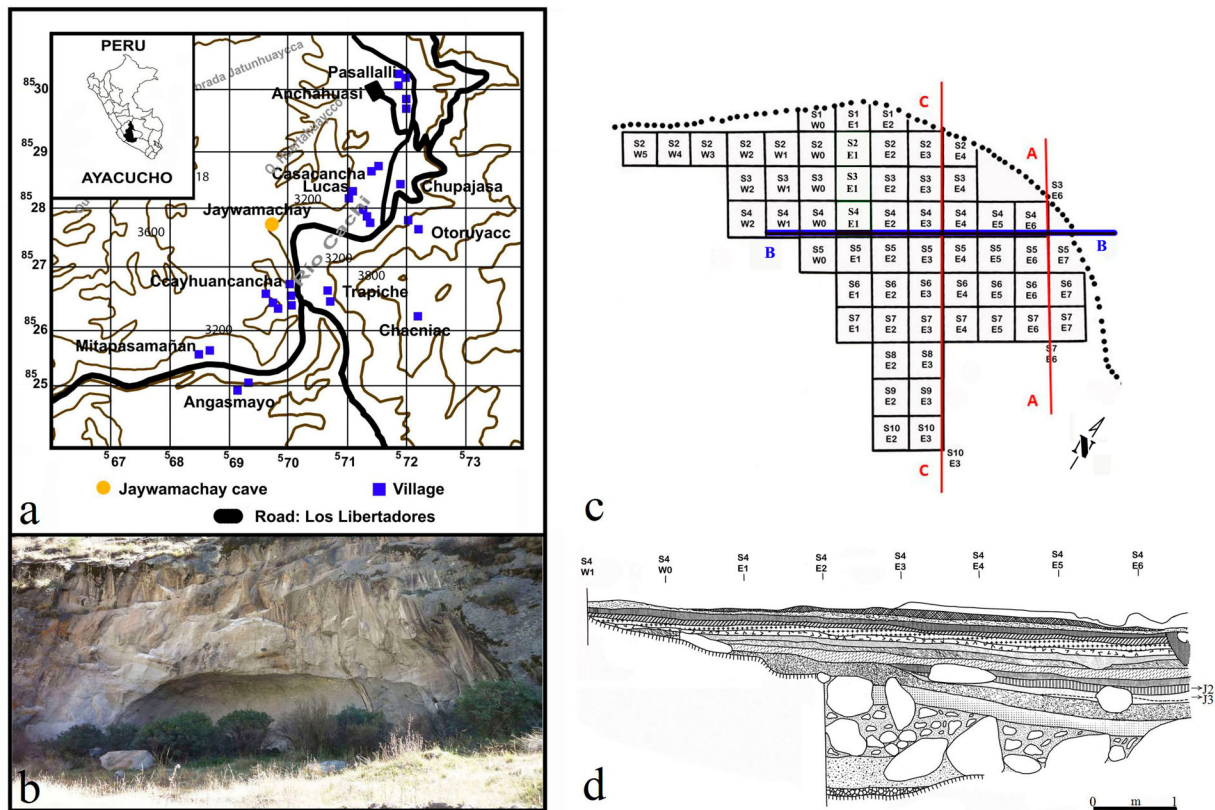


Figure 1 (a–b) Location map and image of Jaywamachay rockshelter in central Peru, (c) plan of the excavated surface and locations of profile drawings; (d) stratigraphic profile (B–B), showing the levels where radiocarbon dates came from in the sequence (MacNeish 1981, 67).

From the J2 and J3 levels, extinct horse, deer, and possibly camelid bones were recovered (Lynch 1980, 111–112, 1983, 116; MacNeish 1971, 43–44). Significantly, among the bones from J2 are two nicely worked implements (Figure 2a–b) formerly identified as a “cylindrical bone pin” and a “long bone flesher” (MacNeish and Nelken-Terner 1980, 316, figures 8–10, 8–11). One of them (catalog number Ac335 51-12) is 42 mm long and 5 mm in diameter, and it bears a cylindrical cross-section with a carefully pointed tip, which is partially broken (Figure 2a). The second (Ac335 46-11h’23) is a fragmented diaphysis (89 mm long, 20 mm wide, and 6 mm thick) of a long bone that exhibits a flattened broken tip with several striae, possibly made during the manufacturing process (Figure 2b). Both tools show polishing, probably due to use.

