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From imperial pyramids to anticolonial sundials: commemorating and contesting French geodesy in Ecuador

Ernesto Capello

Macalester College, History Department, 1600 Grand Avenue, Saint Paul, MN 55105, United States

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ABSTRACT

This article considers the marking of the Andean equatorial zone through the construction, destruction and reconstruction of pyramids and obelisks celebrating the eighteenth-century Franco-Hispanic geodesic mission to Quito. These structures, originally constructed by that mission and lauding Enlightenment rationality and European empire, have been redefined in the twentieth and twenty-first centuries as icons of Ecuadorian nationalism, within both a Eurocentric memorial and an Andean counter-memorial tradition. The article traces these traditions, from medieval orientalist fascination with ancient Egypt to contemporary disputes regarding pre-Columbian indigenous astronomy. As the geodesic pyramidal marker became a contested site of local and national identity, their location also shifted, from the points of geodesic measurements to the more visible and tourist friendly equator. Key players in this history include French academicians and military scientists, Ecuadorian radical liberal politicians, highland indigenous communities, tourist boosters and amateur equator aficionados.

Geodesy – the measurement of the shape of the Earth – is not a household word. In Ecuador, however, schoolchildren learn the story of the Franco-Hispanic geodesic mission (1736–1744), which traveled to the former Spanish colony to measure the arc of the equatorial meridian. Recognized as the first international scientific expedition, this mission responded to a dispute roiling the French Academy of Sciences concerning the impact of Newtonian gravitational theory on ideas about the shape of the Earth. Besides helping verify Newton's conjectures, the expedition was immortalized in the dramatic travelogue of Voltaire's bosom friend Charles Marie de la Condamine, who first branded the Andean province of Quito as the land of the equator. A century later this would be adopted as the new name for the nascent Republic of Ecuador.[1]

The notoriety of the mission itself, however, has largely obscured its place within the broader establishment of a visual culture wherein pyramids and obelisks have become naturalized as objects commemorating geodesic measurement. This article seeks to address this lacuna by first situating La Condamine's decision to employ the pyramid as a geodesic monument within an allegorical visual matrix involving triangles, obelisks and pyramids with roots dating back to Platonic ideals of rational cosmology. Secondly, it traces the development of these physical embodiments of geodesic triangulation from the Andes to Europe and back again, emphasizing the interplay between a growing network of three-dimensional pyramidal monuments and the pictorial representation of the Andes by well-known intellectuals such as La Condamine and Alexander von Humboldt and lesser known figures like Abraham Giacometti, Paul Rivet and Luis Tufiño. This history reached a climax, I argue, in a little-known 1901–1906 commemorative French geodesic survey of the Andean equator. Finally, the closing sections of the essay emphasize the processes whereby reinventing and reimagining the geodesic pyramidal marker became a contested site of local and national identity in Andean Ecuador during the twentieth and twenty-first centuries. This process accompanied the migration of the pyramid-obelisk from

E-mail address: ecapello@macalester.edu.

[1] Recent histories of the mission include N. Safier, *Measuring the New World: Enlightenment Science and South America*, Chicago, 2008; A. Lafuente and A. Mazuecos, *Los caballeros del punto fijo: ciencia, política y aventura en la expedición geodésica hispanofrancesa al virreinato del Perú en el siglo XVIII*, Barcelona, 1987; and L. Ferreiro, *Measure of the Earth: The Enlightenment Expedition That Reshaped Our World*, New York, 2011.

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sites of measurement to the equatorial zone, itself reinvented as a 'site of memory', ripe for tourist exploitation and embedded within local struggles over racially tinged visions of citizenship that continue to the present.[2]

While my analysis is informed by the literature concerning collective memory and tourism, it has been particularly marked by the broader cultural turn in the history of cartography, which observes that cartographic objects operate within frameworks of seeing that John Pickles has termed 'geo-scopic regimes'.[3] In this literature, maps form one pillar within a broader shift toward conceiving of territorial control through a matrix of measurement and visuality, wherein images operate as both support and result of science.[4]

In particular, I am responding to D. Graham Burnett's observation of the important role that the process of identifying and revisiting landmarks played in developing the legitimacy of traverse surveys by establishing a recognizable and iterative route.[5] While Burnett contrasts geodesic surveys to traverse surveys, given that the former base their authority upon mathematical observation, I maintain that geodesic surveys similarly relied upon the establishment of iterative landmarks at the vertices of the vast, imaginary triangles necessitated by their measuring procedures. These typically involved building pyramidal markers, obelisks or cairns alongside other forms of landscape visualization including maps, paintings, photographs and eventually museums. Visiting, recording and celebrating these landmarks thus became a de rigueur step in subsequent geodesic surveys.

In the specific case of the Andean equatorial zone, the physical form of pyramid or obelisk, while initially evoking the processes of geodesic triangulation, eventually developed into a symbol of local and national identity no longer tied to the act of measurement. As such, geodesic cartography transformed into nationalist chorography.[6] This process has continued to mark the contested nature of ethno-historical claims to access and control over the 'equator' in the twentieth century. These struggles have pitted the Eurocentric geodesic history traced here against competing 'Andean' claims to scientific knowledge. The commemoration of geodesic measurement, which long formed part of the European justification for empire, may be transforming into sites and practices of anticolonial resistance.

