

H. AND T. KING GRANT FOR PRECOLUMBIAN ARCHAEOLOGY

Project Title:

ROADS AND CHANGING MOBILITY IN NORTHWEST ARGENTINA (AD 1400-1800)

Título de Proyecto:

CARRETERAS Y CAMBIOS EN LA MOVILIDAD EN EL NOROESTE DE ARGENTINA
(1400-1800 D.C.)

Dr. Verónica Williams

ABSTRACT:

Mobility defines human behavior; roads make that mobility possible. Here we propose to study human mobility along route-networks in an area of the Middle Calchaqui Valley, Salta Province, Argentina. Working in La Hoyada Quebrada (or ravine), tributary of the Calchaqui River Valley, and a natural connection route to the puna. We focus on the archaeology and history of roads and route networks in this quebrada where local conditions –low precipitation and low modern population– have resulted in the preservation of these in this sector.

Archaeological research highlights the fundamental role of high ravines and valleys for communication between different environments, since at least the first millennium of CE. Additionally, historical documents and secondary sources attest to the continued use and importance of this area as a transit zone until well into the Twentieth Century. As such, our case-study focuses on analyzing the development of roads and networks in the La Hoyada Quebrada at two different contiguous periods in time: The Inka (AD 1400-1532) and the Colonial (AD 1532-1810) periods.

The La Hoyada Quebrada incorporates an important Inka road segment that connects the Calchaqui Valley with the *puna* and then into the saltpans, linking this area with the Atacama Desert and northern Chile. This Inka road incorporated several ancillary structures, such as way-stations (*tampu*), that were then reused subsequently. With the introduction of the Spanish colonial system, this entire area became part of the Hacienda de Calchaquí, which had land dedicated to agriculture and pastures for the fattening of cattle that was then taken to Upper Peru.

Wholesale abandonment of the sector in the mid- to late Twentieth Century coupled with changing priorities in the cattle market business led to a progressive abandonment of the land, its

historical routes, and of these activities. Therefore, the La Hoyada Quebrada provides a critical example of over 500 years of changing use and attitudes to pre-industrial roads in the Americas.

In studying the La Hoyada Quebrada we will employ a series of different traditional and new methods to tease out the chronological and economic relationships between the different phases of use of the area and its transit routes, in effect, focusing on these routes as a *unit of analysis*. These include, (i) test-pit excavations of select built-up road segments and associated structures, (ii) material culture analysis, (iii) drone survey and GIS modelling of the road network across the whole transect, (iv) radiometric dating of archaeological deposits (including radiocarbon (^{14}C) and Optically Stimulated Luminescence (OSL) dating), and (v) ethnohistoric and historic research on post-Prehispanic use of the area and the road system.

While material culture analysis will supply us relative dates for the structures and roads found in the area, Bayesian modelling of the chronological data will provide us with a first insight into use of the La Hoyada Quebrada through time, including the phasing of building, exploitation, and abandonment of the region.

RESUMEN:

La movilidad define el comportamiento humano, y los caminos hacen posible la movilidad. Proponemos dar continuidad al estudio de la movilidad humana a lo largo de una red de rutas en un sector del valle Calchaquí medio en la provincia de Salta. Trabajaremos en la quebrada de la Hoyada, tributaria del río Calchaquí, y una vía de conexión natural hacia la puna. Nos focalizamos en la arqueología e historia de los caminos y redes de rutas en esta quebrada, donde las condiciones locales, las bajas precipitaciones y poca población actual, han permitido una preservación particular en este sector.

Los trabajos arqueológicos destacan el papel fundamental de las quebradas y valles altos para la comunicación entre diferentes ambientes, desde al menos el primer milenio de la EC. Los documentos históricos y fuentes secundarias testifican la importancia de esta área como una zona utilizada para la internada de mulas durante la Colonia temprana. Nuestro caso de estudio se focaliza en el análisis del desarrollo de los caminos y las redes en el valle o quebrada de La Hoyada durante el período Inka (1400-1532 d.C.) y la Colonia temprana (1532-1810 d.C.).