Lithic artifacts consisting of unifacial and bifacial implements as well as debitage were recovered in J2 ($n = 33$) and J3 ($n = 20$). Among these are various bifacial specimens which were reported as “Fell’s cave fluted points” (MacNeish et al. 1980b, 51, figures 2–3); however, no detailed information about them has been published. Consequently, we provide additional data on these artifacts. As shown in Figure 2c–e, they are made of obsidian with tones ranging between light brownish gray (5YR 6/1) and

black (N1) (following the Munsell 2009 geological rock-color chart). Specimen 1 is from J2 while specimens 2 and 3 are from J3. As depicted in Figure 2c, the former (without catalog number) is the lower part of bifacial point, probably broken in its middle portion. Its dimensions are 32 mm long, 26 mm wide, and 7 mm thick. It has mostly non-regular parallel retouch, some in diagonal form, made by pressure flaking, and it has a biconvex longitudinal cross-section. Probably the fracture was produced by impact (Dunbar 2012; Weitzel et al. 2014). The artifact shown in Figure 2d (catalog number Ac335 47-11a1) is a complete blade of a broken fishtail point lacking the lower part of the stem. It is lanceolate in shape with light convex edges and a biconvex transverse cross-section. Its dimensions are 41 mm long, 21 mm wide, and 6 mm thick, and the blade length is 32 mm, stem length is 9 mm, base width is 14 mm, and blade/stem intersection is 20 mm. It was finished by pressure flaking which left irregular parallel retouch mostly reaching the symmetrical axis of the piece. Underlying them, it is possible to observe bifacial-thinning flake scars probably made with soft percussion. The artifact shown in Figure 2e (catalog number Ac335 47-11a2) is 27 mm long, 23 mm wide, and 7 mm thick. It is a fragmented preform, originally identified as the basal portion of a point