La Condamine's pyramids: from Yaruquí to Paris and back again

From a purely scientific standpoint, the Franco-Hispanic geodesic mission sought to settle a longstanding dispute pitting Isaac Newton's gravitational theory against Descartes' vortex theory of planetary motion. By the 1730s, this debate had engaged the basic shape of the Earth. Newtonians in the French Academy, led by Pierre Louis de Maupertuis, argued that the planet was an oblate spheroid, bulging at the equator and flattening at the poles. This contrasted with the astronomical establishment, represented by Jacques Cassini, a second-generation director of the Paris Observatory whose measurements in southern France and northern Italy seemed to suggest the inverse, that the Earth was a prolate spheroid elongated at the poles.[7] As the controversy raged, calls emerged to settle the dispute by conducting new geodesic measurements in the Arctic and at the equator. This resulted in two expeditions, one to Lapland led by Maupertuis and a second to Quito, each charged with measuring the arc of the meridian across three degrees of latitude. Maupertuis's Lapland voyage concluded long before the equatorial mission, successfully validating Newton's oblate thesis.

Arguably, the completion of the Lapland expedition rendered the South American mission redundant. Its subsequent prominence stemmed in part from the reputations of its members and the expansion of the original mandate to include experiments concerning the gravitational attraction of mountains and equatorial botanical studies. However, most scholars highlight the import of Charles Marie de la Condamine's melodramatic and racially tinged travel narrative, which emphasized the sensational topography of the 'torrid zone' as well as the 'primitive' nature of its inhabitants, including not only indigenous peoples but also the 'barbaric' Creoles.[8] As Neil Safier has argued, La Condamine deployed such language as an exercise in self-promotion as a daring scientist. Commemorative gestures formed another important component of this activity, in particular the decision to construct pyramids in the Yaruquí valley – a flat plateau just south of the equator – marking the baseline for the mission's geodesic measurements.[9]

It is likely that these structures were inspired by La Condamine's earlier travels in the Levant, but they also reflected an extended fascination with pyramids and obelisks in the European academy, where they were upheld as symbols of enduring universal truths. This dates back to Plato, who posited in his *Timaeus* that a godlike figure known as the demiurge gave order to the universe by arranging disorganized matter into triangles that formed the basic building blocks of the four Greek elements. These were associated with regular polyhedrons also known as the Platonic solids – the triangular pyramid or tetrahedron (fire), the cube (earth), the octahedron (air) and the twenty-faced icosahedron (water).[10] The relative similarity of Plato's account to the biblical account of creation appealed to late medieval and early modern Christian theorists, as did his evocation of an underlying rationality organizing the cosmos. Indeed, engagement with the latter aspect of the *Timaeus* helped foster the twelfth-century renaissance that prepared the ground for the Scientific Revolution. Geometrical iconography, such as the famous compasses held by God the creator (Fig. 1) in the thirteenth-century Viennese *Bible moralisée* provided a visual reminder of this linkage.[11] Even Copernicus cited the motto

[2] Regarding sites of memory, see P. Nora, *Realms of Memory*, New York, 1996. On sightseeing as class differentiation, see D. MacCannell, *The Tourist: A New Theory of the Leisure Class*, New York, 1976, 11–13.

[3] J. Pickles, *A History of Spaces: Cartographic Reason, Mapping and the Geo-Coded World*, London, 2004, 84. Also J.B. Harley, *The New Nature of Maps: Essays in the History of Cartography*, Baltimore, 2001.

[4] M. Carrera, *Traveling from New Spain to Mexico: Mapping Practices of Nineteenth-Century Mexico*, Durham NC, 2011.

[5] D.G. Burnett, *Masters of All They Surveyed: Exploration, Geography, and a British El Dorado*, Chicago, 2000, especially 16–17 and 91–93.

[6] Regarding Spanish American traditions of cartography and chorography, see R. Kagan, *Urban Images of the Hispanic World, 1493–1793*, New Haven, 2000 and N. Appelbaum, *Mapping the Country of Regions: The Chorographic Commission of Nineteenth-Century Colombia*, Chapel Hill, 2016.

[7] Several historians trace this debate, notably J.B. Shank, *The Newton Wars and the Beginning of the French Enlightenment*, Chicago, 2008; M. Terrall, *The Man Who Flattened the Earth: Maupertuis and the Sciences in the Enlightenment*, Chicago, 2002 and J. Greenberg, *The Problem of the Earth's Shape from Newton to Clairaut: The Rise of Mathematical Science in Eighteenth-Century Paris and the Fall of 'Normal' Science*, Cambridge, 1995.

[8] For an alternative perspective, see J. Cañizares-Esguerra, Postcolonialism avant-la lettre? Travelers and clerics in eighteenth-century colonial Spanish America, in: M. Thurner and A. Guerrero (Eds), *After Spanish Rule: Postcolonial Predicaments of the Americas*, Durham NC, 2003, 89–109.

[9] Safier, *Measuring the New World*. Also, C.M. de la Condamine, Histoire des pyramides de Quito, in: *Journal du voyage fait par ordre du roi, a l'Équateur*, Paris, 1751, 219–271 and R. Hernandez Asensio, *El matemático impaciente: La Condamine, las pirámides de Quito y la ciencia ilustrada (1740–1751)*, Lima, 2008.

[10] Plato, *Timaeus*, 53c-56e. Also G.J. Reydams-Schils (Ed.), *Plato's Timaeus as Cultural Icon*, Southbend, 2003.

[11] On twelfth-century Renaissance and neoplatonic compass imagery, see C. Rudolph, In the beginning: theories and images of creation in northern Europe in the twelfth century, *Art History* 22 (1999) 3–55.