La quebrada de La Hoyada contiene un segmento importante de camino Inka que conecta el valle Calchaquí con la puna y los salares, espacio de conexión con el Desierto de Atacama y el norte de Chile. El camino inka registrado incorpora diversas estructuras auxiliares, como las posadas (*tampu*) que fueron reutilizadas en periodos posteriores. Con la implantación del sistema colonial toda esta zona pasó a formar parte de la Hacienda de Calchaquí que poseía estancias dedicadas a la agricultura y potreros para el engorde de ganado que era llevado al Alto Perú.

El abandono del área a mediados del siglo XX, en conjunto un cambio en las prioridades del negocio del mercado ganadero llevó a modificaciones en el uso de la tierra, sus históricas rutas y de estas actividades. Por lo tanto, la quebrada de La Hoyada proporciona un ejemplo de más de 500 años de cambio de usos y actitudes para caminos preindustriales en las Américas.

Para el estudio propuesto emplearemos diferentes métodos para sondear las relaciones cronológicas y económicas entre las distintas fases de uso del área y sus rutas de tránsito, focalizándonos en las rutas como una *unidad de análisis*. La metodología de trabajo incluye: (i)

sondeos en segmentos de camino y estructuras asociadas, (ii) análisis de cultura material, (iii) prospecciones con dron y modelado SIG de la red caminera en toda la transecta, (iv) dataciones radiométricas de depósitos arqueológicos, incluyendo radiocarbono (14C) y datación por Luminiscencia ópticamente estimulada (OSL), y (v) investigación histórica y etnohistórica del uso del área y del sistema de caminos post-hispánico.

Mientras que el análisis de cultura material brindará una datación relativa para las estructuras y caminos hallados en el área, el modelado Bayesiano de los datos cronológicos nos dará una primera aproximación al uso de la quebrada de La Hoyada a lo largo del tiempo, incluyendo fases de construcción, explotación y abandono de la región.

PROJECT DESCRIPTION

Paths, roads and the mobility that goes with them have always held a special place in people's imagination (e.g. Ingold 2015). In this sense, from an anthropological perspective roads and their supporting network can be considered a *total social fact* (*sensu* Mauss 1990) encompassing a society's social, economic, political, and even religious spheres. What we do, and do not do with roads and pathways is a good reflection of where a society is in respect to an area's use and utility. Here, we will study the pathways and transit areas across the La Hoyada Quebrada (or ravine), Salta Province, Northwest Argentina as a single *unit of analysis* endeavoring to understand the socio-economic archaeology and history behind the development, exploitation, and abandonment of this area through the use and disuse of its routes.

This project develops from over 25 years of research focused on the Middle Calchaquí Valley, Salta Province, Argentina, (Baldini 2003; Baldini et al. 2004; Baldini y Villamayor 2007; Williams and D'Altroy 1999; D'Altroy et al. 2000; Williams et al 2010, Korstanje, et al. 2010; Williams 2015, 2019; Williams and Villegas 2017; Williams and Castellanos 2020; Williams et al. 2010). A successful Wenner-Gren Research Grant (2008) made possible a detailed survey of the Middle Calchaquí Valley. This was augmented through further survey in the area between 2016-2019, leading to us selecting the La Hoyada Quebrada as the perfect geographical backdrop in which to study route networks in Northwest Argentina as it constituted an important historical transit zone between the lower mesothermal Calchaquí Valley and the high altitude dry *puna* of the Atacama Desert (see Figure 1).

In this regard, the La Hoyada River Transect is the location of an east-west Inka road segment linking the Calchaquí Valley with the *puna* and thereby important north-south routes during the Inka Period (Hyslop 1984), as well as crucial cattle-ranching routes westwards towards the Pacific (Molina Otárola 2011), the area also served as an important animal wintering zone during the Spanish colonial and Argentine republican period when it belonged to the powerful Isasmendi family and their descendants (Mata 2000).