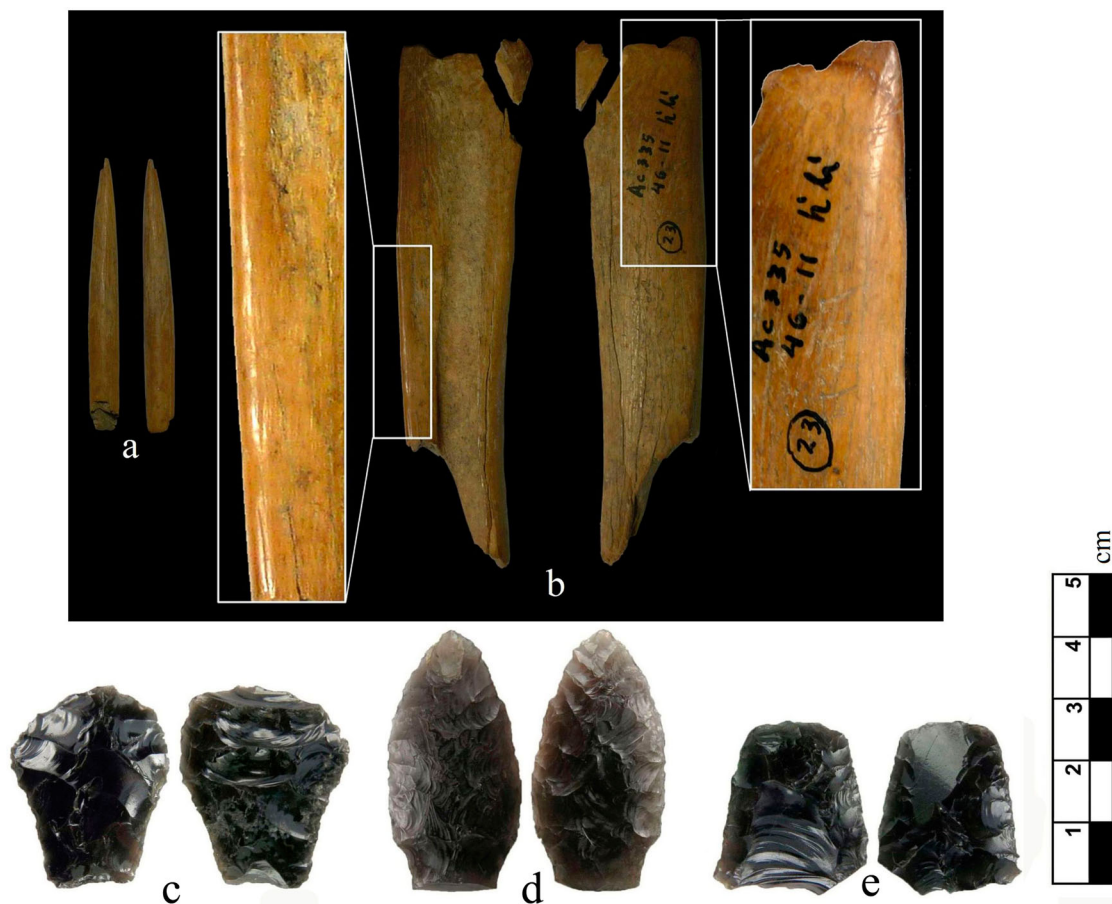


Figure 2 Analyzed artifacts from the J2 and J3 layers (photos by Juan Yataco, MAA-UNMSM): (a–b) bone tools and close-up images showing the polishing and tip of artifact b; (c–d) Fell points (specimens 1 and 2); (e) fluted tip preform (specimen 3).

(MacNeish et al. 1980b, figures 2 and 3). It has been mostly flaked by pressure, leaving irregular parallel retouch. One face still shows the remains of the flake-blank used in its manufacture. The opposing face has the terminal portion of a flute ending with a step fracture. On the tip there is a retouched beveled edge, probably the remnant of platform preparation during flaking (Nami 2014a, figure 13). The aforementioned observations suggest that this represents the tip of a preform broken in two or more pieces during fluting, such as has been archaeologically and experimentally observed (e.g. Frison and Bradley 1980, figures 29c, 34–35; Nami 2014a; Sollberger 1977).

The analyzed artifacts undoubtedly correspond to those manufactured by hunter-gatherers that used Fell points in their weaponry. In fact, specimens with contracting stem similar to artifact 1 (Figure 2c) exist among these lithic points (Mayer-Oakes 1986, figure 3; Nami 2014b, figure 21, Nami 2015, figure 2a). The morphology of artifact 2 (Figure 2d) is consistent with the lanceolate variant with narrow blade of fishtail points (Nami 2014a, figure 22). Similar pieces have been found in several countries in South America, for example Ecuador (Nami 2014a, figure 21), Brazil (Loponte et al. 2015, figures 4–5; da Silva and Nami 2011), Uruguay (Nami 2013, figure 4a–b, d and n–o),

Argentina (Flegenheimer et al. 2013, 370, figure 21.6; Hermo et al. 2015, 106, figure 2), and Chile (Bird 1969, figure 5d, o–p). It is well-known that some Fell points were fluted (Flegenheimer et al. 2013; Nami 2014b); therefore, the flute on the preform is another clue confirming that the artifacts from layers J2 and J3 of Jaywamachay represent the remains of PaleoAmerican hunter-gatherers. Fishtail fluted points and preforms in Peru have been found in Quebrada Santa María (Chauchat and Briceño 1998a, figure 53 right), Quisqui Puncu (Lynch 1970, figures 12j, 20d–e), El Palto (Maggard 2015, 30, figure 3), and the Pucuncho basin (Sandweiss and Rademaker 2011, 279, figures 3–4) as well as in other locations in South America (Hermo et al. 2015, 106, figure 2H; e.g. Jackson et al. 2007; Nami 1987, 2001). It is worth mentioning that artifact Ac335 46-6 aa16, which was illustrated by MacNeish et al. (1980b, 51, figure 2–3, left) cannot be found in the collection; however, judging by the illustration, it is consistent with the Fell points variation named “El Inga broad stemmed” identified in Ecuador and other places in South America (Mayer-Oakes 1986; Nami 2014a, 201, figure 20).