Crucially, aside from the well-preserved Inka road segment the La Hoyada Quebrada transect also includes well-documented evidence for substantial Spanish colonial and even Argentine Republican use by *arrieros* (cattle herders) up to the early Twentieth Century (Strube Erdman 1963; Cornejo 1937; Bertrand 1885). Furthermore, our surveys in the area revealed that there is sufficient archaeological evidence to suggest that the Inka road segment and its ancillary structures were reused and repurposed during the post-Prehispanic periods for cattle and mule wintering, prior to transiting to the west.

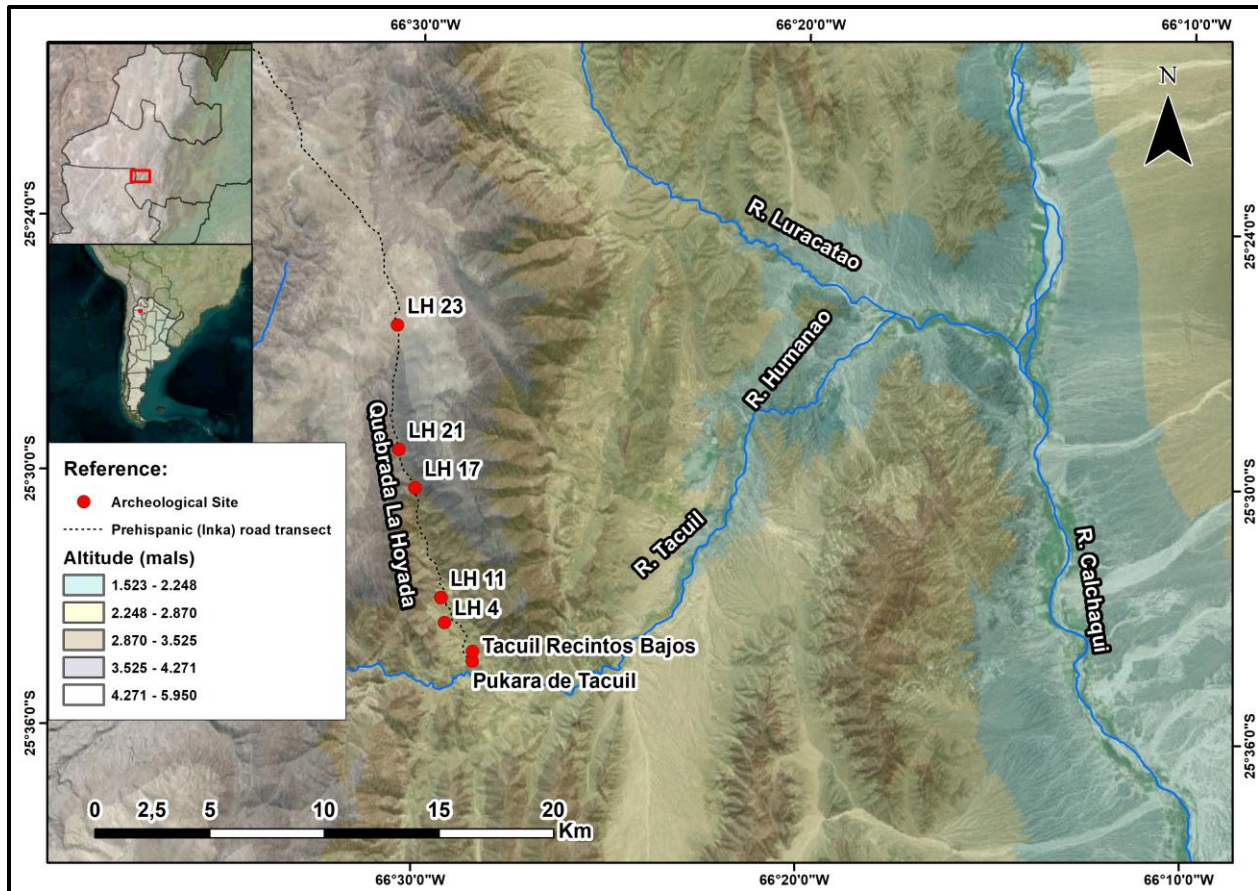


Figure 1: Map of study area showing main sites and main transect of the Inka Road at La Hoyada

Nowadays the La Hoyada Quebrada is no longer a viable transit route and is almost wholly bereft of human habitation. As such, study of the La Hoyada Quebrada and its route network will provide an important insight into the changing relationship between people and roads in Northwestern Argentina, delivering a useful proxy for how historical socio-economically important areas can be forgotten and become marginal once their roads fall into disuse (analogous to many former cattle-ranching areas in the North and South American, Australia and South Africa).

The present proposal will enable us to expand our area of study to include the La Hoyada Quebrada into the larger Argentine state PICT funded project entitled, *Prehispanic and Colonial interactions in arid and semi-arid environments of the Southern Andes: the Middle Calchaquí Valley and Northern La Rioja*, allowing us to produce a detailed assessment of routes and mobility in this important transit zone.

THE LA HOYADA QUEBRADA TRANSECT

The Inka road system or *Capac Ñan* covered some 40,000 kilometers of road linking over 2,000 settlements, administrative centers, way-stations or inns (*tampu*), storage facilities (*qollcas*) and runner stations (*chaskiwasi*). In this regard, the *Capac Ñan* knitted the Inka Empire together allowing local authorities as well as the Inka state to keep tabs on the goings-on in the area under its control, moving armies, people, and resources across the whole region. It was the single, most important apparatus of Inka statecraft appropriated and reutilized by Spanish colonial and subsequent societies until the advent of motorized transport led to the abandonment of huge swathes of this network (Hyslop 1984).

The full length of the La Hoyada Quebrada meanders over approximately 20 km starting near the ancient Prehispanic fortress of Pukara de Tacuil and ending at the pass to the Salar del Hombre Muerto. An Inka road transits through the entirety of it. This Inka road segment covers the road itself as well as several important installations, including from east to west, a *chaskiwasi*, [LH 4], three *tambos* with associated *qollcas* coded respectively as LH 11, LH 17 and LH 21, and the mountain pass [LH 23] separating the quebrada from salt pans to the west marked by a caravanning cairn or *apacheta*. These five sites are in an area of substantial abandoned Prehispanic terracing and later colonial cattle and mule corrals. All these sites are within six kilometers of each other, sometimes less. The Inka road also follows the path of least-cost through the quebrada and it is highly likely that it carried on serving as the main throughfare for post-Inka mobility on the area. In this sense, both LH 11 and LH 17 evidence continued use in the post-Inka period, including the construction of cattle and mule corrals in close association to the *tampus* (Williams et al. 2020)

RESEARCH QUESTIONS AND METHODS

The Inka road network has been described as showcasing the empire through an ‘architecture of power’ (Gasparini and Margolies 1977) and what Trigger (1990) has termed ‘wasteful spending’, over-engineering as a testimony to Inka ability to harness the local workforce and resources. It is this over-engineering and the post-Inka use of the road system that makes this project eminently feasible and welcome, given that the often-ostentatious nature of this road system permits us to excavate the road itself for datable material.

Along the quebrada, the Inka road is therefore clearly demarked over much of the transect, while at certain places –especially along the eastern end– it is build-up or embanked by over a meter (Figure 2). Archaeological excavations at these points can help reveal the construction history of the road and will be targeted accordingly, while excavations at some of the ancillary structures of the road will provide a chronology of use for the area. During the Spanish colonial period, the whole area was a transit zone between the lower mesothermal valleys and the *puna*, similar to patterns described for Jujuy (Conti and Sica 2011) and Antofagasta de la Sierra (Molina Otárola 2011). GIS modelling and field survey of the road and analogous transit zones will provide important insights into post-Inka use of the area.