The above-described lithic artifacts support the conclusion of MacNeish et al. (1980b) that the remains

from levels J2 and J3 at Jaywamachay belong to the makers of Fell points. Similar diagnostic remains were found from the north in Chiapas State in southern Mexico (García Bárcena 1980) and Belize (Pearson and Bostrom 1998) south to the southern tip of South America (Bird 1946; Massone 1987). Particularly in Peru, they have been found in several localities across the country (Briceño Rosario 1999; Chauchat and Zevallos-Quiñones 1979; Chauchat et al. 1998; Díaz Rodríguez 2008; León Canales et al. 2004; Maggard 2010; Maggard and Dillehay 2011; Ossa 1976; Sandweiss and Rademaker 2011). Also, dates from both layers fit with other radiocarbon assays obtained at Fell point sites along the Andean Cordillera (e.g. Jackson et al. 2007; Maggard and Dillehay 2011; Nami and Heusser 2015; Nami and Stanford 2015; Nuñez et al. 1994) and other places in South America (Flegenheimer et al. 2013; Nami 2007; Prates et al. 2013). In addition, the nicely made bone tools from Jaywamachay agree with the assertion that these early foragers, in their traditional technological knowledge, also had a well-developed bone technology (Nami 2010).

In summary, the results of this study provide further data about the earliest occupations in western South America. Excavated in a period with scarce evidence on the subject, we have confirmed that Jaywamachay is one of the few dated sites that provides evidence of hunter-gatherers who used fishtail points in highland Peru during the Pleistocene-Holocene transition. Ongoing research and analysis will add more data and discussions on the remains excavated from the lower archaeological levels of Jaywamachay rockshelter.

Acknowledgements

We are deeply indebted to the Archaeological and Anthropological Museum of San Marcos University, Lima, Perú, for allowing us to study the McNeish collection, and the University of Buenos Aires and CONICET of Argentina for their continuous support. Michael A. Malpass (Department of Anthropology, Ithaca College) provided invaluable editing of an early draft of this paper.

References

Bird, J. 1946. "The archeology of Patagonia." In *Handbook of South American Indians*, edited by J. H. Steward, 17–24. Smithsonian Institution Bulletin 143. Washington, DC: Smithsonian Institution Bureau of American Ethnology.

Bird, J. 1969. "A comparison of south Chilean and Ecuadorian 'fishtail' projectile points." *Kroeber Anthropological Society Papers* 40: 52–71.

Briceño, R. J. 1999. "Quebrada Santa María: Las puntas en cola de pescado y la antigüedad del hombre en Sudamérica." *Boletín de Arqueología PUCP* 3: 19–39.

Bronk Ramsey, C., and S. Lee. 2013. "Recent and planned developments of the program OxCal." *Radiocarbon* 55(2–3): 720–730.

Chauchat, C., and R. J. Briceño. 1998. "Paijan and fish-tail points from Quebrada Santa María, north coast of Peru." *Current Research in the Pleistocene* 15: 10–11.

Chauchat, C., C. Gálvez, J. Briceño, and S. Uceda. 1998. *Sittios arqueológicos de la zona de Cupisnique y margen derecha del valle de Chicama, Patrimonio Arqueológico Zona Norte/4*. Travaux de L'Institut Français d'Etudes Andines 113. Trujillo: Instituto Nacional de Cultura La Libertad; Lima: Instituto Francés de Estudios Andinos.

Chauchat, C., and J. Zevallos Quiñones. 1979. "Una punta en cola de pescado procedente de la costa norte del Perú." *Nawpa Pacha* 17(1): 143–146.

da Silva, L. P., H. G. Nami. 2011. "A new fishtail-point find from south Brazil." *Current Research in the Pleistocene* 28: 104–107.