Figure 2: Embanked section of Inka road in La Hoyada

While a major reason for selecting the La Hoyada Quebrada for this project was essentially the fact that the extant Inka road is well preserved, the currently, largely uninhabited nature of the area also makes for particularly good preservation of post-Inka tracks and routes in the area. A preservation that coupled with archival research should provide the historical context for continued use of the area during the immediate post-Inka period down to the early Nineteenth Century.

In this regard, a series of inter-related research questions guide this proposal:

- (i) *When was the Inka Road built in this quebrada and what was its chronology of use?*

This is a key question of the project, giving us an insight in Inka use of the area and whether their road system was built on top of an earlier pre-existing, pre-Inka route. The answer to this question will involve test-pit (1 m by 1 m) excavations at two embanked locations of the Inka road between the sites of LH 4 and LH 11, coupled with 4 further test-pit excavations per site at two of the *tampus* (LH 11 and LH 17) along the La Hoyada Quebrada. These two *tampu* have been selected due to ease of access, their state of preservation and their association with post-Inka structures, including corrals.

The material culture (ceramics, metal, bone, etc.) recovered through excavation will be used to provide a relative chronology of use, while targeted ^{14}C will be employed to further refine the chronology for the construction and use of the road and ancillary structures in the region through the employment of chronological Bayesian

modelling (Hamilton and Krus 2018). We will also set aside funds to two experimental OSL dates to be taken from sediments at each of the road embankment test-pits. The underlying geology of the area is high in feldspar and quartz making potential use of this dating method viable.

- (ii) *How and why was this area used as a major transit zone from the Inka onwards until the early Nineteenth Century?*

This how and why question aims to understand the social, economic, and/or political rationale behind the setting of an Inka road in this area and the subsequent use of the zone as a major transit route westward to the *puna* and subsequently to the Pacific littoral.

Responding to this question will entail collating all data on roads and routes in the region and engaging in comprehensive drone survey of the La Hoyada Quebrada so that GIS modelling of least-cost-analysis can be used to analyze possible patterns of use of sites and area. Least-cost analysis will provide important data on possible routes and transit zones that can then be further ground-proofed in the field.

We suspect that other factors (social, economic, political) rather than least-cost would have been important in the construction and maintenance of roads and routes in the region. Therefore, field and drone survey, as well as GIS modelling will be coupled with archival research and secondary literature review for all information pertaining to historical use of the area. In this regard, we are already aware of Isasmendi Testimonial, a document tabling the land owned by the Isasmendi family –the colonial owners of the area– and the uses to which it was placed. Further research in archives held in Salta and Buenos Aires will reveal further details of land-use patterns in the La Hoyada Quebrada.

- (iii) *What does the ordering of space due to the initial presence of the Inka road and the subsequent Spanish colonial period cattle and mule caravanning infrastructure reveal about changes in power and politics in the area through time?*

The results from questions (i) and (ii) will provide the necessary data with which to answer the thornier theme of how the political landscape of the area changed through time.

Taking an implicitly Political Ecology approach (Robbins 2004; Grant and Lane 2018) we consider what use of the area throughout this period meant for the inhabitants of the La Hoyada Quebrada. In this sense, we aim to disentangle the evolving power dialectic between these inhabitants and the various authorities and changes in land-use from terrace agriculture to post-Inka cattle and mule caravanning.

In this sense, multi-cultural sites, such as the ones studied here, provide a crucial insight into the negotiation and distribution of, as well as the exercise of power. Analyzing the distribution of archaeological sites, the road, routes, and ancillary structures will provide a palimpsest against which to observe chronological and socio-cultural changes in power distribution across the landscape and the people through time.

These results will set the scene for understanding the chronological parameters underpinning human mobility and the use of roads and routes in the area, serving as a crucial first

PROJECT TEAM:

Dr. Veronica I. Williams (UNLP, 1996) has worked in the Southern Andes (*Collasuyu*) over the past 30 years in Argentina and Chile. She has been undertaken research as project director since 1985 in both Northwestern Argentina and Northern Chile. Her research has been on the Late Intermediate and Inka Period on themes including pottery production, agriculture technology and landscape archaeology.

Dr. Williams will be responsible for fieldwork (surface collections and excavations), as well as Bayesian analysis of the radiometric dates.

Dr. Kevin Lane (Cantab, 2006) has worked in the Andes over the past fifteen years in Argentina, Colombia, and Peru. Aside of his academic background Kevin Lane has a firm grounding in field archaeology having worked in Cultural Resource Management (CRM) for over 8 years. His PhD and continuing research have focused on Late Intermediate Period and Inka high altitude agro-pastoralism, hydraulic technology (terraces, dams, reservoirs, irrigation canals) and assessing human impact on the environment and ecology.

Dr. Lane will be responsible for field and drone survey, as well as for the ensuring GIS modelling

Dr. Maria Cecilia Castellanos (UNC, 2017) has worked over the past 10 years in the Calchaquí valleys, Northwestern Argentina, tackling issues of Late Intermediate, Inca and Colonial Period focused on analyzing written and material sources. She specialized in social interactions centered around technology, particularly on metallurgy and pottery production.

Dr. Castellanos will be responsible for the analysis of the archaeological remains (pottery and metals) collected during excavation and surface collection. She will also undertake the archival and historical research component of this project.

discuss their results across countries and regionally differentiated periodification tables (Isbell and Silverman 2006).

SCHEDULE:

Project Timetable:

	2021			2022								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Fieldwork Prep.												
Fieldwork												
Post-ex analysis, including archival work												
Dating samples sent												
Drone image work & GIS												
SAA Paper & article prep												
SAA Conference												

The project proposal is to run for one year, commencing in October 2021 and finishing in September 2022. Fieldwork will be conducted during the beginning of the Austral spring to offset inclement weather and the high variation in cold and heat during winter and summer. We envisage a field season lasting 35 days. Further work on the project will involve analysis, including article and SAA Conference writing and planning.

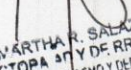
PUBLICATIONS AND OUTPUTS:

Concerning outputs, we will be submitting for publication a preliminary results article on different aspects of the project for publication in *Latin American Antiquity*. We will organize an SAA session on Inka road systems and their chronology of use at the 2022 Chicago meeting. This will be the basis of an article to be submitted to the *Journal of Field Archaeology* in that same year.

PERMITS:

This proposal counts will all the necessary permits from the Province of Salta to undertake this archaeological project. Resolución Nro 80. Exp. Nro 62-124999/14 Cpde 2. Ministerio de Cultura, Turismo y Deporte de la Provincia de Salta (permit included below).

ES COPIA
DEL ORIGINAL


TUAP MARTHA R. SALAZAR
DIRECTORA INY DE RRHH
Ministerio de Cultura, Turismo y Deportes
Provincia de Salta



RESOLUCIÓN N° 80
SALTA, 18 MAR 2019
MINISTERIO DE CULTURA, TURISMO Y DEPORTES
EXPEDIENTE N°: 62 -124999/14 Cpde 2

VISTO el expediente de referencia por el cual el Museo de Antropología de Salta, dependiente de la Secretaría de Cultura, tramita la prórroga del plazo concedida para el Proyecto de investigación denominado "Interacciones prehispánicas y coloniales de las cuencas de Angastaco - Molinos Valles Calchaqui - Salta", presentado por la Dra. Verónica Williams; y

CONSIDERANDO:

Que mediante Resolución N° 17/15 del entonces Ministerio de Cultura y Turismo se aprobó el convenio que autorizaba a la Dra. Williams a realizar su trabajo de investigación;

Que la cláusula tercera del mencionado acuerdo establece la posibilidad de solicitar una prórroga en caso de que los objetivos planteados por el Proyecto no hayan podido cumplirse por razones justificadas;

Que obra el Acta Complementaria de Prórroga extendida por el Museo de Antropología de Salta, dependiente de la Dirección General de Patrimonio Cultural, que prevé la prórroga del mencionado convenio por un plazo de tres años a partir de diciembre de 2018;