Díaz Rodríguez, L. H. 2008. "Una punta tipo cola de pescado con acanaladura de Quillane, Arequipa." *Tambo. Boletín de Arqueología* 1: 73–82.

Dumbar, J. S. 2012. *The Search for Paleoindian Contexts in Florida and the Adjacent Southeast*. PhD dissertation, Florida State University, Tallahassee.

Flegenheimer, N., L. Miotti, and N. Mazzia. 2013. "Rethinking early objects and landscape in the Southern Cone: Fishtail point concentrations in the Pampas and northern Patagonia." In *Paleoamerican Odyssey*, edited by K. E. Graf, C. V. Ketron, and M. R. Waters, 359–376. College Station: Center for the Study of the First Americans, Texas A&M University.

Frison, G. C., and B. Bradley. 1980. *Folsom Tools and Technology at the Hanson Site, Wyoming*. Albuquerque: University of New Mexico Press.

García Bárcena, J. 1980. "Una punta acanalada de la Cueva de Los Grifos, Ocozocoautla, Chis." In *Cuadernos de Trabajo* 17. México City: Instituto Nacional de Antropología e Historia.

García Cook, A. 1981. "The stratigraphy of Jaywamachay, Ac335." In *Prehistory of the Ayacucho Basin, Peru. Vol. II. Excavations and Chronology*, edited by R. S. MacNeish, A. García Cook, L. Lumbrellas, R. Vierra, and A. Nelken-Terner, 57–79. Ann Arbor: Robert S. Peabody Foundations for Archaeology, University of Michigan Press.

Hermo, D., E. Terranova, and L. Miotti. 2015. "Tecnología y uso de materias primas en puntas de pescado de la meseta de Somuncurá (Provincia de Río Negro, Argentina)." *Chungará Revista de Antropología Chilena* 47(1): 101–115.

Hogg, A. G., Quan Hua, P. G. Blackwell, Mu Niu, C. E. Buck, T. P. Guilderson, T. J. Heaton, G. Palmer, P. J. Reimer, R. W. Reimer, C. S. Turney, and S. R. H. Zimmerman. 2013. "SHCal13 Southern Hemisphere calibration, 0–50,000 years cal BP." *Radiocarbon* 55(4): 1889–1903.

Jackson, D., C. Méndez, R. Seguel, A. Maldonado, and G. Vargas. 2007. "Initial occupation of the Pacific coast of Chile during late Pleistocene times." *Current Anthropology* 48: 725–731.

León, C. E., G. J. Alcalde, G. C. Toledo, C. J. Yataco, and L. L. Valenzuela. 2004. "New possible Paleoamerican fish-tail point finds at Laguna Negra, northern Peru." *Current Research in the Pleistocene* 21: 11–13.

Loponte, D., M. Carbonera, and R. Silvestre. 2015. "Fishtail projectile points from South America: The Brazilian record." *Archaeological Discovery* 3: 85–103.

Lynch, T. F. 1970. *Excavations at Quishqui Puncu in the Callejon de Huaylas, Peru*. Pocatello: Occasional Papers of the Idaho State University Museum, 26.

Lynch, T. F. 1980. "Presencia y adaptación post-glacial del hombre en los Andes Sudamericanos." *Revista de Antropología Chilena* 6: 96–123.

Lynch, T. F. 1983. "The Paleo-Indians." In *Ancient South Americans*, edited by Jesse D. Jennings, 87–137. San Francisco: Freeman.

MacNeish, R. S. 1969. *First Annual Report of the Ayacucho Archaeological-Botanical Project*. Andover: Robert S. Peabody Foundation for Archaeology.

MacNeish, R. S. 1971. "Early man in the Andes." *Scientific American* 224(4): 36–46.

MacNeish, R. S. 1976. "Early man in the New World: A survey of the archaeological evidence suggests that a number of specialized tool complexes were widely distributed in the Americas before 12,000 years ago." *American Scientist* 64(3): 316–327.