Que el trámite se enmarca en las previsiones de la Ley N° 6.649 de Preservación del Patrimonio Cultural de la Provincia, y su Decreto reglamentario N° 2.577/08;

Que ha tomado intervención la Dirección de Asuntos Legales;

Por ello,

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FOLIO N° 02
FOLIO N° 12
TUAP MARTHA R. SALAZAR
DIRECTORA ADY DE RRHH
Ministerio de Cultura, Turismo y Deportes
Provincia de Salta

RESOLUCIÓN N° 80
MINISTERIO DE CULTURA, TURISMO Y DEPORTES
EXPEDIENTE N°: 62 -124999/14 Cpde 2

EL MINISTRO DE CULTURA, TURISMO Y DEPORTES
RESUELVE:

Artículo 1º AUTORIZAR la prórroga por tres años, a partir del mes de Diciembre de 2018, de la autorización concedida para la ejecución del proyecto de investigación arqueológica denominado "Interacciones prehispánicas y coloniales de las cuencas de Angastaco - Molinos Valles Cachaqui - Salta", a cargo de la Dra. Verónica Williams, D.N.I. 12.981.913, de acuerdo a lo establecido en la Cláusula Tercera del Convenio de Investigación aprobado mediante Resolución N° 17/15 del Ministerio de Cultura y Turismo.

Artículo 2º - Disponer la aprobación del Acta Complementaria de Prórroga del Convenio de Investigación aprobado mediante Resolución N° 17/15 del Ministerio de Cultura y Turismo.

Artículo 3º - Dejar establecido que las investigaciones planificadas en el proyecto, no generarán erogación alguna para la Provincia.

Artículo 4º - Comunicar, registrar y archivar.



Sr. Juan Manuel Lavallón
Ministerio de Cultura, Turismo y Deportes
Provincia de Salta

BIBLIOGRAPHY:

- Baldini, L. 2003. Proyecto arqueología del Valle Calchaquí central (Salta, Argentina). Síntesis y perspectivas. En *Local, Regional, Global: Prehistoria en los Valles Calchaquíes*, Anales Nueva Época 6. Instituto Iberoamericano, Universidad de Göteborg, Göteborg. Pp. 219-239.
- Baldini, L., I. Baffi, L. Quiroga y V. Villamayor. 2004. Los Desarrollos Regionales en el Valle Calchaquí Central, Salta. En *Revista Relaciones de la SAA* tomo XXIX. Buenos Aires.
- Baldini, L. y V. Villamayor. 2007. Espacios productivos en la cuenca del río Molinos (Valle Calchaquí, Salta). En *Cuadernos FHyCS - UNJu* N° 32: 35-51.
- Bertrand, A. 1885. Memoria sobre las cordilleras del Desierto de Atacama i rejiones limítrofes. Santiago de Chile: Imprenta Nacional.
- Conti, V. y G. Sica. 2011. Arrieros andinos de la colonia a la independencia. *Nuevo Mundo Mundos Nuevos* [En línea], Debates, Puesto en línea el 31 enero 2011, consultado el 12 diciembre 2020. URL: <http://journals.openedition.org/nuevomundo/60560>; DOI: <https://doi.org/10.4000/nuevomundo.60560>
- Cornejo, Atilio. 1937. Apuntes históricos sobre Salta. Segunda edición. talleres gráficos Ferrari Hnos. Buenos Aires, Argentina.
- D'Altroy, Terence, Ana Maria Lorandi, Milena Calderani, Veronica Williams, Christine Hastorf, Elizabeth DeMarrais, and Melissa B. Hagstrum. 2000. 'Inka Rule in the Northern Calchaqui Valley, Argentina'. *Journal of Field Archaeology* 27: 1–26.
- Gasparini, Graziano, and Luise Margolies. 1977. *Arquitectura Inka*. Caracas: Centro de Investigaciones Historicas y Esteticas, Facultad de Arquitectura y Urbanismo, Universidad Central de Venezuela.
- Grant, Jennifer L., and Kevin Lane. 2018. 'The Political Ecology of Late South American Pastoralism: An Andean Perspective A.D. 1,000-1,615'. *Journal of Political Ecology* 25 (1): 446–69.
- Hamilton, W. Derek, and Anthong M. Krus. 2018. 'The Myths and Realities of Bayesian Chronological Modelling Revealed'. *American Antiquity* 83 (2): pp. 187–203.
- Hyslop, John. 1984. *The Inka Road System*. Orlando and London: Academic Press.
- Ingold, Tim. 2013. *Making: Anthropology, Archaeology, Art and Architecture*. London: Routledge.
- Korstanje, A., P. Cuenya y V. Williams. 2010. Taming the control of chronology in ancient agricultural structures. Non-traditional data sets. In *Journal of Archaeological Science* 37: 343–349.
- Mata, S. 2000. *Tierra y poder en el Noroeste Argentino. Salta en vísperas de independencia*. Colección Nuestra América. Diputación provincial de Sevilla, España.
- Mauss, M. 1990. *The Gift: The Form and Reason for Exchange in Archaic Societies*. London: Routledge.