MacNeish, R. S. 1978. "The Harvey Lecture Series. Late Pleistocene adaptations: A new look at early peopling of the new world as of 1976." *Journal of Anthropological Research* 34(4): 475–496.

MacNeish, R. S. 1981. "Synthesis and conclusions." In *Prehistory of the Ayacucho Basin, Peru. Vol. II, Excavations and Chronology*, edited by R. S. MacNeish, A. García Cook, L. Lumbrellas, R. K. Vierra, and A. Nelken-Terner, 199–257. Ann Arbor:

- Robert S. Peabody Foundation for Archaeology, University of Michigan Press.
- MacNeish, R. S., and A. Nelken-Terner. 1980. "Bone tools". In *Prehistory of the Ayacucho Basin, Peru. Vol. III, Nonceramic Artifacts*, edited by R. S. MacNeish, R. K. Vierra, A. Nelken-Terner, and C. J. Phagan, 309–321. Ann Arbor: Robert S. Peabody Foundation for Archaeology, University of Michigan Press.
- MacNeish, R. S., A. Nelken-Terner, and R. K. Vierra. 1980b. "Haftable pointed bifaces." In *Prehistory of the Ayacucho Basin, Peru. Vol. III, Nonceramic Artifacts*, edited by R. S. MacNeish, R. K. Vierra, A. Nelken-Terner, and C. J. Phagan, 35–95. Ann Arbor: Robert S. Peabody Foundation for Archaeology, University of Michigan Press.
- MacNeish, R. S., R. K. Vierra, and A. García Cook. 1983. "The Preceramic way of life in the humid woodland ecozone." In *Prehistory of the Ayacucho Basin, Peru. Vol. IV, The Preceramic Way of Life*, edited by R. S. MacNeish, R. K. Vierra, A. Nelken-Terner, and C. J. Phagan, 188–218. Ann Arbor: Robert S. Peabody Foundation for Archaeology, University of Michigan Press.
- MacNeish, R. S., R. K. Vierra, A. Nelken-Terner, and A. García Cook. 1970. *Second Annual Report of the Ayacucho Archaeological – Botanical Project*. Andover: Robert S. Peabody Foundation for Archaeology.
- MacNeish, R. S., R. K. Vierra, A. Nelken-Terner, and C. J. Phagan. 1980a. *Prehistory of the Ayacucho Basin, Peru. Vol. III, Nonceramic Artifacts*. Ann Arbor: Robert S. Peabody Foundation for Archaeology, University of Michigan Press.
- Maggard, G. J. 2010. "New evidence of fishtail occupation in northern Peru." *Current Research in the Pleistocene* 27: 17–19.
- Maggard, G. J. 2015. "The El Palto phase of northern Peru: Cultural diversity in the late Pleistocene–early Holocene." *Chungara: Revista de Antropología Chilena* 47(1): 25–40.
- Maggard, G., and T. Dillehay. 2011. "El Palto Phase (13800–9800 BP)". In *From Foraging to Farming in the Andes: New Perspectives on Food Production and Social Organization*, edited by T. Dillehay, 77–94. Cambridge: Cambridge University Press.
- Massone, M. 1987. "Los cazadores paleoindios de Tres Arroyos (Tierra del Fuego)." *Anales del Instituto de la Patagonia* 17: 47–60.
- Mayer-Oakes, W. 1986. "El Inga: A Paleo-Indian site in the Sierra of Northern Ecuador." *Transactions of the American Philosophical Society* 76(4).
- Munsell. 2009. *Geological Rock-Color Chart*. Boulder: Geological Society of America.
- Nami, H. G. 1987. "Cueva del Medio: Perspectivas arqueológicas para la Patagonia Austral." *Anales del Instituto de la Patagonia* 17: 71–106.
- Nami, H. G. 2001. "New data on Fell lithic technology from Paso del Puerto, Río Negro Basin, Uruguay." *Current Research in the Pleistocene* 18: 47–50.
- Nami, H. G. 2007. "Research in the middle Negro River basin (Uruguay) and the Paleoindian occupation of the Southern Cone." *Current Anthropology* 48(1): 164–74.