- Molina Otarola, R. 2011. Los otros arrieros de los valles, la puna y el desierto de Atacama. En *Chungara* N° 43, N° 2.: 177-187, Arica, Chile.
- Robbins, Paul. 2004. *Political Ecology: A Critical Introduction*. Critical Introductions to Geography. Oxford: Blackwell Publishing.
- Strube Erdman, L. 1963. Vialidad imperial de los incas. Instituto de Estudios Americanistas. Serie Histórica XXXIII, Facultad de Filosofía y Humanidades, UNC, Córdoba.
- Trigger, Bruce G. 1990. 'Monumental Architecture: A Thermodynamic Explanation of Symbolic Behaviour'. *World Archaeology* 22 (2): 119–32.
- Williams, V. I. 2015. 'Formaciones Sociales En El Noroeste Argentino. Variabilidad Prehispánica En El Surandino Durante El Periodo de Desarrollos Regionales y El Estado Inca'. *Revista Haucaypata* 9: 62–76.
- Williams, V. I. 2019. Nuevos datos sobre las Quebradas altas del Calchaquí medio, Salta, noroeste de Argentina (NOA). Reproducción local entre los siglos XI a XV. *Revista del Museo de La Plata* vol 4 (1): 183-208.
- Williams, V. I. y T. D'Altroy. 1999. 'El Sur Del Tawantinsuyu: Un Dominio Selectivamente Intensivo'. *Tawantinsuyu* 5: 170–78.
- Williams, V. I. y M. P. Villegas. 2017. "Rutas y senderos como paisajes. Las quebradas altas del valle Calchaquí medio (Salta)". *Boletín del Museo Chileno de Arte Precolombino*. Vol 22 nro 1: 69-92.
- Williams, V. I. y M. C. Castellanos. 2020. Relaciones y estrategias de expansión inca en el Noroeste Argentino: marcadores gráficos e indicadores materiales en las quebradas altas del Valle Calchaquí. *Chungara Revista de Antropología Chilena* 52 (3): 445-460.
- Williams, V.I., M. A. Korstanje, P. Cuenya y M. P. Villegas. 2010. La Dimensión Social de La Producción Agrícola En Un Sector Del Valle Calchaquí Medio. In *Arqueología de La Agricultura: Casos de Estudio En La Región Andina Argentina*, edited by M. A. Korstanje and M. Quesada, 178–207. Tucumán: Ediciones Magna.
- Williams, V. I.; M. C. Castellanos, E. Benozzi, S. Lanzelotti, K. Lane, L.V. J. Coll y C. Orsini. 2020. "Atajos inkas: caminos, GIS y modelos de menor costo en el Valle Calchaquí, Salta, Noroeste argentino". *Actas del III Taller Qhapaq Ñan*. In press.