- Nami, H. G. 2010. "Late Pleistocene technology in the New World: Bone artifacts from Cueva del Medio and other sites in the Southern Cone of South America." In *Ancient and Modern Bone Artefacts from Russia. Cultural, Technological and Functional Signature*, edited by A. Legrand-Pineau, I. Sidéra, N. Buc, E. David, and V. Scheinsohn, 279–286. Oxford: BAR International Series.
- Nami, H. G. 2013. "Archaeology, Paleoindian research and lithic technology in the middle Negro River, central Uruguay." *Archaeological Discovery* 1: 1–22.
- Nami, H. G. 2014a. "Arqueología del último milenio del Pleistoceno en el Cono Sur de Sudamérica, puntas de proyectil y observaciones sobre tecnología Paleoindia en el Nuevo Mundo." In *Peuplement et Modalités d'Occupation de l'Amérique du Sud: l'Apport de la Technologie Lithique*, edited by M. Farias and A. Lourdeau, 279–336. Prigonrioux: Impr. Copy-média.
- Nami, H. G. 2014b. "Secuencias de reducción bifaciales Paleoindias y puntas Fell en el Valle del Ilaló (Ecuador): Observaciones para comprender la tecnología lítica Pleistocénica en Sudamérica." In *Peuplement et Modalités d'Occupation de l'Amérique du Sud: l'Apport de la Technologie Lithique*, edited by M. Farias and A. Lourdeau, 179–220. Prigonrioux: Impr. Copy-média.
- Nami, H. G. 2015. "Paleoamerican artifacts from Cerro Largo, northeastern Uruguay." *PaleoAmerica* 1: 288–292.
- Nami, H. G., and C. J. Heusser. 2015. "Cueva del Medio: A Paleoindian site and its environmental setting in southern South America." *Archaeological Discovery* 3: 62–71.
- Nami, H. G., and D. J. Stanford. 2015. "Dating the peopling of northwestern South America: An AMS date from El Inga site, highland Ecuador." *PaleoAmerica* 2: 60–63.
- Nuñez, L., R. Casamiquela, V. Schiappacasse, H. Niemeyer, and C. Villagrán. 1994. "Cuenca de Taguatagua en Chile: El ambiente del Pleistoceno y ocupaciones humanas." *Revista Chilena de Historia Natural* 67: 503–519.
- Ossa, P. 1976. "A fluted 'fishtail' projectile point from La Cumbre, Moche Valley, Peru." *Nawpa Pacha* 13(1): 97–98.
- Pearson, G. A., and P. Bostrom. 1998. "A new fluted stemmed point from Belize and its implications for a circum-Caribbean Paleoindian culture area." *Current Research in the Pleistocene* 15: 55–57.
- Prates, L., G. Politis, and J. Steele. 2013. "Radiocarbon chronology of the early human occupation of Argentina." *Quaternary International* 301: 104–122.
- Sandweiss, D. H., and K. M. Rademaker. 2011. "El poblamiento del sur Peruano: Costa y sierra." *Boletín de Arqueología PUCP* 15: 275–293.
- Sollberger, J. B. 1977. "On Folsom fluting: Notes on recent experiments." *Bulletin of the Texas Archaeological Society* 48: 47–52.
- Weitzel, C., N. Flegenheimer, M. Colombo, and J. Martínez. 2014. "Breakage patterns on fishtail projectile points: Experimental and archaeological cases." *Ethnoarchaeology* 6(2): 81–102.
- Ziólkowski, Mariusz S., F. Pazdur Mieczysław, Andrzej Krzanowski, and Adam Michczyński. 1994. *Andes: Radiocarbon Database for Bolivia, Ecuador, and Peru*. Warsaw: Andean Archaeological Mission of the Institute for Archaeology, Warsaw University; Gliwice: Gliwice Radiocarbon Laboratory, Institute of Physics, Silesian Technical University.